



IT - ITeS SSC
NASSCOM

Participant Handbook

Sector
IT - ITeS

Sub-Sector
IT Services

Occupation
Application Development

Reference ID: **SSC/Q 0508, Version 1.0**
NSQF Level 4



Junior Software Developer

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Shri Narendra Modi
Prime Minister of India

“ Skilling is building a better India.
If we have to move India towards
development then Skill Development
should be our mission. ”



Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

IT-ITes Sector Skills Council NASSCOM
for

SKILLING CONTENT : PARTICIPANT HANDBOOK

Complying to National Occupational Standards of

Job Role/ Qualification Pack: Junior Software Developer QP No SSC/Q0508NSQF Level 4

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Authorised Signatory
(IT-ITes Sector Skills Council NASSCOM)

Acknowledgements

The Indian IT-ITeS industry has built its reputation in the global arena on several differentiators, chief among them being the availability of quality manpower. Organizations across the world recognize the value India brings to every engagement with its vast and readily available pool of IT professionals. Global entities have found it extremely effective to leverage this critical resource as a way to realize competitive edge.

In order to capitalize on the same, it is crucial to develop and be prepared with a pool of skilled talent that surpasses global standards. It is to this end that the IT-ITeS Sector Skills Council NASSCOM (SSC NASSCOM) has been mandated with the objective of facilitating the creation of such a workforce, by building employment related standards for the IT-ITeS industry as well as to keep track of changing scenario of talent demand and supply in the industry.

Courseware development is one of several efforts by which SSC NASSCOM aims to develop ready-to-deploy talent for the IT-ITeS Industry. This Student Handbook is designed to support students undertaking training for the Junior Software Developer job role. It is aimed at equipping learners with the required competencies at the entry level within the larger occupation of Application Development in the IT- Services sub-sector of the industry. In addition to the core knowledge and skills pertinent to the job role, the handbook acts as a guide for professional and employability skills.

We extend our thanks to Wipro Limited, Tata communications and Teknoturf Info Services for producing this course publication.

About this book

India is the world's largest sourcing destination for Information Technology industry. This position has enabled major transformations in the Indian economy, which has changed India's place in the global market. Apart from being the hub for many innovation centres of global IT firms, India also provides the most cost-effective IT solutions to the world. These changes have created a need for introducing courses for engineering and computer science in the education field.

Apart from introducing IT-related modules and courses at the school level, there is also a growing demand for specialized courses and training programme to train individuals for various job roles in this sector. This Participant Handbook is an initiative in that direction. It consists of a wide variety of topics and units ranging from domain knowledge to professional skills like communication skills, grooming skills, etc. This book aims to achieve holistic development of the participant while ensuring they receive the requisite domain knowledge to perform their jobs efficiently.

This Participant Handbook is developed by using the QP-NOS for Junior Software Developer released by the SSC IT-ITeS NASSCOM. It covers the following broad topics:

- Assisting in performing software construction and software testing entry level tasks in IT services
- Providing data or information in a structured format
- Working efficiently in a team and maintaining a healthy relationship with peers
- Managing Work to Meet Requirements
- Developing Knowledge, Skills and Competence
- Following the requisite health and safety precautions at the workplace

We hope that this book helps you to achieve your dream and become a part of one the fastest-growing sectors in India and the world.

Symbols Used



Key Learning Outcomes



Steps



Exercise



Tips



Notes



Objectives

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1. Introduction

Unit 1.1 – Introduction to IT-ITeS Sector

Unit 1.2 – Introduction to the Training Programme



Key Learning Outcomes



At the end of this unit, you will be able to:

1. explain the importance of IT-ITeS Sector
2. Introduction to the Training Program

UNIT 1.1: Introduction to IT-ITeS Sector

Unit Objectives



At the end of this unit, you will be able to:

1. Explain the importance of IT-ITeS Sector

Information Technology (IT)

Information technology (IT) is the application of computers and telecommunications equipment to store, retrieve, transmit or analyse data, often in the context of a business or other enterprise. The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones.

Today, a country's IT potential is paramount for its March towards global competitiveness, healthy gross domestic product (GDP) and meeting up energy and environmental challenges.

India is one of the fastest-growing IT services markets in the world. It is also the world's largest out sourcing destination. The country's cost competitiveness in providing IT services continues to be its USP in the global sourcing market.

India has the potential to build a US\$ 100 billion software product industry by 2025, according to Indian Software Product Industry Round Table (SPIRT).

Why is the IT sector growing?

- Rapid industrialization
- Partial privatization of telecommunication
- Growth of IT parks in the country
- Development of SEZ; which also help IT companies get tax benefits
- A large number of resources readily available in the country
- Low operating costs
- Tax breaks and cooperative policies offered by the government

Major IT companies in India

1. Tata Consultancy Services
2. Infosys
3. Wipro
4. Tech Mahindra
5. HCL Technologies
6. Mphasis
7. Oracle Financial Services
8. Mindtree
9. Polaris Technology
10. Rolta India

The IT industry can be broadly classified into three sectors:

- Software
- IT Services
- IT Enabled Services (ITeS) - BPO and Call Centers

ITeS (Information Technology Enabled Services)

Introduction to ITeS Industry

The CRM Non-Voice is a part of the ITeS sector. This sector aims at communicating with the customers to address his/her queries, requests and complaints or also to introduce company's products and services to him. These interactions are also used to market and sell the ITeS products and the service. The Indian IT Enabled Services industry represents one of the most successful industries showing consistent rapid growth over the past few years.

ITeS (Information Technology Enabled Services)

Information Technology Enabled Services (ITeS), is a form of outsourced service which has emerged due to involvement of IT in various fields such as telecommunication, banking, finance, telecom, insurance, travel among others. Some of the examples of ITeS are Chat based interactions, medical transcription, back-office accounting, insurance claim and credit card processing.

The Indian IT and Information Technology Enabled Services (ITeS) sectors go hand-in-hand in every aspect. The industry has not only transformed India's image on the global platform, but also fuelled economic growth by energising the higher education sector (especially in engineering and computer science). These industries employ over 10 million Indians and, hence, have contributed significantly to economic growth and social transformation in our country.

About ITeS in India

- Call Centres provide customer interaction and communication services
- Back office operations of various large Companies are done in BPOs, eg. British Airways has its reservation system running out of India.
- Most of the top international banks channel their data-churning needs to their units in India.
- ITeS sector includes services ranging from
 - Call Centres
 - Claims processing, eg. Insurance
 - Office operations such as accounting, data processing, data mining
 - Billing and collection, eg. Telephone bills
 - Internal audit and pay roll, eg. Salary bills on monthly basis
 - Cash and investment management, eg.
 - Routine jobs given to a third party and giving importance to core business.

Employment Trends

The IT and ITeS sector has generated large employment in the past and continues to generate large number of jobs every year. With online shopping, social media and cloud computing flourishing more than ever before, there is great demand for IT professionals in e-Commerce and Business to Consumer firms. With the immense opportunities that this sector has to offer, a large number of Indian and MNCs are investing in expanding and setting up IT and ITeS businesses in India.

Major ITeS companies in India

HCL Technologies	Cognizant Technology Solutions
Tata Consultancy Services	Accenture
Capgemini	Amazon
Delloitte Consultancy	Microsoft Corporation
Wipro Technologies	

Exercise

1. Name 5 players in the IT sector in India.

2. Name 5 players in the ITeS sector in India.

3. The Indian Industry can be broadly divided into which of the 3 Sectors?

4. List down some of the major services offered by the ITES Sector?

UNIT 1.2: Introduction to the Training Program

Unit Objectives



At the end of this unit, you will be able to:

1. Introduction to the Training Program

1.2.1 Purpose of the Training Program

This training program is developed to impart specific skills to individuals who wish to perform as a Junior Software Developer the training program is intended for imparting basic skill and knowledge. It is based upon National occupation standards. The National occupation standards have been described in the following subsection of this chapter.

Junior Software Developer in the IT-ITeS Industry is also known as an Entry Level Programmer, Programmer Trainee, Assistant Developer etc.

After successful completion of training and passing the assessment you will be issued a certificate. This will prepare you to get employed as a Junior Software Developer in IT-ITeS companies. Individuals in this job will be assigned one of the many entry level roles in the software industry including support and help desk, testing, user interaction design, maintenance, enhancement, development and documentation. They will be responsible for assisting in performing the key activities and tasks involved in the assigned role.

This program is based on qualification pack called Junior Software Developer. The Qualification Pack Code for Junior Software Developer is SSC/Q0508. This is also called a QP. A QP consists of a set of National Occupational Standards (NOS). NOS specify the standard competency one must achieve when carrying out a function in the workplace. Under Junior Software Developer QP, there are six numbers of NOSs which detail the functions to be performed at a junior Software Developer. The total duration of the course (including theory and practical) is 400 hours.

NOS Code	Major Function/Task
SSC/N0506:	Assist in performing software construction and software testing entry-level tasks in the IT Services industry
SSC/N9001:	Manage your work to meet requirements
SSC/N9002:	Work effectively with colleagues
SSC/N9003:	Maintain a healthy, safe and secure working environment
SSC/N9004:	Provide data/information in standard formats
SSC/N9005:	Develop your knowledge, skills and competence

1.2.2 Role and Responsibilities of a Junior Software Developer

- Assist in performing the key activities and tasks in Software Construction.
- Test entry level roles in the IT Services industry where their business impact and technical complexity are low.
- Plan and organise your work in order to complete it to the required standards on time.
- Work effectively with colleagues, either in your own work group or in other work groups within your organization.
- Monitor the working environment and making sure it meets requirements for health, safety and security.
- Provide specified data/information related to your work in templates or other standard formats.
- Apply knowledge and skills to perform to the standards required.

1.2.3 Personal Attributes of a Junior Software Developer

A Junior Software Engineer in addition to his technical skills should also possess certain soft skills and personal qualities such as:

- Good communication skill
- Ability to work in a collaborative way
- Willingness to learn
- Undertake desk job entailing long hours
- Good problem solving skills
- Planning and organising skills
- Decision making skills
- Customer Centricity

Exercise



1. State whether the following statements are true or false.

- It is required to for a Junior Software Developer to know basic computer skills_____.
- Only technical skills are required to be a Junior Software Developer. _____

2. List the roles and responsibilities of a Junior Software Developer.

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[illegible]





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2. Core/Generic Skills

Unit 2.1 – Communication Skills

Unit 2.2 – Team Work



Key Learning Outcomes



At the end of this unit, you will be able to:

1. develop effective Communication Skills
2. state the importance of Teamwork

UNIT 2.1: Communication Skills

Unit Objectives



At the end of this unit, you will be able to:

1. develop effective Communication Skills

2.1.1 Verbal Communication

Basic rules of communication

1. Structure your speech
2. Understand the objective.
3. Stress on the important points.
4. Be clear and concise.
5. Develop probing skills
6. Ask the right questions.
7. Paraphrase.
8. Summarise.

Develop active listening

1. Be prepared to listen.
2. Avoid distractions.
3. Keep an open mind.
4. Concentrate on what is being said.

Note: Don't just hear; listen!

2.1.2 Verbal Communication

Non-verbal communication is the process of communicating without words. Non-verbal signs are the primary way to communicate emotions.

Forms of non-verbal communication:

- Facial expressions
- Tone and volume of voice
- Body language
- Gestures
- Silence

2.1.3 Barriers to Communication



Exercise



Each question has three options, mark the option that you feel is correct. Look at the explanation for each category, once you have answered all the questions.

Questions	Most of the time	Sometimes	Almost never
	1	2	3
1. I can detect the mood of others by looking at them as we converse.			
2. I find it easy to see things from someone else's point of view.			
3. I can tell when someone doesn't understand what I'm saying.			
4. When talking to people, I pay attention to their body language (e.g. facial expressions, hand movements, etc.).			
5. I manage to express my ideas clearly.			
6. When I know what someone is going to say, I finish the sentence for him or her.			
7. People tend to misinterpret what I say.			
8. I have difficulty putting my thoughts into words.			

Category	Options	Explanation
1	Most of the time	You know how to communicate well!
2	Sometimes	You are halfway in to understanding how to communicate. There is always scope for improvement.
3	Almost never	You need to take a lesson in communication as there is lots to learn.

UNIT 2.2: Teamwork

Unit Objectives



At the end of this unit, you will be able to:

1. state the importance of Teamwork

2.2.1 What is Teamwork

Coming together is a beginning.

Keeping together is progress.

Working together is success.

- Henry Ford

(Founder of the Ford Motor Company)

The only way any business works is when the members function as a team. Unless the members are in harmony and are striving towards a common goal, success can never be achieved. A team is not just a group of members working together; it is a group where the members are moving in the same direction.

Output of a single person can never be equal to the output given by a team. For a team to be effective, the output of a team should always be more than the sum of individual outputs.

Building an effective team can be challenging at times. It is fostered by respect, encouragement, enthusiasm, and care for other team members. At the heart of a great team is spirituality and love that brings compassion, love and respect to work.

For a team to be effective, the ideas of an individual gained from knowledge and experiences should be translated to the entire group's insight or idea. The skills of one person should be propagated to other members of the team. Only then will an individual's success lead to the organization's success.

2.2.2 Characteristics of an Effective Team

An effective team is productive. Teamwork not just helps the team, it also increases job satisfaction. Here are a few characteristics of an effective team:

- The goal should be clear.
- A plan to achieve that goal should be set.
- Each member should be given clear roles.
- Members should be competent and committed.
- Decisions should be taken through consensus.
- Members should have effective communication and interpersonal skills.

- Members should know each other well and empathise with each other.
- Each member should be allowed to speak up and act.
- Each member should thrive to be better.
- Members should be good listeners.
- Members should be open to accept new ideas.
- Self-assessment should happen periodically.
- Members should have shared leadership.
- Members should trust each other and be active participants.
- Members should be problem-solvers.

Exercise



- Given below are a few indicators. To what extent are these characteristics a part of your attitude or behaviours? Mark yourself in a scale of 5 and count the score.

5 = Very characteristic

4 = Moderately characteristic

3 = Somewhat characteristic

2 = Moderately uncharacteristic

1 = Very uncharacteristic

1	I listen to my colleagues and supervisors and never miss a word.	1	2	3	4	5
2	I am open to ideas, suggestions and feedbacks from others and take them positively.	1	2	3	4	5
3	I set team interest above individual interest.	1	2	3	4	5
4	I readily share knowledge and information with others.	1	2	3	4	5
5	I ask for a feedback from others and do a self-evaluation periodically.	1	2	3	4	5
6	I have good relationship with all my team members.	1	2	3	4	5
7	I share credit with others.	1	2	3	4	5
8	I understand other team members' problems and difficulties.	1	2	3	4	5
9	I help other team members whenever required.	1	2	3	4	5
10	I focus on team vision and goal always.	1	2	3	4	5
11	I foster 'we' feeling.	1	2	3	4	5
12	I focus on learning rather than failure when I make a mistake.	1	2	3	4	5
13	I trust all my team members and they trust me.	1	2	3	4	5
14	Whenever there is a problem, I prefer working in a group to find a solution rather than working alone.	1	2	3	4	5
15	I have no problems if my colleague is in control of the project.	1	2	3	4	5

Notes







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3. Basic of IT

Unit 3.1 – Basic Computer Skills

Unit 3.2 – Internet



Key Learning Outcomes



At the end of this unit, you will be able to:

1. explain the important characteristic of computers
2. list the application of computers
3. identify the different components of computers
4. describe files and folder
5. state the features of computer network
6. state the functions of the Internet
7. browse the Web
8. state the uses of E-mail

UNIT 3.1: Basic Computer Skills

Unit Objectives



At the end of this unit, you will be able to:

1. explain the important characteristic of computers
2. list the application of computers
3. identify the different components of computers
4. describe files and folder

3.1.1 Application of Computer

What is a Computer?

Computer plays a very important role in our personal and professional lives. It has become an integral part of our lives.

Computers are electronic devices that perform the basic operations of input, processing storage, and output under the direction and control of a program. It has the ability to store, retrieve and process data. A computer is used to type documents, work with spreadsheets, manage database, create presentations, send e-mails, and surf the internet for relevant information.



Fig.3.1.1.Computers basic operation

How does the Computer Work

The different parts of the computer need to talk to each other to do things for us. When you type letters on the keyboard, the keyboard sends a message through a wire to the System Unit which in turn sends a message to the monitor, they shows those letters on screen. So, only when all the parts are connected the computer can function properly.

Hardware is nothing but the physical components of a computer system like the Monitor, Keyboard, Mouse, System Unit, Printer and Speakers. The hardware components like the motherboard, the Central Processing Unit (CPU), the RAM, the Internal Buses, etc., present inside the System Unit make it possible for the computer to process commands received from the input devices and perform a particular task.

Software is a collection of computer programs and related data that provide instructions telling a computer what to do. In contrast to hardware, software is intangible, meaning it “cannot be touched”.

Few examples of Computer Software

Application Software	Programming Software / Languages	System Software
Word Processors or Video games	Define the syntax and semantics of computer programs	Operating Systems that allow the user to interface with the computer

Important Characteristics of a Computer

- **Speed:** Computers provide the processing speed required by all sectors of service. The quick service we expect at the bank, at the grocery store, on the stock exchange, and on the Internet are dependent on the speed of computers.
- **Reliability:** Humans, not computers, cause most errors.
- **Storage:** Computers are capable of storing enormous amounts of data that must be located and retrieved very quickly.
- **Capacity:** The capability to store and retrieve volumes of data is crucial for the Information Age.
- **Productivity:** Computers provide the processing speed.

Applications of Computer

- **Business:** To track inventories with bar codes and scanners, check the credit status of customers, and transfer funds electronically.
- **Homes:** The tiny computers embedded in the electronic circuitry of most appliances control the indoor temperature, operate home security systems, tell the time, and turn video cassette recorders on and off.
- **Automobiles:** They regulate the flow of fuel, thereby increasing petrol mileage.
- **Entertainment:** They are used to create digitised sound on stereo systems or computer – animated features from a digitally encoded laser disc.
- **Education:** Computers are used to track grades and prepare notes; with computer – controlled projection units, they can add graphics, sound, and animation to enrich lectures.
- **Scientific Research:** Computers are used to solve mathematical problems, display complicated data, or model systems that are too costly or impractical to build, such as testing the airflow around the next generation of space shuttles.
- **Defence/Military:** Computers are used in sophisticated communications to encode and unscramble messages, and to keep track of personnel and supplies.

3.1.2 Computer Generation

Computers have come a long way since the very first models. The earliest computers were very large sized machines. Innovations and inventions have continued to make computers faster and smaller in size.

Period	First Generation	Second Generation	Third Generation	Fourth Generation	Fifth Generation
	1945 To 1956	1956 To 1963	1964 To 1971	1971 To 1991	1991 and Beyond
Circuitry	Vacuum tubes were used	Transistors	Integrated Circuits & Microchips	Large Scale Integrated Circuits (LSI) and Very large Scale Integrated Circuits (VLSI) .	Ultra Large Scale Integrated (ULSI) Circuits
Technology for Memory	<ul style="list-style-type: none"> * Mercury delay lines * Magnetic drums * Electronic storage tubes 	Magnetic Core	Magnetic Disks	<ul style="list-style-type: none"> * LSI Semiconductor memory * Magnetic Disks * Optical Disks 	<ul style="list-style-type: none"> * ULSI Semiconductor memory * Magnetic Disks * Optical Disks
Types of Languages	Machine Language	<ul style="list-style-type: none"> * Assembly Language * COBOL * FORTRAN 	High level language such as Pascal & basic command language	<ul style="list-style-type: none"> * C * C++ * Command Line Interface * Graphical User Interface 	<ul style="list-style-type: none"> * Java
Features	Colossus a secret code breaking computer was completed in 1943 by the British to decode German messages	Transistors led to smaller, faster, more reliable, more energy – efficient machine	Development of Operating system allowed machines to run many different programs at once	In 1981, IBM introduced its personal computer (PC) for use in the home, office and schools.	In this generation computers were able to accept spoken word instructions (voice recognition) and imitate human reasoning. The ability to translate a foreign language is also moderately possible.
Networking	None	Mainframe based networks	Mainframe & Micro frame based network	Local & Client server Network	Internet/Intranet & Extranet
Example	<ul style="list-style-type: none"> * UNIVAC * ENIVAC 	LARC	Mainframes	Internet/Intranet & Extranet	<ul style="list-style-type: none"> * Laptop * Palmtop

How does a Computer Work

The Different Components of a Computer

The devices that convey information to the computer are called as input devices. Eg. keyboard, scanner, mouse, mic or microphone convey information to the computer. The information is processed and displayed with the help of output devices such as, printer, monitor, speaker etc.

Monitor

The monitor shows us pictures, letters, numbers and even movies. The screen [(go on and touch it once)] is made of glass and is delicate. When you touch it, the marks of your hands and fingers can be seen on it and the monitor may become dirty. The monitor has a power button to switch it On and Off.

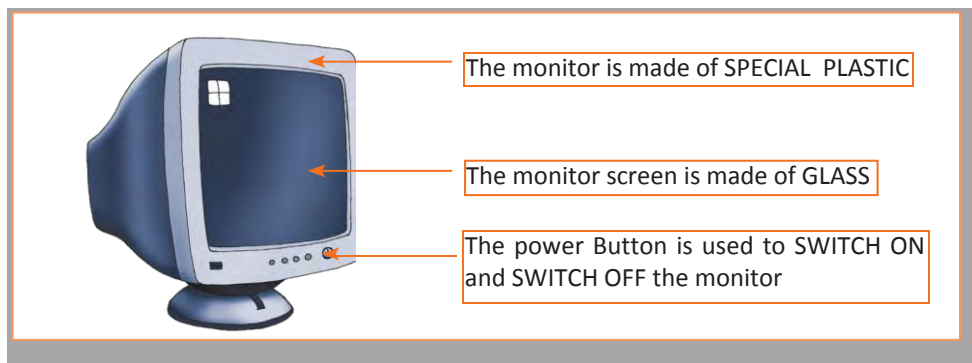


Fig.3.1.2. Monitor

CRT (Cathode Ray Tube) and LCD (Liquid Crystal Display) are the two basic types of technology used for computer monitors.

System Unit (SU)

It stores information and is called the brain of the computer.

The System Unit is shaped like a rectangle. It has a power button to switch it ON and OFF. You have to press this power button once to start the computer.

The system unit is like a little house. Many things stay inside it.

- There is a CD ROM drive in which you can put CDs and play music or watch movies. The CD ROM drive has a tray to place the CD. It also has a button to open and close the tray.

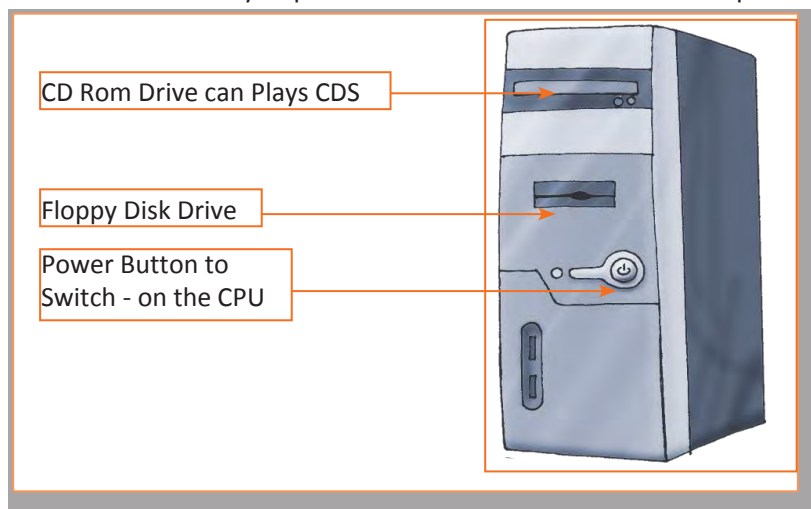


Fig.3.1.3. System Unit (SU)

The System Unit is shaped like a rectangle. It has a power button to switch it ON and OFF. You have to press this power button once to start the computer.

The system unit is like a little house. Many things stay inside it.

- There is a CD ROM drive in which you can put CDs and play music or watch movies. The CD ROM drive has a tray to place the CD. It also has a button to open and close the tray.
- Then, there is a Floppy Disk Drive. This is where you can put your floppy. There is a small button under the Floppy Drive. To remove the floppy you have to press this button.

Microchip – The brain of the computer sits inside the System Unit



Fig.3.1.4. Microchip

A small chip sits inside the System Unit. This chip is called the Microchip. The Microchip does all the thinking for the computer. The monitor, keyboard, mouse, speakers and printer are all connected to the System Unit with wires.

Mouse

Mouse is used to point and select.



Fig.3.1.6. Mouse pad

Always place the mouse on a mouse pad.

The different types of mice available are:

- * Trackball mouse
- * Optical mouse
- * Touchpad
- * Ball mouse

Input/Output Devices

Keyboard

The Keyboard is made up of Number and Letter keys. Keyboard is used for typing and the monitor shows what is typed. But first the keyboard tells the System Unit what to do and the System Unit gives this message to the monitor.

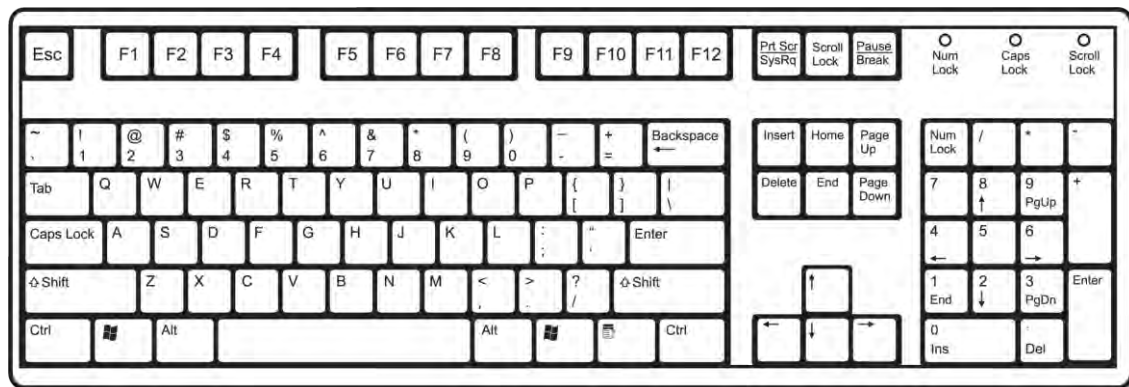
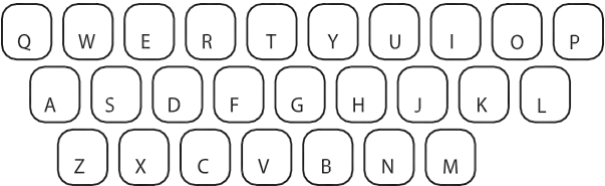
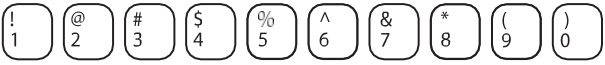
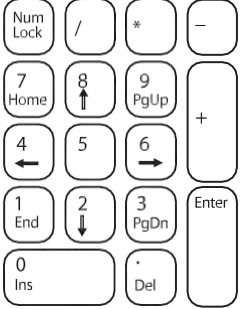







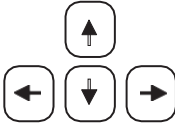


Fig.3.1.7. Keyboard

Different sets of keys	Discription
 <p>Alphabet Keys</p>	The keyboard has 26 letter keys from A to Z called the alphabet keys.
 <p>Numeric Keys</p>	The number keys (0 to 9) are called 'numeric keys'.
 <p>Symbols on the Number Keypad</p>	<p>  for addition.  for subtraction.  for division.  for multiplication  calculates the answer </p>

 <p>Spacebar</p>	<p>The longest key on the keyboard is the 'spacebar.'</p> <p>It is used to put an empty space in between letters and numbers.</p>
 <p>Escape Key</p>	<p>The key that stands alone on the top left corner is the 'escape key'.</p>
 <p>Arrow Keys</p>	<p>The set of four keys that have arrows on them are the 'arrow keys'.</p>

Finger-key coordination

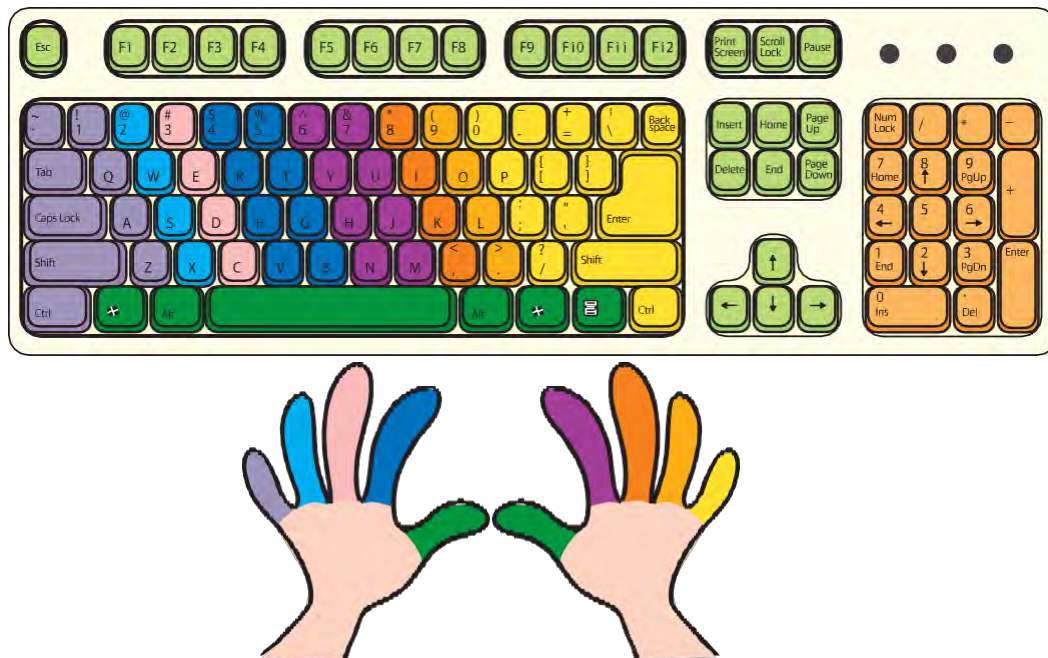
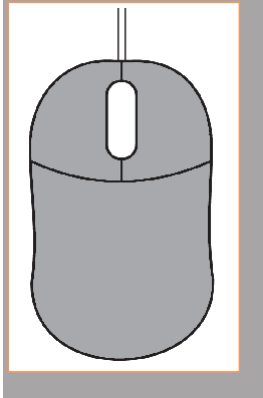


Fig.3.1.8. Finger-key coordination

Mouse

Mouse is used to point and select.



Click	Use	How to Use
(Left) Click	Select	Press and release the button without moving the mouse.
Click and Drag	Move	Press and do not release the left mouse button, and then move the mouse with the button still held down, and finally release the button.
(Left) Double-click	Open	Press and release the left mouse button twice in rapid succession without moving the mouse.
Right-click	Display usable dropdown menu	Press and release the right mouse button, without moving the mouse.

Dos and Don'ts

Keep your wrist straight when you use the mouse.
Do not tilt it upwards or downwards.

Your hand should remain straight, not tilted towards the right or the left.
Make sure you hold the mouse correctly, so that your hands do not hurt later.

Fig.3.1.9. Dos and Don'ts

Computer Peripherals



Fig.3.1.10. Printer

It is a device that prints text or illustrations on paper. There are different types of printers like dot-matrix, ink-Jet, laser etc.

All the parts are connected to system unit with cables or wires. The system unit in turn is connected to the main power supply.



Fig.3.1.11. Speakers

Speakers are devices used to listen to music, voices and other sounds.



Fig.3.1.12. Microphone

The microphone converts sound inputs by the user into a format understood by the computer. It is used for sound recording.



Fig.3.1.13. Web camera

These are small cameras (usually, though not always, video cameras), whose images can be accessed using the World Wide Web, instant messaging like hotmail, Google talk, or a PC video conferencing application.



The scanner converts print data into electronic data. Images and text available in books, newspapers and magazines can be scanned and used as computer data. The scanner is similar to a photocopier machine, except here the copy comes in electronic format.



Stationary (fixed) storage devices are fixed on the hard disk drive inside the system unit. They can store large amounts of data (eg. 40 to 300 GB data), and can be used only in a particular machine.



Fig.3.1.16. CD-ROM

Compact Disk- Read Only Memory is a mobile storage device. It can store around 800 MB of data. Data copied to a CD-ROM cannot be edited directly.



Fig.3.1.17. Flash Drives

They are mobile storage devices. They can store from 540 MB to 16 GB of data and the data can be edited directly.

3.1.5 Turning On the Computer

How to Start your Computer

- First, plug in the computer and switch it on.
- Turn on the UPS.

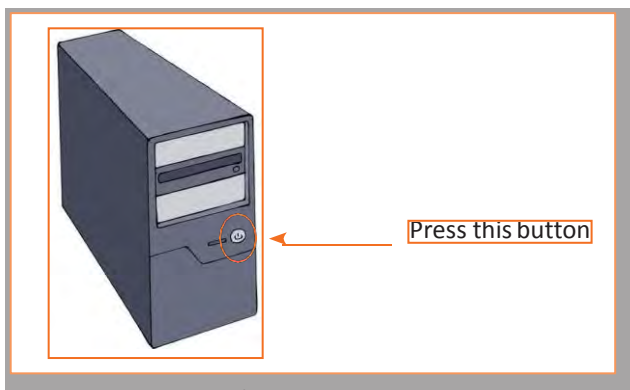
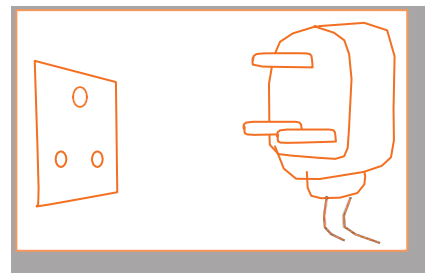



Fig.3.1.18. Turning on the Computer

- Turn on the system unit by pressing the power button .
- Let the computer start .
- Type in the password if you have set one.

Once the booting process is over the following window is displayed.

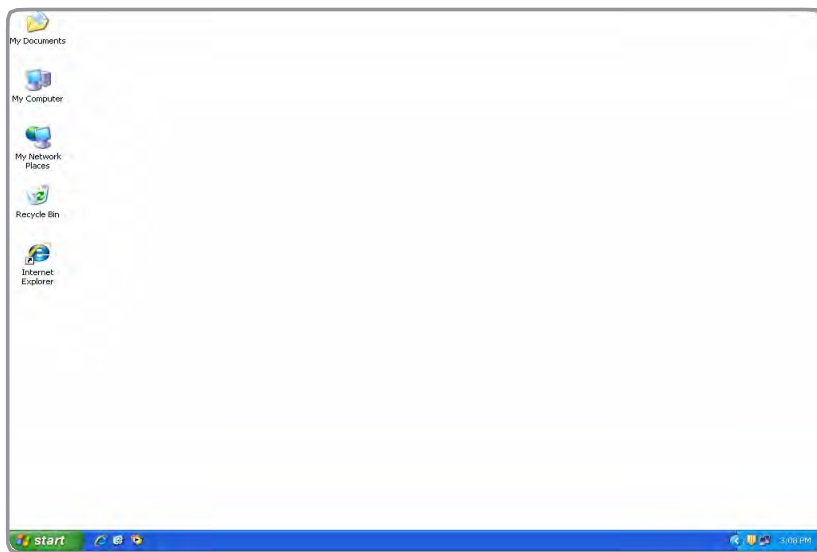


Fig.3.1.19. Desktop screen

3.1.6 Turning Off the Computer

How to Shutdown your Computer

Never just switch off your computer – you may lose unsaved information and damage your computer's hard disk drive or may loose the saved information too!

To Shutdown your Computer properly close all open applications.

- Click on the Start button.

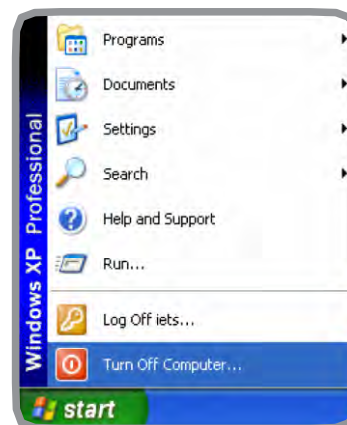


Fig.3.1.20. Start button



Fig.3.1.21. Turn off

- Select the 'Turn off' option by clicking on it.
- Click on the 'Yes' button to confirm selection.

Introduction to Windows Operating System

Windows

Windows is the program that manages all the other programs. Windows knows which file to open when you double-click on an icon on the desktop. Windows also knows how much of your computer's memory (or resources) to give to each open program, so you can be doing many different things at the same time.

Desktop

The desktop is the screen seen when working on a Windows Operating System with no application window open.

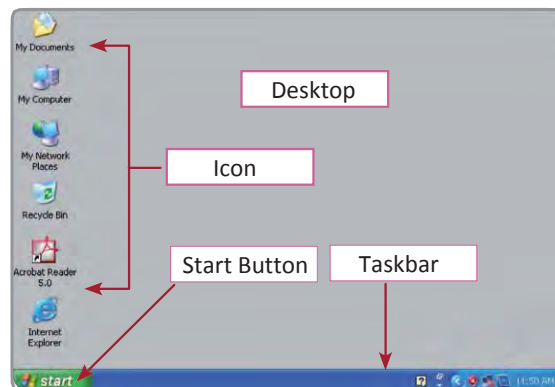


Fig.3.1.22. Desktop screen

Properties of the desktop can be changed by right clicking anywhere on it and selecting the different Display Properties.



Fig.3.1.23. Display properties

Icons

Icons are the small interactive images that relate to a particular command/function. Icons help to execute commands quickly. Single click selects an icon, while double click opens the same.

Taskbar

The horizontal bar at the bottom of the screen is called the Taskbar. It displays all running applications of the computer.



Fig.3.1.24. Taskbar

It could have a number of default icons running in the right corner; e.g., clock/calendar, speaker features, etc.

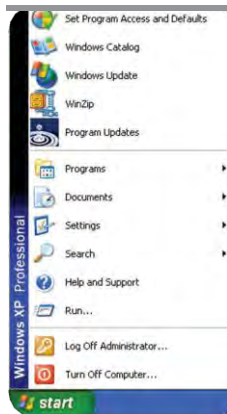



Fig.3.1.25. Start Menu

The left corner of the Taskbar has the  **Start** button, clicking on which displays the Start Menu.

The Start menu helps to go to various applications, as well as for changing the variable features of Windows.

A menu provides a way to send commands to the computer. To select and execute a command, click on the menu item.

Selecting (executing) a command/function causes a dialog box or a Window to appear. All options for a command/function selected appear in this Window or Dialog box.

Dialog box

Most dialog boxes provide command buttons like OK, Cancel, Apply, etc to send the commands to the computer. The different options available in a dialog box appear as a tab. Press the tabs to flip through the options. The title bar has buttons for closing “x” and help “?”.

Few frequently used option/command buttons in a dialog box:

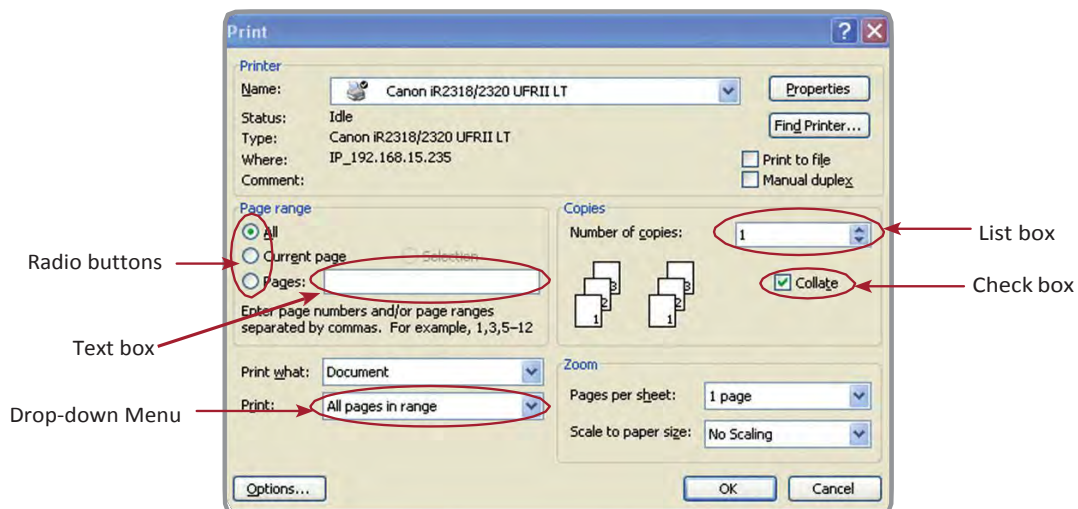


Fig.3.1.26. Print dialog box

Radio buttons are round with a dot in the centre. The dot indicates that the option is selected. They are used to present a list of mutually exclusive options. Only one of the options presented can be selected.

Check boxes are another method used to select options. The selected options are marked with a tick. To remove the selection, click on the box again. More than one option can be selected.

Text boxes are also referred to as fields. Here the user can input a text or number.

List boxes enable to make choice from a list of options. Using the scroll bar provided near the box the listed items can be seen.

Drop-down menu is very similar to a List box. On click of the down arrow present on the right side of the drop-down menu, the options appear.

Scroll bars

If the contents of the work area do not fit in the window, scroll bars will appear. A vertical scroll bar will appear at the right side of the window and a horizontal scroll bar at the bottom of the window.

The right and bottom scroll bars let the user to scroll either up and down or right and left in the window.

Menu bar and Tool bar

Menus and Tool bars are used to give instructions to the Windows application about what needs to be done.

A Menu displays a list of commands. Some of the commands have images next to them, so you can quickly associate the command with the image. Most menus are located on the Menu bar at the top of the Window. Shortcut menus are available when you right-click text, objects or other items.

A Toolbar can contain buttons with images (the same images you see next to corresponding menu commands), menus or a combination of both. There are many built-in toolbars that can be shown and hidden as needed. By default, the standard toolbar is docked below the Menu bar.

Status bar

The Status bar is a horizontal bar at the bottom of the window. It displays information about the current status of what you are viewing in the window and any other appropriate information.



My Computer

My Computer

Double click on the icon to open.

The My Computer window shows the components which are present in the computer and are being used. For example: default folders, hard disk drives such as Local disk (D:), Local Disk (E:) and New Volume (F:); drives for removable storage devices such as CD-ROM drive; and network drives.

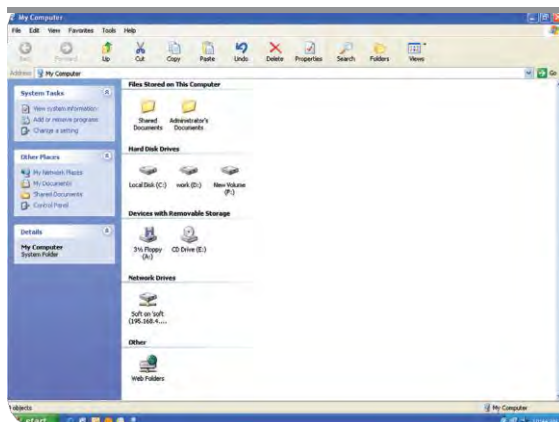


Fig.3.1.27. My computer



My Documents

My Documents

Open the Folder by double-clicking on the icon. Any file created will get saved in this folder by default.

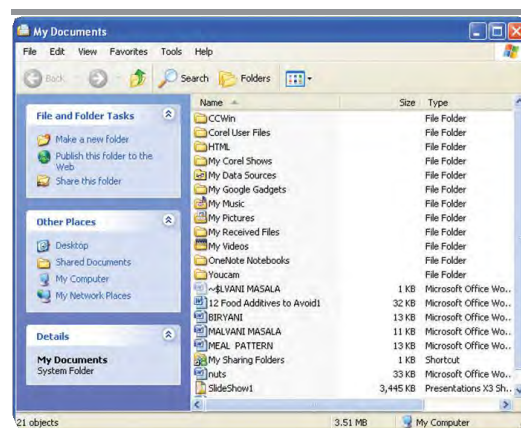


Fig.3.1.28. My documentnts



My Network Places

Double-click the icon to open. This window helps you to see the computers in your neighborhood, i.e. the computers that are connected or networked.



Recycle Bin

Recycle Bin

Double-click the icon to open. Files or folders that are deleted will be sent to the Recycle Bin.

These can be retrieved by right-clicking on the respective Files/Folders and selecting the option – Restore.

Once deleted (cleared) from the Recycle Bin then there is no way that these can retrieve the Files/Folders.

Basics of File Management

File and Folders

The entire computer as a storage device is like your room (My Computer). Within it are many cabinets (A: C: D: E:...drives) in which things (data) can be stored. Inside these cabinets are drawers (folders) in which we could either have:

- ❖ smaller drawers (sub-folders)
- ❖ items/data (files)



Fig.3.1.29. File and folders

The Drives are

1. **A:** for 3.5 inch floppy
2. **C:** and **D:** for the hard disk (it depends on the formatting and sectioning of the hard drive, as to how many sections have been created)
3. **E:** for the CD drive (note that if there are more than two sections on the hard disk, then the CD drive could be **F:** or even **G:**)



A **Folder** is a section of the drive, which is given a specific name and can store either sub-folders or files created for better organisation. A particular drive cannot have 2 folders with the same name.

Files are the work created in different applications. Each application file is different from the other and all of them can be stored in a single folder. A particular folder cannot have two files of the same application with the same name.

A file extension is a suffix, separated by a dot to the file name. It helps Windows to understand the kind of application file. The file extension of the files created in different applications is also different.

Application	File	Extension	Icon
MS Paint file	Bitmap	*.bmp	 car
MS Word file	Document	*.doc/ *.docx	 input
MS Excel file	Workbook	*.xls/ *.xlsx	 DELHI
MS PowerPoint file	Presentation	*.ppt/ *.pptx	 teachers
Wave file	Sound	*.wav	 Goat0m0s
Movie file	Video	*.mov	 p5141 a
Image file	Animation	*.gif	 hhbar
Executable file	programme Executable file (programme)	*.exe	 Command

Windows Explorer

Windows Explorer was first released with Windows 95 as a version of a utility programme called File Manager in previous Windows versions. It allows to 'explore' system disks, which include floppy disks, hard drives and the CD-ROM drive and other removable storage devices connected.

How to open Windows Explorer

- Click on **Start > Programs > Accessories > Windows Explorer**; or
- Right-click on **Start button > Explore**

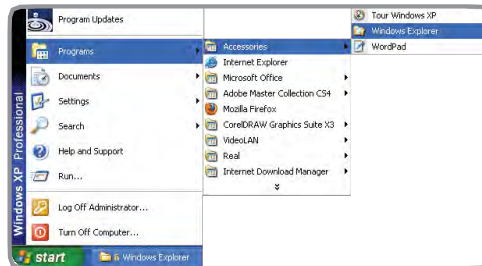


Fig.3.1.30. Window explorer

The various features of Windows Explorer are:

The main section comprises two panels:

- The left panel shows the disk drives and the directories or folders. It is used mainly for navigating through the file system.
- The right panel shows the contents of any item that is highlighted or selected in the left panel. It allows you to see the content of a folder in the system.

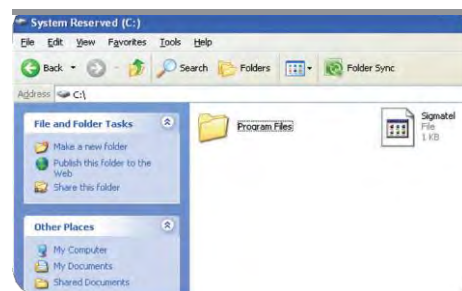


Fig.3.1.31. Disk drive

- If a top level directory/folder contains any sub directories, then the left panel will show a '+' symbol to the left of this icon. Clicking on this icon will open up that top level directory and display the sub directories.
- If an item, i.e., a drive, folder or file, is clicked on, then some writing is seen in the status bar at the bottom edge of the Explorer window. This usually has information about the size and/or number of the item(s).
- How to Create Folder Directories

✧ Using My Computer

- Double-click on My Computer.
- Select drive/folder in which new folder is to be created.
- Click on File > New > Folder or right-click in the white area of drive/folder and select New Folder
- A folder box appears, type your desired folder name and click Enter.

✧ Using Windows Explorer

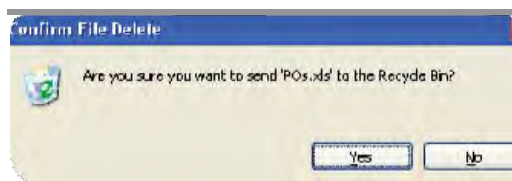
- Click on Start button > Programs > Accessories > Windows Explorer.
- On the left, select drive/folder in which new folder is to be created.

- Click on File > New > Folder or right-click in the white area of drive/folder and select New > Folder
- A folder box appears on the right. Type your desired folder name and click Enter.

How to Delete Files and Folders

Deleting files and folders is easy using any of the several options listed below:

- Select the file or folder and click the Delete icon on your toolbar.
- Select the file or folder and press the Delete (Del) key from the keyboard.
- Right - click the file or folder and choose Delete.
- Select the file/folder. Click on File > Delete.



A message confirming deletion will be displayed.

Click on 'Yes' to continue; 'No' to cancel the action.

Fig.3.1.32. Delete files and folders


How to Move Files and Folders

There are several methods for moving files:

✧ Using Right - Click

- Open the drive/folder containing the file to be moved.
- Select the file, right click and select Cut.
- Open the drive/folder where it is to be placed .
- Right click and select Paste.

✧ Using Tool Bar Icons

- Open the drive/folder containing the file to be moved.
- Select the file and click on the  Cut icon on the toolbar.
- Open the drive/folder where it is to be placed.
- Click toolbar icon for Paste.

✧ Using Tool Bar Menu

- Open the drive/folder containing the file to be moved
- Select the file, click on Edit > Cut.
- Open the drive/folder where it is to be placed.
- Click Edit > Paste.

✧ Using Keyboard Shortcuts

- Open the drive/folder containing the file to be moved.
- Select the file, press Ctrl+X.
- Open the drive/folder where it is to be placed and press Ctrl+V.

✧ Using the Mouse

- Open the drive/folder containing the file to be moved and resize the window.

- Select the file and open the drive/folder where it is to be placed.
- Resize the window so that both drives/folders can be viewed together.
- Click-drag the selected file, from the source to the destination drive/folder.

How to Rename Files and Folders

Just as Delete and Move, renaming of files and folders can be done using any of the following options.

✳ Using right click menu

- Right-click the file or folder and choose Rename.
- Type the new name and press Enter.

✳ Using tool bar menu

- Select the file, click on Rename.
- Type the new name and press Enter.



How to Copy Files and Folders

Just as moving files and folders, there are several methods for copying files.

✳ Using right click

- Open the drive/folder containing the file to be copied.
- Select the file, right-click and select Copy.
- Open the drive/folder where it is to be placed.
- Right-click and select Paste.

✳ Using tool bar icons

- Open the drive/folder containing the file to be copied.
- Select the file and click on the  Copy icon on the toolbar.
- Open the drive/folder where it is to be placed.
- Click toolbar icon for  Paste.

✳ Using Tool Bar Menu

- Open the drive/folder containing the file to be copied
- Select the file, click on Edit > Copy
- Open the drive/folder where it is to be placed
- Click Edit > Paste.

✳ Using Keyboard Shortcuts

- Open the drive/folder containing the file to be copied.
- Select the file, press Ctrl+C.
- Open the drive/folder where it is to be placed and press Ctrl+V.

Search Files and Folders

Windows gives a facility to search files and folders present in the system. There are various options available in the search facility to locate a file or folder.

Click on the Start button, point to search and click on 'Files and Folders'. The search results window appears.

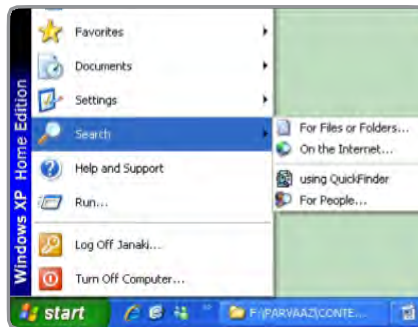


Fig.3.1.33. Search files and folders

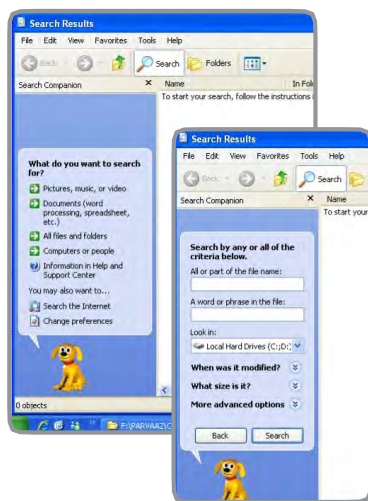


Fig.3.1.34. All files and folders

On the left panel of the search results window are presented the options for – What do you want to search for?

Click on the option 'All Files and Folders'.

In the textbox type the name of the file/folder to be located. Select the path from the drop down list and click on Search.

The search results appear on the right panel of the Window.

More about Windows

❖ Turn Off Computer :

When this option is selected all the programs in memory shut down and the power supply to the system unit turns off automatically.

❖ Restart

This option closes all open programs from memory and machine switches off and starts again.

❖ Graphical User Interface (GUI)

GUI is a type of interface where commands visible on the screen are easy to understand icons/ pictures and menus.

❖ Multitasking

Multitasking means many applications are open at a time on screen. Windows allows switching between applications.

❄ **Menu Driven**

All commands in Windows are listed and operated using menus. The commands need not be memorised. Within the program the user clicks on the menu option from the menu bar and selects or quits.

❄ **User friendly means easy and simple to use**

Windows OS is a very user friendly software. All command names are action/task names so that it is convenient for the user to choose the task to be performed. Various message and warnings are displayed in message window / dialog box with command buttons for the user's response.

❄ **How to select more than one file or folder (consecutive files)**

- Click the first file or folder.
- Press and hold down shift key.
- Then, click the last file or folder.
- Finally, release the shift key and finish the selection.

❄ **How to select non-consecutive files or folders**

- Click the first file or folder.
- Press and hold down CTRL key.
- Then, click each of the file or folder.
- Finally, release the CTRL key and finish the selection.

Exercise

Read the questions. Tick the correct the answers.

1. Devices that convey information to the computer _____

- i. software
- ii. input devices
- iii. output devices
- iv. None of the above

☐
☐
☐
☐

2. Computer devices that display the processor information _____

- i. software
- ii. information
- iii. output devices
- iv. None of the above

☐
☐
☐
☐

3. Which type of mouse click is used to open a selected item?

- i. left click
- ii. right Click
- iii. double Click
- iv. None of the above

☐
☐
☐
☐

4. Work created in different application _____

- i. file
- ii. hardware
- iii. mouse
- iv. None of the above

☐
☐
☐
☐

Notes



UNIT 3.2: Internet

Unit Objectives



At the end of this unit, you will be able to:

1. state the features of computer network
2. state the functions of the Internet
3. browse the Web
4. state the uses of E-mail

Network

How is networking useful

The primary function of computers in a network is to share information and resources.

Share information

The stored information on one computer can be viewed or sent to other computers.

Share resources

Devices like printer or scanner, Internet connection can be shared.

Types of Network

The main computer to which all other computers are connected is called Server. The computer connected to the Server is called Client.

Two common types of networks are:

- * Local Area Network (LAN) – In this type of network the computers are connected to each other by cables. The connection is restricted to a building or a small area.
- * Wide Area Network (WAN) – In this type of network the computers are connected in larger geographical limits like one city or state to another. Use of modem, telephone lines or satellite links facilitate the exchange of data.

Wireless Technologies

The scope of communication has increased with the advance in technology in the recent years. Computer networks have become the core of modern communication. More and more networks are operating without cables.

Wireless communication is facilitated through satellite links, infrared light beams, microwave transmissions, radio signals and blue tooth.

Wireless communication is rapidly growing and has become part of everyday life. A good example is our cellular phones. Wireless networks are becoming popular in business houses and homes due to the following advantages:

- * Mobility
- * Fast Set up
- * Cost effective
- * Expandability

Bluetooth

Bluetooth is a open wireless technology standard for exchanging data over short distances. Bluetooth allows electronic devices to communicate wirelessly at a short range and low cost. It is extremely popular in our cellular phones.

Internet

Internet

Internet is a collection of inter-connected computer networks that are worldwide in scope. The Internet is a tool that serves billions of users all over the world. The computers all over the world connected to each other on the Internet are termed as World Wide Web. No one owns the Internet.

History of Internet

The history of Internet can be traced back to the year 1968-69. The Defense Advanced Research Projects Agency came up with the idea that several computers could be linked together by telephone wires so they could “talk” to one another. A note that was written on one computer could be immediately sent to all the other computers. So they wired four computers together in a group and called that group of computers a network. The network’s name was DARPNET, after the first letters of the name of the agency with NET (meaning network here) added to the end. Soon the D was dropped and it was called ARPANET, which grew over time, adding more and more computers over phone wires.

As technology advanced the computer networks also became available to schools, colleges and government. More and more networks were added and wired together. These interconnected networks were called an Inter-Net-Network. Today we call it the Internet.

As the commands for email and file transfer were standardised, non technical people learned to use the net. Today people own personal computers and the Internet is even more popular. In the last 10 years it has grown from about 5,000 users to millions today – with thousands of new computer users coming online every month.

How Does the Internet Function

Internet is a widely used, global system of network connection. Internet facilitates data communication services like remote login, file transfer, email, newsgroups etc.

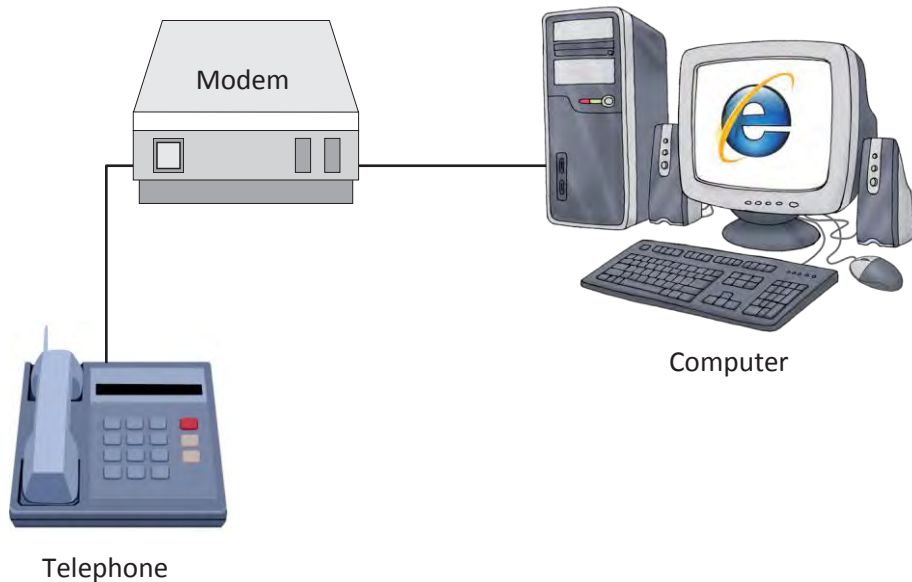


Fig.3.2.1. Functioning of Internet

Protocol and IP Address

Communication systems that interact with each other require standardization. Protocols are rules applicable while transferring data from one computer to another. There are different types of network protocols and standards to send or receive data on the Internet.

One of the most commonly used information service on the Internet is the World Wide Web (www). The protocol that makes the www work is HTTP.

Some of the major protocols are:

- * Ethernet
- * TCP/IP (Transmission Control Protocol/Internet Protocol)
- * HTTP (Hyper Text Transfer Protocol)
- * FTP (File Transfer Protocol)
- * DNS (Domain Name System)

In a network every computer has its own address called "IP Address", either fixed (static) or dynamic (temporary). The IP address is a set of numbers separated by dots. There are four sets of numbers called octet, for example, 192.168.15.248.

It is necessary to know address of the computers sending and receiving data in a network. Protocol searches the computer in the network and reply is received.

3.2.4 Protocol and IP Address

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- * TCP/IP (Transmission Control Protocol/Internet Protocol)
- * HTTP (Hyper Text Transfer Protocol)
- * FTP (File Transfer Protocol)
- * DNS (Domain Name System)

In a network every computer has its own address called “IP Address”, either fixed (static) or dynamic (temporary). The IP address is a set of numbers separated by dots. There are four sets of numbers called octet, for example, 192.168.15.248.

It is necessary to know address of the computers sending and receiving data in a network. Protocol searches the computer in the network and reply is received.

3.2.5 Internet Address – URL

An Internet address or a web address is sometimes called URL – Uniform Resource Locator. A URL is composed of four parts:

- * Protocol name
- * Location of the site
- * Name of the organisation that maintains the site
- * A suffix or a domain name that identifies the kind of institution/organisation.

For example, the URL <http://www.ilfsets.com> provides the following information:

http	The Web server uses the Hypertext Transfer Protocol.
www	The site is on the World Wide Web.
ilfsets	The Web server is at ILFSETS.
com	This is a commercial institution.

3.2.6 Domain Names

Names assigned to the addresses are called Domain names. Communication in a network is possible using the Domain names. They can be classified according to the kind of institution or business or country.

Few categories of Domain Names:

.gov	Government
.edu	Education
.mil	Military
.net	Network
.org	Organisational
.au	Australia
.in	India
.nz	New Zealand
.jp	Japan
.fr	France
.uk	United Kingdom

3.2.7 Website and Webpage

It is a set of information on the Internet in the form of pages. The individual pages are called Webpages. Using the Domain name of the site the website can be viewed. Text, pictures, links etc can be hosted on the Web page. The linking of different pages in a website or different Websites is called hyperlinks. These hyperlinks allow navigating from one page to another.

A hyperlink is generally underlined or in a different colour from the normal text. If the mouse pointer is placed on a hyperlink the arrow pointer changes to hand cursor.



3.2.8 Requirements to Connect to the Internet

The five basic requirements to connect to the Internet are:

- Computer of requisite configuration
- Modem (Modulator and Demodulator)
- Telephone line
- ISP (Internet Service Provider) account
- Browser (eg. Internet Explorer/Netscape Navigator) software installed on the computer

Computer is a digital device. The language a computer understands is combination of 0 (zero) and 1 (one). In a network, data is transmitted through telephone cables. Telephone lines transmit analog signals.

To convert digital signals to analog signals and analog signals to digital a modem is used. A modem is a device that connects the computer to a telephone line.

ISP (Internet Service Provider) is the company that provides access to the Internet. There are many ISPs in India:

VSNL, BSNL, MTNL, Sify, Tata Indicom, Vodafone, Hathaway, Idea, Reliance Communications, Airtel and Aircel.

Internet Explorer

Browser is a software which allows viewing and exploring information on the Web/Internet. Internet Explorer (IE) is a web browser by Microsoft Corporation.

Internet Explorer makes it easier to get the most from the WORLD WIDE WEB, whether you are searching for new information or browsing your favourite websites.

3.2.9 How to visit a webpage

Visit a Webpage

To visit any Webpage or Website you need know the URL (Uniform Resource Locator) or the address of the site. For example, to visit the Parvaaz site – URL is <http://www.parvaaz.in/>.

- Open Internet Explorer.
- Click on the address bar.
- Type the URL – www.parvaaz.in

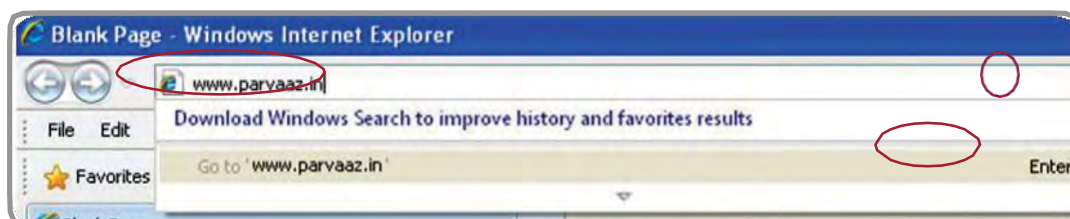


Fig.3.2.2. URL

- Click on Enter or  or Press Enter from the keyboard.

The Webpage requested appears on the screen. A Website may consist of a single Webpage or multiple interconnected pages.



Fig.3.2.3. Webpage

An incorrect or incomplete address typed on the address bar will be replied with the message “Internet Explorer cannot display the webpage”.

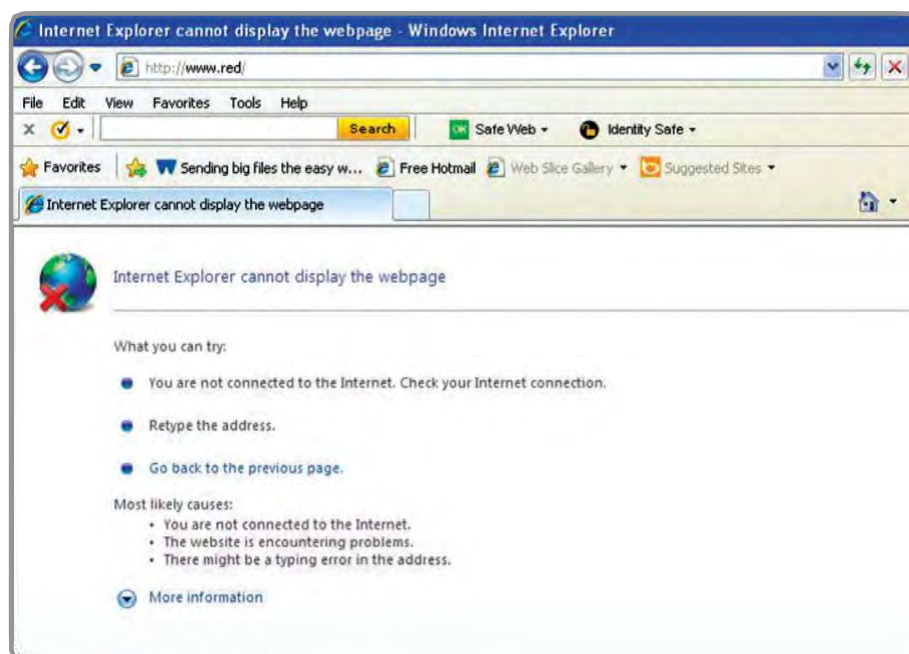


Fig.3.2.4. Internet Explorer cannot display the webpage

Internet Explorer – Interface

To view, navigate, print and save Webpage there are options present on the Toolbars. The various Toolbars: Menu Bar, Favorites Bar, Command Bar and Status Bar can be accessed from the View Menu. To keep the Toolbars visible on the interface check it from the View Menu.

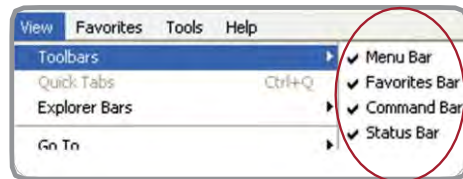


Fig.3.2.5. View menu

Menu Bar

The Menu bar includes File, Edit, View, Favorites, Tools and Help options. Click on the option to open the menu options/commands.



Fig.3.2.6. Menu bar

- The File menu options consist of commands like New Tab, New Window, Save, Close Tab, Open, and Print etc.
- The Edit menu includes options for editing like Cut, Copy, Paste and Find.
- The View menu includes options for changing the Tool bars; changing size of Text onscreen, Refresh current page, Zoom options and more.
- The Favorites menu consist bookmarked pages and options to bookmark Webpages.
- The Tools menu includes commands related to Browsing sessions and changing advanced options.
- The Help menu consist various selections for seeking help with Internet Explorer.

Navigating in a Web page

Webpages generally contain “hyperlinks”, which when clicked opens the link. The link can be another Webpage or another section in the same page or a file or an image.

Move the mouse over a link the cursor changes to a hand. Click to open the link.

For long pages use the scroll bars to scroll right/left and up/down along the page.



Fig.3.2.7. Navigating in a Web page



Fig.3.2.8. Web page

To move back and forth between pages click on the Back and Forward buttons on the Tool bar.

To stop loading of a Webpage click on Stop button. To reload a page click on Refresh button.

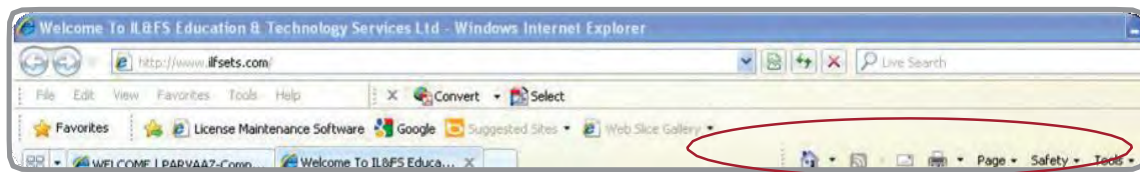


Fig.3.2.9. Command bar

Command Bar

Anytime while browsing to move or load the Home Page, click on the Home button on the Command Bar.

Shortcut Keys	Action
Esc	Stop
F5	Refresh
Ctrl -	Zoom In
Ctrl +	Zoom Out
Ctrl + 0	Zoom 100%
Alt + Left Arrow	Back
Alt + Right Arrow	Forward
Alt + Home	Home Page
F11	Full Screen View

Favorites

While you browse the URLs can be saved as a bookmark for later viewing. IE marks these bookmarks as Favorites.

To Bookmark a Page

- Browse the webpage to be marked as bookmark.
- Click on Favorites from the menu bar.
- Click on Add to Favorites.



Fig.3.2.10. Favorites

- In the Add a Favorite dialog box, a name for the favorite bookmark appears (you can change it if desired).
- Click Add.

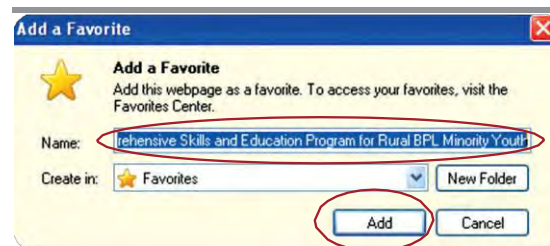


Fig.3.2.11. Favorite dialog box

The bookmark is added to the Favorites menu.

While adding the bookmark use the “Create in” or “New Folder” options to organise the Favorites into folders.


The bookmark can be directly added to the Favorites Bar by clicking on the option Add to Favorite Bar.



Fig.3.2.12. Bookmark



Fig.3.2.13. Favorite bar

The Favorites option can also be accessed from the Toolbar using the  Favorites icon. The Favorites pane appears with Add and Organize options.

To Organise Favorites

- Click on Favorites icon on the Toolbar.
- In the Add to Favorites drop down menu, click on Organize Favorites.

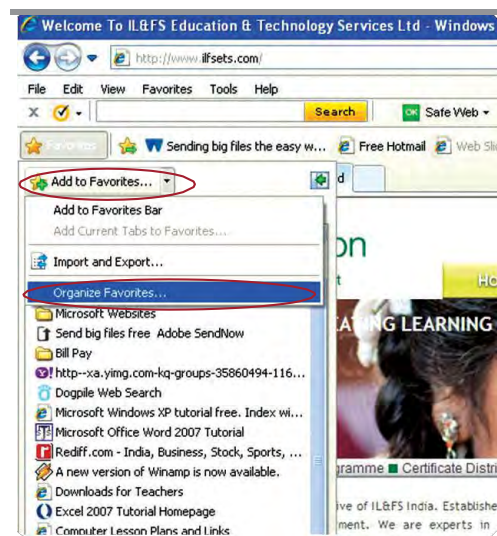


Fig.3.2.14. Toolbar

- In the Organize Favorites dialog box a list of favorites and folders appear.
- Using options, New Folder, Move, Rename and Delete organise the favorites.
- Click on Close when done.

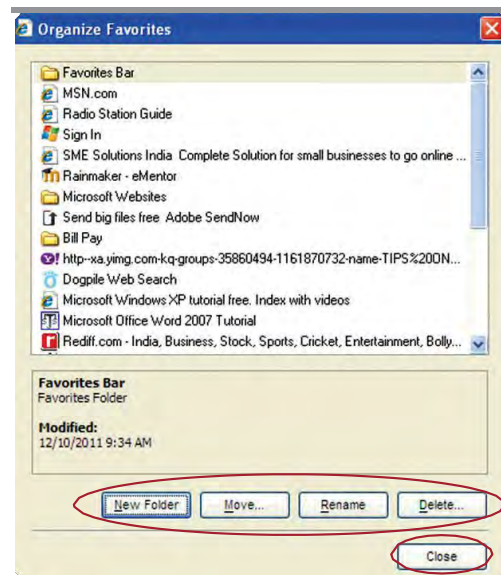


Fig.3.2.15. Organise Favorites

New Window for Browsing

The New Window option in the File Menu allows opening multiple browser windows.

- Click on File in the Menu bar.
- Click on New Window.

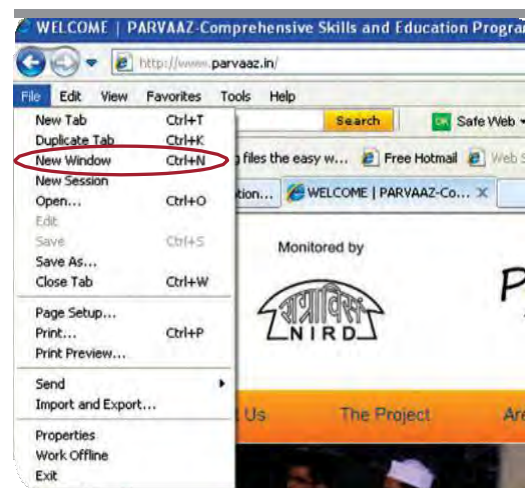


Fig.3.2.16. New window for browsing

- A new browser window with the current site opens
- In the address bar of the new window, to open another site - type the URL
- Click on Enter from the keyboard or click on ➡



Fig.3.2.17. New window

The open Windows are grouped on the Status bar. To switch between websites click on the Windows from the Status bar.

New Tab for Browsing

IE allows opening multiple websites in a single browser window. IE groups the open tabs on the Toolbar. You can switch between the webpages by clicking the tabs.

- Click on File in the Menu bar.
- Click on New Tab.
- A new tab gets added below the Toolbar.

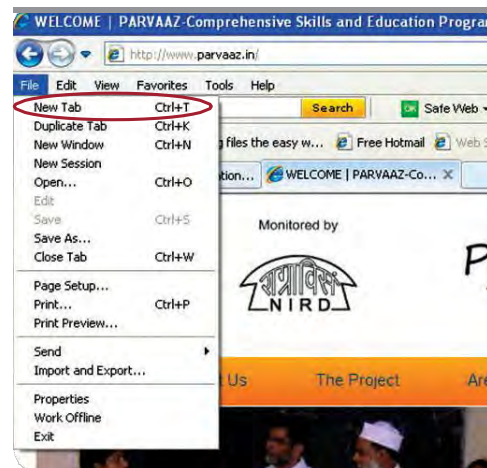


Fig.3.2.18. New tab

- In the address bar of the new tab page, type the URL.
- Click Enter from the keyboard or click on ➡.

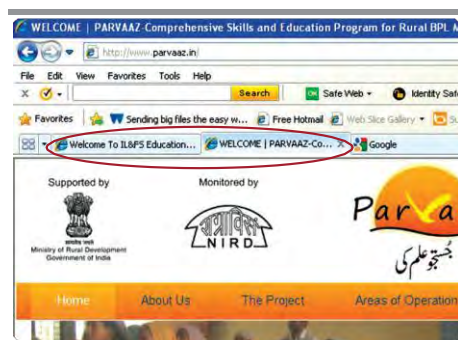


Fig.3.2.19. Address bar


To close a tab, click on the  Close button, on the tab.

Fig.3.2.20. Close a tab

If you click on Close, on the upper right corner of IE Window, a message to close the current tab or entire browser window is prompted.

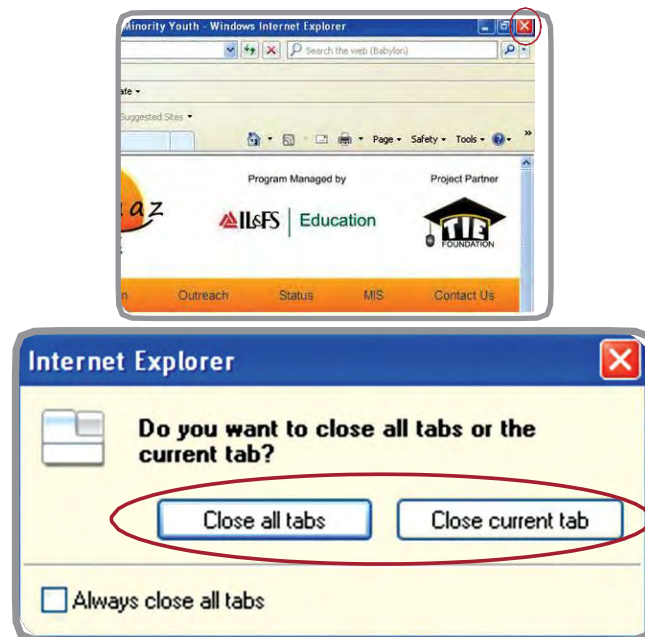


Fig.3.2.21. Close dialog box

Shortcut Keys	Action
Ctrl + T	Open a New Tab
Ctrl + Tab OR Ctrl + Shift + Tab	Switch between Tabs
Ctrl + N	Open a New Window
Ctrl + W OR Alt + F4	Close current Tab or current Window

3.2.10 Search Engines

A Search Engine (usually web-based) is a system for searching the information available on the Web.

Some popular Search Engines are:

Google	www.google.com
Altavista	www.altavista.com
Ask	www.ask.com
Excite	www.excite.com
All the web	www.alltheweb.com
Hotbot	www.hotbot.com
Lycos	www.lycos.com

Yahoo	www.yahoo.com
Go	www.go.com
Mozilla	www.mozilla.com
123India	www.123india.com
India Info	www.indiainfo.com
Rediff	www.rediff.com
Khoj	www.khoj.com

Points to Note

- Start typing a frequently used Web address in the Address bar, and a list of similar addresses appears that you can choose from.
- Search for websites by clicking the Search button on the toolbar.

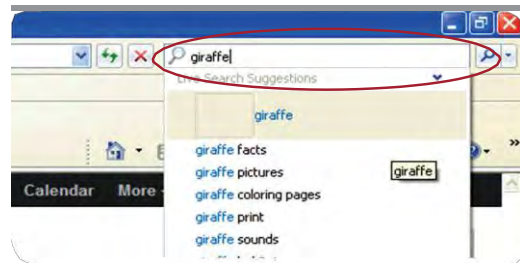


Fig.3.2.22. Points to note

- It is important to minimise the number of words you type into your search field to keep the results of the search focused to your needs. For example, “giraffe pictures” is better than “pictures of giraffe”.
- For each search that you perform you will probably get lots of possible websites to visit, which would take up a lot of time. In order to make your search effective, try using other search engines.

3.2.10 Email

An E-mail is electronic mail where messages can be exchanged digitally. Using e-mail, you can send text messages, images and video clips to anyone with an email account. Your message can reach the recipient (anywhere in the world) within minutes of being sent. Therefore, e-mail is both efficient and less expensive way of communicating with others.

E-mail can be used to:

- send messages to anyone on the Internet
- receive messages from anyone
- send and receive text and images
- send and receive other files (word processor, spreadsheets, graphics, images...)

To send or receive e-mail, the sender and the recipient both need to have an e-mail account. The most commonly used e-mail sites are:

www.gmail.com

www.yahoo.com

www.rediffmail.com

www.hotmail.com

The e-mail site connects you to the e-mail server through an e-mail account. An e-mail server is like an e-Post that stores, sends and accepts e-mail messages.

Getting an E-mail Account

You can visit any of the above e-mail sites which offer free e-mail service and create an e-mail account.

Points to Note

- Remember your login name; it can include alphabets, numbers and an underscore (_).
- Login names are case sensitive.
- No space anywhere in the login name.
- Do not disclose your password to anyone.

Sample E-mail id

Here is an example of a username or login name or e-mail id testing1234email@gmail.com. The @ sign stands for “at the rate of”. It is used to separate the username from the e-mail service website name.

Operating Your E-mail Account

The incoming and outgoing messages in your e-mail account are organised into folders. You can also create customised folders to store and retrieve e-mails.

Inbox

Inbox is the folder where all your new e-mails are stored. The e-mails received are displayed one below the other, with the latest message at the top.

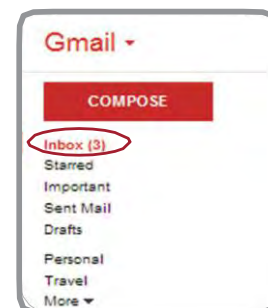


Fig.3.2.23. Inbox

Components of an E-mail Message

An e-mail message consists of two components: the message header and the message body. The message header consists of sender/recipient addresses, subject, submission date/time and any other information about the e-mail. The message body is the basic content or the message composed.

Sent Mail

A copy of the e-mails sent is saved in the folder “Sent Mail”. To access the sent e-mails click on “Sent Mail”.

E-mail Attachments

E-mail attachments are files that are sent along with the main message. For example: Word files, photographs, presentations, sound files etc.

3.2.11 Chat and Instant Messaging

Chat and Instant Messaging programs allow users on the Internet to communicate with each other online or in real time.

Types of Chat	Method
Message	Typing and sending text messages
Voice	In addition to sending text messages, you can also talk using mic and speakers
Video	While sending messages, you can see the person on the web camera and talk to him

With chat or instant messaging, a user on the Web can contact another user currently logged in and have a text/voice or video conversation.

There are many variations of Chat. It is sometimes included as a feature of a website. The users log in to the site, exchange comments and information on topics addressed in the site. There are many companies who sponsor web enabled video conferences, discussion forums and seminars.

Chat room	Web based conference room where group of users exchange comments and information over the web
Webinar	Transmission of interactive web based seminar, lecture or presentation

Social Networking

A Social Network service focuses on building social networks or social relations among people, e.g., who share interests and/or activities. A Social Network service, essentially, consists of a representation of each user (often a profile), his/her social links, and a variety of additional services.

Web-based Social Network services provide users to interact over the Internet, using applications that allow as e-mailing and instant messaging.

Some of the popular social networking sites are:

- Facebook
- Twitter
- Orkut



Fig.3.2.24. Social Networking sites

Some social networks have additional features, such as the ability to create groups that share common interests or affiliations, upload or stream live videos, and hold discussions in forums.

Lately, mobile social networking has become popular. In most mobile communities, mobile phone users can now create their own profiles, make friends, participate in chat rooms, create chat rooms, hold private conversations, share photos and videos, and share blogs by using their mobile phone.

E-Commerce

Buying and Selling on the Internet is termed as E-Commerce or Electronic Trade. There are various E-Commerce sites to purchase and sell goods.

These sites, generally, accept payments online through Credit Cards, Debit Cards or via Internet banking.

Here is a list of few sites where you can buy or sell goods.

www.rediff.com
www.wirelessduniya.com
www.flipkart.com
www.ebay.in
www.cleartrip.com
www.futurebazaar.com
www.fashionandyou.com
www.letsbuyproducts.com
www.yebhi.com
www.naaptol.com
www.quickr.com



Fig.3.2.25. E-commerce sites

Exercise



Read the questions. Choose the correct the answers.

1. Rules applicable while transferring data from one computer to another.
 - i. Internet
 - ii. Modem
 - iii. Protocol
 - iv. None of the above
2. A website address or Internet address specified in the address bar of the Web browser
 - i. URL
 - ii. Domain name
 - iii. Webpage
 - iv. None of the above
3. A set of information on the Internet
 - i. URL
 - ii. Website
 - iii. Search Engine
 - iv. None of the above
4. Messages exchanged digitally
 - i. Internet
 - ii. Webpage
 - iii. E-mail
 - iv. None of the above

[illegible]



4. Assist in Performing Software Construction and Software Testing Entry-Level Tasks in the IT Services Industry



IT - ITeS SSC
NASSCOM

- Unit 4.1 – C Programming
- Unit 4.2 – PHP
- Unit 4.3 – MYSQL
- Unit 4.4 – SQL using Oracle



Key Learning Outcomes



At the end of this unit, you will be able to:

1. create algorithms for solving problems
2. draw flowcharts for solving problems
3. state the features of C language
4. state the different data types available in C
5. explain Operators and Expressions in C
6. write a simple program in C
7. code a C Program in Turbo C Editor
8. compile and fix errors
9. run or execute the program
10. write a program in 'C' using the "if – else" construct
11. write a program in 'C' using the "switch – case" construct
12. repeat a set of instructions using Loops
13. define Functions
14. state the need for Functions
15. use functions in 'C' Programs
16. construct an Array
17. access Array elements
18. use Array in function
19. use String as an Array of characters
20. use Structures to handle a collection of related dissimilar Data Types
21. expalin PHP
22. expalin basic syntax and usage of PHP
23. practice basic coding in PHP
24. expalin the basic built in functions in PHP
25. expalin Classes Objects in Object Oriented Programmning
26. expalin the basics of Relational Databases
27. learn simple SQL commands using MySQL
28. expalin Persistence using MySQL
29. expalin how to create a basic web application using PHP & MySQL
30. get an overview of DBMS concepts
31. expalin basics of Structure Query Language
32. expalinsimple Data Manipulation
33. expalin basic SQL operations

UNIT 4.1: C Programming

Unit Objectives



At the end of this unit, you will be able to:

1. create algorithms for solving problems
2. draw flowcharts for solving problems
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15. use functions in 'C' Programs
16. construct an Array
17. access Array elements
18. use Array in function
19. use String as an Array of characters
20. use Structures to handle a collection of related dissimilar Data Types

Basic Principles of Programming

What is a Computer Algorithm?

An Algorithm (pronounced AL-go-rith-um) is a procedure or formula for solving a problem. The word derives from the name of the mathematician, Mohammed ibn-Musa al-Khwarizmi, who was part of the royal court in Baghdad and lived from about AD 780 to 850. Al-Khwarizmi's work is the likely source for the word algebra as well.

Definition

A finite set of unambiguous instructions performed in a prescribed sequence to achieve a goal, especially a mathematical rule or procedure used to compute a desired result. Algorithms are the basis for most computer programming.

Need for Algorithm

- To make a computer work, you have to write a computer program.
- To write a computer program, you have to tell the computer, step by step, exactly what you want it to do.
- The computer then “executes” the program, following each step mechanically, to accomplish the end goal.
- When you tell the computer what to do, you also get to choose how it's going to do it.
- That's where computer Algorithms come in.
- The Algorithm is the basic technique used to get the job done.

Real life example of Algorithm

Let's follow an example to get an understanding of the Algorithm concept.

Let's say you have a friend arriving at the railway station, who needs to get to your house. Here are the different sets of instructions that you might give your friend for getting to your home:

The taxi algorithm:

1. Go to the taxi stand.
2. Get in a taxi.
3. Give the driver my address.

The call-me algorithm:

1. When your train arrives, call me on my cell phone.
2. Meet me outside baggage claim.

The bus algorithm:

1. Outside baggage claim, board bus number 165.
2. Get off the bus on reaching Shahabad Dairy.
3. Board an auto to LIG flats.
4. Walk two blocks north to my house.

All these instructions or algorithm accomplish exactly the same goal, but each algorithm does it in complete different way. Each one also has a different cost and a different travel time. Taking a taxi, for example, is probably the fastest way, but also the most expensive. Taking the bus is definitely less expensive, but a whole lot slower. You choose the algorithm based on the circumstances.

Examples of Algorithm

In computer programming, there are often many different ways (algorithms) to accomplish any given task. Each algorithm has advantages and disadvantages in different situations

Sorting is one place where a lot of research has been done, because computers spend a lot of time sorting lists. Here are five different algorithms that are used in sorting:

- Bin sort
- Merge sort
- Bubble sort
- Shell sort
- Quick sort

Mathematical algorithm is a set of rules for solving a math problem.

For example:

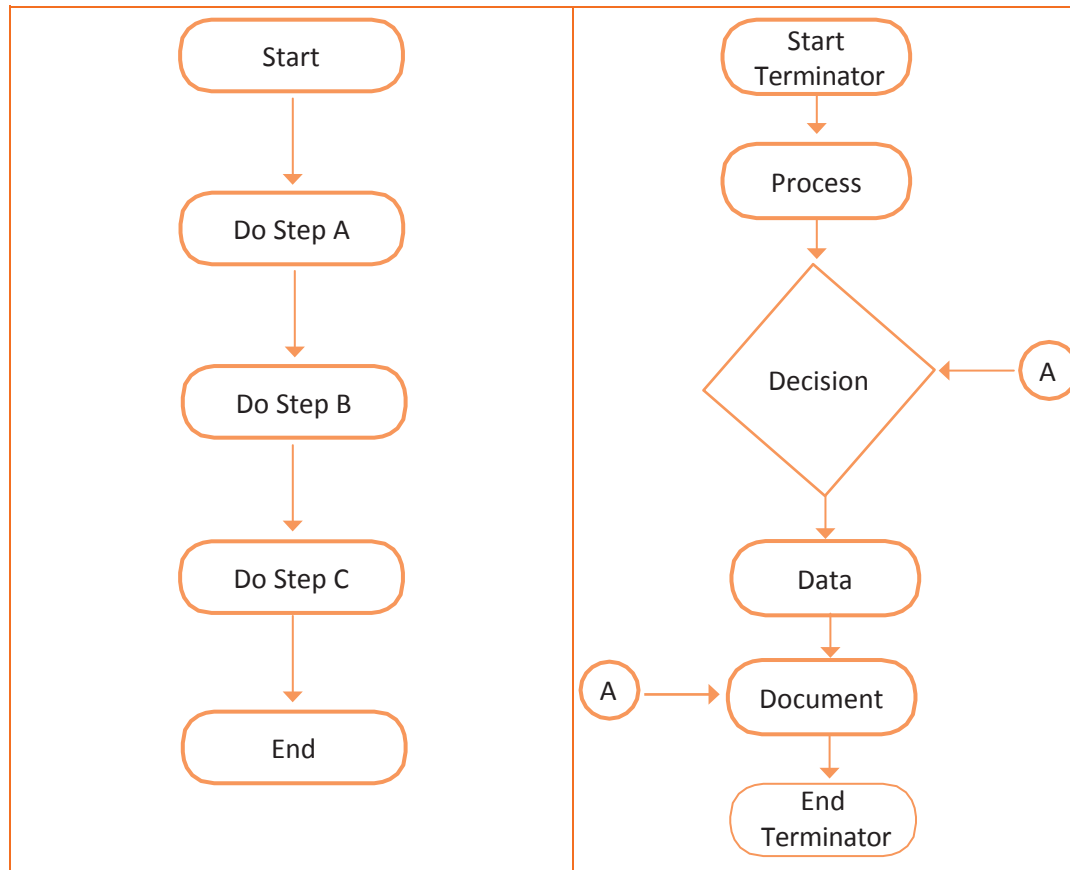
Left-to-right Algorithm to add numbers or carry over addition.

Flowchart**What is Flowchart?**

A flow chart is a graphical or symbolic representation of a process. Each step in the process is represented by a different symbol and contains a short description of the process step. The flowchart symbols are linked together with arrows showing the process flow direction.

What is Flowchart?

A flow chart is a graphical or symbolic representation of a process. Each step in the process is represented by a different symbol and contains a short description of the process step. The flowchart symbols are linked together with arrows showing the process flow direction.



Need for Flowchart

Flowcharts are used in designing and documenting complex processes or programs. Like other types of diagram, they help to visualise what is going on and thereby help the viewer to understand a process, and perhaps also find flaws, bottlenecks, and other less-obvious features within it. There are many different types of flowcharts, and each type has its own repertoire of boxes and notational conventions. The two most common types of boxes in a flowchart are:




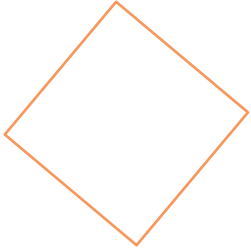
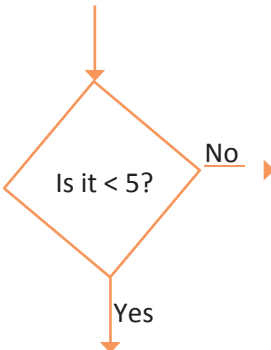
- a processing step, usually called activity, and denoted as a rectangular box
- a decision, usually denoted as a diamond.







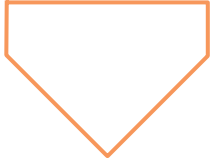


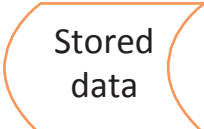
Difference between Flowchart and Algorithm

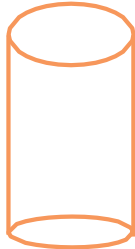
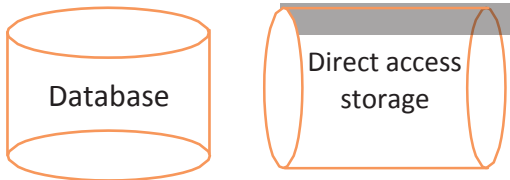

What is Flowchart?

A flow chart is a graphical or symbolic representation of a process. Each step in the process is represented by a different symbol and contains a short description of the process step. The flowchart symbols are linked together with arrows showing the process flow direction.

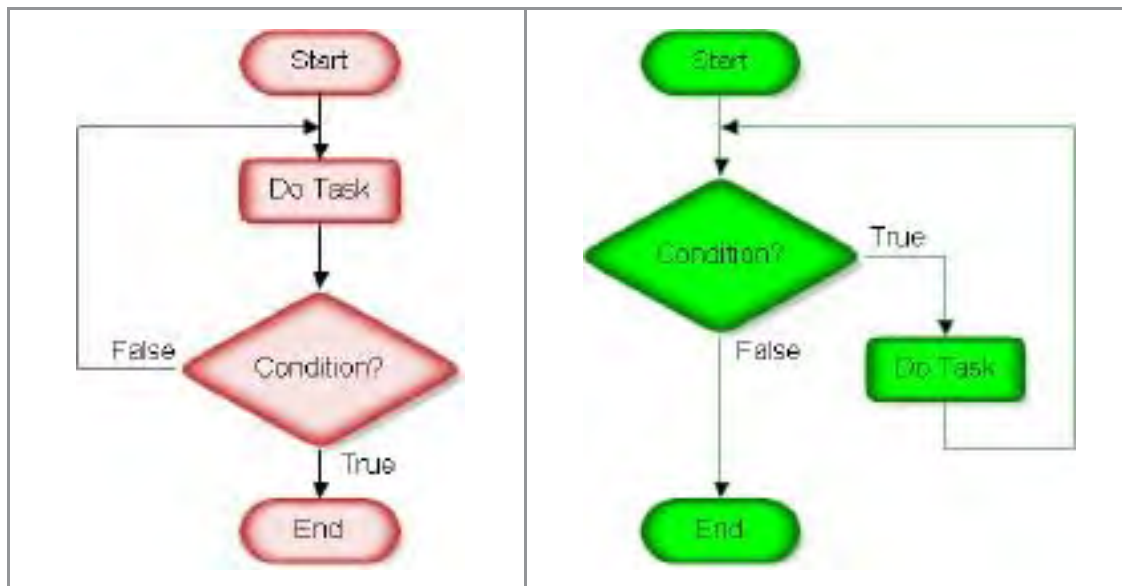
The Flowchart Symbols and their Usage

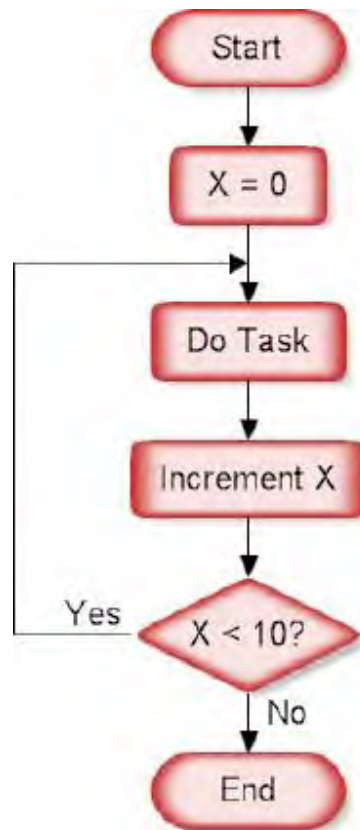
<p>Terminal or Terminator Shape</p> 	<p>This shape tells you where the flowchart begins and ends. It shows the entry point of your flowchart and the exit point. To designate the start of your flowchart, you would fill this shape with words like Start or Begin. The words you use are up to you.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; border-radius: 15px; padding: 5px 10px; text-align: center;">Start</div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px 10px; text-align: center;">Begin</div> </div> <p>To designate the ending point of the chart, this shape is filled with words like End, Exit, or Return.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; border-radius: 15px; padding: 5px 10px; text-align: center;">End</div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px 10px; text-align: center;">Exit</div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px 10px; text-align: center;">Return</div> </div> <p>Usually, a flowchart has one starting point. However, a flowchart can have as many ending points as needed.</p>
<p>Lines with Arrows</p> 	<p>You read a flowchart by following the lines with arrows from shape to shape. The lines with arrows determine the flow through the chart. Flowcharts are usually drawn from top to bottom or left to right. Numbering shapes is optional. Numbering is helpful if you have to refer to a shape in a discussion. But it does not determine the flow of control. That is determined by the lines with arrows.</p>
<p>Rectangle</p> 	<p>In most flowcharts, the rectangle is the most common shape. It is used to show a process, task, action, or operation. It shows something that has to be done or an action that has to be taken. The text in the rectangle almost always includes a verb.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;">Send the Order</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Process the Order</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Create Bill</div> </div>
<p>Decision</p> 	<p>A decision asks a question. The answer to the question determines which arrow you follow out of the decision shape. For example, in the shape below, if it is < 5, you follow the arrow down for Yes. If it is not < 5, you follow the arrow to the right for No.</p>  <p>The arrows flowing from the decision shape are usually labelled with Yes, No or True, False. But you can label them any way you want as long as the meaning is clear.</p>

<p>Circle</p> 	<p>If you need to connect to another page or another section of the chart, you can use a circle. You draw the line to the circle and label the circle with a letter. Then you place a copy of the circle where you want the flow to continue. This should be avoided, but sometimes is necessary.</p> 
<p>Input/Output</p> 	<p>A parallelogram is used to show input or output. Examples of input are receiving a report, getting an e-mail, getting an order, receiving data in some format, etc. Examples of output are, generating a report, sending an e-mail, faxing a message, etc.</p> 
<p>Document</p> 	<p>A rectangle with a curved bottom represents a document or report.</p> 
<p>Off Page Connector</p> 	<p>This shape means the flow continues on another page. A letter or page number in the shape tells you where to go. It is an alternative to using a circle.</p> 
<p>Stored Data</p> 	<p>This shape represents stored data. The data may be stored on a hard drive, magnetic tape or memory card of any storage device.</p> 

<p>Database</p> 	<p>A cylinder represents a data file or database. This shape can also represent the magnetic disc itself. A hard drive is referred as direct access storage since any sector on the drive can be accessed. A tape is sequential access storage as the data has to be read sequentially.</p> 
<p>Subroutine or Predefined Process</p> 	<p>A subroutine shape is used to flowchart a software program. Subroutines are portions of code that run and return to the execution. This allows you to write one subroutine and call it as often as you like from anywhere in the code. Subroutines make the code smaller and easier to test.</p> <p>Subroutines are also called pre-defined process.</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; text-align: center;">Collection Type-1</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Collection Type-2</div> </div>

Loop





In the above example, the task is performed 10 times X counts from 0 to 10 and repeats the task till the condition X reaches 9. A loop is denoted by the arrow moving back to the process box indicating perform process until the condition is satisfied.

A good flowchart should have a title, either on the chart or in the text of the document. It is sometimes helpful to include a key to the shapes, especially if you are using any non-standard shapes. Including the name of the author and date of last modification is also useful.

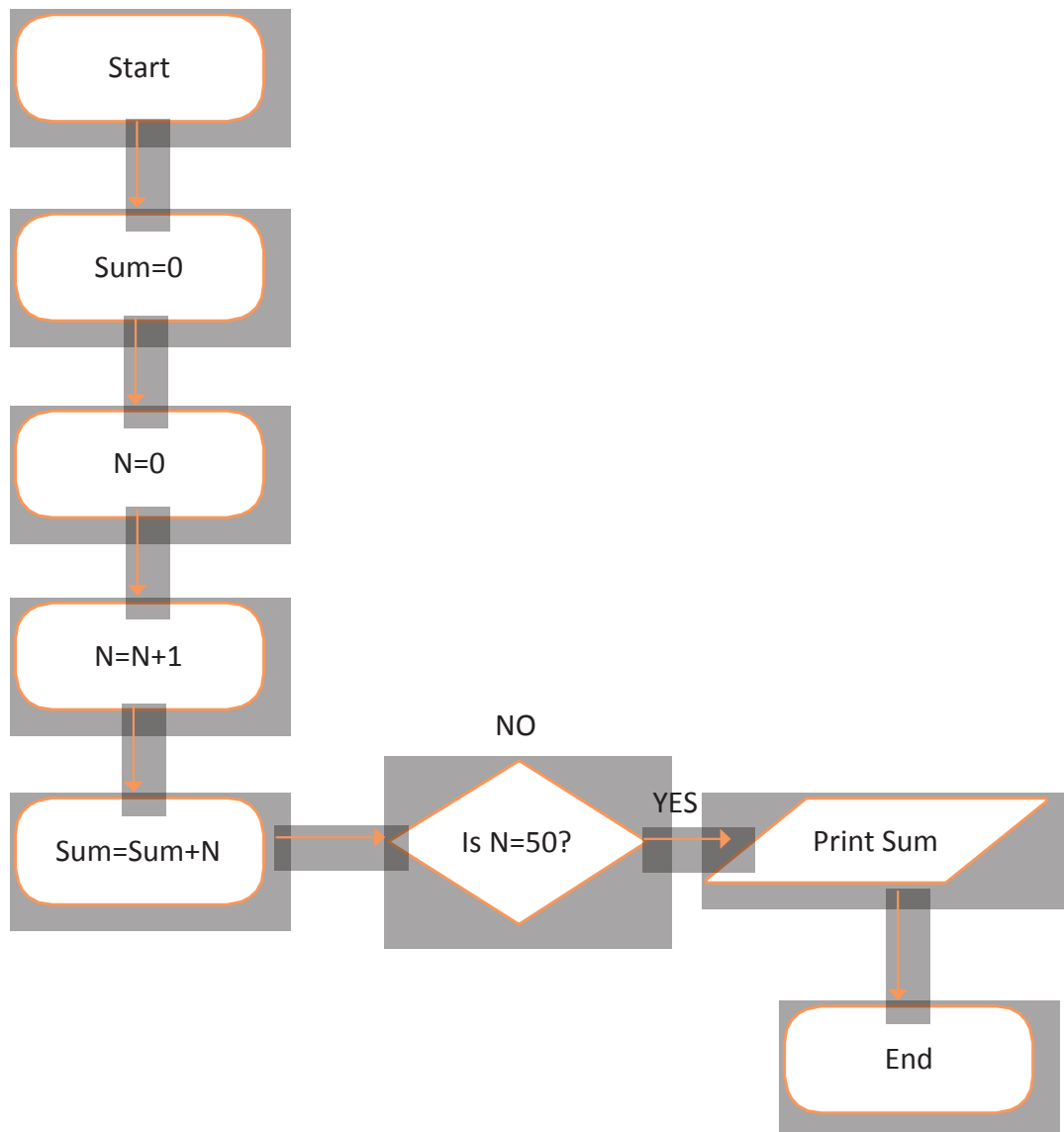
Examples: Flowchart

What is Flowchart?

A flow chart is a graphical or symbolic representation of a process. Each step in the process is represented by a different symbol and contains a short description of the process step. The flowchart symbols are linked together with arrows showing the process flow direction.

Example 1

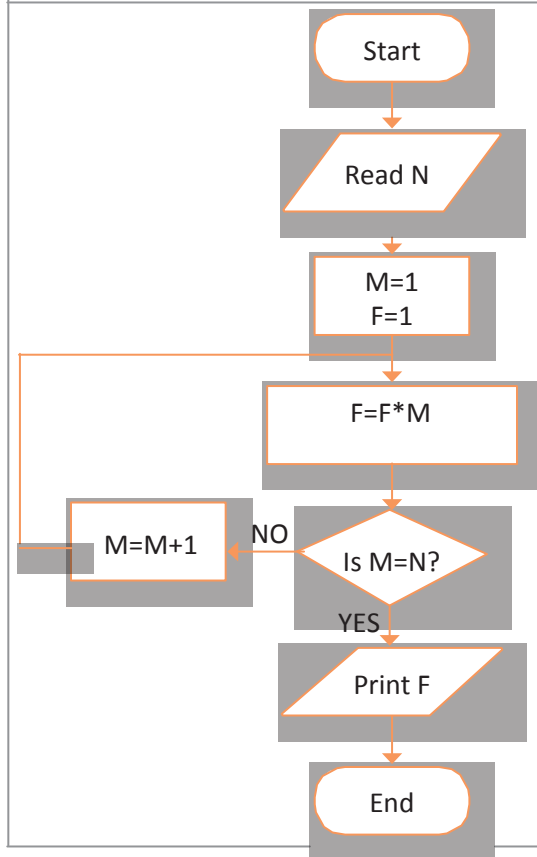
Draw a flowchart to find the sum of first 50 natural numbers.



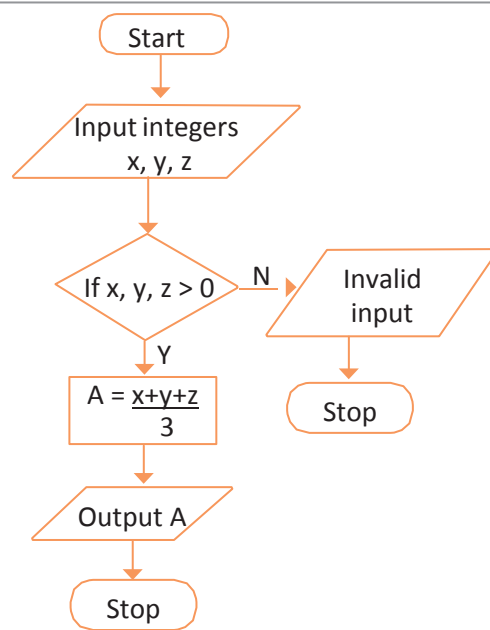
Example 2

Draw a flowchart for computing factorial N (N!).

Where $N! = 1 \times 2 \times 3 \times \dots \times N$.

**Example 3**

Average of 3 nos.



Note - For further reading refer to the website

Basics of C Programming

Significance and Features of C

C is a high-level programming language designed and written by the scientist “Dennis Ritchie” at AT and T Bell Laboratories USA, in 1972. C is an imperative (procedural) language. In 1989, the American National Standards Institute published a standard for C. Standard for C (“ANSI C” / “C89”) was published by American National Standards Institute in 1989. C is one of the most widely used general purpose programming language of all time.

Significance and Scope of C

Device Driver programs are exclusively written in C. It is the only language used for programming Embedded Operating Systems for various electronic appliances like microwave ovens, washing machines, etc. C exhibits better performance and speed as compared to other programming languages because of which it is used to build many popular gaming frameworks, professional 3D computer games etc.

Features of C

- **Modularity** – It is a structured programming language that supports top-down approach of programming paradigm that involves breaking down a complex problem into small sub-modules which are further subdivided into sub-routines and functions.
- **Portability** – Portability feature allows programs written on one computer to be executed on another without modifications. C programs written to work under UNIX operating system can be easily ported to work under MS-DOS operating system with little source code modifications.
- **Extensibility** – C program is basically a collection of functions that are supported by the C library. We can continuously add our own functions to the C library. With the availability of a large number of functions, the programming task becomes easier. Hence C exhibits extensibility feature.
- **Code-Reusability** – Besides the standard C function library, a programmer can easily create his own functions and use them over and over again in different applications.

Structure of a C Program

The structure of a C program is like rules to the programmer that must be followed while writing a C program. The general basic structure of C program is shown below.

# include <stdio.h> ----->	Preprocessor Directives
main ()	
{	
statements; ----->	Body of the main function
}	

The whole program is controlled within main () along with left brace denoted by { and right braces denoted by }. The main () function contains the program statements; the actual task to be executed. If you need to declare variables, then these are enclosed within { and } ,within the body of the main function.

C Character Set

Character set is a set of valid characters that a language can recognise. A character represents any letter, digit, or sign.

Character Set	Descriptions
Letters :	A, B,, Y, Z / a, b,, y, z
Digits :	0-9
Special symbols :	~ ' ! @ # % ^ & * () _ - + = \ { } [] : ; " ' < > , . ? /
White Spaces :	Blank Space , Horizontal Tab (à), Carriage Return, Newline, Form Feed
Other Characters :	C can process any of the 256 ASCII characters as data or as literals.

C Keywords

C Keywords are the reserved words that convey special meaning to the compiler. Reserved words cannot be used as identifier names while declaring variables or constants in C.

ANSI C has recommended 32 keywords:

1	auto	17	break
2	case	18	char
3	const	19	continue
4	default	20	do
5	double	21	else
6	enum	22	extern
7	float	23	for
8	go to	24	if
9	int	25	long
10	register	26	return
11	short	27	signed
12	size of	28	static
13	struct	29	switch
14	typedef	30	union
15	unsigned	31	void
16	volatile	32	while

C Identifiers

Identifiers are the fundamental building blocks of a program. Identifiers are used as a general terminology for the names given to the different parts of the program, viz variables, functions, arrays etc.

Rules for writing Identifiers:

- Identifiers can be alphanumeric (consisting of both letters and digits) but the first character must always be a letter or _(underscore).
- Identifiers can't use any special characters other than _(underscore).
- Keywords can't be used as Identifiers.
- Identifiers written in both lower case and upper case are permitted.

Examples:

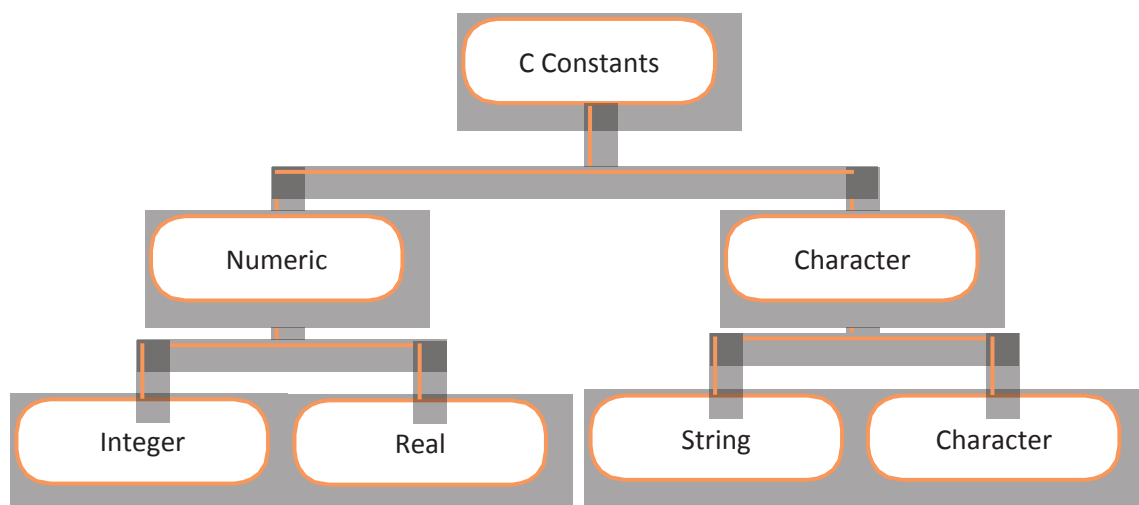
- My_Data
- _xy_z
- F13
- Name

You cannot use C key words in identifiers for example:

- Auto – Reserved keyword
- 2Row – Starting with a digit
- My. File – Contains special character (.)
- X-Y-Z- Contains special character (-)

C Literals/Constants

Literals are also referred to as Constants. Constants are the data items that never change their value during program execution.



Integer Constants

Integer Constants are the whole numbers without any fractional part .

Rules for writing Integer Constants

- An integer constant must have at least one digit.
- Integer constant should not contain any decimal point.
- Integer constant may contain + ve, - ve signs.
- A number with no sign is assumed to be + ve.
- Commas or blanks cannot appear in an integer constant.

Examples

- Integer constants in Decimal (Base 10) : 1234 , -34, +18
- Integer constants in Octal (Base 8) : 010 , 014
- Integer constants in Hexadecimal(Base 16) : 0XC, E16

Character and String Constants

A Character Constant in C can contain any one character (single alphabet, single digit, single special symbol) enclosed within the single quotation marks.

E.g.: 'u', 'K', '7', '*', :, etc

The maximum length of a character constant is of one character only.

A String Constant in C can contain any string comprising multiple characters (alphabets, digits, special symbols) enclosed within the double quotation marks.

E.g.: "You are a Boy ", "I Love Kites", "7_apples", "sue*2" etc

Real Constants

Real Constants are also called Floating Constants.They are the numbers comprising fractional parts.

Real constants can be written in one of the two forms:

- Fractional form
- Exponent form

A Real Constant in fractional form consists of signed or unsigned digits including a decimal point between digits.

Rules for writing Real Constants are as follows:

- A Real Constant in fractional form must have a decimal point in the form that it must contain at least one digit before a decimal point and one digit after the decimal point.
- A Real Constant may also have either +ve or – ve sign preceding it.
- A Real Constant with no sign is assumed to be positive.

Examples of some valid Real Constants in fractional form:

- a. 12.0
- b. -14.5
- c. - 0.009
- d. 6.756

Examples of some invalid Real constants in fractional form with reasons:

- a. 12 – No decimal point
- b. -14/2 – / is illegal symbol
- c. 6. – No digit after decimal point
- d. 6,75,600 – Commas are not allowed
- e. 0.00.9 – Two decimal Points are not allowed

A real constant in exponent form consists of two parts:

- a. Mantissa
- b. Exponent

For example. 8.9 can be written as $0.89 \times 10^1 = 0.89E01$, where mantissa part is 0.89 (part appearing before E) and exponent part is 1 (part appearing after E) .

Rules for writing a real constant in exponent form are as follows:

- a. A real constant in exponent form has two parts: a Mantissa and an Exponent.
- b. The mantissa must be either an integer or a proper real constant.
- c. Mantissa is followed by a letter E or e and the exponent.
- d. The exponent must be an integer.
- e. 132E03 , 3.45E08 , -0.132E-4 , 0.143E-4

Examples of some invalid real constants in exponent form

- a. 234.E4 : At least a digit must follow the decimal point
- b. 23.7E : No digit specified for exponent
- c. 0.123E3.4 : Exponent can't have fractional part
- d. 12,325E09 : Commas are not allowed
- e. 15E-6 : No preceding digit is written before the decimal point

Variables

Variables represent named storage locations, whose values can be manipulated during the execution of the program. These locations can contain integer, real or character constants depending upon the data type that is being used while declaring them.

In other words, Variables are the identifiers that are used to store certain values in our program for temporary and permanent use.

Example: To store name and marks of a student, we require storage locations called as Symbolic Variables like Name, Marks etc.

Unlike constants, the value of Variables can change several times during the execution of a program. Variables in C can be initialised or assigned to a value.

Rules for Constructing Variable Names

- A Variable Name can be any combination of 1 to 31 alphabets, digits or underscores. Do not create unnecessarily long Variable Names as it adds to your typing effort.
- The first character in the Variable Names must be an alphabet or underscore.
- No commas or blanks are allowed within a Variable Name.
- No special symbol other than an underscore (_) can be used in a Variable Name.
- It is a good practice to construct meaningful Variable Names.
Example: num_1, Count, _23D etc

Declaration of a Variable

The declaration of a Variable follows the Syntax:

<Data type name> <variable name>

Example: Int age, float Salary, double pie value, long double res . Here int and float are data types, age and salary are variable names.

To declare signed, unsigned variables, following modifiers must be used before the data type.

Example: unsigned int age, signed slot salary

Initialisation and Assignment of Variables

A simple declaration does not provide any first value to the variable, i.e. Variable is uninitialised and the variable's value is said to be undefined.

A Variable with a declared first value is said to be an Initialized Variable . An initial value may be specified in the definition of a Variable.

C supports Variable Initialization and assignment at the time of Variable definition .

Syntax for Variable-Assignment is:

<data type><variable-name> = <value> or <expression>

E.g. : Int age = 20 , float Salary = 12000.50

Data Types in C

Data Types in C can be of many types e.g. character, integer, real, string etc. They are the means to identify the type of data and associated operations of handling it.

C Data Types are of two types :

- a. Fundamental Data Types
- b. Derived Types

Fundamental Data Types:

C supports the following fundamental Data Types: integer, character, float and double.

Datatypes	Memory allocation
Integer	
short int	2 bytes
signed int	2 bytes
long int	4 bytes
Character	
char	1 byte
Decimal	
float	4 bytes
double	8 bytes

Derived Data Types

Derived Data Types are other Data Types that are derived from fundamental Data Types by using Declaration Operators.

Derived Data Types are as follows:

- a. Arrays
- b. Functions
- c. Pointers
- d. Structure
- e. Union

Operators in C

'C' supports the following operators:

- Arithmetic operators
- Assignment operators
- Equalities and relational operators
- Logical operators
- Conditional operators

Arithmetic Operator:

Operation	Operator	Operator Expression
Addition	+	a+b
Substraction	-	a-b
Multiplication	*	a*b
Division	/	a/b
Increment	++	a++, b++
Decrement	--	a--, b--
Modulus	%	a%, b

Pre and Post Increment Operators

- Pre Increment : ++i and --i
- Post-Increment : i++ and i--

int a = 9;

printf("%d\n", a++); -----> Output will be 9

printf("%d", a); -----> Output will be

Assignment operators are used to combine the '=' operator with one of the binary arithmetic operators.

Operator	Example	Meaning
==	x == y	x is equal to y
!=	x != y	x is not equal to y

Below is a table given to illustrate Assignment operators. Note that all the operations done below are using value of C as 9.

Operator	Example	Equivalent Statement	Result
+=	c += 7	c = c + 7	c = 16
-=	c -= 8	c = c - 8	c = 1
*=	c *= 10	c = c * 10	c = 90
/=	c /= 5	c = c / 5	c = 1
%=	c %= 5	c = c % 5	c = 4

Logical Operators

Logical Operators are useful when we want to test multiple conditions simultaneously .

There are 3 types of basic logical operators in C:

- AND – &&
- OR – ||
- NOT – !

Logical AND – (&&)

All the conditions must be true for the whole expression to be true.

Example: if (a == 10 && b == 9 && d == 1)

the *if* statement is true only when *a* == 10 **and** *b* == 9 **and** *d* == 1.

|| – Logical OR

The truth of one condition is enough to make the whole expression true.

Example: if (a == 10 || b == 9 || c == 1)

the *if* statement is true when any of *a*, *b* or *c* has the right value.

Logical NOT!

Logical Not is also called logical negation.

It reverses the meaning of a condition.

Example: if (!(points > 90))

means if points not bigger than 90

Conditional Operator

The Conditional Operator (?:) is used to simplify an If/Else statement.

Syntax:

Condition ? Expression1 : Expression2

if (Condition)

Expression1

else

Expression2

Precedence Rules

- Precedence rules are to be used when there is a combination of arithmetic operators in one statement. For example: $x = 9 * a - ++b \% 3$
- The precedence rules are needed to specify which of the operators will be evaluated first.

Sr No.	Precedence	Operator	Associativity Level
1	(highest)	()	left to right
2		unary	right to left

3		* / %	left to right
4		+ -	left to right
5	(lowest)	= += -= *= /= %=	right to left

4.1.3 First C Program

Structure of a C Program

```
#include <stdio.h>    header files for the program
#include <conio.h>

main()               main function
{
    Program Statements
    statement1;
    statement2;
    statement3;
}
```

The basic syntax is to first include the header files for the program. All C programs when executed, refer to the header library included. The header library contains the standard functions we will be using in the program statements.

The header file `stdio.h` contains the standard – input – output header library and `conio.h` is for displaying our program output on screen or console.

The structure of a C program is like rules to the programmer that must be followed while writing a C program. The whole program is controlled within `main ()` along with left brace denoted by “{” and right braces denoted by “}”. All program statements are ended with a semicolon (;) and enclosed within the body of the main function. The program is always written in small letters.

The `main ()` function can be preceded by documentation, preprocessor statements and global declarations. C program is a combination of functions, and `main()` is one such function. Every C program has only one main function.

First C program

Let us consider the following C program:

```
#include<stdio.h>
#include<conio.h>
main()
{
    clrscr();
    printf("HELLO WORLD");
    getch();
}
```

The printf() is a function which prints the output on screen. In our example statement within the double quotes is printed on screen as output.

The getch() waits for an input to be supplied from the key board and only on a key press the program ends. The getch() actually holds the output on screen and the control goes back to the editor on a key press.

The clrscr() command in the beginning gives a clears the output screen before the output is displayed.

The "C" program source code is saved with a file extension ".C".

Input Function

Suppose we want to input values from the keyboard to our program, C offers the input function – scanf(). This function accepts the input value in the variable specified. The syntax for scanf() is as follows:

```
scanf("%d", &x);
```

where the input value accepted is an integer specified by the "%d" symbol and stored in the variable "x". The integer value for – x is the input to be supplied from the keyboard. The "&" symbol before the variable x – is like a place holder to store the value input in the memory allocated for x.

Format Specifier	Datatypes	
%d	Integer	short int
%f	Float, Double	float, double
%ld	Integer	long int
%u	Integer	unsigned int
%c	Character	char
%s	Text	string

Formatted Output

The value in a variable is also printed using the format specifier as per the data type. For example: to print the value in variable “x” of data type the printf() statement will be:

```
printf("\nValue in variable x is %d", x);
```

The escape sequence “\n” will print the statement on a new line.

Declaring and Defining Variables

The variables need to be declared specifying the data type. The syntax for declaring variables:

```
int x;
```

```
char name;
```

```
float avg_val;
```

```
long int lx;
```

The data type is specified first, then the variable name and then end the statement with a semicolon. If a value is assigned to the variable the same becomes a variable definition for example:

```
int x = 10;
```

Example Program

```
#include <stdio.h>
```

```
#include <conio.h>
```

```
main()
```

```
{
```

```
    /* My first C Program – Average of 3 Numbers */
```

```
    int x, y, z;
```

```
    float a;
```

```
    clrscr();
```

```
    printf("Find Average of 3 numbers \n");
```

```
        printf("Enter the first number.. \n ");
```

```
        scanf("%d", &x);
```

```
        printf("Enter the second number.. \n ");
```

```
        scanf("%d", &y);
```

```
        printf("Enter the third number.. \n ");
```

```
        scanf("%d", &z);
```

```
    a=(x+y+z)/3.0;
```

```
    printf("Average of 3 numbers is..    %f, a);
```

```
    getch();
```

```
}
```

Declaring and Defining Variables

The variables need to be declared specifying the data type. The syntax for declaring variables:

```
int x;
char name;
float avg_val;
long int lx;
```

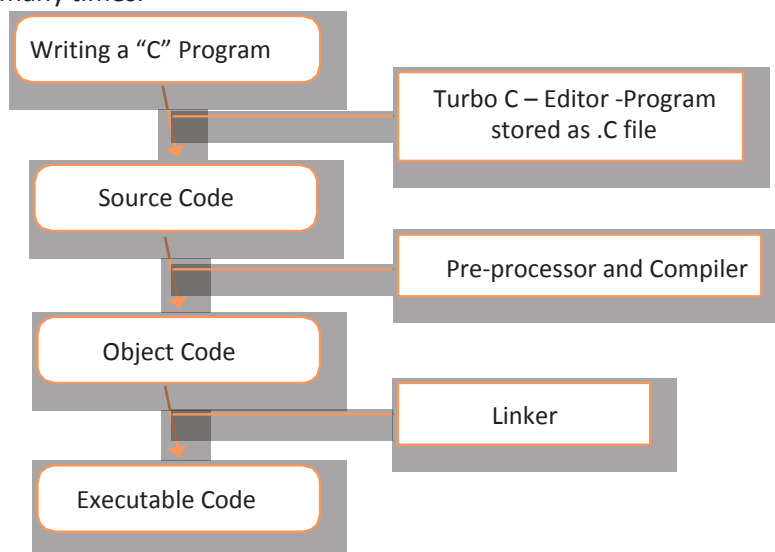
The data type is specified first, then the variable name and then end the statement with a semicolon. If a value is assigned to the variable the same becomes a variable definition for example:

```
int x = 10;
```

4.1.4 Turbo C Editor

Compiler

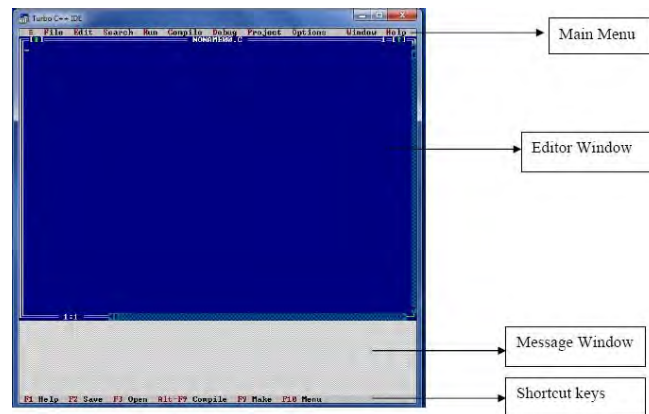
- The turbo C - Editor is an integrated tool to edit and compile c Program. A compiler is a program that translates readable source code in to machine code. This code can be then executed many times.



When you type a code and save the file, the .C program is called the source code. The Turbo C compiler first compiles the pre-processor commands, which includes the header files in the C program. Next, it compiles the program code to create an error free object code the .OBJ file. The object code is sent to the linker by the compiler to give us the final executable code.

Parts of Turbo C IDE

- Main Menu
- Editor Window
- Compiler Message Window
- Shortcut keys – quick reference bar



Main Menu Commands in Turbo C

- **File:** Loads and saves files, handles directories, invokes DOS, and exits Turbo C
- **Edit:** Invokes the Turbo C editor
- **Run:** Compiles, links and runs the program currently loaded in the environment
- **Project:** Manages multi-file project
- **Options:** Sets various compiler, linker and environmental options
- **Debug:** Sets various debug options

File Menu Commands in Turbo C

- **New:** Lets you edit a new file
- **Open:** Lets you open an already saved file to edit
- **Save:** Saves the file currently in the editor
- **Save As:** Lets you save the file in a different file name
- **Save All:** Lets you save all the open files
- **Change Dir.:** Changes the default directory to the one you specify
- **Print:** Lets you print an open file
- **DOS shell:** Loads the DOS command processor and lets you execute DOS commands
- **Quit:** Quits Turbo C

Run Menu Commands in Turbo C

- **Run:** Executes and compiles the current program
- **Program reset:** Terminates your program when it is being run in debug mode
- **Goto cursor:** Executes your program until it reaches the line of code where the cursor reaches the line of code where the cursor is positioned
- **Trace into:** Executes the next line or statement
- **Step over:** Executes the next line of code, but it does not trace into subroutines called

Compile Menu Commands in Turbo C

The Compile option allows to compile a file currently in the editor to a .OBJ file which can be linked to give a .EXE – an executable file.

Get info displays information about your program and the environment including how much free memory is available and the length of the file.

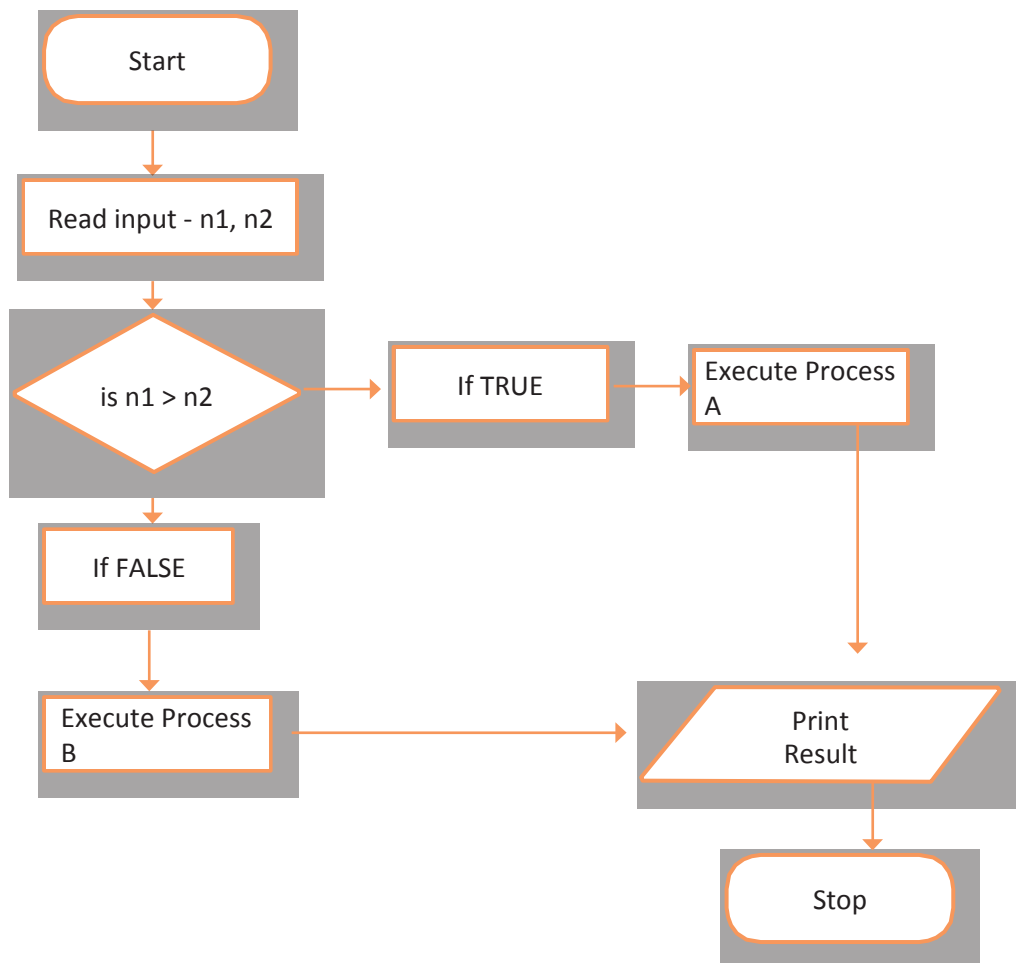
Other Menu Commands in Turbo C

- **Project:** Is used to aid the development and maintenance of large, multi-file programs
- Options:
 - Compiler
 - Save options
 - Linker
 - Retrieve options
 - Environment
 - Directories
 - Arguments
- **Debug:** Lets you control the way Turbo C's integrated debugger operates
- **Break/watch:** Lets you set break points in your program and define variables and expressions to be watched while your program executes
- **Message Window:** Used to display various compiler or linker messages; when a program is running, the message window becomes the watch window, which is used to display debug information
- **HotKeys:** Hot keys are shortcut keys. By pressing the combination of the keys from the keyboard the hot keys allow to navigate in the editor window and perform some frequently used tasks or commands.

4.1.5 Decision Making and Branching

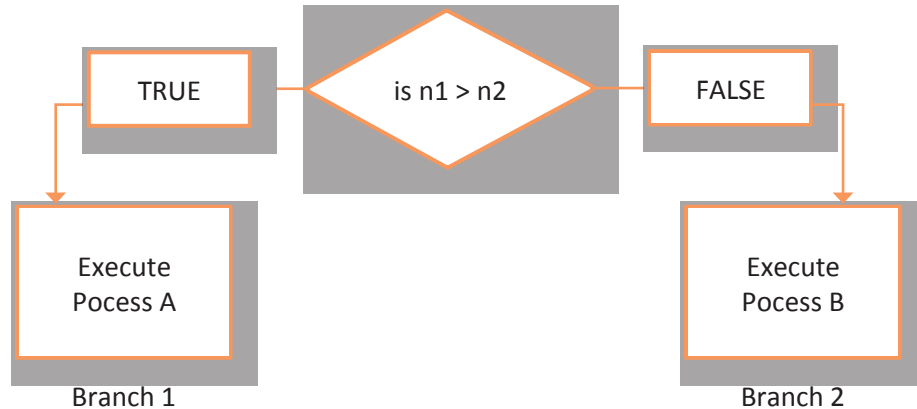
The decision making constructs in programs allows making logical (true/false) decisions, based on the condition they are in. In C language programming we have statements for decision making which are known as Conditional statement. The If statement and the Switch statement constructs are conditional statements used in C.

Decision Making Flowchart



Branching

As a result of the condition checked the program code branches to execute a series of code. Thus, the flow of a program can be changed by using conditional statements.



Example: Program

As a result of the condition checked the program code branches to execute a series of code. Thus, the flow of a program can be changed by using conditional statements.

<p>Syntax</p> <pre> if (condition) { expr_set1; } else { expr_set2; } </pre>	<p>Program :</p> <pre> #include<stdio.h> int main() { int x, y; printf("Enter value for x :"); scanf("%d",&x); printf("Enter value for y :"); scanf("%d",&y); if (x > y) { printf("X is large number - %d\n",x); } else { printf("Y is large number - %d\n",y); } } </pre>
---	--

Header file

main function

variables

Input/output statements

Decision making statement

Simple If-Else Structure

A simple If-else checks for only two alternatives – true or false. If the check condition is true the block of statements for true is executed, else the program control moves to the else block.

```
if(r == 1)
    printf("this is true block");
else
    printf("this is else block");
```

Nested If-Else

It is a conditional statement used to check more than one condition at a time in the same program. The conditions are executed from top to bottom checking whether each "If" meets the criteria or not. If the condition is found true then it executes the block of code, else the control goes to the next condition to be executed.

```
if(condition 1)
{
    ...statements;
if(condition 2)
{
    ...statements;
}
else
{
    ...statements;
}
}
else
{
    ...statements;
}
```

Example: Program

Program to check the number entered is less than or greater than or equal to zero:

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int n;
    clrscr();
    printf("\n Enter any number :");
    scanf("%d" , &n);
    if(n > 0)
    {
        printf("The Number Entered is Positive\n");
    }
    else
    {
        if(n == 0)
        {
            printf("The Number Entered is ZERO\n ");
        }
        else
        {
            printf("Number Entered is Negative\n");
        }
    }
    getch();
}
```

Switch Case

C offers another control structure for checking multiple conditions called the Switch case. The number of choices is defined in the switch variable and the checks are defined in the case statements.

The Switch-case code first evaluates the switch expression – the value it gives is matched with the case statements. When a match is found the case statement is executed; If no match is found the default case statement specified is executed. A Break statement is specified in each case for the program control to break out of the case if a match is found.

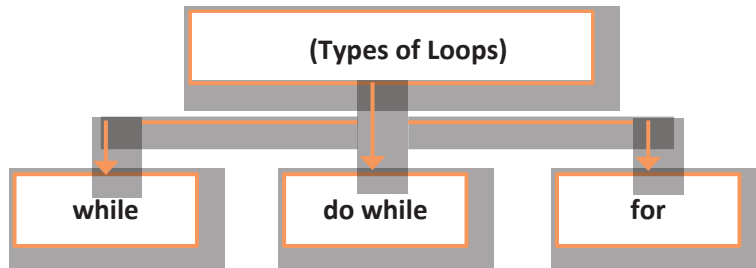
Syntax:

```
switch (my_option)
{
    case 1:
        option_statement1;
        break;
    case 2:
        option_statement2;
        break;
    case 3:
        option_statement3;
        break;
    case 4:
        option_statement4;
        break;
    default:
        option_default statement;
}
```

Note - For further reading refer to the website

Loops

A Loop is used to repeat a set of program instructions until a condition is satisfied. C offers three kinds of Loops.



Loops are also called Iteration Statements.

While Loop

The most basic loop is the While loop. There are three basic requirements for any Loop:

- **Initialization** – Start point of the loop
- **Condition** – Control point when the loop should terminate
- **Counter** – to increment or decrement the loop value

The while is an entry control loop. We need to specify the condition for the loop to terminate at the start of the loop.

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int ctr = 1;
    while(ctr<=10)
    {
        printf("\n %d \n", ctr);
        ctr = ctr + 1;
    }
    printf("\n End of Loop \n");
    printf("\n End of Program \n");
    getch();
}
```

Do-while Loop

the top of the loop the Do-while checks the condition at the end of the loop. So the Do-while loop is executed atleast once. Generally, the Do-while loop is used in a menu selection, where you want the user to enter a valid response and an invalid response can cause a re-prompt of the selection menu within.

the do-while.

```
#include<stdio.h>
#include<conio.h>
void main()
{
int i = 1, n = 0;
clrscr();
printf("\n Enter a Number ");
scanf("%d", &n);
printf("\n Print %d numbers in sequence starting from 1 to %d", n);
do
{
printf("%d", i);
i++;
} while(i<=n);
printf("\n End of Loop\n");
printf("\n End of Program\n");
getch();
```

For Loop

The For loop consists of a large expression within the parenthesis. The expression is composed of three fields: initialization, test condition and counter. Each field is separated by a semicolon.

Syntax:

```
for(i=1; i<=10; i++)
{
printf("\n %d HELLO! \n", i);
}
```


Functions

Functions are small routines or set of instructions that can carry out specific tasks. Functions in C can be classified into:

- C Library Functions
- User-defined Functions

The ready Functions like the `printf()` and `scanf()` in our programs are from the C Library. Apart from these ready functions you can write your own Functions and make them part of the C Library. Such Functions are called user defined Functions.

Need for Functions

Writing Functions avoids rewriting the same block of code over and again to carry out a task exactly in the same way at various stages of a program.

Functions are also useful when you need to breakdown a complex program into logical parts. Separating the code into modular functions breaks down a complex code to manageable tasks.

Return Value of Functions

Functions work in several ways:

- They immediately carry out a task.
- They send a message to the computer hardware or the Operating System.
- They return information from the computer.

Like all other C functions – a user defined function also can carry out these actions.

Functions always return a value whenever used. All Functions, necessarily, generate a result or process any value. Functions without return values are like procedures – just carry out the task specified.

`main()` is also a Function with the task as program statements within the curly braces. The compiler generates warnings if main Function is not defined with a return type. To avoid this we can have `main return – void` (nothing).

Syntax:

```
void main( )
{
    Statements;
}
```

We can also have the main Function, return an integer, then the syntax will change to:

```
int main( )
{
    Statements;
    return (0);
}
```

Every Function, except those returning void, should have at least one Return statement.

Need for Functions

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```

We can also have the main Function, return an integer, then the syntax will change to:

```
int main( )
{
    Statements;
    return (0);
}
```

Every Function, except those returning void, should have at least one Return statement.

Writing Functions in C

User – defined Functions are declared and defined in the same way as variables. A function declaration has no body and is terminated with a semicolon – just like in a variable. Defining a function is actual coding of the function...<pause>... it is describing the function for linking and compiling.

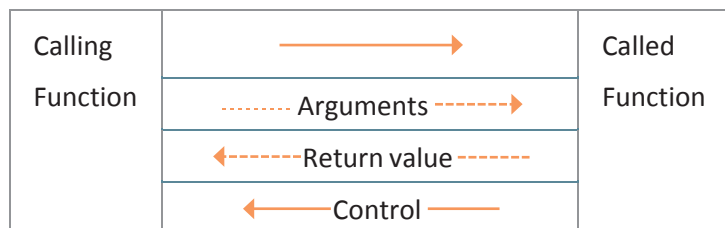
```
void newfunction();           // declaration – no body
void newfunction()           //definition – actual coding
{
    printf("\n this is a sample function\n");
}
```

If we need our Function to generate a result or return a value we will need to specify the Return Type and the Return Statement. The value returned can be any data type.

return type function name (list of arguments)

```
{
    Body of the function;
    return(value);
}
```

When a Function is called, the control moves to the called Function and the code is executed. The control passes back to the calling Function with return Value if specified. The block of code in the curly brackets is the task to be carried out by the Function.



The calling function is the “caller” from where the control passes to the called function. The control returns back to the calling function once the function is executed. Arguments passed to a function are its parameters. The calling function and the called function communicate through the arguments and return value.

Function declaration is always done before the main() but can be defined before the main – or after the main.

Program to add two numbers using a function:

```
#include <stdio.h>
#include <conio.h>
int add(int, int);
int add (int p, int q)
{
```

```

int r = p + q;
return(r);
}
void main( )
{
int r;
r = add(15,25);
printf("The sum of p and q is %d", r);
getch( );
}

```

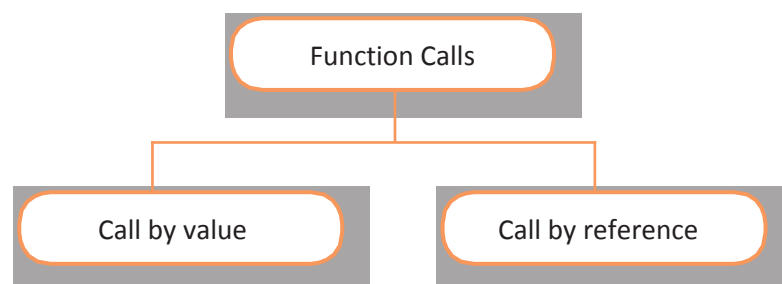
Function Categories

Based on the arguments and return values, functions can be categorised into:

1. **Functions with no arguments and no return values** This type of function does not return any value and does not pass data to the calling function.
2. **Functions with arguments and no return values** This type of function takes arguments but does not return a value back to the caller function.
3. **Functions with arguments and return values** Commonly - used function category – since it can facilitate a two-way communication. Arguments can be passed from the caller function to the called function and the result data can be returned to the caller function.
4. **Functions with no arguments but with return values** The best example of this kind of function is getch() which has no arguments but waits for a return value.

Function Calls

Function calls are of two types:



Call by Value

Example:

```

#include<stdio.h>
#include<conio.h>
void swap(int, int);
void swap(int p, int q)
{

```

```

int temp;
printf("\n now function swap .. p is %d and q is %d \n");
temp=p;
p=q;
q=temp;
printf("\n function swap executed.. values of variables..\n");
printf("\n Now p is %d and q is %d", p, q);
}
void main()
{
int a =10, int b= 20
printf("\n value before swap\n");
printf("\n value of a is %d value of b is %d", a, b);
swap(a,b);
printf("\n value after swap\n");
printf("\n value of a is %d value of b is %d", a, b);
}

```

Output:

```

value before swap
value of a is 10 value of b is 20

now function swap .. p is 10 and q is 20
function swap executed.. values of variables
Now p is 20 and q is 10

value after swap
value of a is 10 value of b is 20

```

The task of this function is to swap – the values of integers “p” and “q”. But you will notice that the values of “a” and “b” remains unchanged after the function call. This shows that all the changes have happened to the function variables and the original variables main remains unchanged.

Call by Reference

The same swap program here has been modified to Call by Reference – using the address operator “&” in the calling function arguments. The function definition holds the pointer variables – which points to the addresses of the variables. The result here is – the values of the variables in main (original) also changes.

The %u is used to print the address of the variable as unsigned integer and the “&” before the variable name specifies address of the variable.

```
#include<stdio.h>
#include<conio.h>
void swap(int *p, int *q)
{
    int temp;
    printf("\n now function swap .. p is %d and q is %d \n");
    temp=*p;
    *p=*q;
    *q=temp;
    printf("\n function swap executed.. values of variables..\n");
    printf("\n Now p is %d and q is %d", p, q);
}
void main()
{
    int a =10, int b= 20
    printf("\n value before swap\n");
    printf("\n value of a is %d value of b is %d", a, b);
    printf("\n address of a is %u value of b is %u",&a, &b);
    swap(&a,&b);
    printf("\n value after swap\n");
    printf("\n value of a is %d value of b is %d", a, b);
    printf("\n address of a is %u value of b is %u",&a, &b);
    getch();
}
```

Arrays

- An Array is a collection of similar type of data stored under a unique name.
- The value in an Array is called as Elements of an Array.
- These Elements are accessed by numbers called as Subscripts or Index Numbers.
- Array is also called as 'Subscripted Variable'.

Types of Arrays

1. One - dimensional Arrays

The Array which is used to represent and store data in a linear form is called as 'single or one dimensional Array'.

2. Two - dimensional Arrays

The Array which is used to represent and store data in a tabular form is called as 'two dimensional Array.' Such type of Array specially used to represent data in a matrix form.

3. Multi - dimensional Arrays

Multidimensional Arrays can be described as "Arrays of Arrays"

Two - Dimensional Array

Syntax:

<Data-type> <Array_nm> [row_subscript][column-subscript];

Example: `int a[3][3];`

Memory Allocation:

	<div> <div></div> <div>Row</div> </div>			
<div> <div>j</div> <div>Column</div> </div>	a [0] [0]	a [0] [1]	a [0] [2]	a [i] [j] element
	a [1] [0]	a [1] [1]	a [1] [2]	
	a [2] [0]	a [2] [1]	a [2] [2]	

Limitations Of Two-dimensional Arrays

- We cannot delete any element from an Array easily.
- If we don't know that how many elements have to be stored in a memory in advance, then there will be memory wastage if large Array size is specified.

Example: Two-dimensional Arrays

```
#include <stdio.h>
```

```
#include <conio.h>
```

```
void main()
```

```
{
```

```
int a[3][3], i, j;
```

```

clrscr();
printf("\n\t Enter matrix of 3*3 : ");
for(i=0; i<3; i++)
{
    for(j=0; j<3; j++)
    {
        scanf("%d",&a[i][j]); //read 3*3 Array }
    }
}
printf("\n\t Matrix is : \n");
for(i=0; i<3; i++)
{
    for(j=0; j<3; j++)
    {
        printf("\t %d",a[i][j]); //print 3*3 Array } printf("\n");
    }
}
Printf("\n");
}
getch();
}

```

Multidimensional Arrays

Syntax:

Data_type Array_name [size1][size2][size3];

Example: int numbers [2][1][3];

- Memory Allocation

	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
row 1	a [0] [0]	a [0] [1]	a [0] [2]	a [0] [3]	a [0] [4]	a [0] [5]
row 2	a [1] [0]	a [1] [1]	a [1] [2]	a [1] [3]	a [1] [4]	a [1] [5]

Example: Multidimensional Arrays

```

main()
{
    int a[2][2][2];
    int i,j,k;
    for(i=0;i<2;i++)
    for(j=0;j<2;j++)
        for(k=0;k<2;k++)
        {
            printf("i= %dnj=%dnk=%dnnn ",i,j,k);
            printf("enter the value to store at the specified
position");
            scanf("%d",a[i][j][k]);
        }
    getch();
}

```

Practice

Write a program that accepts 10 numbers in an Array and reverse it and display.

```

#include<stdio.h>
#include<conio.h>
void main()
{
    int a[10],i,n;
    printf("enter
elements");
    scanf("%d",&n);
    for(i=0;i<=n;i++)
    scanf("%d",&a[i]);
    for(i=n-1;i>=0;i--)
    printf("%d\t",a[i]);
}

```

Example: Multidimensional Arrays

```

main()
{
int a[2][2][2];
int i,j,k;
for(i=0;i<2;i++)
for(j=0;j<2;j++)
for(k=0;k<2;k++)
{
printf("i= %dnj=%dnk=%dn\n",i,j,k);
printf("enter the value to store at the specified
position");
scanf("%d",&a[i][j][k]);
}
getch();

```

Practice

Write a program that accepts 10 numbers in an Array and reverse it and display.

```

#include<stdio.h>
#include<conio.h>
void main()
{
int a[10],i,n;
printf("enter elements");
scanf("%d",&n);
for(i=0;i<=n;i++)
scanf("%d",&a[i]);
for(i=n-1;i>=0;i--)
printf("%d\t",a[i]);
}

```

Practice

Write a program that accepts 10 numbers in an Array and reverse it and display.

```

#include<stdio.h>
#include<conio.h>
void main()

```

```

{
int a[10],i,n;
printf("enter elements");
scanf("%d",&n);
for(i=0;i<=n;i++)
scanf("%d",&a[i]);
for(i=n-1;i>=0;i--)
printf("%d\t",a[i]);
}

```

Strings

A string is a single dimensional Array of characters terminated by a null character (\0). "C" automatically inserts the null character at the end of the string. Elements in a character Array or a String is accessed in the same way as in numerical Arrays.

"C" offers a simple way to display strings – using the format specifier - %s.

```

#include<stdio.h>
#include<conio.h>
void main()
{
/* Program to display a string using the percent - s */
char arr[ ] = "welcome";
clrscr();
printf("\n Printing character Array\n");
printf("%s", arr);
getch();
}

```

String Functions

and many more. These functions can be used directly in a 'C' program to manipulate strings.

String Functions	Description
strlen ()	Finds the length of a string
strlwr ()	Converts a string to lower case
strupr ()	Converts a string to upper case
strcat ()	Appends one string to the end of another
strcpy ()	Makes another copy of a string
strcmp ()	Compares two strings

strcmp ()	Compares two strings without regard to case
strnset ()	Sets the first n characters of a string to a given character
strrev ()	Reverses a string
strdup ()	Duplicates a string
strchr ()	Finds the first occurrence of a given character in a string
strstr ()	Finds the first occurrence of a given string in another string
strset ()	Sets all characters of string to a given character

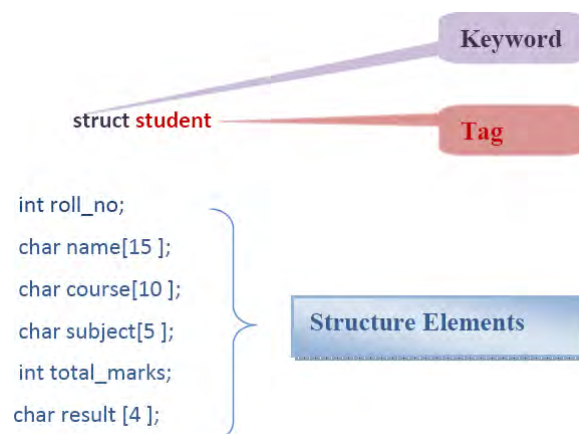
4.1.9 Structures

Introduction

Suppose you want to store details of students – the name, course, subject, roll number, test marks and result again – all of different data types and the data is related to a particular student. Then instead of constructing individual arrays for storing values of each item in the group, you can use “STRUCTURE”. A Structure is a group of logically related data items.

```
struct student
```

```
{
int roll_no;
char name[15 ];
char course[10 ];
char subject[5 ];
int total_marks;
char result [4 ];
};
```



Format of Structure

The general format of a Structure is using the key word “STRUCT”, then the structure name or tag name, followed by the members, that is the fields of the Structure. Each field is a declaration statement and the variables declared are members of the Structure. These fields are called “STRUCTURE ELEMENTS” or “STRUCTURE MEMBERS”.

Accessing the Elements of a Structure

Just as in arrays, the elements of a Structure are also stored as consecutive memory locations. An object of the type ‘struct’ is created to establish connection of the Structure with its member elements.

```
struct student
{
int roll_no;
char name[10];
char course[10];
char subject[10];
int total_marks;
char result[5];
};
struct student s;
```

The link or connection is established by using a “dot” or “period” operator.

The member element is always prefixed with the object of the Structure.

For example:

```
printf("enter name:");
scanf("%s", &s.name);
printf("Roll No: %d \n", s.int roll_no);
printf("Name: %s \n", s.name);
printf("Course: %s \n", s.course);
printf("Subject: %s \n", s.subject);
printf("Marks :%d \n", s.test_marks);
printf("Result: %s \n", s.result);

for(j=0; j<3; j++)
```

Exercise



I. Read the following questions. Choose the correct answers.

1. Which of the following special symbol is allowed in a variable name?

- i. * (asterisk)
- ii. | (pipeline)
- iii. - (hyphen)
- iv. _ (underscore)

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2. Array is a kind of

- i. Fundamental data type
- ii. Integer
- iii. Derived data type
- iv. None of the above

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3. The expression if ($x==y$) in 'C' means

- i. Assign value y to x
- ii. Compare if x is equal to y
- iii. Assign value x to y
- iv. None of the above

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4. What is the shortcut key to compile a C Program in the Turbo C – Editor?

- i. F9
- ii. F8

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iii. Alt + F9

iv. Ctrl + F9

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5. Under which Menu do the breakpoints appear?

i. File

ii. Run

iii. Options

iv. Debug

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6. What is the file extension name of a "C" program source code?

i. .C

ii. .turbo

iii. .Source

iv. None of the above

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7. What is the Shortcut Key to Run a C Program in the Turbo C – Editor?

i. F9

ii. F8

iii. Alt + F9

iv. Ctrl + F9

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8. The condition in a While is checked at the

- i. top of the loop
- ii. end of the loop
- iii. inside the loop
- iv. None of the above

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9. When the condition becomes false the control comes

- i. to the start of the loop again
- ii. out of the loop
- iii. end of the program
- iv. None of the above

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10. All Functions necessarily, generate a result or process any value which is called:

- i. arguments
- ii. return value
- iii. data type
- iv. None of the above

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11. The Argument passed in the Call by Reference method holds

- i. the address of the variable
- ii. the value of the variable
- iii. the return value
- iv. None of the above

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12. The condition in a While is checked at the

- i. top of the loop
- ii. end of the loop
- iii. inside the loop
- iv. None of the above

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13. When the condition becomes false the control comes

- i. to the start of the loop again
- ii. out of the loop
- iii. end of the program
- iv. None of the above

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14. All Functions necessarily, generate a result or process any value which is called:

- i. arguments
- ii. return value
- iii. data type
- iv. None of the above

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15. The Argument passed in the Call by Reference method holds

- i. the address of the variable
- ii. the value of the variable
- iii. the return value
- iv. None of the above

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16. What will happen if in a C program you assign a value to an Array element whose subscript exceeds the size of Array?

- i. The element will be set to 0.
- ii. The compiler would report an error.
- iii. The program may crash if some important data gets overwritten.
- iv. The Array size would appropriately grow.

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17. Which of the following statements mentioning the name of the Array begins DOES NOT yield the base address?

- i. When Array name is used with the sizeof operator.
- ii. When Array name is operand of the & operator.
- iii. When Array name is passed to scanf() function.
- iv. When Array name is passed to printf() function.

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18. Which of the following statements are correct about 6 used in the program?

```
int num[6];  
num[6]=21;
```

- i. In the first statement 6 specifies a particular element, whereas in the second statement it specifies a type.
- ii. In the first statement 6 specifies an Array size, whereas in the second statement it specifies a particular element of Array.
- iii. In the first statement 6 specifies a particular element, whereas in the second statement it specifies an Array size.
- iv. In both the statements 6 specifies Array size.

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19. The Structure elements can be accessed using the

- i. %s format specifier
- ii. object and dot operator
- iii. %struct
- iv. None of the above

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20. Each variable declared in the Structure is

- i. a member of the structure
- ii. a special variable
- iii. a pointer
- iv. None of the above

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II. Read the following questions. Choose the correct answers.

1. Find the error in the

```
program: main();  
{  
    printf("this is my first program in C\n");  
}
```

2. Write a simple program in C to input two integer values and add them. Print the result of the addition.

III. Read the following questions. Choose the correct answers.

1. What will be the output of this program if the user enters a value 50 for x? Explain why?

```
main()
{
    int x;
    printf("enter a value for x: ");
    scanf("%d", &i);
    if (x=1)
    {
        printf("you have entered value %d for x");
        printf("\n this is if – statement executed\n");
    }
    else
    {
        printf("you have entered value %d for x");
        printf("\n this is else – statement executed\n");
    }
    printf("end of program");
}
```

- i. You have entered value 50 for x
this is if-statement executed
end of program
- ii. You have entered value 50 for x
this is else-statement executed
end of program
- iii. Program will show compile error
- iv. None of the above

Reason:

2. Write the If-else code for the following conditions:

- i. If key entered is "x" – perform the operation1
- ii. If key entered is "y" – perform the operation2

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

UNIT 4.2: Analyze Various Concepts of PHP

Unit Objectives



At the end of this unit, you will be able to:

1. explain PHP
2. explain basic syntax and usage of PHP
3. practice basic coding in PHP
4. explain the basic built in functions in PHP
5. explain Classes Objects in Object Oriented Programmning

What is PHP (PHP Hypertext Preprocessor)

- PHP is open source software that is used for Server side scripting language.
- PHP supports and interacts with many databases.
- PHP can be used to create a highly interactive web application that can be used by many users over the internet. PHP file contains PHP code apart from the normal HTML text. The PHP code is executed on the server side before generating a response page to the end user.

Why PHP?

- PHP is portable and can run on different operating systems. It is supported and compatible with most of the servers that are used today.
- PHP is open source and comes with free of cost to use. PHP can be downloaded from the official resource: www.php.net whenever required.
- PHP syntax is based on programming languages like C and PERL. PHP is easy to learn and it runs efficiently on the server side.

Basic Syntax of PHP

PHP file contains both HTML and PHP Scripting tags. PHP Scripting Elements are enclosed within

```
<?php
```

```
?>
```

Example: Prints Welcome Message in the Web Browser

```
<?php
```

```
    echo "Welcome to PHP Scripting";
```

```
?>
```

Output on the Web Browser

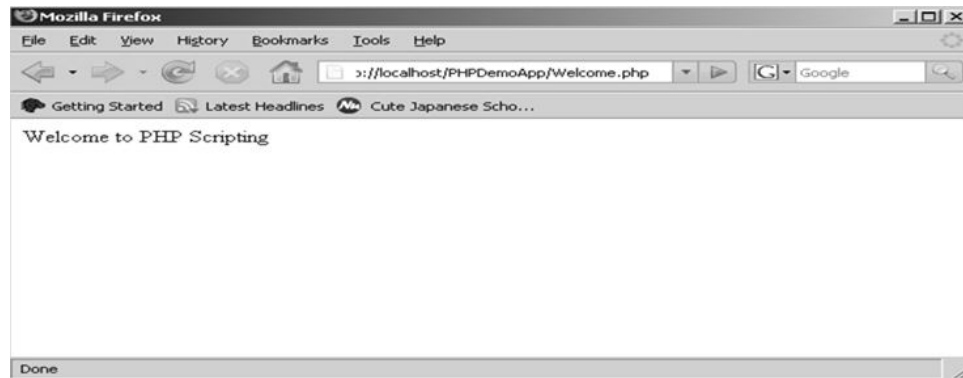


Fig. 4.2.1. Welcome Message

PHP Statement Terminator and Case Insensitivity Feature

- A PHP statement is terminated by a semicolon.

```
<?php
```

```
    echo "PHP is a scripting language";
```

```
    echo "PHP is portable across many operating systems";
```

```
?>
```

- Keywords and functions in PHP are case insensitive.

The following statements convey the same meaning for the PHP interpreter.

```
print("All is Well");
```

```
PRINT("All is Well");
```

Embedding PHP in HTML

A PHP block can be embedded in HTML using `<?php` blocks within a HTML code.

`?>`. There can be multiple PHP

Example : Embed PHP tag in HTML

```
<html>
```

```
<body>
```

```
<font color="blue">
```

```
    Sample PHP Page.....
```

```
<br>
```

```
    <?php
```

```
        echo "PHP can be embedded in HTML...";
```

```
?>
```

```
</font>
```

```
</body>
```

```
</html>
```


The following message will be displayed on the Web Browser in blue color.

Sample PHP Page

PHP can be embedded in HTML

PHP block can also include the HTML tag enclosed within single or double quotes.

Example : Embed String

```
<html>
<font color="red">
<?php
    echo "Sample PHP Page";
    echo "PHP can be embedded in HTML";
echo "<br>";
?>
</font>
</html>
```

The following message will be displayed on the Web Browser in Red color:

Sample PHP Page

PHP can be embedded in HTML

Comments

Comments can be used to document and explain the code for better readability. The PHP interpreter ignores the statements within the comments. PHP supports single and multi-line comments

- Single line comment - // or #
//This PHP block is used to validate a session code.
Or
#This PHP block is used to validate a session code.
- Multi line comment - /* */
/*

This is a Multi-Line Comment. Can be used to explain the code in detail

- */

Variables

Variables are used to store data. Variables in PHP are declared using a \$ symbol. Variables in PHP need not be declared before its usage. PHP variables are not bound to a particular type. They can hold any values within its life time. They are associated with the data type depending on the value assigned to it from time to time.

Syntax for declaring a variable

\$variable_name=value

Rules for Declaring a Variable

- A variable name must start with an alphabet or an underscore "_". A variable name should not contain spaces.
- A variable name can contain alpha numeric characters (a-z, A-Z, 0-9, and _).

Assigning value to a variable

```
$city="Chennai";
```

```
$married="true";
```

Example : Calculating area of a circle

```
<body>
<font face="arial">
<h3><b><i>Calculate Simple Interest</i></b></h3>
<?php
    $interest=2.12;
?>
<?php
$principle=3000;
$number_of_yrs=3;
$Simple_Interest=$principle*$number_of_yrs*$interest/100;
print "<hr>";
print "Principle=$principle<br>";
print "Years=$number_of_yrs<br>";
print "Interest=$interest<br>";
print "<b>Simple Interest: ".$Simple_Interest."</b><br>";
print "<hr>";
?>
</font>
</body>
```

Output for the above code



Fig. 4.2.2. Simple Interest Calculation

Constants

PHP constants are variables whose value cannot be changed once assigned. The naming conventions are similar to PHP variables, except that they do not have a leading \$ (dollar) sign.

Although it is possible to define case insensitive constants, it is recommended to use case sensitive constants for clarity and consistency

Constant can be declared using the following syntax

```
define("CONSTANT_NAME", value [, case_insensitive])
```

where

- "CONSTANT_NAME" is a string that represents the name of the constant variable.
- Value can be any valid PHP expression except arrays and objects.
- case_insensitive represents an optional Boolean value (true/false) . The default value for it is false
- case_insensitive represents an optional Boolean value (true/false) . The default value for it is false

Example: Usage of Constant

```
$radius=5;
define ("PI",3.14);
$circle_area=PI*$radius*$radius;
echo $circle_area;
```

Managing Variables

The isset() method helps us to check whether a variable is existing in the program, remove a variable and check the variable's Truth values

isset() returns a Boolean value depending on the variables defined in a PHP.

Example : Usage of isset

```
<?php
$city="Pune";
if(isset($city))
echo $city;
else
$city="Chennai";
echo "<br>";
?>
```

unset() un-declares an already declared variable and frees up the memory location that was used by it.

```
unset($city);
if(isset($city))
echo $city;
```

```
else
```

```
$city="Chennai";
```

empty() is used to check if a variable has not been declared or if its value is false. The variable's value will be converted to Boolean according to the rules and will be checked for truth-value. The rules applicable for Boolean Conversion will be discussed in the following section. Normally it is used to check the status of a form variable, if it contains the data or not.

```
if (empty($city)) {
```

```
print 'City Not Selected';
```

```
}
```

The empty() method returns to true, if \$city does not contain a value that evaluates to true.

Data Types

PHP supports 8 data types

Integers

Integers are whole numbers without any decimal point.

```
$price=2500
```

Range of Integer Data type

Integers in PHP are equivalent to C long type, which is machine dependent. For most of the common Operating System platforms, the largest integer is $2^{31} - 1$ (or 2,147,483,647) and the smallest integer is $-(2^{31} - 1)$ (or -2,147,483,647)

Double

Double values are numbers with a decimal point.

```
$discount_percentage=2.5;
```

Range of Double

Range of Double is equivalent to C double data type. It has a range of approximately $2.2E-308$ to $1.8E+308$ on most of the common operating system platforms,

Boolean

Boolean takes one of the two values: TRUE and FALSE.

```
$marital_status=true;
```

Code Snippet:

```
if (true)
```

```
    print(" condition is true ");
```

```
else
```

```
    print("condition is false");
```

Boolean Rules

The following are the rules to determine the “truth “ of a non-boolean value.

Boolean Rules Summary

Data Type	False	True
Integer	0	All non-zero values
Floating-Point	0.0	All non-zero values
String	Empty String: "" String with value 0: "0"	All other Strings
Null	Always false	Will never be True
Array	Empty Array	An array with one element at least
Object	Never	Always
Resource	Never	Always

Code Snippet:

```
$marital_status=1;
if($marital_status)
print "Married";
else
print "Single";
```

This code will produce an output: Married

NULL

The only possible value of NULL type is called NULL, which indicates an unassigned or an unknown value. NULL represents a PHP constant and is case insensitive.

The following statement assigns no value (null) to city.

```
$city=null;
$city=NULL;
```

A Variable when assigned NULL

1. evaluates to FALSE when used in a Boolean context.
2. returns FALSE when tested with IsSet() method.

String

Strings represent sequences of characters.

```
$quote="Learning never ends!!!"
```

Strings can be enclosed in single or double quotes, except that they behave differently during the access time. Strings within the single quotes are treated almost literally, while strings enclosed in double quotes replace variables with their values and treat certain specially interpreted character sequences differently. Double quotes can be used within single quotes and vice versa.

Single Quoted and Double Quoted Strings**Single Quoted Strings****Code Snippet: Using Single Quotes**

```
$quote='Failure is Success, if we learn from it';
print 'Quote for Today : $quote';
```

The output for the above code is

Quote for Today : \$quote

Code Snippet: Using Double Quotes

```
print 'Quote for Today: "Failure is Success if we learn from it";
```

The output for the above code is

Quote for Today: "Failure is Success if we learn from it

Single quote can be used within a single quote, by escaping it with the backslash. To escape a back slash we can use \\

```
$msg=' \' PHP Programming \'';
```

The above code produces the following output:

' PHP Programming'

Accessing Characters in String

Individual Characters within a string can be accessed using \$string(offset) format. We can use this notation to manipulate a String.

Code Snippet: To Write String Characters

```
$season="A";
$season {1}="u";
$season {2}="t";
$season {3}="u";
$season {4}="m";
$season {5}="n";
echo $season;
```

The above code will produce the output

Autumn

For accessing a character within in String, we use the valid offset/index. String index starts with 0

```
$day="Holiday!";
echo $day{0};           //will produce the output: H
echo $day{7};           //will produce the output: !
echo $day{15};          // error
```

Resources

Resource data type represents PHP's extension resources such as a file, database connection, or other external resource types.

Array

An array represents a collection of key/value pairs, where keys (or indexes) are mapped to values. An array index must be an Integral or String value whereas the value of an array can be of any type, including other arrays).

Code Snippet:

```
$season= array ("spring", "autumn", "winter", "summer");
echo $season[1];
will display autumn.
```

Object

Objects are instances of classes defined by the programmer. Class groups both attributes and functions that are specific to the class.

Example : Create Employee Object and access its attributes / behaviors

```
<?php
class Employee
{
    var $emp_id=0;
    var $emp_name=null;
    function get_empid()
    {
        return $this->emp_id;
    }
    function get_empname()
    {
        return $this->emp_name;
    }
}
$employee_obj=new Employee();
$employee_obj->emp_id=1;
$employee_obj->emp_name="Peter";
echo "Employee id:". $employee_obj->get_empid();
echo "<br>";
echo "Employee Name:". $employee_obj->get_empname();
?>
```

The code displays the following on the web browser

Employee ID id: 1

Employee Name: Peter

Output Function

Echo and Print are the two output statements in PHP that can be used to print contents on to the web browser. Using parenthesis for a function call is optional

```
echo "Survive"; // will produce the output : Survive
```

```
echo ("Survive"); // will produce the output: Survive
```

Echo

Multiple Arguments can be given when echo is used without parenthesis

```
echo "Time is what we want most", ", ", "but what we use worst";
```

echo when used with parenthesis, can accept only one argument. The above statement produces an error when used within the parenthesis.

Print

The print statement is very similar to echo, but different in two ways:

- Print can accept only one argument.
- Print returns a value, indicating whether the print statement was successful or not. Print returns 1 if the printing was successful and 0 otherwise.

```
Print 4000.75;
```

```
Print 'Trust';
```

4.2.3 Operators

Operators are meant to act on variables/constants and the data associated with them. Operators acting on a single operand are termed as Unary operators. Operators working on two operands are termed as binary operators and operators working on three operands are termed as ternary operators.

There are different types of operators:

- Arithmetic Operators
- Bitwise Operators
- Comparison Operators
- Logical Operators
- Incrementing/Decrementing Operator
- Concatenation Operator

Arithmetic Operators

Arithmetic operators are used to perform arithmetic operations such as addition, subtraction etc. Operations of arithmetic operators correspond to their respective mathematical operators except modulo operator. Modulo operator gives the remainder of a division of two values.

Operator	Name
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Modulo

Example : Usage of Arithmetic Operators

```
<?php
$n1=12.5;
$n2=19;
echo $n1+$n2;
echo $n1*$n2;
?>
```

Bitwise Operators

A bitwise operator operates on each bit of data. These operators are used for complementing the bits or performing bitwise AND, OR and XOR operations

Operator	Name
&	Bitwise AND
	Bitwise OR
^	Bitwise XOR(exclusive OR)

Comparison Operators

Comparison operators are used to compare the value of two operands and perform certain operations based on result of comparison. The result of the comparison yields true (1) or false(0) value.

Operator	Name
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to
= =	Equal to
!=	Not equal to

Code snippet

1. 25==72 results in false
2. 25!=72 results in true
3. 25<72 results in true
4. 25>72 results in false
5. 25<=72 results in true
6. 25>=72 results in false
7. 23=='24' results in true ---> Automatic type conversion

For Comparison Operators automatic type conversion will happen.

Logical Operators

Logical operators are used with comparison operators to determine if a given conditional expression is true or false. The logical operations AND, OR, and EXCLUSIVE-OR are supported by PHP.

Operator	Name
&&, AND	Logical AND
, OR	Logical OR
XOR	Logical Exclusive-or

AND operates on two Boolean expressions. If both expressions evaluate to True, the result is True. If any one of the expression evaluate to false, then the AND operator returns False.

OR operators on two Boolean expressions. If one of the expressions evaluates to True, the result is true. If both the expression evaluates to false, OR operator returns false.

XOR operates on two Boolean expressions. If only one of the expressions evaluates to True, XOR returns true. If both expressions evaluate to True or both expressions evaluate to False, XOR returns false.

Concatenation Operator

Concatenation operators are used to combine multiple strings into one string. The Dot(.) operator is used as a Concatenation operator.

Code Sample:

```
$string1="Welcome";
$string2="Peter";
echo $string1." ".$string2;
```

The above code displays the output:

Welcome Pete

Increment and Decrement Operator

PHP supports the usage of pre-increment and post-increment operators like C. This operator can be used with any variable without providing any direct value.

Operator	Name
\$a++	Post-increment
\$a--	Post-decrement
\$++a	Pre-increment
\$--a	Pre-decrement

Note: The increment/decrement operators do not have any impact on Boolean values.

Example : Usage of Pre/Post increment operators.

```
<?php
/* Post increment */
$a = 20;
echo "Value is 20: " . $a++ . "<br />";
echo " Value is 21: " . $a . "<br />";
/* Preincrement */
$a = 20;
echo "Value is 21: " . ++$a . "<br />";
echo "Value is 21: " . $a . "<br />";
?>
```

Ternary Operator

The ternary operator "?" works on three operands. It is a conditional operator that is equivalent to a if..then..else statement. The first operand takes a Boolean expression; if the expression evaluates to true then the value of the second operand is returned, else the value of the third operand is returned.

Syntax:

expression?operand1:operand2

Example: The following code checks the greatest of two values and prints the result accordingly

```
$x=10;
$y=20;
$res=($x>$y)?"$x is greater":"$y is greater";
echo $res;
```

The above code displays

20 is greater

Operator Precedence

Operator Precedence denotes the order of evaluation of operators within an expression. Operators with a higher precedence are performed before an operator that has a lower precedence.

For example, the expression "1 + 2 * 8 / 4" will be treated as "1 + (2 * (8 / 4))" and 5 is the result.

When operators are of the same precedence, their associativity decides whether they are evaluated beginning from the right, or from the left.

Operator according to the Precedence	Associativity
++ --	Non- Associativity
* / %	Left to Right
+ -	Left to Right
<<= >>=	Non- Associativity
== != === !==	Non- Associativity
&	Left to Right
^	Left to Right
	Left to Right
&&	Left to Right
	Left to Right
?:	Left to Right

String Manipulation

A String represents series of characters that can be specified as follows:

```
$company_name="Teknoturf";
```

```
$employee_id="Teknoturf/02/02"
```

Strings can be represented within double or single quotes. As specified earlier, double quotes with references to variables are automatically replaced with the variables values, but when single quotes are used, this is not done. The various methods used to manipulate strings in PHP are:

- `strtoupper()` – This function is used to convert a given string to upper case.
- `strtolower()` - This function is used to convert a given string to lower case
- `ucfirst()` – This function is used to convert the first character in a given string to uppercase.
- `ucwords()` – This function is used to convert the first character of each word within a given string to uppercase.
- `strcmp()` – This function is used to compare two strings and return one of the following values.
 - Returns a negative number if str1 is less than str2
 - Returns a positive number if str1 is greater than str2
 - Returns 0 if both the Strings are equal.

- `strlen()` – This function is used to find the length of a string.
- `substr(str,pos)` - This function is used to retrieve a the substring within the specified string by mentioning the specified position (pos)
- `trim()` – This function is used to remove whitespace at the leading and trailing ends of a string.

Code Snippet

- `$message="We learn to do by doing";`
- `echo strtoupper($message);`
 - output: **we learn to do by doing**
- `echo strtolower($message);`
 - output: **we learn to do by doing**
- `echo ucfirst($message);`
 - output: **We learn to do by doing**
- `echo ucwords($message);`
 - output: **We Learn To Do By Doing**
- `echo strlen($message);`
 - output: **23**
- `echo substr($message,4);`
 - output: **earn to do by doing**

Control Structures

Control structures enable to control the flow of program execution. In PHP, the control structures are basically divided into two types:

- Decision Making and branching
 - If - If – else and if- else if – else
 - Switch – Case
- Decision Making and looping
 - For loop
 - Do- while loop
 - While loop

Decision Making and branching

"If" - "If– else" - "if- else if – else" Statement:

Syntax for if:

if construct is used to perform a task based on a given condition.

```
if (Conditional expression)
```

Statements to be executed in case the above specified conditional expression is evaluated to be true

else

Alternative execution block in case the above specified condition is evaluated to be false

If –else--if—else

If –else--if—else is used to combine many conditions. Based on a particular condition that evaluates to be true, the respective task gets executed. If none of the condition evaluates to be true, then the task in the else part gets executed

Syntax for if – else if – else:**if(Conditional expression)**

Statements to be executed in case the above specified conditional expression is evaluated to be true

else if(Conditional expression)

Statements to be executed in case the above specified conditional expression is evaluated to be true

else

Alternative execution block in case the above specified conditions are evaluated to be false

Example : Code for if-else:

```
<?php
/* Working with if .... else */
print "***** Digit Information Finder *****";
$digit=90;
if($digit<=9)
echo $digit. " is a single digit number.";
else
echo $digit. " is a double digit number.";
?>
```

```
***** Digit Information Finder *****
10 is double digit number.
*****
```

Fig. 4.2.10. Output of Digit Information Finder

Example : code for if-else if –else:

```
<?php
/* Working with if .... else if .... else*/
$number1=20;
$number2=15;
$number3=30;
print "*****Greatest Number Finder *****";
print "<br/>";
if(($number1>$number2) &&($number1>$number3))
```

```

{
    echo $number1 . " is greater than " . $number2." and " . $number3."<Br/>";
}
else if($number2>$number3)
{
    echo $number2 . " is greater than " . $number1." and " . $number3."<Br/>";
}
else if($number3>$number1)
{
    echo $number3 . " is greater than " . $number1." and " . $number2."<Br/>";
}
else
{
    echo "All three numbers are equal and they hold the value " . $number3."<br/>";
}
print "*****";
?>

```

```

***** Greatest Number Finder *****
30 is greater than 20 and 15
*****

```

Fig. 4.2.11. Output of Greatest Number Finder

Switch – Case Statement

Switch-case is similar to the if—else if—else statement discussed above. Switch-case construct compares the value of a given expression with the case blocks. If the comparison evaluates to be true, then the respective case block gets executed.

Syntax:

```

switch (expression)
{
    case value:
        statements;
        break;
    case value:
        statements;
        break;
    ...
    default:
        statements;
        break;
}

```

Example : Code with switch- case block:

```

<?php
/* Working with switch .... case */
$nameInitial='U';
print "*****Vowel Checker *****<br/>";
switch($nameInitial)
{
case 'A':
    echo "Your initial," . $nameInitial . " is a vowel<br/>";
    break;
case 'E':
    echo "Your initial," . $nameInitial . " is a vowel<br/>";
    break;
case 'I':
    echo "Your initial," . $nameInitial . " is a vowel<br/>";
    break;
case 'O':
    echo "Your initial," . $nameInitial . " is a vowel<br/>";
    break;
case 'U':
    echo "Your initial," . $nameInitial . " is a vowel<br/>";
    break;
default:
    echo "Your initial," . $nameInitial . " is a consanant.<br/>";
}
print "*****<br/>";
?>

```

```

*****Vowel Checker *****
Your initial, U is a vowel
*****

```

*Fig. 4.2.12. Output of Vowel Checker***Looping Constructs**

Looping Constructs are used to perform a task repeatedly.

While Statement

While executes a set of statements within the loop till the condition remains true.

Syntax:

```
while (ConditionalExpression)
statement;
```

Example: Code using while statement

```
<?php
/* Working with while */
$searchedDigit=5;
$phoneNumber=565571557;
$digitCounter=0;
$original=$phoneNumber;
while($phoneNumber>0)
{
    $temp=$phoneNumber % 10;
    if($temp==$searchedDigit)
        $digitCounter++;
    $phoneNumber=floor($phoneNumber/10);
}

print "***** Digit Search Information*****<br/>";
echo "Number of occurrences of ".$searchedDigit," in ".$original." is ".$digitCounter."<br/>";
print "*****<br/>";
;
```

Output on execution of Example code- 1.4

```
***** Digit Search Information*****
Number of occurrences of 5 in 565571557 is 5
*****
```

Fig. 4.2.13. Output of Digit Search Information

Do – While :

Do-While is similar to While, except that it executes the statements within the loop at least once before checking for a condition.

Syntax:

```
do
{
    statements
} while(ConditionalExpression);
```

Example :Code using do –while

```

<?php
/* Working with do .... while */
$startMultiplicationIndex=1;
$endMultiplicationIndex=5;
$multiplicationTableNumber=7;
if($endMultiplicationIndex>0)
{
print "***** Multiplication Table *****<br/>";
do
{
echo $startMultiplicationIndex . " * " . $multiplicationTableNumber . " =
        " . ($startMultiplicationIndex*$multiplicationTableNumber);

    echo "<br/>";
    $startMultiplicationIndex+=1;
}while($startMultiplicationIndex <= $endMultiplicationIndex);

print "*****<br/>";
}
?>

```

```

***** Multiplication Table *****
1 * 7 = 7
2 * 7 = 14
3 * 7 = 21
4 * 7 = 28
5 * 7 = 35
*****

```

*Fig. 4.2.14. Output of Multiplication Table***For loop:**

For loop executes a set of statements repeatedly when the condition is true

Syntax:

```

for(initialization:test-condition:increment/decrement)
    statement;

```

Example :Usage of For Loop

```
<?php
/* Working with for */
$seriesLimit=10;
$sumOfSeries=0;
for ($ind = 0; $ind <= $seriesLimit; $ind++)
    $sumOfSeries+=$ind;
echo "*****Sum of Series*****<br/>";
echo "Sum of series of numbers from 1 to ".$seriesLimit." is ". $sumOfSeries."<br/>";
echo "*****<br/>";
?>
```

Output on execution of code 1.6

```
*****Sum of Series*****
Sum of series of numbers from 1 to 10 is 55
*****
```

Fig. 4.2.15. Output of Sum of Series

Loop Control – break and continue:

Break statement is used to break from a loop in the middle of the iteration. Continue is used to skip the current iteration and continue with the next iteration.

Example: The following code searches for a character “e” in a given String. The loop breaks once it finds the character.

```
<?php
$name="Peter Alfonsa"
$length=strlen($name);
for($i=0;$i<$length;$i++)
{
    if($name[$i]=='e' )
    { echo "Character Found";
      $flag="1";
      break;
    }
}
If !(isset($flag))
{
    echo "character not found";
}
```

```
?>
```

Example:Sum of Multiples of 5

```
<?php
```

```
/* Working with continue */
```

```
$seriesLimit=25;
```

```
$multiple=5;
```

```
$sum=0;
```

```
for ($ind = 0; $ind <= $seriesLimit; $ind++)
```

```
{
```

```
    $temp=$ind % $multiple;
```

```
    if($temp!=0)
```

```
    {    continue;
```

```
    }
```

```
    else
```

```
        $sum+=$ind;
```

```
}
```

```
echo "*****Sum of Multiples *****<br/>";
```

```
echo "Sum of all multiples of ".$multiple." - from 1 to ".$seriesLimit." = ".$sum."<br/>";
```

```
echo "*****<br/>";
```

```
?>
```

Output on execution of code 1.8

```
*****Sum of Multiples *****
```

```
Sum of all multiples of 5 - form 1 to 25 = 75
```

```
*****
```

Fig. 4.2.16. Output of Sum of Multiples

Built in Functions

PHP has many predefined functions and constructs. There are functions in PHP which require specific PHP extensions compiled in, otherwise it leads to fatal “undefined function”. For instance PHP must be compiled with MYSQL support to use the `mysql_connect`. There are also many basic functions which are included as part of every version of PHP such as the string and the variable functions. When a call to `phpinfo()` is made, it will tell which extensions are loaded into the PHP.

Whenever we work on predefined functions, it is important to understand what the function accepts and what it returns. Always refer to PHP manual page which explains clearly about the function parameters, behaviour changes, return values for both success and failure and the availability information.

include()

`include()` will include and evaluate the specified file. When the file is included, its code inherits variable scope on which `include` has occurred. Any variables available at that line in the calling file will be available within the called file, from that point onwards. All the functions and classes defined in the included file will have global scope.

Example

Samp.php

```
<?php
```

```
$color='red';
```

```
$fruitName='apple';
```

```
?>
```

Trial.php

```
<?php
```

```
Echo "A $color $fruitName"; //A
```

```
Include('Samp.php');
```

```
Echo "A $color $fruitName";// A red apple
```

```
?>
```

require()

require is similar to include() except that when failure is encountered it produces a fatal E_COMPILE_ERROR level. In other words, it will stop the script. Include, on the other hand, only gives a warning and allows the script to continue.

4.2.4 Classes and Object

Introduction to Object Oriented Programming

Object oriented programming (OOP) concepts are supported in PHP from version 4 onwards. Support for OOP in PHP4 was not elaborate whereas, PHP 5 made a big redesign in terms of OOP. The fundamental perspective of OOP is solving problems using decomposition units called as "Objects". Object is any real world entity with interest within the domain or project perspective. An Object is a cohesive entity that has attributes, behavior and state.

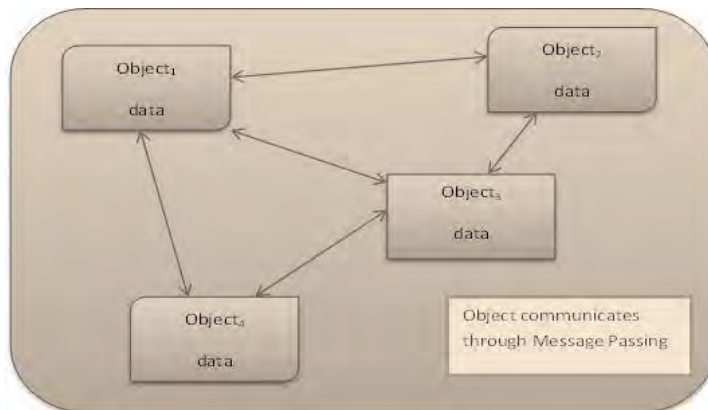


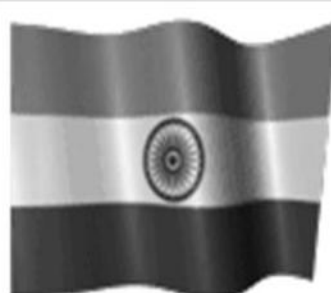
Fig. 4.2.17. Object communication Message Passing

Time to think about Objects

Any real world entity can be called as "Object". Some examples of objects or entities are:



Calculator



Flag



Clock

Fig. 4.2.18. Thinking objects

Object represents entities described by data and behavior. Objects represent real world objects (example. Flight) or conceptual entities (example Bank Account, Trademark). Object can be characterized by state, identity and behavior. State of an object refers to its attributes with the corresponding value associated to them. Behavior of an object refers its operational aspects. Behavior of an object might change its state.

For example A deposit or withdrawal transaction made on a Bank Account will affect the state, i.e., its account balance, if transaction is successfully performed.

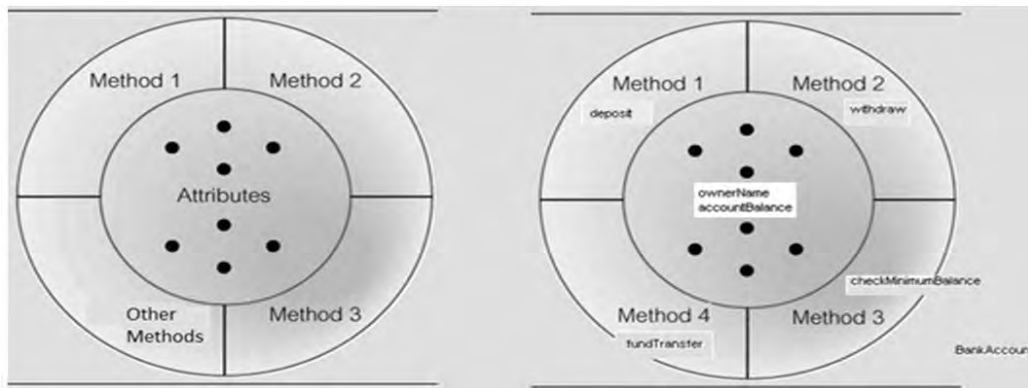


Fig. 4.2.18. Bank Account depicted using Object Notation

Class

Class is defined as a blueprint or a template to describe real world object with a well-defined structure and behavior. In Object Oriented programming perspective, a class is a programmatic representative of a real world entity or object.

In PHP, a class is a well-defined collection of attributes or variables, defined using the keyword "var" and methods using the keyword "function". Variables defined in a class are called "Member Variables" and methods defined within a class is called "Member functions".

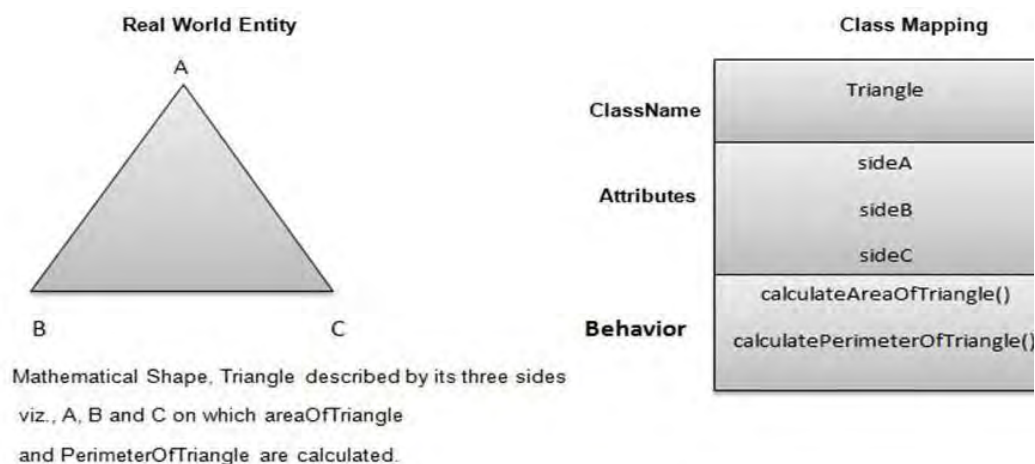


Fig. 4.1.19. Real World Entity to Class Mapping

Syntax

```
<?php
class ClassName
{
    // Attributes Definition
    // Method Definition
}
?>
```

Fig. 4.1.20. Syntax for Class Creation

Defining attributes and behavior

```
var $variableName;
```

var is a keyword to define variant type. In PHP, variables are automatically associated to its corresponding type depending on its value.

```
function methodName (Method Parameters if any)
{
    .....
    .....
}
```

function is a keyword used to define object's behavior. Return statement using return keyword is an optional statement if behavior intends to return void.

Use of 'this' reference

In PHP, a special variable called \$this is automatically defined during the execution of an object's method. \$this is also called as a pseudo variable, which denotes a reference to the current object. Using \$this variable and the -> notation, the object's methods and properties can be further referenced.

\$this along with -> notation is used to access the properties and behaviors within a class. Usage of \$this is explained in the following code snippet- Example Code 4.1.a.

Properties of a class are defined as \$attributeName. In method block of the class, they are not accessed as \$attributeName, instead they are accessed as \$this->attributeName.

Example**4.1.a Creating Account Class in PHP**

```
<?php
```

```
class Account
```

```
{
```

```
    // Properties of a class are defined as $attributeName
```

```
    var $accountNumber;
```

```
    var $accountBalance;
```

```
    /* Properties of a class are defined as $attributeName as above , but are not accessed as
```

```
    $attributeName. Instead they are accessed as $this->attributeName. */
```

```
    /* Scope of $transactionBalance is restricted to this block as it is considered as it is a local variable */
```

```
function withdraw($transactionAmount)
```

```
{
```

```
    $transactionBalance=$this->accountBalance-$this->accountBalance-$transactionAmount;
```

```
    return $transactionBalance;
```

```
}
```

```
/* Scope of $transactionBalance is restricted to this block as it is considered as it is a local variable */
```



```

function deposit($transactionAmount)
{
    $transactionBalance=$this->accountBalance=$this->accountBalance+$transactionAmount;
    return $transactionBalance;
}
public function queryBalance()
{
    return $this->accountBalance;
}
}??>

```

Class Instantiation

A class is used as a template for the creation of similar objects. An object is a run time instance of a class. A class is the blueprint form which individual objects are created. The attributes / fields define the state of the object. The methods define the object behavior.

Syntax for Object Creation

```
objReferenceName=new ClassName( );
```

Example

```
haryObj=new Employee ( );
```

Objects are created as a result of class instantiation. new is a keyword that is used to create objects.

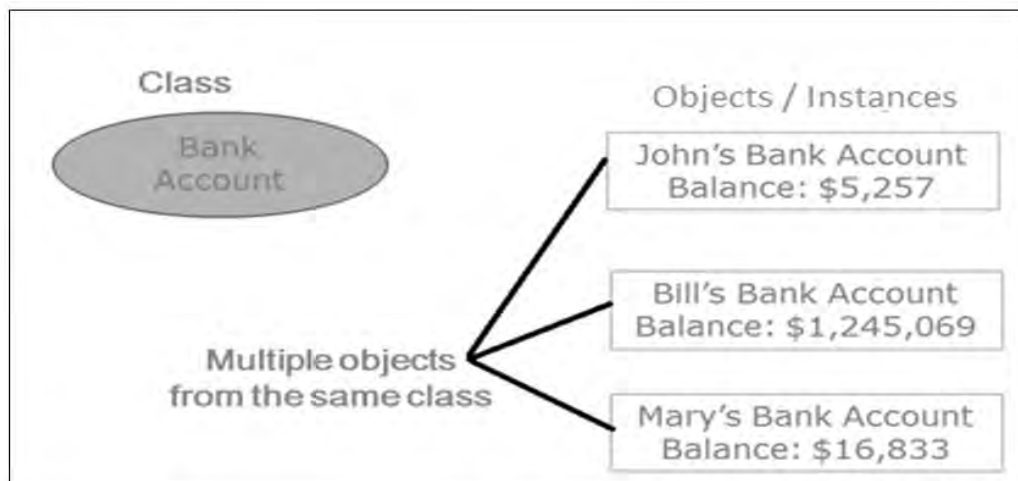


Fig. 4.1.21. Objects or Instances of Bank Account

Example

4.1.1.b. Code for Class Instantiation:

```
<?php
require ('Account.php');
print "<b>***** Account Transactions *****</b><br/>";
$accObj1=new Account(); //Object Creation
$accObj1->accountNumber=1001; //Assigning value to Account Object Attributes
$accObj1->accountBalance=10000; //Assigning value to Account Object Attributes
print "Account number : ".$accObj1->accountNumber;
print "<br/>"; //<br/> is embedded to print new line as means to separate output lines
print "Account balance:Rs.". $accObj1->accountBalance;
print "<br/>"; $tranAmount=2500;
$accObj1->withdraw($tranAmount); //performing withdrawal operation on Account object print
"Account balance afterwithdrwawal of Rs.". $tranAmount." is Rs.". $accObj1->queryBalance()."<br/>";
$tranAmount=5000; $accObj1->deposit($tranAmount); //performing deposit operation on Account
object
print "Account balance after deposit of Rs.". $tranAmount." is Rs.". $accObj1->queryBalance()."<br/>";
print "<b>***** End of Account Transactions *****</b><br/>";
?>
```

```
***** Account Transactions *****
Account number : 1001
Account balance:Rs.10000
Account balance after withdrwawal of Rs.2500 is Rs.7500
Account balance after deposit of Rs.5000 is Rs.12500
***** End of Account Transactions *****
```

Fig. 4.1.22. Output screenshot on execution of code 4.1.b

Access Specifier in PHP

Access specifiers supported in PHP are public, private or protected. Public attributes of a class can be accessed everywhere. Protected Members can be accessed only within the class and by inherited classes. Private members can be accessed only by the class that defines the member. Default access specifier is Public.

With the use of access specifiers, variables can be defined as:

```
<<AccessSpecifier>> $AttributeName;
```

With the use of access specifiers functions can be defined as:

```
<<AccessSpecifier>> function <<FunctionName>>
{
    <<Method Implementation goes here>>
}
```

Encapsulation

Wrapping up attributes and operations related to an Object into a single unit is called as "Encapsulation". Encapsulation leads to "Information Hiding". Information Hiding is a mechanism which deals with the ability of hiding information or data, so that it is not accessible outside the class and is accessible only to those methods which are wrapped within the class.

In order to achieve information hiding, data members are marked with private access and access to data is provided via "Member Functions". Methods which are used to assign or set the state of the attribute and retrieve or get the state of the Object are called as Mutators and Accessors. Methods that play the role of assigning or setting the state of the object are called as "Mutators" and methods that return attribute values of an object are called as "Accessors".

Example

4.2 Class defined using Access Specifiers and Mutators – Accessors

```
<?php
class Calculator
{
//Access specifier marked as private indicates it can be accessed only by the class where it is defined
private $num1;
private $num2;
private $operatorChoice;

/*Mutator Method used to set or assign value for num1 attribute */
public function setNum1($valueForNum1)
{
    $this->num1=$valueForNum1;
}
```

```

/*Mutator Method used to set or assign value for num2 attribute */
public function setNum2($valueForNum2)
{
    $this->num2=$valueForNum2;
}
/*Mutator Method used to set or assign value for operator attribute */
public function setOperatorChoice($operator)
{
    $this->operatorChoice=$operator;
}
/* Business Logic method used to perform arithmetic operations based on choice */
public function performArithmetic()
{
    if($this->operatorChoice=='+')
    {
        return $this->num1+$this->num2;
    }
    else if($this->operatorChoice=='-')
    {
        return $this->num1-$this->num2;
    }
    else if($this->operatorChoice=='*')
    {
        return $this->num1*$this->num2;
    }
    else if($this->operatorChoice=='/')
    {
        return $this->num1/$this->num2;
    }
    else
    {
        return -1;
    }
}
/*Accessor Method used to retrieve value for num1 attribute */
public function getNum1()
{
    return $this->num1;
}

```

```

/*Accessor Method used to retrieve value for num2 attribute */

public function getNum2()
{
    return $this->num2;
}

/*Accessor Method used to retrieve value for operator attribute */
public function getOperatorChoice()
{
    return $this->operatorChoice;
}

//Code for Class Instantiation or Object Creation
print "<b>***** Arithmetic Operations *****</b><br/>";

// Instance creation for Calculator and method invocations
$calcObj=new Calculator();

/* Trying to access private property of a class – raises "Fatal error: Cannot access private property
Calculator::$num1" */

$calcObj->setNum1(100);
print "<hr/> Value for Number1 is: ".$calcObj->getNum1()."<br/><br/>";
$calcObj->setNum2(80);
print "Value for Number2 is: ".$calcObj->getNum2()."<br/><br/><hr/> ";

$calcObj->setOperatorChoice('+');
print "Result of ".$calcObj->getNum1().$calcObj->getOperatorChoice().$calcObj->getNum2()." is
".$calcObj->performArithmetic()."<br/><hr/>";

$calcObj->setOperatorChoice('-');
print "Result of ".$calcObj->getNum1().$calcObj->getOperatorChoice().$calcObj->getNum2()." is
".$calcObj->performArithmetic()."<br/><hr/>";

$calcObj->setOperatorChoice('*');
print "Result of ".$calcObj->getNum1().$calcObj->getOperatorChoice().$calcObj->getNum2()." is
".$calcObj->performArithmetic()."<br/><hr/>";

```

```
$calcObj->setOperatorChoice('/');
print "Result of ".$calcObj->getNum1().$calcObj->getOperatorChoice().$calcObj->getNum2()." is
".$calcObj->performArithmetic()."<br/><hr/>";
print "<b>***** End of Arithmetic Operations *****</b><br/>";

?>
```

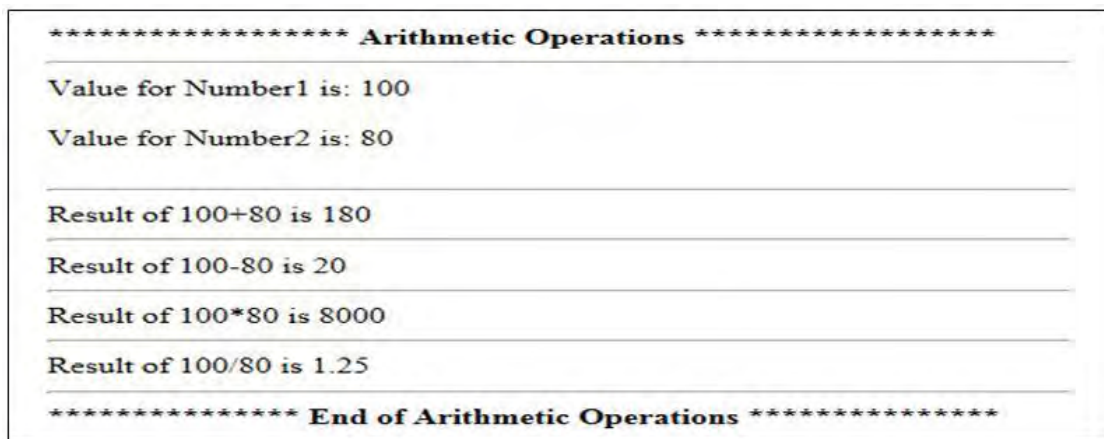


Fig. 4.1.23. Output screenshot on execution of code 4.2

Exercise



- Write a program to check whether a given character is vowel or not.
- Write a program to print whether a given number is even or odd.
- Write a program to print the number from 1 to 100.
- Write a program to extract each character from a string.
- Write a program to extract each word from a string.
- Write a program to design a calculator, which perform only addition, subtraction, multiplication, and division. The operation should happen based on the user choice.
- Write a program to accept the string from the user and count the number of vowels and white spaces.
- Write a function to generate the employeeid. The function should generate the employeeid in a sequential manner.
- Write a function to calculate the tax for an employee. To calculate the tax, the user should provide the salary amount and the function should return the tax amount.

Income	% of tax
>180000	10
>400000	20
<180000	Nil
- Write a function to reverse a string. Modification should be made in the original string and temporary string variables should not be used.

11. Write a function to swap two string values using:
 - a. call by value
 - b. call by reference
12. Write a function to calculate the average for a student. The user should provide marks for 5 subjects and the function should return the average. Based on the average the grade is assigned. Also write another function to find the grade. The user should receive only the grade as output.

Notes



UNIT 4.3: Introduction to MYSQL

Unit Objectives



At the end of this unit, you will be able to:

1. explain the basics of Relational Databases
2. discuss simple SQL commands using MySQL
3. explain Persistence using MySQL
4. explain how to create a basic web application using PHP & MySQL

4.3.1 What is a Database?

A database is a repository of well organized information that can be used for effective storage and manipulation.

Relational Database

Relational Database is one of the database models that can be used for storing and managing the data in a table format.

For Example,

Course details are maintained in the following format. Every column is termed as field and every row is termed as a record.

Field		
	Course Id	Course Name
Record →	1	C Programming
	2	C++
	3	PHP
		Course Fee
		2300
		4500
		6000

MYSQL

MYSQL is a relational database management system that is used to manage and manipulate data in a tabular format.

MYSQL Data types

MYSQL fields have to be created with their associated data type indicating the type value they can store.

The following are a few data types supported by MYSQL.

Data type	Description
INT	A standard integer
BIGINT	A large integer
DECIMAL	A fixed-point number
FLOAT	A single-precision floating-point number
DOUBLE	A double-precision floating-point number
CHAR	A fixed-length non-binary (character) string
VARCHAR	A variable-length non-binary string
DATE	A date value in 'CCYY-MM-DD' format
TIME	A time value in 'hh:mm:ss' format

SQL

SQL is an ANSI standard to query and manipulate data that is stored in the database.

Some of the important tasks done by SQL are:

1. Create Database
2. Create tables and manage the table structure and data that resides in a table
3. Retrieve information that is stored in a database.

CREATE TABLE command

Creates a table in MYSQL database

Syntax

```
Create Table table_name(
    Column list)
```

The following command creates a course table with course id, course name and course fee.

```
create table course(course_id int, course_name varchar(50),price decimal);
```

DESCRIBE Command

To view the table's metadata information, we use the DESCRIBE command

Syntax

```
DESC(RIBE) table_name
```

The following displays the metadata information about the product table.

Describe course;

Constraints

Constraints are used to apply certain conditions or restrictions on the table data.

Constraints can be specified during table creation time using the CREATE TABLE command or after creating the table using the ALTER command.

Constraints that can be placed on the table are:

1. Not Null
2. Unique
3. Primary Key
4. Foreign Key
5. Check

Not Null

A NOT NULL constraint is used to enforce that a column should always contain some value. A NOT NULL column cannot hold a NULL value.

UNIQUE

UNIQUE constraint enforces column values cannot be duplicated and hence they have to be unique. A UNIQUE column cannot hold duplicate values.

Primary Key

PRIMARY KEY constraint is used for unique identification of record within a table. A column that is declared as PRIMARY KEY is by default UNIQUE and NOT NULL.

A table can contain only one primary key. The primary key identified in the table can be made up of one or more columns.

The following command creates the course table with course_id as primary key and other columns as not null.

Create table course(course_id int primary key, course_name varchar(50) not null, course_fee decimal not null);

Foreign Key

A FOREIGN KEY is a column in one table that refers to a PRIMARY KEY in another table.

A FOREIGN KEY column can have only those values of the PRIMARY KEY column it refers to or NULL. It cannot hold any other values

Assume that the Course contains the following information

Course Id	Course Name	Course Fee
1	C Programming	3000
2	C++	3500
3	PHP	3500

The Faculty table contains the following:

Faculty_id	Facutly_name	Course_id
100	Peter	2
101	Philp	1
102	John	1

Assume that the Faculty handles one course and should be associated with a Course he or she handles.

Course_id is the primary key in the Course table. The Course id in the Faculty table refers to the course id in the COURSE table. Therefore course_id in FACULTY table has to be declared as a foreign key.

Create table Faculty(faculty_id int primary key,faculty_name varchar(50) not null,course_id int, foreign key(course_id) references course(course_id));

Check

Check constraint for a column enforces that the values of that column satisfies the condition specified in the check constraint

Assume that the Course table has a column called as Course_category. The course category can have values that can be either 'Normal' or 'Fast Track'. This can be specified using CHECK constraint as follows:

Create table course(course_id int primary key,course_name varchar(50) not null,course_fee decimal not null,course_category check course_category in('Normal','Fast Track'))

Alter Command

Alter command is used to update/modify the existing table structure of a particular table.

Add a new column:

Syntax

```
Alter table table_name add [column definition]
```

To add a new column to the course table,

Alter table course add course_description varchar(50);

Modify existing column:

Syntax

```
Alter table table_name modify [column definition]
```

To modify the data type of the course_fee from decimal to float

Alter table course modify course_fee float;

Drop Existing Column

Syntax

```
Alter table table_name drop column_name
```

To drop the course_description column in the course table

Alter table course drop course_description;

Drop TABLE Command

The **Drop Table** command is used to remove an existing table from the database.

Syntax

```
Drop table table_name;
```

To drop the course table

Drop table course;

SELECT COMMAND

Select command is used to take the available information from the database table.

Syntax

```
Select * from table_name [where condition]
```

To view all available courses,

Select * from product;

To select the course based on certain criteria, we use the WHERE clause.

To select all course whose fee is greater than 3000

*Select * from course where course_fee>3000*

Operators that can be used in the Where Clause are:

Operator	Description
=	Equal
<>	Not Equal
>	Greater Than
>=	Greater Than or Equal To
<	Less Than
<=	Less Than or Equal To
Between	Between an inclusive range
Like	Search for a pattern
In	Search amongst a discrete set of values

DML Statements

DML Statements are used to manipulate data in database tables through insert , update and delete commands.

- **INSERT**

INSERT Command is used to insert new records into database tables.

- **UPDATE**

UPDATE command is used to modify the values of existing records in database tables.

- **DELETE**

DELETE command is used to delete existing records from database tables.

INSERT Command

Syntax

```
INSERT into table_name values(value_1,value_2,value_3....value_n)
```

The following command inserts a course into the course table.

```
insert into course values(1,'C++', 3000);
```

UPDATE Command

The basic syntax of UPDATE command is

Syntax

```
Update table_name set column_name=value,column_name=value,... [where condition]
```

The following command updates the course fee of C++ course from 3000 to 3500;

```
Update course set course_fee=3500 where course_id=1;
```

DELETE Command

Syntax

```
Delete from table_name [where condition]
```

The following command deletes the 'C++' course details.

```
Delete from course where course_id=1;
```

4.3.2 Persistence using PHP and MYSQL



Persistence refers to the ability of storing the object's state permanently even after the creator ceases to exist. One of the most commonly used mechanisms to achieve persistence is "Usage of Database".

Communication between PHP and MYSQL

The following steps are required for PHP to communicate to database. Functions in MYSQL

- Obtain Database Connection
- Select Database
- Execute Queries
- Close Database Connection

Step 1: Obtain Database Connection

Syntax

```
mysql_connect(ServerTarget, UserName, Password)
```

This methods is used to open database connection from PHP to MySQL Server.

ServerTarget

ServerTarget parameter specifies the database server to connect. Default value for this parameter can be marked as "localhost:3306" or "localhost".

User Name

UserName parameter specifies the username to log in to the MYSQL database. Default value is the name of the user who owns the server process.

Password

Password specifies the password to log in to the MYSQL database. Default password will depend on the value configured at the time of installation.

Example: Code to test database connectivity from PHP to MYSQL

```
<?php
$con = mysql_connect("localhost:3306","root","root");
if ($con)
{
    echo "*****<br/>";
    echo "Database Connection Established with MYSQL from PHP. <br/>";
    echo "*****<br/>";
}
else
{
    echo "*****<br/>";
    echo "Sorry!!!! Connection could not be established.<br/>";
    echo "*****<br/>";
}
?>
```

```
*****
Database Connection Established with MYSQL from PHP.
*****
```

Fig 4.2.6 Output on execution of code in 4.2.6

Step 2: Select Database**Syntax**

```
mysql_select_db(DatabaseName,ConnectionReference)
```

This method is used to select a database for the connection established. To execute queries, database has to be selected.

Database Name

Database name to be selected is specified as first argument.

Connection Reference

Connection reference points to the connection established in step 1.

Example : Code to select database for connectivity from PHP to MYSQL

```
<?php
$con = mysql_connect("localhost:3306","root","root");
if ($con)
{
    echo "*****<br/>";
    echo "Database Connection Established with MYSQL from PHP. <br/>";
    echo "*****<br/>";
    mysql_select_db("tekno", $con); //Assuming tekno is the name of database in MYSQL
    echo "*****<br/>";
    echo "Database Selected for the established connection from PHP to MYSQL. <br/>";
    echo "*****<br/>";
}
else
{
    echo "*****<br/>";
    echo "Sorry!!!! Connection could not be established.<br/>";
    echo "*****<br/>";
}
?>
```

```
*****
Database Connection Established with MYSQL from PHP.
*****
Database Selected for the established connection from PHP to MYSQL.
*****
```

Fig 4.3.7 Output on execution of code in 4.2.7

Step 3: Execute Queries

Syntax

```
mysql_query($query)
```

This method is used to send a MySQL query for execution to MYSQL engine. DDL, DML or DRL Queries can be executed using the above syntax.

DDL – Data Definition Language

DML – Data Manipulation Language

DRL – Data Retrieval Language

On execution of select queries, data can be retrieved using the following methods

mysql_num_rows(\$result) – This method returns the number of rows returned by the query.

mysql_fetch_array(\$result)- This method returns the current row as an associative array.

Query

Query to be executed is specified as an argument, which can be DDL / DML / DRL.

Example: Code to perform DDL, DRL and DML Operations

Create Retrieve Update Delete Operations using Books in LibraryManagementSystem

Book.php

```
<?php
```

```
class Book
```

```
{
```

```
    private $isbnCode;
```

```
    private $bookName;
```

```
    private $authorName;
```

```
    private $bookPrice;
```

```
    /* Constructor Block */
```

```
    function Book($isbnCode,$bookName,$authorName,$bookPrice)
```

```
    {
```

```
        $this->isbnCode=$isbnCode;
```

```
        $this->bookName=$bookName;
```

```
        $this->authorName=$authorName;
```

```
        $this->bookPrice=$bookPrice;
```

```
    }
```

```
    /* Mutators and Accessors */
```

```
    function getIsbnCode()
```

```
    {
```

```
        return $this->isbnCode;
```

```
    }
```

```
    function getBookName()
```

```
    {
```

```
        return $this->bookName;
```

```
    }
```

```
    function getAuthorName()
```

```
    {
```

```
        return $this->authorName;
```

```
    }
```

```
    function getBookPrice()
```



```

    {
        return $this->bookPrice;
    }
    function setIsbnCode($isbncode)
    {
        $this->isbnCode=$isbncode;
    }
    function setBookName($bookName)
    {
        $this->bookName=$bookName;
    }
    function setBookPrice($bookPrice)
    {
        $this->bookPrice=$bookPrice;
    }
}
?>
Library.php
<?php
    require ('Book.php');

    class Library
    {
        var $bookList;
        var $bookCount=0;
        var $connection;
        /* Constructor block used to establish connection to database and select database */
        function Library()
        {
            // Make a MySQL Connection
            $this->connection=mysql_connect("localhost:3306", "root", "root") or die(mysql_error());
            //select a connection
            mysql_select_db("tekno",$this->connection) or die(mysql_error());
        }
    }

```

```

/* Method to create BookStore Table - DDL Operation */
function createBookStore()
{
    $bookStore="create table BookStore(isbncode varchar(20) primary key,bookname
varchar(20),authorname varchar(20),bookprice numeric(9,2))";
    mysql_query($bookStore);
    return "BookStore table created in MYSQL";
}

/* Method to insert record to BookStore - DML Operation */
function addBookToLibrary($bookobject)
{
    $this->bookList[$this->bookCount]=$bookobject;
    $this->bookCount++;
    $insertBookInfo="insert into BookStore values('".$bookobject->
getIsbnCode()."', '".$bookobject->getBookName()."', '".$bookobject->getAuthorName().
"', '".$bookobject->getBookPrice()."')";
    mysql_query($insertBookInfo) or die(mysql_error());
    return "<br/>Registered book with ISBN Code - ".$bookobject->getIsbnCode();
}

/* Method to select records from BookStore - DRL Operation */
function reportBookList()
{
    $result = mysql_query("SELECT * FROM BookStore") or die(mysql_error());
    echo "<table border='1'>";
    echo "*****
*****<br/>";
    echo "<tr><th>ISBN CODE</th><th>BOOK NAME</th><th>AUTHOR NAME</th>
<th>BOOK PRICE</th></tr>";
    while($row = mysql_fetch_array( $result )) {
        echo "<tr><td>";
        echo $row['isbncode'];
        echo "</td><td>";
        echo $row['bookname'];
        echo "</td><td>";
        echo $row['authorname'];
        echo "</td><td>";
    }
}

```

```

        echo $row['bookprice'];
        echo "</td></tr>";
    }
    echo "</table>";
    echo "*****
*****<br/>";
}
/* Method to update book information in BookStore */
function updateBookPrice($isbnCode,$newPrice)
{
    $currentPrice=0.0;
    $pricerresult = mysql_query("SELECT * FROM BookStore where isbncode='".$isbnCode."'")
or
    die(mysql_error());
    if($row = mysql_fetch_array( $pricerresult)) {
        $currentPrice=$row['bookprice'];
    }

    $updateQuery="update BookStore set bookprice='".$newPrice.'" where
isbncode='".$isbnCode."'";
    mysql_query($updateQuery) or die(mysql_error());
    return "updated Book with ISBNCODE - ".$isbnCode." to Rs.".$newPrice." from
Rs.".$currentPrice;
}
/* Method to remove book information in BookStore */
function removeBookFromStore($isbnCode)
{
    $available="NotExists";
    $bookresult = mysql_query("SELECT * FROM BookStore where isbncode='".$isbnCode."'")
or die(mysql_error());
    if($row = mysql_fetch_array( $bookresult)) {
        $available="Exists";
    }
    if($available=="Exists")
    {
        $deleteQuery="delete from BookStore where isbncode='".$isbnCode."'";
        mysql_query($deleteQuery) or die(mysql_error());
        return "Deleted Book with ISBN - ".$isbnCode." from BookStore<br/>";
    }
}

```

```

    }
    else
    {
        return "Book with ISBN - ".$isbnCode." does not exists in BookStore<br/>";
    }
}
/* Method to close connection established */
function closeDatabaseConnection()
{
    mysql_close($this->connection);
    return "Connection Closed";
}
} ?>

```

LMS.php

```

<?php
require ('Library.php');
$javaBook=new Book("$112233","Java","BruceEckel",450);
$j2eeBook=new Book("$223344","J2EE With RUP","Booch&Others",500);
$phpBook=new Book("$334455","PHP","RobinNixon",520);
$libraryObj=new Library();
/* Create Table - DDL Operation */
$libraryObj->createBookStore();
/* Insert Table - DML Operation */
    echo "*****";
    echo $libraryObj->addBookToLibrary($javaBook)."<br/>";
    echo "Added Book to Library.";
    echo "<br/>*****<br/>";

    echo "*****";
    echo $libraryObj->addBookToLibrary($j2eeBook)."<br/>";
    echo "Added Book to Library.";
    echo "<br/>*****<br/>";

    echo "*****";
    echo $libraryObj->addBookToLibrary($phpBook)."<br/>";
    echo "Added Book to Library.";
    echo "<br/>*****<br/>";

```

```

/* Select Table - DRL Operation */
echo "Book Report List from BookStore<br/>";
echo $libraryObj->reportBookList();

/* Update Table - DML Operation */
echo "*****<br/>";
echo "Book Price Updation Request in BookStore<br/>";
echo $libraryObj->updateBookPrice('$112233',650);
echo "<br/>*****<br/>";

/* Select Table - DRL Operation */

echo "***** Book report after updation request*****<br/>";
echo "Book Report List from BookStore<br/>";
echo $libraryObj->reportBookList();

/* Delete Table - DML Operation */
echo "*****<br/>";
echo "Book Deletion Request in BookStore<br/>";
echo $libraryObj->removeBookFromStore('$334456');
echo "<br/>*****<br/>";

/* Delete Table - DML Operation */
echo "*****<br/>";
echo "Book Deletion Request in BookStore<br/>";
echo $libraryObj->removeBookFromStore('$112233');
echo "<br/>*****<br/>";

/* Select Table - DRL Operation */
echo "***** Book report after deletion request*****<br/>";
echo "Book Report List from BookStore<br/>";
echo $libraryObj->reportBookList();

/* Request to Close Connection*/
echo "*****<br/>";
echo $libraryObj->closeDatabaseConnection()."<br/>";
echo "*****<br/>";
?>

```

```

*****
Registered book with ISBN Code - $112233
Added Book to Library.
*****
Registered book with ISBN Code - $223344
Added Book to Library.
*****
Registered book with ISBN Code - $334455
Added Book to Library.
*****

```

Fig 4.3.8 Output on execution of Example of LMS

code block to Add Book to BookStore

```

Book Report List from BookStore
*****

```

ISBN CODE	BOOK NAME	AUTHOR NAME	BOOK PRICE
\$112233	Java	BruceEckel	450.00
\$223344	J2EE With RUP	Booch&Others	500.00
\$334455	PHP	RobinNixon	520.00

```

*****

```

Fig 4.3.9 Output on execution of Example of LMS code block to list Books from BookStore

```

*****
Book Price Updation Request in BookStore
updated Book with ISBNCODE - $112233 to Rs.650 from Rs.450.00
*****

```

Fig 4.2.10 Output on execution of Example Code block to update Book price based on ISBNCODE

```

***** Book report after updation request*****
Book Report List from BookStore
*****

```

ISBN CODE	BOOK NAME	AUTHOR NAME	BOOK PRICE
\$112233	Java	BruceEckel	650.00
\$223344	J2EE With RUP	Booch&Others	500.00
\$334455	PHP	RobinNixon	520.00

```

*****

```

Fig 4.3.11 Output on execution of ExampleLMS code block to list Books from BookStore after updation of book price for ISBNCODE - \$112233


```

*****
Book Deletion Request in BookStore
Book with ISBN - $334456 does not exists in BookStore

*****
*****
Book Deletion Request in BookStore
Deleted Book with ISBN - $112233 from BookStore

*****

```

Fig 4.3.12 Output on execution of Example of LMS Code block to delete Book Information based on ISBN CODE

```

***** Book report after deletion request*****
Book Report List from BookStore
*****

```

ISBN CODE	BOOK NAME	AUTHOR NAME	BOOK PRICE
\$223344	J2EE With RUP	Booch&Others	500.00
\$334455	PHP	RobinNixon	520.00

```

*****

```

Fig 4.3.13 Output on execution of Example of LMS code block to list Books from BookStore after deletion of book information with ISBN CODE - \$112233

Step 4: Close Database Connection

Syntax:

```
mysql_close(ConnectionReference)
```

This method is used to close connection for the specified connection reference

ConnectionReference

Connection reference points to the connection established in step 1.

closeDatabaseConnection() - Method specified in example 8.3.b is used to close connection established and on the execution of this method the following output is obtained.

```

*****
Connection Closed
*****

```

The above steps 1 to 4 help in establishing connection between PHP and MYSQL to achieve persistence.

Exercise



1. Create a PHP Web application for Employee Management System which has the following functionalities;

- Add Employee
- Modify Employee Details
- Delete Employee
- View Employee by Id
- View All Employee Details
- View Employee By Designation
- View Employee By Salary

The Manager should be able to perform all operations in the system and view the entire details of all employees.

The Tech Lead should be able to view the details of Employee by id and designation. The salary detail of an employee should not be displayed to the tech lead.

All the pages should display a welcome message along with the name of the manager or tech lead depending on whoever has logged into the system.

The Following details about an employee should be stored inside the system;

- Employee Id
- Employee Name
- Age
- Designation
- Salary

All the Details of an Employee can be updated except the Employee Id.

An Employee is deleted from the system, given the Employee Id. Before deletion the system should ask for confirmation to delete.

Notes



This image shows a single page of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

UNIT 4.4: SQL using Oracle

Unit Objectives



At the end of this unit, you will be able to:

1. Get an overview of DBMS concepts
2. Explain basics of Structure Query Language
3. Explain simple Data Manipulation
4. Explain basic SQL operations

Overview of Database Management Systems

Data is any fact that can be recorded. A database is a collection of logically related data. The set of programs which is used to manage databases is called Database Management System (DBMS). The main goal of DBMS is to provide an efficient and convenient way of storing and retrieving data. DBMS is a collection of programs which helps in access, retrieval, security, creation and sharing of database among its users or other applications.

RDBMS stands for Relational Database Management System. RDBMS serves as the basis for SQL, and for modern databases like MS SQL Server, DB2, Oracle, MySQL, and Microsoft Access. The data in RDBMS is stored in two dimensional tables that are composed of Rows and Columns.

DBMS helps us in overcoming the Data redundancy and inconsistency. The integration and sharing of data files minimizes the duplication and redundancy of data to a great extent. DBMS also eliminates the difficulty in accessing data with the help of queries. We need not write a new program to carry out a new task.

Integrity problems are also overcome. Integrity constraints (e.g., account balance > 0) are stated explicitly.

Atomicity of updates is maintained. The Failures of a transaction will not leave the database in an inconsistent state. There are no partial updates carried out. For instance, Transfer of funds from one account to another should either be completed or not happen at all.

DBMS allows concurrent access by multiple users. Controlled Concurrent access is needed for increased performance. It is achieved with the help of locking strategies. e.g., In a Railway Transaction, any number of passengers can book tickets for various trains but a passenger cannot reserve a ticket for the same train and at the same date and time till another passenger is done with that reservation.

Data Security is enforced. The DBMS can prevent unauthorized users from viewing the data or updating the data in the database. Using authentication, users are allowed access to the entire database or a subset. e.g., in an Employee Database, Account Department users may be able to view salaries while Transport Department users may view only contact details like employee number, name, address and phone number data.

Structure Query Language (SQL)

Communication with RDBMS: SQL stands for Structured Query Language. It is used to access and manipulate databases. SQL is an ANSI (American National Standards Institute) standard. SQL is used to execute queries against a database. SQL can retrieve data from a database. Dr. E.F. Codd proposed the relational model for database systems in 1970. RDBMS stands for Relational Database Management System. RDBMS serves as the basis for SQL, and for all database systems like MS SQL Server, DB2, Oracle, MySQL, and Microsoft Access. The data is stored in database object called tables. A table is a collection of inter related data and it consists of columns and rows. SQL is both an easily understandable language and a good tool for managing data.

Features of SQL

Vendor Independence

A SQL-based database and the programs that use it can be moved from one DBMS to other DBMS with minimal conversion and little retraining of personnel.

SQL Standards

In 1986, the American National Standards Institute (ANSI) and the International Standards Organization (ISO) published the first official standard for SQL which was later upgraded in 1989, 1992 and 1999. These standards serve as an official stamp of approval for SQL and have speeded its market acceptance.

Portability across Computer Systems

SQL databases run on various systems, ranging from mainframes to stand-alone computer systems. SQL-based applications that begin on single-user or departmental server can be moved to a very large server systems as they grow.

Relational Foundation

SQL is a language for the relational databases. The relational database model makes SQL simple and easy to understand. The relational model has a strong theoretical foundation that has made the evolution and implementation of relational databases.

Programmatic Database Access

SQL is also a language used by the programmers to write applications that access the database. The same SQL statements are used for both interactive and programmatic access; the database accessing parts of the application can be tested first with interactive SQL and then embedded into the program.

Data Types

Data types in SQL

char(<i>n</i>)	Fixed length character string, with user-specified length <i>n</i> .
varchar(<i>n</i>) length <i>n</i> .	Variable length character strings, with user-specified maximum length <i>n</i> .
int dependent).	Integer (a finite subset of the integers that is machine-
smallint domain type).	Small integer (a machine-dependent subset of the integer
numeric(<i>p,d</i>) with <i>n</i> digits to the	Fixed point number, with user-specified precision of <i>p</i> digits, right of decimal point.
real, double precision	Floating point and double-precision floating point numbers, with machine-dependent precision.
float(<i>n</i>) least <i>n</i> digits.	Floating point number, with user-specified precision of at least <i>n</i> digits.

Data Type	Description
VARCHAR2(<i>size</i>)	Variable-length character data
CHAR(<i>size</i>)	Fixed-length character data
NUMBER(<i>p, s</i>)	Variable-length numeric data
DATE	Date and time values
LONG	Variable-length character data up to 2 gigabytes
CLOB	Character data up to 4 gigabytes
RAW and LONG RAW	Raw binary data
BLOB	Binary data up to 4 gigabytes
BFILE	Binary data stored in an external file; up to 4 gigabytes
ROWID	A 64 base number system representing the unique address of a row in its table.

Communicating Database Using SQL Statements

DDL–Data Definition Language

DML–Data Manipulation Language

DCL–Data Control Language **TCL**–

Transaction Control Language

DSL–Data Select Language (a *varied Category*).

SELECT	Data retrieval
INSERT UPDATE DELETE MERGE	Data manipulation language (DML)
CREATE ALTER DROP RENAME TRUNCATE	Data definition language (DDL)
COMMIT ROLLBACK SAVEPOINT	Transaction control
GRANT REVOKE	Data control language (DCL)

Sample Tables used:

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY
100	Steven	King	SKING	515 123.4567	17-JUN-87	AD_PRES	24000
101	Neena	Kochhar	NKOCHHAR	515 123.4568	21-SEP-89	AD_VP	17000
102	Lex	De Haan	LDEHAAN	515 123.4569	13-JAN-93	AD_VP	17000
103	Alexander	Hunold	AHUNOLD	590 423.4567	03-JAN-90	IT_PROG	9000
104	Bruce	Ernst	BERNST	590 423.4568	21-MAY-91	IT_PROG	6000
107	Diana	Lorentz	DLORENTZ	590 423.5567	07-FEB-99	IT_PROG	4200
124	Kevin	Mourgos	KMOURGOS	650 123.5234	16-NOV-99	ST_MAN	5800
141	Trenna	Rajs	TRAJS	650 121.8009	17-OCT-95	ST_CLERK	3500
142	Curtis	Davies	CDAVIES	650 121.2994	29-JAN-97	ST_CLERK	3100
143	Randall	Matos	RMATOS	650 121.2874	15-MAR-98	ST_CLERK	2600
144	Timothy	Gietz	TGIEZT	650 121.2004	09-JUL-98	ST_CLERK	2500
144	Jeffrey	Plant	JPLANT	1 44 1344.429018	29-JAN-00	SA_MAN	10500
144	Timothy	Gietz	TGIEZT	1 44 1644.429018	11-MAY-00	SA_REP	4100
144	Timothy	Gietz	TGIEZT	1 44 1644.429018	11-MAY-00	SA_REP	4100

DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
10	Administration	200	1700
20	Marketing	201	1800
50	Shipping	124	1500
60	IT	103	1400
80	Sales	149	2500
90	Executive	100	1700
110	Accounting	205	1700
190	Contracting		1700

GRADE	LOWEST_SAL	HIGHEST_SAL
A	1000	2999
B	3000	5999
C	6000	9999
D	10000	14999
E	15000	24999
F	25000	40000

Data Definition Language (DDL)

The *CREATE TABLE* Statement: CREATE TABLE privilege should be given by the administrator

```
CREATE TABLE [schema.]table
(column datatype [DEFAULT expr] [, ...]);
```

Create the table

```
CREATE TABLE dept
(deptno NUMBER(2),
dname VARCHAR2(14),
loc VARCHAR2(13));
```

Table created.

Describe the table

Name	Null?	Type
DEPTNO		NUMBER(2)
DNAME		VARCHAR2(14)
LOC		VARCHAR2(13)

The ALTER TABLE Statement: ALTER TABLE statement is used to:

- Add a new column for the table
- Modify an existing column from the table
- Give a default value for the new column
- You can drop a column from the table
- ALTER TABLE statement is used for adding, modifying, or dropping columns.

```
ALTER TABLE table
MODIFY      (column datatype [DEFAULT expr]
             [, column datatype]...);
```

```
ALTER TABLE table
DROP          (column);
```

```
ALTER TABLE table
ADD          (column datatype [DEFAULT expr]
             [, column datatype]...);
```

Adding a Column:

- Depth 80 New Column

EMPLOYEE_ID	LAST_NAME	ANNSAL	HIRE_DATE
149	ZLOTKEY	126000	29-JAN-00
174	Abel	132000	11-MAY-96
175	Taylor	103200	24-MAR-98

JOB_ID

- Depth 80

EMPLOYEE_ID	LAST_NAME	ANNSAL	HIRE_DATE	JOB_ID
149	ZLOTKEY	126000	29-JAN-00	
174	Abel	132000	11-MAY-96	
175	Taylor	103200	24-MAR-98	

ADD clause is used for adding new columns:

```
ALTER TABLE dept80
ADD          (job_id VARCHAR2(9));
Table altered.
```

The new column becomes the last column:

EMPLOYEE_ID	LAST_NAME	ANNSAL	HIRE_DATE	JOB_ID
149	ZLOTKEY	126000	29-JAN-00	
174	Abel	132000	11-MAY-96	
175	Taylor	103200	24-MAR-98	

Modifying a Column: Column's data type, size, and default value can be modified using modify clause:

```
ALTER TABLE dept80 MODIFY (last_name VARCHAR2(30));
```

Table altered.

A change to the default value affects only subsequent insertions to the table.

Dropping a Column:

DROP COLUMN clause is used to drop columns that are no longer needed from the table.

```
ALTER TABLE dept80 DROP COLUMN job_id;
```

Table altered.

Dropping a Table:

- All data and structure in the table will be deleted.
- Any pending transactions that are there are committed.
- All indexes will be dropped.
- DROP TABLE statement cannot be rollback.

```
DROP TABLE dept80;
```

Table dropped.

Changing the Name of an Object:

- To change the name of a table, view, sequence, or synonym, you execute the RENAME statement.
- You must be the owner of the object.

```
RENAME dept TO detail_dept;
```

Table renamed.

Truncating a Table:]

- Removes all rows from a table
- Releases the storage space used by that table
- You cannot roll back row removal when using TRUNCATE
- Alternatively, you can remove rows by using the DELETE statement.


```
TRUNCATE TABLE detail_dept;
```

Table truncated.

Constraints Types

Constraints: Constraints enforce rules at the table level. Constraints prevent the deletion of a table if there are dependencies. The following constraint types are valid:

- NOT NULL
- UNIQUE
- PRIMARY KEY
- FOREIGN KEY
- CHECK

```
CREATE TABLE [schema.]table
    (column datatype [DEFAULT expr]
    [column_constraint],
    ...
    [table_constraint][,...]);
```

```
CREATE TABLE employees(
    employee_id NUMBER(6),
    first_name VARCHAR2(20),
    ...
    job_id VARCHAR2(10) NOT NULL,
    CONSTRAINT emp_emp_id_pk
        PRIMARY KEY (EMPLOYEE_ID));
```

Column constraint level:

```
column [CONSTRAINT constraint_name] constraint_type,
```

Table constraint level:

```
column,...
[CONSTRAINT constraint_name] constraint_type
(column, ...),
```

The NOT NULL Constraint: Ensures that null values are not permitted for the column

100	King	SKING	515.123.4567	17-JUN-87	AD_PRES	24000		
101	Kochhar	NKOCHHAR	515.123.4568	21-SEP-89	AD_VP	17000		100
102	De Haan	LDEHAAN	515.123.4569	13-JAN-93	AD_VP	17000		100
103	Hunold	AHUNOLD	590.423.4567	03-JAN-90	IT_PROG	9000		102
104	Ernst	BERNST	590.423.4568	21-MAY-91	IT_PROG	6000		103
205	Whalen	SJWHALEN	515.123.8080	JUN-94	AC_ACCOUNT	8300		206
206	Gietz	WGIEZT	515.123.6181	07-JUN-94	AC_ACCOUNT	8300		206

20 rows selected.

NOT NULL constraint
(No row can contain
a null value for
this column.)

**NOT NULL
constraint**

**Absence of NOT NULL
constraint**
(Any row can contain
null for this column.)

At the column level

```
CREATE TABLE employees (
  employee_id    NUMBER(6),
  last_name      VARCHAR2(25) NOT NULL,
  salary         NUMBER(8,2),
  commission_pct NUMBER(2,2),
  hire_date      DATE
  CONSTRAINT emp_hire_date_nn
  NOT NULL,
```

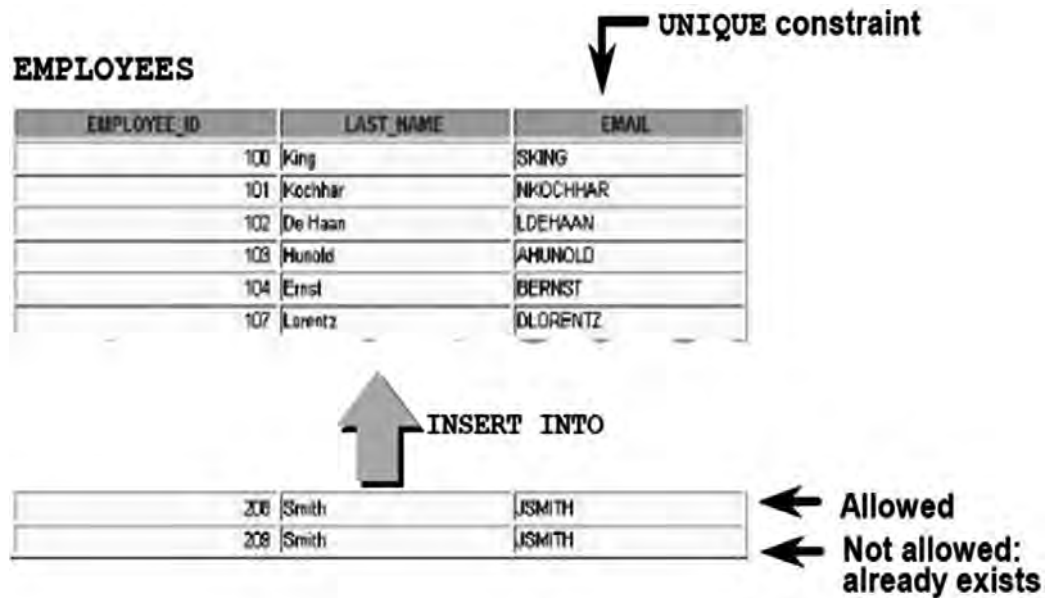
System
named

User
named

The UNIQUE Constraint:

Used for enforcing the uniqueness of a column. If a column has a Unique Constraint on it, you cannot insert duplicate values in that column. Unique key allows Null values to be stored.


The NOT NULL Constraint: Ensures that null values are not permitted for the column




Is defined at either the table level or the column level

```
CREATE TABLE departments(
  department_id      NUMBER(4),
  department_name    VARCHAR2(30)
  CONSTRAINT dept_name_nn NOT NULL,
  manager_id        NUMBER(6),
  location_id        NUMBER(4),
  CONSTRAINT dept_id_pk PRIMARY KEY(department_id));
```

The PRIMARY KEY Constraint: Only one primary key can be there for a table. The PRIMARY KEY constraint is a column or set of columns that uniquely identified as each row in a table. The column containing the primary key cannot have duplicate values and null values in to the table

DEPARTMENTS
 **PRIMARY KEY**

DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
10	Administration	200	1700
20	Marketing	201	1800
50	Shipping	124	1500
60	IT	103	1400
80	Sales	149	2500

**Not allowed
(null value)**

 **INSERT INTO**


	Public Accounting		1400
50	Finance	124	1500

Not allowed



Is defined at either the table level or the column level

```
CREATE TABLE departments(
  department_id      NUMBER(4),
  department_name     VARCHAR2(30)
    CONSTRAINT dept_name_nn NOT NULL,
  manager_id         NUMBER(6),
  location_id         NUMBER(4),
  CONSTRAINT dept_id_pk PRIMARY KEY(department_id));
```

The FOREIGN KEY Constraint: The FOREIGN KEY, or referential integrity constraint, is for a column or combination of columns as a foreign key and establishes a relationship between a primary key and a unique key in the same table or a different table. A foreign key value must match with the existing and a unique key in the same table or a different table. A foreign key value must match with the existing values in the parent table or it can be also NULL

DEPARTMENTS
 **PRIMARY KEY**

DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
10	Administration	200	1700
20	Marketing	201	1800
50	Shipping	124	1500
60	IT	103	1400
80	Sales	149	2500

**Not allowed
(null value)**

 **INSERT INTO**

	Public Accounting		1400
50	Finance	124	1500

Not allowed


Is defined at either the table level or the column level

```
CREATE TABLE departments(
  department_id      NUMBER(4),
  department_name     VARCHAR2(30)
    CONSTRAINT dept_name_nn NOT NULL,
  manager_id         NUMBER(6),
  location_id         NUMBER(4),
  CONSTRAINT dept_id_pk PRIMARY KEY(department_id));
```

The FOREIGN KEY Constraint: The FOREIGN KEY, or referential integrity constraint, is for a column or combination of columns as a foreign key and establishes a relationship between a primary key and a unique key in the same table or a different table. A foreign key value must match with the existing and a unique key in the same table or a different table. A foreign key value must match with the existing values in the parent table or it can be also NULL

DEPARTMENTS**PRIMARY KEY**

DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
10	Administration	200	1700
20	Marketing	201	1800
30	Shipping	124	1500
60	IT	103	1400
80	Sales	143	2500

Not allowed
(null value)**INSERT INTO**

	Public Accounting		1400
50	Finance	124	1500

Not allowed

Is defined at either the table level or the column level

```
CREATE TABLE departments(
  department_id      NUMBER(4),
  department_name     VARCHAR2(30)
    CONSTRAINT dept_name_nn NOT NULL,
  manager_id         NUMBER(6),
  location_id         NUMBER(4),
  CONSTRAINT dept_id_pk PRIMARY KEY(department_id));
```

The FOREIGN KEY Constraint: The FOREIGN KEY, or referential integrity constraint, is for a column or combination of columns as a foreign key and establishes a relationship between a primary key and a unique key in the same table or a different table. A foreign key value must match with the existing and a unique key in the same table or a different table. A foreign key value must match with the existing values in the parent table or it can be also NULL

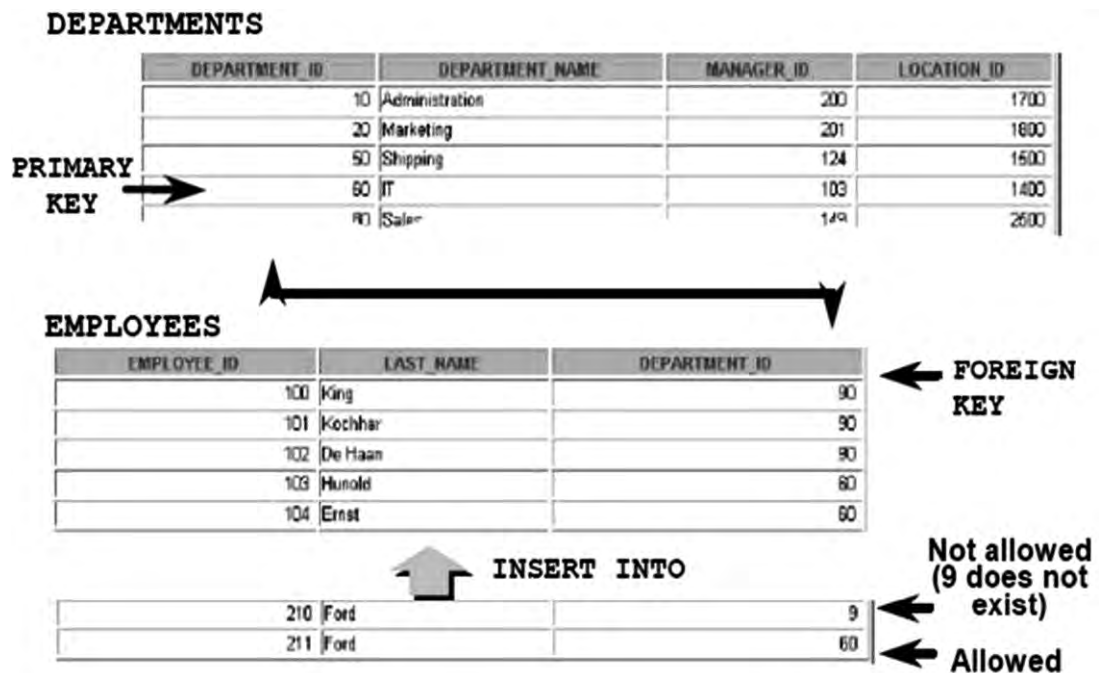


Fig.1.1.1. *****

The Check Constraint: check (P), where P is a condition. Check Constraints are the most elementary form of integrity constraints. Check constraint is also known as the Domain Integrity constraint. It allows establishing range for data. Check Constraints are created by specifying a range for a column. If we specify a domain constraint for a column, that column will contain only values specified in that domain.

```
create table employee
(employee_id number(5),
employee_name char(30),
age integer,
primary key (employee_id),
check (age >= 0));
```

Integrity Constraints

Data Integrity Constraints: Integrity constraints ensure that data conforms to guidelines specified by the database administrator. Various integrity constraints are

UNIQUE constraints : Ensures that a given column is unique

NOT NULL constraints : Ensures that no null values are allowed

FOREIGN KEY constraints: Ensures that two keys share a primary key to foreign key relationship

Data Manipulation Language (DML)

Data Manipulation Language (DML) is a part of the SQL statements that helps us in the access, retrieval and manipulation of the data in existing schema objects. It is used to select, insert, update, or delete the data against the schema objects in the database. A logical group of DML statements that form a logical unit of work is called a transaction. The DML statements are

- SELECT rows from one or more tables or views
- INSERT new rows to a table
- UPDATE the column values of existing rows in a table
- DELETE existing rows in a table

The SELECT Statement

The SELECT statement is a limited form of DML statement in that it can only access data in the database. It cannot manipulate the data in the database, but can compute expressions or use functions on the accessed data before returning the results of the query.

A SELECT statement is used to retrieve the data from one or more tables or views. To select the data from a table, the table must be present in our own schema or we must be granted the SELECT privilege on that table. To select rows from the base tables of a view, we must have the SELECT privilege on the view, and the owner of the schema containing the view must have the SELECT privilege on the base tables.

The syntax of a basic SELECT statement is

```
SELECT *|{[DISTINCT] column|expression [alias],...} FROM table;
```

The SELECT and FROM clauses are mandatory. The default display of queries using * is all rows, all columns including duplicate rows.

Example:

```
SELECT * FROM employees;
```

```
SELECT DEPTNUM FROM EMPLOYEE; May return duplicate department numbers
```

```
SELECT DISTINCT DEPTNUM FROM EMPLOYEE; Returns unique department numbers
```

```
SELECT EID, ENAME FROM EMPLOYEE;
```

WHERE CLAUSE

The WHERE clause is used to restrict the rows from the SELECT query. If omitted, Oracle returns all the rows from the tables or views in the FROM clause.

```
SELECT *|{[DISTINCT] column|expression [alias],...} FROM table [WHERE condition(s)];
```

Example:

```
SELECT EMPLID, EMPLNAME FROM EMPLOYEE WHERE EMPLNAME='KUMAR';
```


The INSERT Statement

The INSERT Statement helps us to add new rows to a table. To insert the rows in a table, the table must be owned by the schema user or the INSERT object privilege on that table has to be granted by the other schema user. To insert the rows in a table, the table must be owned by the schema user or the INSERT object privilege on that table has to be granted by the other schema user.

Syntax of Insert Statement:

```
INSERT INTO table (column1 [, column2, column3 ... ]) VALUES (value1 [, value2, value3 ... ])
```

The number of columns and the corresponding values must be the same. If a column is not specified then the default value for the column as specified in the create table or null is used.

Example:

```
INSERT INTO EMPLOYEE(EMPLID,EMPLNAME) VALUES('E02','ANITA');
```

The other form of the INSERT Statement is:

```
INSERT INTO table VALUES (value1, [value2, ... ])
```

This form of INSERT Statement would require all the values for the columns corresponding to the base table in the same order we had specified at CREATE TABLE Statement.

Example:

```
INSERT INTO EMPLOYEE VALUES('E02','ANITA',25000);
```

The UPDATE Statement

The UPDATE statement is used to change the existing values of specified column or columns for one or more rows in a table or view.

To update the values in a table, the table must be owned by the schema user or the UPDATE object privilege on that table has to be granted by the other schema user. To update the values in the base table of a view then we must have the UPDATE object privilege on the view, and the owner of the schema containing the view must have been granted the UPDATE object privilege on the base table.

All the rows can be updated on the table if there is no condition specified in the update statement using a WHERE clause. Otherwise a subset of qualifying rows will only be updated on the table.

The UPDATE Statement syntax is :

```
UPDATE table_name SET column_name = value [, column_name = value ...] [WHERE condition]
```

Example:

UPDATE TABLE EMPLOYEE SET SALARY=SALARY+1000 WHERE EMPLID='E01'; Will update the SALARY column for only that specific row on the employee table.

UPDATE TABLE EMPLOYEE SET SALARY=SALARY+1000 ; Will update SALARY column for all the rows on the Employee table.

The DELETE statement

The DELETE statement is used to remove one or more records from a table or a view. It is usually defined for deletion using a condition where only the rows that meet the search condition are deleted. If you omit the WHERE clause then all rows in the table or view are deleted.

To delete the rows of a table, the table must be owned by the schema user or the delete privilege should have been granted by the other schema user.

The DELETE statement has the syntax:

```
DELETE FROM table_name [WHERE condition];
```

Example:

DELETE FROM Employee; --will delete all the rows in the employee table

DELETE FROM EMPLOYEE WHERE EMPLID='E01';-- will delete only that particular record

The WHERE clause is optional. Any rows that match the WHERE condition will be removed from the table. It should be used cautiously because if it is omitted then all rows in the table are removed.

Arithmetic Expressions

Arithmetic Expressions help us to modify the way in which the data is displayed or perform any calculations on the columns scenarios. An arithmetic expression can contain simple column names or constant numeric values and the arithmetic operators.

Arithmetic Operators are used to create expressions with columns of Number and Date data types. Arithmetic Operators can be used in any of the clauses of a SELECT statement except FROM clause.

Operator	Meaning
+	Addition
-	Subtraction
*	Multiplication
/	Division

Example:

SELECT emplname, empls salary, empls salary + 5000 FROM Employees;

EMPLNAME	EMPLSALARY	EMPLSALARY+5000
Bob	25000	30000
Tim	20000	25000

The addition operator is used to calculate a salary increase of Rs 5000 for all Employees and displays a new column in the output result set with the column name as SALARY+ 5000. It is a calculated column and not a new or existing column in the EMPLOYEES table. Its usage is limited to display only. We can give some meaningful column name with the help of an alias name specified with as keyword.

Example:

SELECT emplname, empsalary, empsalary + 5000 as SalaryHike FROM Employees;

EMPLNAME	EMPSALARY	SALARYHIKE
Bob	25000	30000
Tim	20000	25000

The Operator Precedence for the arithmetic operators is as follows

- +, - (UNARY) IDENTITY, NEGATION
- *, / MULTIPLICATION, DIVISION
- +, - (BINARY) ADDITION, SUBTRACTION

If an arithmetic expression contains more than one operator, * and / takes precedence and are evaluated first. For the operators within an expression of the same priority, then the expression is evaluated from left to right. Parenthesis can be used to force the precedence and be evaluated first.

Example:

*SELECT emplname, empsalary, empsalary*12+5000 FROM Employees;*

Here the expression “ empsalary * 12 + 5000 “ is the same as (empsalary * 12) + 5000

Arithmetic expressions containing a null value evaluate to null. A null value is a value that is unavailable or unknown. A null value is not the same as zero or a blank space.

Example:

SELECT emplname, empsalary, bonus FROM Employees;

EMPLNAME	EMPSALARY	BONUS
Bob	25000	5000
Tim	20000	-

Here '-' represents null.

SELECT emplname, empsalary, bonus, empsalary+bonus as salaryhike FROM Employees;

EMPLNAME	EMPSALARY	BONUS	SALARYHIKE
Bob	25000	5000	30000
Tim	20000	-	-

Since Tim has a null value for Bonus column, the arithmetic expression involving bonus column which is salary hike evaluates to null.

Condition

A condition is like a logical data type. Some examples of valid conditions are

- EmpName='SMITH'
- Employee.deptno=department.deptno
- HireDate>'01-Jan-1985'
- Job_id IN ('CLERK','ADMIN')
- Salary BETWEEN 5000 AND 10000
- Commission IS NULL AND Salary=2000

Condition Precedence is the order in which Oracle evaluates different conditions in the same expression. When evaluating an expression containing multiple conditions,

- Oracle evaluates conditions with higher precedence before evaluating those with lower precedence.
- Oracle evaluates conditions with the equal precedence from left to right within an expression.

SQL Operators

SQL operators are evaluated before SQL conditions

TYPE OF OPERATOR	PURPOSE
1. =, !=, <, <=, >, >=	25000
2. IS [NOT] NULL, LIKE, [NOT] BETWEEN, [NOT] IN, EXISTS	20000
<ul style="list-style-type: none"> • NOT • AND • OR 	LOGICAL NEGATION CONJUNCTION DISJUNCTION
<ul style="list-style-type: none"> • +, - (UNARY) • *, / • +, - (BINARY) • 	IDENTITY, NEGATION MULTIPLICATION, DIVISION ADDITION, SUBTRACTION CONCATENATION

The SQL Operator Precedence is as follows

Order evaluated	Operator
1	ARITHMETIC OPERATORS
2	ONCATENATION OPERATORS
3	COMPARISON OPERATORS
4	IS [NOT] NULL, LIKE, [NOT] IN
5	[NOT] BETWEEN
6	NOT LOGICALCONDITION
7	AND LOGICALCONDITION
8	OR LOGICALCONDITION

Comparison Operators

The Comparison Condition operators are used to compare one expression with another. The result can be TRUE, FALSE or UNKNOWN

- = is for Equality test
- e.g., SELECT * FROM Employee WHERE emplid=1000;
- !=,<,>, are for Inequality test
- e.g., SELECT * FROM Employee WHERE emplid !=1000;
- <, > are for lesser than and greater than
- eg., SELECT * from Employee WHERE salary>2500 and salary<3000;

The Group Comparison Condition operators ANY and SOME are used to compare a value to each value in a list or returned by a query. They must be preceded by any of the operators like =, !=, >, <, <=, >= . It evaluates to FALSE if the query returns no rows at all.

Example:

`SELECT * FROM Employee WHERE emplid<=ANY(7,8,9);` Output is till emplid 9

The ALL operator compares a value to each value in a list or returned by a query. They must be preceded by any of the operators like =, !=, >, <, <=, >= . It evaluates to FALSE if the query returns no rows. eg., `SELECT * FROM Employee WHERE emplid<=ALL(7,8,9);` Output is till emplid 7

The Logical Condition operators are NOT, AND, OR used for Negation, Conjunction and Disjunction respectively. Eg. `SELECT * from Employee WHERE NOT (job_id IS NULL);`

Example:

`SELECT * from Employee WHERE NOT(salary BETWEEN 1000 AND 2000);`

`SELECT * from Employee WHERE job_id='CLERK' AND emplid=8;`

`SELECT * from Employee WHERE job_id='clerk' OR emplid=9;`

The Membership Condition operators tests for membership or presence of values in a list or sub query as specified by the IN operator.

Example:

`SELECT 'true' from Employee WHERE deptno NOT IN (10,20);`

`SELECT 'true' from Employee WHERE deptno NOT IN (10,20,NULL);`

The Range conditions operators test for the presence of values within a Range. The Syntax is `Expr [not] between expr and expr`

Example:

*`SELECT * FROM Employee WHERE emplid BETWEEN 10 and 20; (including 10 AND 20)`*

The Null condition checks for null values in the data for the specified column.

The syntax is :

`Expr IS [NOT] NULL`

Example:

*`SELECT * FROM Employee WHERE emplid is NOT NULL`*

The EXISTS operator is used to check the presence of values which are returned

Example:

*`SELECT deptno FROM Department d WHERE EXISTS (SELECT * FROM Employee e WHERE d.dno=e.dno);`*

The LIKE condition operator is used to check for PATTERN MATCHING for character values of data type CHARACTER or VARCHAR. The '=' operator exactly matches one character value to another. The LIKE matches a portion of one character value to another.

The pattern can contain the special pattern-matching characters:

% matches any string of any length 0 or more characters

_ matches any single character.

To search for the characters % and _ we have to precede them by the escape character. For example, if the escape character is @, then you can use %@ to search for %, and @_ to search for _

To search for the escape character, repeat it. For example, if @ is the escape character, then you can use @@ to search for @.

In the given pattern, the escape character should be followed by one of %, _ or the escape character itself.

Example:

```
SQL>SELECT ENAME FROM EMPLOYEE WHERE EMPLNAME LIKE 'ANITA';
SQL>SELECT * FROM EMPLOYEE WHERE EMPLNAME LIKE 'F%';
SQL>SELECT * FROM EMPLOYEE WHERE EMPLNAME LIKE 'F_';
SQL>SELECT * FROM EMPLOYEE WHERE HIRDATE='95'; Will select all employees who
have joined between Jan 1995 and Dec 1995
SQL>SELECT JOB_ID FROM EMPLOYEE WHERE JOB_ID LIKE '%SA_\'ESCAPE\'; Will
select job_id SA_CLERK
```

The Concatenation operator is used to concatenate columns or character strings to other columns. It is represented by '||' operator and it creates a resultant column that is a character expression.

Example:

```
SQL>SELECT EMPLNAME || JOB_ID AS "EMPLOYESS" FROM EMPLOYEE;
SQL>SELECT EMPLID FROM EMPLOYEE;
      1
      5
SQL>SELECT EMPLID || EMPLID+10 FROM EMPLOYEE;
      21
      65
SQL>SELECT EMPLID || +10 FROM EMPLOYEE;
      110
      510
SQL>SELECT EMPLID || -10 FROM EMPLOYEE;
      1-10
      5-10
```

Exercise



Activity 1

I. Create the following table structure

Table Structure: COURSE

CourseID	Number(4) – Primary Key
CourseName	Varchar2(20)
Duration	Number
Fees	Number(7,2)

Table Structure: STUDENT

Studid	Number(4) –Primary Key
FisrtName	Varchar2(20)
LastName	Varchar2(20)
Street	Varchar2(20)
City	Varchar2(20)
DOB	Date

Table Structure: REGISTRATION

CourseID	Number(4) –Foreign Key
Studid	Number(4) –Foreign Key
DOJ	Date

Activity 2

II. Write queries for the following :

1. Add a field - Age Number(2) to the Student table.
2. Add a constraint in course table to check the fees entered is greater than zero.
3. Calculate the value of the age field using the DOB Field.
4. Decrease the fees by Rs. 500/- whose duration is lesser than or equal to 3 months
5. Delete the student record whose last name is David and the city is Chennai
6. Display first name, lastname and concatenate them to display as fullname from student table.
7. Display the details of course C++ from the course table.
8. Display the details from the course table which has a fess of more than 4000.
9. Display the details from the course table which has a duration of 2 to 4 months.
10. Display the student details whose birthday lies in the months between apr and sep
11. Display course details, which has duration of 2 months and has a fees of more than 3000

12. Display the details of the students whose ids are 3002, 3004 and 3005 from student table
13. Display the details from the student table whose lastname is Kumar
14. Display the details from student table whose first name starts with A
15. Display the details from the student who comes from Bangalore and last name is Kumar
16. Display the details from the student whose street name ends with Nagar.
17. Display the details of students Dileep and Abdul from the student table.
18. Display details of eldest student.
19. Display the details of students whose id is other than 3004 and 3006 from student table.
20. Display maximum, minimum and average fees from course table.

Notes



This image shows a single page of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.





IT - ITeS SSC
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5. Manage Work to Meet Requirements

Unit 5.1 – Self and Work Management



(SSC/N9001)

Key Learning Outcomes



At the end of this unit, you will be able to:

1. discuss how to understand your work to meet requirements.
2. explain the code of conduct of a Junior software developer.
3. discuss organisational procedures and policies.

UNIT 5.1: Self and Work Management

Unit Objectives



At the end of this unit, you will be able to:

1. discuss how to understand your work to meet requirements
2. explain the code of conduct of a Junior software developer
3. discuss organisational procedures and policies

5.1.1 Manage Work Requirements

This unit is about planning and organizing your work in order to complete it to the required standards on time and quality.

Deliverables

Deliverables is the basic output of what a Junior Software Developer does. It comprises of accurate, standardized and free of error information.

Quantity

Quantity is a measure that focuses on output. It ensures the work is completed on time. For a Junior Software Developer it is necessary to show the output of his work on basis of per shift/ day/ week/ month.

Quality standards

A quality measure/standard focuses on the correctness or accuracy. A Junior Software Developer should handle the query in a proper manner and provide with the accurate information.

Timing

It is a time-based measure. It mainly means that the Junior Software Developer adheres to the time limit.

Identify and refer anomalies in data

The Junior Software Developer must pay serious attention that will point out errors in the data. These errors must be fixed right away. In case of exceptions, the Junior Software Developer must refer the same to the Supervisor.

Implications of not meeting up the appropriate timescales and implications of the same

The Junior Software Developer should in mutual consultation with his Supervisor define the timelines for the work to be undertaken and delivered. Over a period of time the Junior Software Developer will get a sense of how much time his work takes and be able to fix realistic deadlines even for the smallest task. While planning deadlines always keep some leeway for unexpected activities that may need to be undertaken. The implications of missing deadlines should also be discussed.

Obtaining resources for work and using them

To maintain productivity, the Junior Software Developer should always ensure that he or she has the right resources needed to carry out the work. A daily status log on the functioning of the resource should be maintained. This information should be shared with the Supervisor on a periodic basis. This log will also help the Junior Software Developer to note which of the resource could break down and create a work block going ahead. Appropriate action should be taken by reporting the same to the senior and technical staff. The idea should be to pre-empt a breakdown and ensure there is replacement available before the breakdown happens.

Further, a Junior Software Developer should know how to work with the available resources and not be affected by the quality of the resource. And still perform. Here the Junior Software Developer will need to think out of the box and ensure that lack of resource or that resources are limited does not affect work performance.

Refer anomalies to the line manager

The Junior Software Developer should show all the anomalies to the Supervisor or the line manager. Further, the Junior Software Developer should have clarity on all the anomalies i.e. from where it originates or from where it will get cleared and approved.

The skills required to manage your work to meet the requirements:

1. Code of conduct
2. Organisational procedures and policies
3. Planning and Organising
4. Team Work: Cooperation and coordination
5. Anger Management
6. Attention to Detail
7. Reporting and Communication at work

5.1.2 Code of Conduct of a CCE

Your code of conduct requires you to behave like a professional. Everyone observes the way you conduct yourself, how you dress, your grooming, how neat or untidy your work area is, etc. This session briefly tells you how to conduct yourself at work, professionally.

Resource Management

One of the most important skills required to manage your work is to manage the resources given to you. Resource management is the efficient and effective use of an organization's resources when they are needed. Such resources may include information technology (IT), physical resources, information etc.

Your Work Area

It is important not to abuse the resources allocated to you. The resources allocated to you will be your Computer and any accessories.

The way you will be careful, while using your personal resources, please be careful using the organization's resources too in a similar manner.

Your code of conduct requires you to behave like a professional. Everyone observes the way you conduct yourself, how you dress, your grooming, how neat or untidy your work area is, etc. This session briefly tells you how to conduct yourself at work, professionally.

It's important that:

1. You log out and shut down the computer every day. If you don't shut down, there is a continuous electric supply to the computer, which lessens the life of the computer.
2. Use the keyboard and the mouse carefully. It's important to use the devices in such a way that the power cables are not bent or entangled.
3. You should also take proper physical care of the equipment so that you don't damage it in any way.
4. Do not use the processor as a foot rest. It makes it dirty and if pushed, it can fall. This can harm the integration of the processor inside.

Remember to:

1. Keep your workstation neat and tidy. This reflects in your thought process. It has been proven scientifically that a person in a neat area can think clearly.
2. Ensure that all the paperwork you have used the whole day is stacked nicely before you leave for the day.
3. If there is any sensitive information that needs to be shredded, remember to do that immediately rather than postponing it to the next day.
4. The importance of maintaining high standards of health, safety and security.
5. Implications that any non-compliance with health, safety and security standards may have on individuals and the organization.
6. Different types of breaches in health, safety and security standards and how and when to report these.
7. Government agencies in the areas of safety, health and security and their norms and services.

A tidy work area can only be maintained when the Junior Software Developer will have respect for their workplace. This is very important and is discussed as follows

Respect your Workplace

Some of the ways we respect our workplace is by:

- Respecting the people around us.
- Respecting the resources at work.
- Not misusing the resources like paper, stapler, printer etc.
- Respecting the resources and not doing anything to damage the resources available for our use.
- Not littering around or dirtying our workplace.

Keep your immediate work area clean and tidy

An important part of effective performance is to work in a clean and tidy. Your workplace should be free of germs.

Few ways of keeping your work area clean

- Avoid eating at your desk. One tends to eat at the desk and not wash one's hand. With the same dirty hand then, one touches the work station, key board etc. Making everything dirty.
- Ensure that the floor of the centre is always kept clean.
- Make enough storage compartments around your work station so that all the unused material, papers, electronic items and equipment's can be kept here. The storage area should be within the reach so that work is not affected, in the event he or she needs something from there.
- Properly storing items would also declutter your work station and make your work process free and easy.
- Ensure that the passages, work ways etc. are free from any obstacles. If you organise your work station properly, you will find things more easily. This will improve productivity and the quality of work.

It is important for a Junior Software Developer to:

- Be at the workstation at least 15 minutes before your shift begins.
- Always take planned leave so that your seat is given to someone and your work gets covered.
- Frequent job hopping is not advisable. It reflects poorly on your commitment to your organization.

Personal Grooming

People are usually judged first by their appearance, which is why it is important to be well groomed. As a Junior Software Developer there are a lot of parameters to take care of. One of them is personal grooming. You will be liked or disliked not only based on your performance at work, but also based on how you appear.

Below are some basic guidelines for professional grooming:

- Neat and tidy look
- Washed face and clean teeth
- Clean clothes
- Hair neatly brushed/tied
- Clean and clipped nails
- Proper shoes and socks
- Professional attire
- Controlled body odour

General Code of Conduct

As a Junior Software Developer it is important that you:

- Maintain the Confidentiality and Privacy (Organisation, Client and Customer)
- Follow Company Procedures like Metrics set for execution of the job role
- Handle Company property with honesty and integrity
- Respect Confidentiality of Customers Data
- Understand the importance of respect for self, respect for others and the environment
- Respect the policies of the organization
- Understand and abide by the leaves policy and other HR norms

Attendance and Leaves

- All the employees are expected to be in the office daily and on time.
- Employees are not expected to be late at all.
- Leaves can't be claimed. It is not a right.
- Your leave can be refused or revoked anytime.
- You need to inform your immediate supervisor in advance

Check your work is complete and free from errors

Make sure your work is free from errors and is 100 percent accepted. The goal should be to minimise reject rate because of minor error that you overlooked. This will result in waste of time, money and efforts of an entire system.

Get your work checked by peers

As mentioned in previous modules, get your work checked once in a while by your peers. There are other software developers who work with you. Take advice from them on your decisions. Share your work with more experienced Operators and see if you can learn some ideas on how to work better.

Work effectively in a team environment

Learn to be a part of a team. Organisations work on teams. As mentioned above, learn to share ideas, data, and experiences in team meetings. Be helpful of others, share your opinion on their problems and advise on matters where you think you have experienced yourself. Build your credentials as been a professional person who is open minded and respectful of others.

Ensure your work meets the agreed requirements

Junior software developer must have detailed knowledge about the processes and methods of work. He must also understand the policies, procedures and guidelines that influence and impact the quality of data.

A thorough knowledge of the product, technique and technology will enable him to deliver the work that matches the requirements of the work. He must analyse needs, requirements and dependencies in order to meet your work requirements.

Organisational Procedures and Policies

Identification

- Always identify yourself as a representative of your company, with clear indication of your role.
- In case you go out of office for any reason, always carry your identity card along with letter of authorisation at all times and show it to the customer voluntarily.
- Identity card should contain the contact no of your supervisor/helpline.
- At the time of calling /contacting the customer, the agent must convey the complete details such as name of contacting person, contact no. and the product you are going to pitch for.
- Never misrepresent yourself as anyone else, like someone who is taking a survey or anyone else.

Fraudulent Practices

Fraudulent practices can lead to immediate termination of employment, prosecution and police complaints on the concerned Junior Software Developer.

While both large and small organisations fall victim to occupational fraud, companies with fewer employees are particularly vulnerable compared to their larger counterparts.

Theft and cybercrime, especially credit card abuse, are some of the most common sources of fraud which in turn adds to company reputational loss.

The following practices are defined as fraudulent practices.

- Tampering, falsification or unauthorized overwriting of cheques, receipt books, drafts or any other negotiable instruments.
- Tampering, falsification and false commitments on receipts and settlement letters.
- False commitments to customers, promising waivers, settlements etc.
- Commitment on settlement and waivers without the approval of specific authority from your company.

Compliance with organization's current health, safety and security policies and procedures

Compliance with organisations safety policies is the responsibility of every employee. A Junior Software Developer would be usually trained in compliance related matters by the company appointer specialist or his supervisor.

A Junior Software Developer must understand and thoroughly inculcate safety policies in his everyday work routine. The responsibility of maintaining a safe environment is not just the duty of the organisation alone. Every employee has a role to play in maintaining a safe and secure environment.

As part of being in a operational environment, the Junior Software Developer will come across many security lapses such as, wires lying around, water leakages in document storage area, fire extinguisher improperly placed etc. He must immediately report this to the appropriate authority as specified in the safety protocols.

A Junior Software Developer must set an example for compliance of work safety policies. In the event of non-compliance, there could be serious damages not just to the people, but cause monetary loss to the organisation as well. Serious safety lapses could put the entire organisation at risk from legal point of view.

It is very important to follow the organization's emergency procedures that are set for different emergency situations as only this can assure of safety during such situations.

Planning and Organising

Importance of planning and organising for a Junior Software Developer:

- Establish and agree work requirements with appropriate people.
- Ensure work meets the agreed requirements.
- Work within the limits of your job role.
- Work in line with organization's policies and procedures.
- Treat confidential information correctly.
- Utilize time effectively.
- Know the limits of your responsibilities and when to involve others.
- Prioritise your workload according to urgency and importance
- Know the importance of completing work accurately and how to do this.
- Achieving targets and deadlines of your work.

Analyse data and activities

The Junior Software Developer should analyse all the work related data and activities involved. As an intelligent Junior Software Developer, it is your duty to identify your data. It is important for your personal reference and for maintaining records to provide your TL.

Goal setting

It is very important to organize work by setting the required goals and manage the time. Time is money. Therefore, it is important for you to plan and utilize your time effectively so as to achieve the decided goals. Further, all the targets set according to these goals should be time driven. You will be required to achieve certain within suggested time span.

Time Management

Time management is about effective scheduling of your time, goal setting, prioritising and choosing what to do and what not to do, delegating tasks, analysing and reviewing your spent time, organizing your workspace, keeping your concentration and focus at your work, motivating yourself to work towards a goal.

Time management requires:

1. Effective planning
2. Setting goals and objectives
3. Setting deadlines
4. Delegation of responsibilities
5. Prioritising activities as per their importance
6. Spending the right time on the right activity

Time Robbers

Time robbers are those activities which create interruption at the workplace. These activities create a deviation from the objectives which needs to be achieved.

Time Robbers could be:

1. Poor personal planning and scheduling
2. Interruptions by people
3. Poor delegation
4. Poor use of the media: Telephone, Mobile, e-mail, and fax etc.
5. Reading junk mail
6. Lack of concern for good time management
7. Lack of clear priorities

The Time Robbers can be avoided by:

1. Being active all the time.
2. Developing and maintain an organized personal activity schedule.
3. Setting your priorities.
4. Proper delegation.
5. Utilizing modern technical media.

Prioritisation - Urgent and Important Matrix

This matrix will help you plan and organize your targets and your schedule to help you meet the company's expectation from you.

This matrix helps you understand:

1. What should be done?
2. What should be planned?
3. What should be resisted?
4. What should be rejected?

The Urgent and the important tasks	The Non-Urgent but important tasks
DO NOW	PLAN TO DO THEM
<ul style="list-style-type: none"> • Emergencies, complaints and crisis issues • Demands from seniors • Planned tasks or project work now due • Meetings with superiors/ colleagues 	<ul style="list-style-type: none"> • Planning, preparation • Scheduling • Designing, testing • Thinking, creating, modelling the data

The Non-Important but Urgent tasks	The Non-Important and Non-Urgent tasks
REJECT AND EXPLAIN	RESIST AND CEASE
<ul style="list-style-type: none"> • Trivial requests from others • Apparent emergencies • Misunderstandings appearing in work • Pointless routines or activities 	<ul style="list-style-type: none"> • Comfort activities • Computer games, net surfing • Excessive cigarette breaks • Personal Chat, gossips, social communications • Communications • Reading irrelevant and useless material

Exercise



1. Why is following a code of conduct important for a CCE?

2. Write down some measures for respecting the workplace resources.

3. What are your time robbers?

4. What will you do to plan and organise effectively?

5. List down your activities for a day. Then arrange them on the basis of their priority. Identify what is important and what is not so urgent.

Urgent and Important	Important not Urgent

Urgent	Neither Important nor Urgent

Notes



This image shows a single page of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.





IT - ITeS SSC
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6. Work Effectively with Colleagues

Unit 6.1 – Team Work and Communication



(SSC/N9002)

Key Learning Outcomes



At the end of this unit, you will be able to:

1. explain how to work effectively in a team
2. explain how to communicate clearly, concisely and accurately with colleagues

UNIT 6.1: Team Work and Communication

Unit Objectives



At the end of this unit, you will be able to:

1. explain how to work effectively in a team
2. explain how to communicate clearly, concisely and accurately with colleagues

6.1.1 Working Effectively in Teams

A Junior Software Developer is not only an individual contributor; he is also a team player.

There are many resources available at work which will help you manage your work to meet requirements. These resources could be

1. Your Team Leader
2. Your Team
3. The Intranet

You should use these resources to ensure the completeness of your work. You should get your work checked by your peers, if you are not clear of any of the concepts. Specially, during the first 3 months, after training, you should ensure that your Team Leader or your peers, or your seniors go through your work. This will guarantee complete and error free work.

Being a good team player is crucial for the role. Every day you will come across situations where you will require the co-operation of your team members. A good teamwork will be the key to your success.

To be an effective team member:

- Cherish and live team values: for instance, pulling together, respect, putting the customer first
- Focus on everyone's positive behaviors
- Work within the limits of your authority and refer any matters outside your authority to a senior person.

A team succeeds when its members have:

- A commitment to common objectives
- Defined roles and responsibilities
- Effective decision systems, communication and work procedures
- Good personal relationships

A team fails when its members:

- Have communications difficulties
- Have competition between members

Seek clarification on problems from others

In an organisational set up, the Junior Software Developer must take feedback and advice from his Supervisor. This is an important part of a Junior Software Developer work day. The operator should show them to the Supervisor, in case of demographic data anomalies so as to verify them. Get clarity on the anomaly from where it originates or from where it will get cleared and approved.

If Junior Software Developer has issues relating to his work, he must not hesitate to ask for help from others. Asking for help is a sign of being a team player. When asking for help, do so politely and not like a boss. Asking others for a point of view will also help in getting clarity on the problem and if you are on the right track in solving the problem.

Get your work checked by peers

As mentioned in previous modules, get your work checked once in a while by your peers. There are other Junior Software Developer who work with you. Take advice from them on your decisions relating to data. Share your work with more experienced Junior Software Developer and see if you can learn some ideas on how to work better.

Pass on/Provide relevant information to others

Share relevant information about your work with others in your team so that they can map their own workload, processes etc. against their deadline. In an organisation, everything is interdependent. People have to work in teams to achieve the overall corporate goals. There is a high degree of co-dependency on data, processes and process outcome. Sharing information with the team facilitates in achieving the corporate goals.

The Junior Software Developer must maintain strict record of the progress of his work, the issues face and how it was resolved. He can then easily share relevant data with people who need the information.

The purpose of keeping others updated with the progress of your work

The Junior Software Developer must maintain detailed records of all the work. These records can give the Supervisor a realistic assessment of the progress of the work being done. By maintaining proper records will help the Junior Software Developer and accordingly sharing the appropriate information with the relevant people will further help in the timely progress of work.

For updating the work progress, the records should include the people involved in your work, the issues you face with respect to their work, the resources related issue, timelines and actual date when deadlines were met.

Maintaining detailed records will help the Junior Software Developer share the right information on the progress of the enrolment work being done with the Supervisor and other concerned personnel so that appropriate planning can be done ahead by everyone.

It is important that progress report is shared periodically so that others can map their workload in comparison to the work that is being undertaken by the Junior Software Developer. And then map their deliverables and deadlines as well against the workload undertaken.

Information will be shared with the core team who influences workloads and impacts work outcomes. Based on organizational protocols, relevant information should be shared with relevant people.

Obtain guidance from appropriate people, where necessary

Whenever the Junior Software Developer comes across any problems and issues, the Junior Software Developer must take guidance from appropriate people. This is very important as taking the required guidance will largely help the Junior Software Developer in completing task on time and also help in improving the quality of work done.

Ask for clarification and advice from line managers

As discussed in the previous sessions, in an organizational set up, the Junior Software Developer must take feedback and advice from his Supervisor. This is an important part of a Junior Software Developer work day. Sharing information with the Supervisor and asking for his feedback will help the Junior Software Developer in completing task on time and also help in improving the quality of work done.

If a Junior Software Developer has issues relating to his work, he must not hesitate to ask for help from others. Asking for help is a sign of being a team player. When asking for help, do so politely and not like a boss. Asking others for a point of view will also help in getting clarity on the problem and if you are on the right track in solving the problem.

6.1.2 Communication Effectively with Colleagues

Writing

To be effective keep all the important data like tasks and reports documented safely in a word document or excel sheet. Make a list of what all you need to do at your end and keep checking the list throughout the day. Writing the tasks helps you in easy recalling.

Example: Making a list of reports to be sent on a particular day of the week. This helps in completion of all such reports to be sent in time to the concerned person.

Reading

Reading company guidelines and procedure time and again to not only keep yourself updated within your limits and according to company procedures.

Oral Communications

You have to talk to people around you, to your team mates and seniors. Therefore, it is important to have effective oral communication skills to seek their help and support as and when required. You have to be polite and patient, choose your words wisely while speaking to people around. Make sure you say nothing which is offensive or rude.

6.1.3 Professional Skills

Decision making helps you to prioritise your work and deliver work efficiently and in time. It helps you decide which task to go for first and deciding its importance.

Example: You have seven pending queries to answer and arrange for an executive to visit one of the areas to provide a service to the customer. According to the priority, assign the duty to the executive and then get back to answering queries. Else if you start with queries, you may forget about the other important task and the day may pass.

Value of being flexible and adapting work plans to reflect change

Plans have a tendency to change. Reasons could be the as simple as the printer breaking down or enrolment software not working or a huge queue or crowd collecting outside or something completely unexpected and unplanned.

When such things happen, the Junior Software Developer should be flexible to rework his priorities and work around this changed schedule. This may mean shifting priorities, working on shorter deadlines to make up for slippages in other part of the project or even working on already committed deadlines despite breakdown in system.

Exercise



1. Describe how seeking guidance from your team can help growth of the team?

2. Explain the following terms:
 - a. Collaboration
 - b. Cooperation
 - c. Team
3. Create a conversation with your supervisor where you want to seek his help as you are not able to meet your task

4. Make a team of four members each. Allocate the task among yourself and decided who will do what to attain the goal.

Notes





7. Maintain a Healthy, Safe and Secure Working Environment



**IT - ITeS SSC
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Unit 7.1 – Hazards at Workplace

Unit 7.2 – Dealing with Emergencies



Key Learning Outcomes



At the end of this unit, you will be able to:

1. deal with occupational hazards
2. explain what is an emergency evacuation
3. demonstrate the evacuation procedure

UNIT 7.1: Hazards at Workplace

Unit Objectives



At the end of this unit, you will be able to:

1. deal with occupational hazards

7.1.1 Recognizing Physical Hazards

The organization can face some health hazard that could put the lives of the employees in danger. Hazards can be of different types depending on the industry and the environment in which the employees work. The different types of hazards include:

- Physical
- Chemical
- Biological
- Mechanical

7.1.2 Dealing with Occupational Hazards

Occupational hazards are problems that a worker faces due to his or her occupation. As a CRM, you will have prolonged hours of working in front of a computer, using headphones and sitting on a chair. For users who habitually use display screen equipment as a significant part of their work, have come across certain occupational hazards. These lead to health problems like repetitive strain injury, eye strain, back pain and stress.

In order to minimize the impact of occupational hazard, there are certain precautions that should be followed. Mentioned below are some of them.

7.1.3 Checklist for Workstations

The workstation should:

- provide sufficient space for the user or the operator to alter position Comfortably;
- provide lighting that is adequate with suitable contrast between the screen and background;
- avoid glare and reflections on the screen;
- have windows fitted with adjustable coverings to alter the sunlight level;
- be spacious enough when a workstation is shared by more than one person.

The display screen should:

- display well-defined characters of adequate size and spacing;
- have a stable image;
- have easily adjustable brightness and contrast;
- tilt and swivel easily to suit the user;

- be free from glare and reflections;
- Use a separate base for the screen or an adjustable table.

The keyboard should:

- be able to tilt easily and should be able to separate from the screen to allow the user to adopt a comfortable working position;
- have space in front to provide support for the hands or arms of the user;
- have a matt surface;
- have clearly legible symbols on the keys.

The work surface should:

- provide adequate space for the user;
- have a low reflective surface;
- be of an adequate size to allow the screen, keyboard etc. to be flexibly arranged;
- have a stable and adjustable document holder, which should be at the same level as the screen and at the same viewing distance.

7.1.4 Checklist for Work Environment

The work chair should have a seat that is adjustable in height and with a seat back adjustable in height and tilt. A footrest should be available too.

You should know the basic health and safety aspects of working with computers. They include:

- The importance of good posture, changing position and good keyboard technique.
- Avoiding glare or bright reflections in the screen.
- Cleaning and adjusting the screen.
- Using a mouse.

7.1.5 Norms And Services Of Government Agencies

- All wiring on the floor or along the walls properly insulated
 - Wiring required for the generator backup and for connecting the various devices used for enrolment neatly organized
 - Fuel for generator or any other inflammable material stored away from the enrolment area
 - Fire safety equipment available handy
 - Power generator kept sufficiently away from the enrolment stations
 - Local Emergency Help numbers available at the centre and are Operators aware of them.
- All the electrical equipment are properly earthed.

In the event, a review of his work process, raises a safety risk, he must take action to correct it. Additionally he must review the reason for the same with his peers and his supervisors and other authorities, to ensure that it does not happen again.

Exercise

1. Your back has been hurting due to a bad backrest of your chair. What do you do?
 - a. Complain about it to everyone you meet
 - b. Write an email to your TI telling them how inefficient they are
 - c. Join yoga classes
 - d. Ask your TI to change your chair and stretch your back as much as possible during work hours
2. You have developed glasses due to prolonged use of the computer. You have a bad habit of sitting too close to the screen. What do you do now?
 - a. Resign and tell your TL that It is his or her fault
 - b. Cry about it. Nothing more you can do Li
 - c. Develop a healthier habit of maintaining safe distance from the screen
 - d. Continue to sit close to the screen. It is a sign of being intelligent to have glasses
3. What kind of keyboard should you use?
 - a. A modern, brand new keyboard
 - b. Old, second-hand keyboard
 - c. One that allows you to work comfortably and alter your position
 - d. The one that your TL is using

Notes

UNIT 7.2: Dealing with Emergencies

Unit Objectives



At the end of this unit, you will be able to:

1. explain what is an emergency evacuation
2. demonstrate the evacuation procedure

7.2.1 Emergencies at Work Place

Every organization has an evacuation procedure. Every organization also has an assembly point, within the organization compound or outside it, where all employees are expected to gather in case of an emergency evacuation. The team leader guides the team and takes them to a safe place. It is very important to assemble at the safe area immediately during an emergency evacuation.

If a team member does not reach the safe area on time, the team leader is responsible his or her team member's safety.

An unforeseen situation is one that:

- threatens the employees, customers or the public;
- disrupts or shuts down the operations;
- Causes physical or environmental damage.

Emergencies that require evacuation include:

- Fire;
- Explosion;
- Floods;
- Earthquake;
- Hurricane;
- Tornado;
- Toxic material release;
- Civil disturbance;
- Workplace violence.

7.2.2 Equipped for Emergency

Every company has:

- An evacuation policy. All the TIs are responsible for informing their employees about it. When the U is informing you about these details, pay attention. Negligence at this time could cost lives.
- A designated assembly point for emergencies. Ensure you know where it is.
- A 'buddy system' for individuals with special needs or disabilities. This system ensures that the differently abled are assisted and guided out of the premises or the impacted area properly. If you are a buddy to someone, ensure that your buddy is safely at the assembly point with you.
- Floor plans with evacuation routes in work areas. Ensure that you understand these so you can use it in time of need.
- Assembly areas. These are the areas where you are required to assemble after evacuation.
- Periodic evacuation drills. Ensure that you pay attention during these drills. You need to save your life and you can be helpful in saving someone else's life too.

7.2.3 Equipped for Emergency

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- Periodic evacuation drills. Ensure that you pay attention during these drills. You need to save your life and you can be helpful in saving someone else's life too.

7.2.4 Dealing with a Medical Emergencies

A medical emergency is an accidental injury or a medical crisis that is severe. These could be situations where:

- The person is not breathing;
- Stroke or heart attack;
- Severe bleeding;
- Shock;
- Poisoning;
- Burns.

A medical emergency requires your immediate attention. Sometimes, even before you call emergency services for help.

It is crucial to know Emergency Medical Service (EMS) number for your safety and the safety of others.

Call EMS if:

A seizure happens to someone who is not known to have epilepsy or seizure disorder. It could be a sign of serious illness.

- A seizure lasts for more than five minutes.
- The person is slow to recover, has a second seizure or has difficulty breathing afterwards.
- Has another medical condition.
- The lady is pregnant.
- There are any signs of injury or illnesses.

Do not:

- Give the person anything to eat or drink.
- Restrain the person.
- Put anything between the person's teeth during the seizure.
- Splash or pour any liquid on the person's face.
- Move the person to another place (unless it is the only way to protect the person from injury).

7.2.5 Bleeding

Procedure to assist someone who is bleeding:

- Apply direct pressure to the wound with a direct pressure bandage.
- Elevate the wound to slow the bleeding

7.2.6 Shock

Wherever necessary, apply additional pressure to help reduce bleeding.

Fainting is a brief loss of consciousness that is caused by a temporary reduction of blood flow to the brain.

- A brief loss of consciousness causing the person to fall on the floor;
- A slow pulse;
- Pale, cold skin and sweating.
- Causes
 - Consuming too little food and fluids (dehydration;
 - Low blood pressure;
 - Lack of sleep;
 - Over exhaustion.

Procedure to assist someone who has fainted:

1. Position the person by lying on his/her back and elevate his/her legs.
2. Check the person's airway to ensure it is clear.
3. Check for signs of breathing, coughing or movement.
4. Loosen clothing (neck ties, collars, belts etc.)
5. If consciousness is not regained within one minute, call the EMS.

7.2.7 Fainting

A person suffers from shock when the circulatory system fails and insufficient amount of oxygen reaches the tissues. If it is not treated quickly, vital organs can fail that ultimately cause death. Shock is made worse by fear and pain.

Procedure to assist someone who is in shock:

1. Keep the person lying down, if possible.
2. Elevate the person's leg unless you suspect a back injury or broken bones.
3. Cover the person to maintain body temperature.
4. Provide the person with plenty of fresh air and space.
5. If the person begins to vomit, place him/her on his/her left side.
6. Loosen restrictive clothing.
7. If the person's condition seems to worsen, call EMS.

7.2.8 Muscle Cramps

Procedure to assist the person suffering from muscle cramps:

1. Slowly stretch the affected muscle to counteract the cramp.
2. Massage the cramped muscle firmly but slowly.
3. Apply moist heat to the area.
4. Get medical help if the cramp persists.

7.2.9 Strains and Sprains (R.I.C.E)

The steps to follow when assisting someone suffering from strain or sprain:

- Rest- Avoid movements and activities that cause pain.
- Ice- Ice helps reduce pain and swelling.
- Compression- Light pressure can be applied from using an elastic wrap or bandage. It helps reduce swelling.
- Elevation- Raising the affected limb reduces pain and swelling.

7.2.10 Fractures

A fracture is a break or crack in the continuity of the bone.

Symptoms:

- Pain at or near fractured site;
- Tenderness at or near the affected area;
- Swelling over the fracture site;
- Deformity e.g. irregularity of bone, angulation or rotation of limb, depression of bone etc.;
- Temporary loss of movement;
- Signs and symptoms of shock.

7.2.11 Dislocation

A dislocation is the displacement of one or more bones at a joint. It usually occurs in the shoulders, elbow, thumb, fingers and the lower jaw.

Symptoms:

- Pain at the site of injury;
- Limited movement at the joint;
- Deformity;
- Swelling;

7.2.12 Dislocation and Fractures

Steps to take when assisting someone suffering from a fracture or dislocation:

- I - Immobilize area. Stop any movement by supporting the injured area. Use pillows, jackets, blankets etc.
- A - Activate Emergency Medical Services (EMS). Call your office medical helpline.
- C - Care for the person if he or she seems in shock.
- T - Treat any additional secondary injuries.

7.2.13 Early Warning Signs of an Asthma Attack

The early signs of an asthma attack:

- Coughing with no cold;
- Wheezing (however light) especially upon exhaling;
- Fast/irregular breathing;
- Anxiousness;
- Cyanosis (bluish skin colour);
- Nostrils flaring with each breath.

Procedure to assist someone suffering from an asthma attack:

1. Keep the person in a comfortable upright position leaning slightly forward. This is known as the 'tripod' position. Generally, the person will dictate what position is most tolerable to them. Usually, sitting up makes it easier to breathe. Check with the person first about the most comfortable position for him or her.
2. Try to calm and reassure the person.
3. Administer warm fluids if possible.
4. Ask the person about any asthma medication he or she may be using. Usually, the person will have an inhaler nearby.
5. If the person does not respond to his or her medication, cannot speak or cannot breathe, seek medical attention immediately.

7.2.14 Animal Bites

Procedure to assist someone who has been bitten by an animal:

1. Wash the bite area with mild soap and warm water for five minutes to remove saliva and any other foreign matter.
2. Use direct pressure or pressure point bleeding control to stop any bleeding.
3. If the wound is swollen, apply ice wrapped in a towel for 10 minutes.
4. Cover the wound with a clean dressing or bandage.
5. Seek medical assistance if the person showcases any severe symptom.

5.2.15 Nose Bleeds

Precautions to take while assisting someone with a nose bleed:

- It often occurs when a person has been breathing dry air.
- Seek professional help if they occur often.
- Do not tilt the persons head back. This could cause them to choke as the blood runs down their throat.

5.2.16 Object in the Eye

Procedure to assist someone who has a foreign object in their eye:

- Do not rub the eye.
- Wash your hands, clean the person's eye using water.

Exercise

1. Unfortunately a fire broke in your company and everyone is running to the safe area. You were outside the building. What will you do?
 - a. You will run away without informing anyone.
 - b. You will go to the safe area too.
 - c. You will wait for someone to call you and tell you about it.
 - d. You will stand there watching because it doesn't impact you.
2. Names are being called out at the safe area by your TL. You realize one of your friend from another team is still in the building but your TI doesn't know because he is not from your team. What will you do?
 - a. You will inform your TL
 - b. You will run into the building like a hero.
 - c. You will call your friend and ask him to come out.
 - d. You will wait.
3. An assembly point is _____.
 - a. a place where office supplies are kept
 - b. a place where people come to gossip
 - c. a place where you assemble during emergency evacuation
 - d. the best place in the office
4. First aid for bleeding includes:
 - a. Applying direct pressure to the wound with a direct pressure bandage.
 - b. Elevating the wound to slow the bleeding.
 - c. When necessary, applying additional pressure to help reduce bleeding.
 - d. All of the above

5. What is the first thing you should do when you notice someone who may be suffering from a medical emergency?
 - a. Run away. You do not want to be blamed for it.
 - b. Take charge of the situation and assist the person in need.
 - c. Gather everyone and gossip about it.
 - d. Call your TL. This looks like his job.
6. What does R.I.C.E stand for?
 - a. Rest, Ice, Compression, Elevation
 - b. Rejoice, Idealise, Concentrate, Encourage
 - c. Rest, Ice, Compression, Exercise
 - d. Rest, Ice, Call, Elevate

Notes







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8. Data and Information Management

Unit 8.1 – Provide Data /information in Standard Formats



(SSC/N9004)

Key Learning Outcomes



At the end of this unit, you will be able to:

1. explain the importance of providing qualitative and quantitative data
2. use standard format templates for data/information documentation
3. explain the organisation's procedures and guidelines for data/information entry
4. recognise and adhere to company's policies and procedure for information sharing
5. collect and validate data/information using company specific norms
6. use organisational procedures for updating data in appropriate formats
7. use CRM Database to extract, record and share information
8. recognize the work-scope and time-scales and how to use them to collect and present relevant data

UNIT 8.1: Provide Data /information in Standard Formats

Unit Objectives



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7. use CRM Database to extract, record and share information
8. recognize the work-scope and time-scales and how to use them to collect and present relevant data

8.1.1 Performance Criteria for Junior Software Developer

To be competent, a Junior Software developer must be able to execute the following tasks as per the requirements and standards of the organization. One of his important tasks is about providing specified both qualitative and quantitative data/information related to his work in templates or standard formats to appropriate people like his line manager, members of his own work group and people in other work groups in his organization and subject matter experts.

Establish and agree with appropriate people the data/information you need to provide, the formats in which you need to provide it, and when you need to provide it.

One's primary task is to establish and agree with the appropriate people the data/information, the formats in which these data and information needs to be provided, and the timelines they need to be provided in.

Obtain the data/information from reliable sources

The data/information sources could be obtained either from within the organization or outside the organization. It is very important that one always collects the data/information from reliable and authentic sources.

Check that the data/information is accurate, complete and up-to-date

Once the data/information is collected, one has to verify and check if it is accurate and up to date by careful scrutiny and examination. It is very important to have accurate, complete and up-to-date data/information to perform any kind of analysis or make any inferences.

Obtain advice or guidance from appropriate people where there are problems with the data/information

The importance of the accuracy of data cannot be stressed enough. It is essential to clarify and make the necessary corrections under the able guidance of the appropriate subject matter experts. Where there are problems with the data/information, one has to clarify with the appropriate people like line-managers and other superiors and refine the data accordingly.

Carry out rule-based analysis of the data/information, if required.

Every organization will have its own established system to validate and analyse its data. The junior software developer should be aware of them and conduct a rule-based analysis of the clarified data/information to verify if the data/information is accurate and up-to-date.

Insert the data/information into the agreed formats.

Once the rule-based analysis is done, the collected and analysed data/information should be inserted into the agreed formats mandated by the organisation for easier documentation. Depending on the requirement, the data/information should be presented either on paper electronic templates.

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Insert the data/information into the agreed formats.

Once the rule-based analysis is done, the collected and analysed data/information should be inserted into the agreed formats mandated by the organisation for easier documentation. Depending on the requirement, the data/information should be presented either on paper electronic templates.

Check the accuracy of your work, involving colleagues where required.

At all times, it is essential to check the accuracy of the work, involving colleagues wherever required. Despite highly automated intelligent data management systems, it is still advisable to check the accuracy of the work involving other colleagues, when in doubt. Having your work reviewed manually by others can throw up hidden flaws and oversights.

Report any unresolved anomalies in the data/information to appropriate people

In the process of checking, if any discrepancies or unresolved anomalies are observed in the data/information, it should be reported to the appropriate people, so that necessary action can be taken on time.

Provide complete, accurate and up-to-date data/information to the appropriate people in the required formats on time

Overall, the junior software developer is responsible for collecting, validating and analysing data/information for useful business analysis. Thus he should be competent enough to provide complete, accurate and up-to-date data/information to the appropriate people in the required formats on time.

A junior software developer should strive to fully know and understand the organization's procedures and guidelines for providing data/information in standard formats. He must be aware of the bigger picture and the role he plays in the entire framework of his organization's work. This awareness is important for him to understand the importance of his responsibilities and how his job role can affect the organization at large.

Organizational culture differs widely and hence the way they manage their knowledge systems will also vary. However all organizations strive to maximise their knowledge management to improve the organization's performance. So a junior software developer should be aware of his organization's approach, priorities and main concerns regarding the management of its knowledge systems and work accordingly.

Every organization spends considerable time and research to set up a systematic mechanism for creating, sharing and using the knowledge/data collected from within and outside the organization. Hence the junior software developer should know and fully understand the organization's policies and procedures for recording and sharing information, without compromising on the confidentiality of the same. It is crucial that he complies with these policies and procedures in the best interests of the organization.

Data validation is vital to ensure the data is clean, correct and useful. A good qualitative analysis is possible only with the input of good quality data. Hence the junior software developer should ensure that he validates all data/information before he uses it. He should be conversant with applying the 'validation rules'/'validation constraints'/'check routines' that check for correctness, meaningfulness and security of the data

The purpose of a CRM database is to consolidate customer information and document the same, so that the organization can access and use it to improve its business. If the junior software developer is aware of the importance of manning the CRM database, he would be more efficient in managing the data.

The junior software developer should be versatile with the organization's CRM database software and its various workflows and processes. Only then, he would be able to record the correct information and retrieve the relevant data as and when required by his line managers or people from other work groups who might want them for making business decisions based on the information logged and maintained in the CRM database.

Flaws and loopholes are best identified by manual analysis. So the junior software developer should ensure that his work is always reviewed by others before it is put to any other use, because data validation is best done only when it is manually analysed and reviewed.

Depending on the final use of the data, the junior software developer should ensure that all the relevant details are included. Understanding the bigger picture definitely helps in all stages of data collection, analysis and management. Care should be taken to record details to the maximum level and detail possible to enable all possible kinds of analysis when the need arises.

Too much data can sometimes be confusing and retard the speed of the work. Hence the junior software developer should ensure that all relevant data alone is given major importance while managing the CRM database.

Having the information/data available on time is as important as collecting and presenting the relevant data. Data that is not available on time becomes outdated. Hence it is crucial to adhere to timescales at all times.

Exercise



Activity 1

Activity Name: **My Activity Log**

Aim: To make participants understand the importance of maintaining logs.

Procedure:

Distribute worksheets with the following details and ask the participants to fill in details.

Date/Time	Activity Description	Lessons Learned	Actions to take

Debrief:

- Unless you maintain a log, you cannot keep track of an activity.
- Documentation is very important when it comes to maintaining track of events/data/information.

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Date/Time	Activity Description	Lessons Learned	Actions to take

Debrief:

- Unless you maintain a log, you cannot keep track of an activity.
- Documentation is very important when it comes to maintaining track of events/data/information.

Activity 2

Activity Name: **Maintain my inventory**

Aim: To make participants understand the importance of collecting, maintaining, updating data and take necessary action.

Procedure:

Students to be put in teams and asked to come up with the course of action that they need to take in the given scenario. For eg. They could be asked to maintain the inventory of a department store/ chemist/ mobile store... etc. the following actions need to be carried out on a day-to-day basis. **As a team decide what needs to be done to keep the database accurate and up-to-date.**

- Maintain an inventory of all stock
- New stock arrives
- Some products have reached minimum stock level

Notes



Lined area for taking notes, consisting of 25 horizontal lines.

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IT - ITeS SSC
NASSCOM

9. Develop your knowledge, skills and competence

Unit 9.1 – Learning and self Development



(SSC/N9004)

Key Learning Outcomes



At the end of this unit, you will be able to:

1. identify knowledge, skills and abilities needed for an area of work / job role
2. explain how to perform a training needs analysis
3. plan a learning and development program with the help of appropriate stakeholders
4. apply learned skills at the workplace under supervision
5. recognize how to obtain valid feedback and develop a plan of action based on it
6. explain organisation's guidelines as related to learning and development programs
7. use and maintain learning and development logs for continuous improvement

UNIT 9.1: Learning and Self Development

Unit Objectives



At the end of this unit, you will be able to:

1. identify knowledge, skills and abilities needed for an area of work / job role
2. explain how to perform a training needs analysis
3. plan a learning and development program with the help of appropriate stakeholders
4. apply learned skills at the workplace under supervision
5. recognize how to obtain valid feedback and develop a plan of action based on it
6. explain organisation's guidelines as related to learning and development programs
7. use and maintain learning and development logs for continuous improvement

9.1.1 Knowledge, Skills and Competences

Obtain advice and guidance from appropriate people to develop your knowledge, skills and competence

Your knowledge, skills and competencies provide much needed positive attitude and practical behaviour at the work place. Developing these areas will ensure an up-to-date description of what is needed for the job. In order to meet the evolving need of the work environment and company standards, one needs to ask for practical advice and guidance from one's superiors and seniors so that a consistency of standard is maintained.

Identify accurately the knowledge and skills you need for your job role

In order to become more effective at work, one has to truly analyse one's job role and identify the skills one needs in particular to complete his/her tasks effectively. Knowing what your job role is and having a clear sense about the knowledge areas and skills the job role entails is crucial for career success. Such skills can be learned during a specialized pre-onboard training and later, on the job itself.

Identify accurately your current level of knowledge, skills and competence and any learning and development needs

Before starting on a training and development course, it is vital to assess the level of knowledge and competence in the desired area of performance. The scale and the scope of this analysis have to be deep enough for one to accurately pinpoint learning and development needs. Moreover, it needs to be relevant to the people undergoing the training so that it will lead to efficiency at work.

Agree with appropriate people a plan of learning and development activities to address your learning needs

The framework for the learning and development program should be viewed and agreed upon by the most important stakeholders like the senior line managers and other decision makers. These stakeholders have a better grip on what skills and development qualities are required for the job. They have a deeper understanding of what would make someone in that particular job role successful in their work.

Undertake learning and development activities in line with your plan.

Once the framework is in place and the major stakeholders are in agreement with it, preparation for the activities that need to be included in the learning and development program have to be commenced. Identifying and obtaining resources needed for these activities goes a long way in executing the learning and development program

Apply your new knowledge and skills in the workplace, under supervision.

A role-based learning and development program has ample scope for supportive training by people who are already on the job. This enables a solid learning process that provides leader-support, coaching, mentorship and performance based feedback from those who matter most in that area of work.

Obtain feedback from appropriate people on your knowledge and skills and how effectively you apply them.

Obtaining feedback on work performance and identifying areas of improvement will help you address those much needed areas where you need to work up. An effective feedback can be got only from those people who are directly involved in your progress.

Review your knowledge, skills and competence regularly and take appropriate action.

Once feedback is obtained, it is essential to take necessary remedial steps or action in order to become better in one's area of work competency. Have an action plan that includes the reviewed goals and documents each step of action taken to achieve progress.

Every organisation has norms and guidelines as to how their learning and development programs are conducted. These guidelines play an important role in the implementation of a training program. Knowing and understanding these guidelines will help you make most effective use of the training offered.

The company invests a lot of time and resources in developing your knowledge, skills and competence. Understanding this will help you undertake the training better. Being aware of the fact that this training is important goes a long way in making you a successful worker in the organisation.

The organisation would use different strategies and method to review your skills and knowledge. This would include a training needs analysis where the training department assess your current knowledge, skills and abilities to perform the task at hand. A performance appraisal instrument would also be in place to test your level of competence at the job and give you relevant and valid feedback at strategic point in time.

You need to know how to use these methods to review your skill sets against your job role and take necessary actions wherever applicable.

An awareness of the different types of learning and development activities for your job role and how to access them will broaden your possibilities for learning more meaningfully and help you identify those learning programs which you need to be part of.

You also need to know how to produce a plan to address your learning and development needs and underline the specific goals you have in mind that will help you address your individual needs. Once you have the plan at hand, seeking the agreement of appropriate superiors and helping them understand the importance of your learning will support your individual learning goals.

There are various types of support tools available to help you chart out your individual plan for learning and development. Understanding how to use these types of support systems will help you use the learning and development activities to their fullest potential.

Accountability to your learning and development program starts with a good record/log keeping facility. As a professional, you need to understand how to maintain a clear and tangible record of what you have learnt and how you have implemented your learning.

Once you have a documented evidence of your learning and development program, you need to know how to use it as a reference to obtain valid feedback from your superiors in order to take your learning to the next level.

Knowing how to use feedback is the most vital step in your career development. It can use feedback to record, plan and review your relevant work activities.

Exercise



Activity 1

Activity Name: **Dashboard**

Aim: To help participants understand the importance of knowledge, skills and abilities in an area of work / job role.

Things needed:

- a. A Minute to Win It Video (anyone would do)
- b. An empty/plain white-board which people can 'dash over' to and scribble words/ideas

Procedure:

1. Play the Minute to Win It video on your screen.
2. Ask participants the following questions and make them scribble their ideas/ answers on the dashboard.
 - Identify the core-concept of the game
 - What are some skills a player would require to play this game?
 - What are some skills you need to possess that will help you win this game?
 - How can you make these skills better?
3. Debrief them on how knowledge, skills and abilities are important for anyone to complete a particular work task. Reiterate the importance of honing KSAs for any task they are assigned.

Activity 2

Activity Name: **Feedback Figure**

Aim: This training game illustrates that feedback is an important part of the communication cycle in a work environment. This feedback game is used to demonstrate the value of checking whether you have done something correctly and if you have done it well.

Procedure

This training game is played in pairs. It is played in two rounds. The seating for this training game are pairs of chairs are placed around the room giving the participants the room to spread out. The chairs have their back to each other. So when participants are seated they will have their backs to each other.

In the pairs one of the participants is assigned the letter name A and the other is assigned the letter name B.

All the 'A's in this training game are given the following figure on a paper.

Notes

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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10. Employability and Entrepreneurship Skills

Unit 10.1 – Personal Strengths & Value Systems

Unit 10.2 – Digital Literacy: A Recap

Unit 10.3 – Money Matters

Unit 10.4 – Preparing for Employment & Self Employment

Unit 10.5 – Understanding Entrepreneurship

Unit 10.6 – Preparing to be an Entrepreneur



Key Learning Outcomes



At the end of this unit, you will be able to:

1. Explain the meaning of health
2. List common health issues
3. Discuss tips to prevent common health issues
4. Explain the meaning of hygiene
5. Discuss the purpose of Swacch Bharat Abhiyan
6. Explain the meaning of habit
7. Discuss ways to set up a safe work environment
8. Discuss critical safety habits to be followed by employees
9. Explain the importance of self-analysis
10. Discuss motivation with the help of Maslow's Hierarchy of Needs
11. Discuss the meaning of achievement motivation
12. List the characteristics of entrepreneurs with achievement motivation
13. List the different factors that motivate you
14. Discuss the role of attitude in self-analysis
15. Discuss how to maintain a positive attitude
16. List your strengths and weaknesses
17. Discuss the qualities of honest people
18. Describe the importance of honesty in entrepreneurs
19. Discuss the elements of a strong work ethic
20. Discuss how to foster a good work ethic
21. List the characteristics of highly creative people
22. List the characteristics of highly innovative people
23. Discuss the benefits of time management
24. List the traits of effective time managers
25. Describe effective time management technique
26. Discuss the importance of anger management
27. Describe anger management strategies
28. Discuss tips for anger management
29. Discuss the causes of stress
30. Discuss the symptoms of stress
31. Discuss tips for stress management
32. Identify the basic parts of a computer
33. Identify the basic parts of a keyboard
34. Recall basic computer terminology

35. Recall the functions of basic computer keys
36. Discuss the main applications of MS Office
37. Discuss the benefits of Microsoft Outlook
38. Discuss the different types of e-commerce
39. List the benefits of e-commerce for retailers and customers
40. Discuss how the Digital India campaign will help boost e-commerce in India
41. Describe how you will sell a product or service on an e-commerce platform
42. Discuss the importance of saving money
43. Discuss the benefits of saving money
44. Discuss the main types of bank accounts
45. Describe the process of opening a bank account
46. Differentiate between fixed and variable costs
47. Describe the main types of investment options
48. Describe the different types of insurance products
49. Describe the different types of taxes
50. Discuss the uses of online banking
51. Discuss the main types of electronic funds transfers
52. Discuss the steps to prepare for an interview
53. Discuss the steps to create an effective Resume
54. Discuss the most frequently asked interview questions
55. Discuss how to answer the most frequently asked interview questions
56. Discuss basic workplace terminology
57. Discuss the concept of entrepreneurship
58. Discuss the importance of entrepreneurship
59. Describe the characteristics of an entrepreneur
60. Describe the different types of enterprises
61. List the qualities of an effective leader
62. Discuss the benefits of effective leadership
63. List the traits of an effective team
64. Discuss the importance of listening effectively
65. Discuss how to listen effectively
66. Discuss the importance of speaking effectively
67. Discuss how to speak effectively
68. Discuss how to solve problems
69. List important problem solving traits
70. Discuss ways to assess problem solving skills
71. Discuss the importance of negotiation

72. Discuss how to negotiate
73. Discuss how to identify new business opportunities
74. Discuss how to identify business opportunities within your business
75. Explain the meaning of entrepreneur
76. Describe the different types of entrepreneurs
77. List the characteristics of entrepreneurs
78. Recall entrepreneur success stories
79. Discuss the entrepreneurial process
80. Describe the entrepreneurship ecosystem
81. Discuss the purpose of the Make in India campaign
82. Discuss key schemes to promote entrepreneurs
83. Discuss the relationship between entrepreneurship and risk appetite
84. Discuss the relationship between entrepreneurship and resilience
85. Describe the characteristics of a resilient entrepreneur
86. Discuss how to deal with failure
87. Discuss how market research is carried out
88. Describe the 4 Ps of marketing
89. Discuss the importance of idea generation
90. Recall basic business terminology
91. Discuss the need for CRM
92. Discuss the benefits of CRM
93. Discuss the need for networking
94. Discuss the benefits of networking
95. Discuss the importance of setting goals
96. Differentiate between short-term, medium-term and long-term goals
97. Discuss how to write a business plan
98. Explain the financial planning process
99. Discuss ways to manage your risk
100. Describe the procedure and formalities for applying for bank finance
101. Discuss how to manage your own enterprise
102. List important questions that every entrepreneur should ask before starting an enterprise

Unit 10.1: Personal Strengths & Value Systems

Unit Objectives



At the end of this unit, you will be able to:

1. Explain the meaning of health
2. List common health issues
3. Discuss tips to prevent common health issues
4. Explain the meaning of hygiene
5. Discuss the purpose of Swacch Bharat Abhiyan
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8. Discuss critical safety habits to be followed by employees
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27. Describe anger management strategies
28. Discuss tips for anger management
29. Discuss the causes of stress
30. Discuss the symptoms of stress
31. Discuss tips for stress management

10.1.1 Health, Habits, Hygiene: What is Health

As per the World Health Organization (WHO), health is a “State of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity.” This means being healthy does not simply mean not being unhealthy – it also means you need to be at peace emotionally, and feel fit physically. For example, you cannot say you are healthy simply because you do not have any physical ailments like a cold or cough. You also need to think about whether you are feeling calm, relaxed and happy.

Common Health Issues

Some common health issues are:

- Allergies
- Asthma
- Skin Disorders
- Depression and Anxiety
- Diabetes
- Cough, Cold, Sore Throat
- Difficulty Sleeping
- Obesity

Tips to Prevent Health Issues



Taking measures to prevent ill health is always better than curing a disease or sickness. You can stay healthy by:

- Eating healthy foods like fruits, vegetables and nuts
- Cutting back on unhealthy and sugary foods
- Drinking enough water everyday
- Not smoking or drinking alcohol
- Exercising for at least 30 minutes a day, 4-5 times a week
- Taking vaccinations when required
- Practicing yoga exercises and meditation

How many of these health standards do you follow? Tick the ones that apply to you.

1. Get minimum 7-8 hours of sleep every night. ☐
2. Avoid checking email first thing in the morning and right before you go to bed at night. ☐
3. Don't skip meals – eat regular meals at correct meal times. ☐
4. Read a little bit every single day. ☐
5. Eat more home cooked food than junk food. ☐

6. Stand more than you sit. ☐
7. Drink a glass of water first thing in the morning and have at least 8 glasses of water through the day. ☐
8. Go to the doctor and dentist for regular checkups. ☐
9. Exercise for 30 minutes at least 5 days a week. ☐
10. Avoid consuming lots of aerated beverages. ☐

What is Hygiene

As per the World Health Organization (WHO), “Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases.” In other words, hygiene means ensuring that you do whatever is required to keep your surroundings clean, so that you reduce the chances of spreading germs and diseases.

For instance, think about the kitchen in your home. Good hygiene means ensuring that the kitchen is always spick and span, the food is put away, dishes are washed and dustbins are not overflowing with garbage. Doing all this will reduce the chances of attracting pests like rats or cockroaches, and prevent the growth of fungus and other bacteria, which could spread disease.

How many of these health standards do you follow? Tick the ones that apply to you.

1. Have a bath or shower every day with soap – and wash your hair with shampoo 2-3 times a week. ☐
2. Wear a fresh pair of clean undergarments every day. ☐
3. Brush your teeth in the morning and before going to bed. ☐
4. Cut your fingernails and toenails regularly. ☐
5. Wash your hands with soap after going to the toilet. ☐
6. Use an anti-perspirant deodorant on your underarms if you sweat a lot. ☐
7. Wash your hands with soap before cooking or eating. ☐
8. Stay home when you are sick, so other people don't catch what you have. ☐
9. Wash dirty clothes with laundry soap before wearing them again. ☐
10. Cover your nose with a tissue/your hand when coughing or sneezing. ☐

See how healthy and hygienic you are, by giving yourself 1 point for every ticked statement! Then take a look at what your score means.

Your Score

0-7/20: You need to work a lot harder to stay fit and fine! Make it a point to practice good habits daily and see how much better you feel!

7-14/20: Not bad, but there is scope for improvement! Try and add a few more good habits to your daily routine.

14-20/20: Great job! Keep up the good work! Your body and mind thank you!

Swachh Bharat Abhiyan

We have already discussed the importance of following good hygiene and health practices for ourselves. But, it is not enough for us to be healthy and hygienic. We must also extend this standard to our homes, our immediate surroundings and to our country as a whole.

The 'Swachh Bharat Abhiyan' (Clean India Mission) launched by Prime Minister Shri Narendra Modi on 2nd October 2014, believes in doing exactly this. The aim of this mission is to clean the streets and roads of India and raise the overall level of cleanliness. Currently this mission covers 4,041 cities and towns across the country. Millions of our people have taken the pledge for a clean India. You should take the pledge too, and do everything possible to keep our country clean!

What are Habits

A habit is a behaviour that is repeated frequently. All of us have good habits and bad habits. Keep in mind the phrase by John Dryden: "We first make our habits, and then our habits make us." This is why it is so important that you make good habits a way of life, and consciously avoid practicing bad habits.

Some good habits that you should make part of your daily routine are:

- Always having a positive attitude
- Making exercise a part of your daily routine
- Reading motivational and inspirational stories
- Smiling! Make it a habit to smile as often as possible
- Making time for family and friends
- Going to bed early and waking up early

Some bad habits that you should quit immediately are:

- Skipping breakfast
- Snacking frequently even when you are not hungry
- Eating too much fattening and sugary food
- Smoking, drinking alcohol and doing drugs
- Spending more money than you can afford
- Worrying about unimportant issues
- Staying up late and waking up late

Tips



- Following healthy and hygienic practices every day will make you feel good mentally and physically.
- Hygiene is two-thirds of health – so good hygiene will help you stay strong and healthy!

10.1.2: Safety: Tips to Design a Safe Workplace



Every employer is obligated to ensure that his workplace follows the highest possible safety protocol. When setting up a business, owners must make it a point to:

- Use ergonomically designed furniture and equipment to avoid stooping and twisting
- Provide mechanical aids to avoid lifting or carrying heavy objects
- Have protective equipment on hand for hazardous jobs
- Designate emergency exits and ensure they are easily accessible
- Set down health codes and ensure they are implemented
- Follow the practice of regular safety inspections in and around the workplace
- Ensure regular building inspections are conducted
- Get expert advice on workplace safety and follow it

Non-Negotiable Employee Safety Habits

Every employee is obligated to follow all safety protocols put in place by the employer. All employees must make it a habit to:

- Immediately report unsafe conditions to a supervisor
- Recognize and report safety hazards that could lead to slips, trips and falls
- Report all injuries and accidents to a supervisor
- Wear the correct protective equipment when required
- Learn how to correctly use equipment provided for safety purposes
- Be aware of and avoid actions that could endanger other people
- Take rest breaks during the day and some time off from work during the week

Tips



- Be aware of what emergency number to call at the time of a workplace emergency
- Practice evacuation drills regularly to avoid chaotic evacuations

10.1.3 Self Analysis – Attitude, Achievement Motivation: What is Self-Analysis

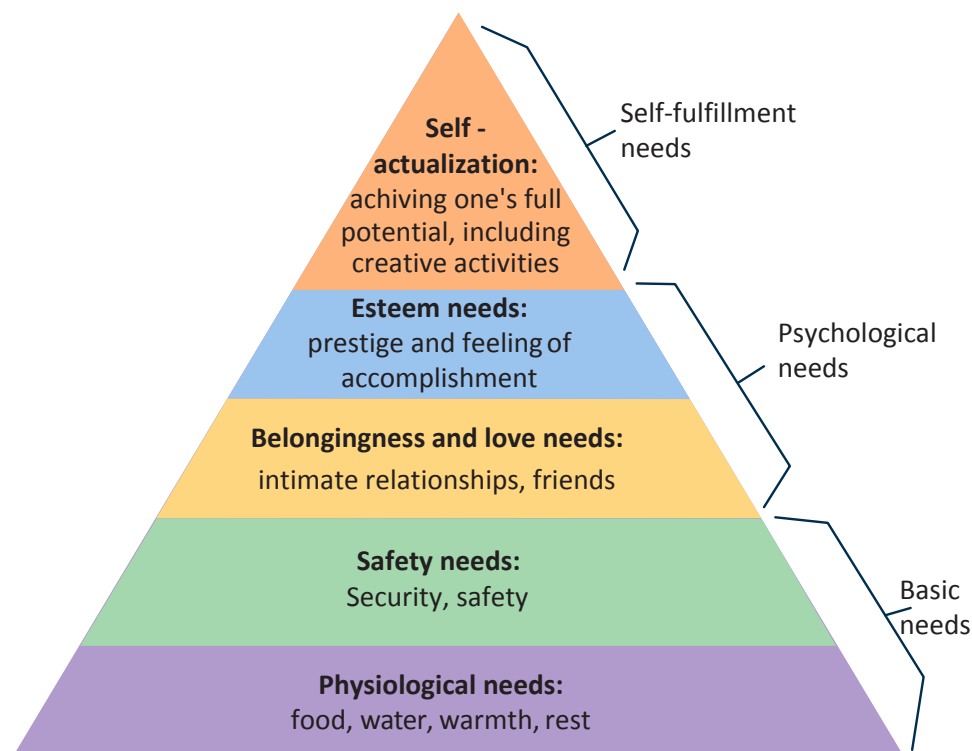
To truly achieve your full potential, you need to take a deep look inside yourself and find out what kind of person you really are. This attempt to understand your personality is known as self-analysis. Assessing yourself in this manner will help you grow, and will also help you to identify areas within yourself that need to be further developed, changed or eliminated. You can better understand yourself by taking a deep look at what motivates you, what your attitude is like, and what your strengths and weaknesses are.

What is Motivation

Very simply put, motivation is your reason for acting or behaving in a certain manner. It is important to understand that not everyone is motivated by the same desires – people are motivated by many, many different things. We can understand this better by looking at Maslow's Hierarchy of Needs.

Maslow's Hierarchy of Needs

Famous American psychologist Abraham Maslow wanted to understand what motivates people. He believed that people have five types of needs, ranging from very basic needs (called physiological needs) to more important needs that are required for self-growth (called self-actualization needs). Between the physiological and self-actualization needs are three other needs – safety needs, belongingness and love needs, and esteem needs. These needs are usually shown as a pyramid with five levels and are known as Maslow's Hierarchy of Needs.



As you can see from the pyramid, the lowest level depicts the most basic needs. Maslow believed that our behaviour is motivated by our basic needs, until those needs are met. Once they are fulfilled, we move to the next level and are motivated by the next level of needs. Let's understand this better with an example.

Rupa comes from a very poor family. She never has enough food, water, warmth or rest. According to Maslow, until Rupa is sure that she will get these basic needs, she will not even think about the next level of needs – her safety needs. But, once Rupa is confident that her basic needs will be met, she will move to the next level, and her behaviour will then be motivated by her need for security and safety. Once these new needs are met, Rupa will once again move to the next level, and be motivated by her need for relationships and friends. Once this need is satisfied, Rupa will then focus on the fourth level of needs – her esteem needs, after which she will move up to the fifth and last level of needs – the desire to achieve her full potential.

Understanding Achievement Motivation

We now know that people are motivated by basic, psychological and self-fulfillment needs. However, certain people are also motivated by the achievement of highly challenging accomplishments. This is known as Achievement Motivation, or 'need for achievement'.

The level of motivation achievement in a person differs from individual to individual. It is important that entrepreneurs have a high level of achievement motivation – a deep desire to accomplish something important and unique. It is equally important that they hire people who are also highly motivated by challenges and success.

What Motivates You

What are the things that really motivate you? List down five things that really motivate you. Remember to answer honestly!

I am motivated by:

Characteristics of Entrepreneurs with Achievement Motivation

Entrepreneurs with achievement motivation can be described as follows:

- Unafraid to take risks for personal accomplishment
- Love being challenged
- Future-oriented
- Flexible and adaptive
- Value negative feedback more than positive feedback
- Very persistent when it comes to achieving goals
- Extremely courageous
- Highly creative and innovative
- Restless – constantly looking to achieve more
- Feel personally responsible for solving problems

Think about it:

- How many of these traits do you have?
- Can you think of entrepreneurs who display these traits?

What is Attitude

Now that we understand why motivation is so important for self-analysis, let's look at the role our attitude plays in better understanding ourselves. Attitude can be described as your tendency (positive or negative), to think and feel about someone or something. Attitude is the foundation for success in every aspect of life. Our attitude can be our best friend or our worst enemy. In other words:

“The only disability in life is a bad attitude.”

When you start a business, you are sure to encounter a wide variety of emotions, from difficult times and failures to good times and successes. Your attitude is what will see you through the tough times and guide you towards success. Attitude is also infectious. It affects everyone around you, from your customers to your employees to your investors. A positive attitude helps build confidence in the workplace while a negative attitude is likely to result in the demotivation of your people.

How to Cultivate a Positive Attitude

The good news is attitude is a choice. So it is possible to improve, control and change our attitude, if we decide we want to! The following tips help foster a positive mindset:

- Remember that you control your attitude, not the other way around
- Devote at least 15 minutes a day towards reading, watching or listening to something positive
- Avoid negative people who only complain and stop complaining yourself
- Expand your vocabulary with positive words and delete negative phrases from your mind
- Be appreciative and focus on what's good in yourself, in your life, and in others
- Stop thinking of yourself as a victim and start being proactive
- Imagine yourself succeeding and achieving your goals

What Are Your Strengths and Weaknesses

Another way to analyze yourself is by honestly identifying your strengths and weaknesses. This will help you use your strengths to your best advantage and reduce your weaknesses.

Note down all your strengths and weaknesses in the two columns below. Remember to be honest with yourself!

Strengths	Weaknesses

Tips



- Achievement motivation can be learned.
- Don't be afraid to make mistakes.
- Train yourself to finish what you start.
- Dream big.

10.1.4 Honesty & Work Ethics: What is Honesty

Honesty is the quality of being fair and truthful. It means speaking and acting in a manner that inspires trust. A person who is described as honest is seen as truthful and sincere, and as someone who isn't deceitful or devious and doesn't steal or cheat. There are two dimensions of honesty – one is honesty in communication and the other is honesty in conduct.

Honesty is an extremely important trait because it results in peace of mind and builds relationships that are based on trust. Being dishonest, on the other hand, results in anxiety and leads to relationships full of distrust and conflict.

Qualities of Honest People

Honest individuals have certain distinct characteristics. Some common qualities among honest people are:

1. They don't worry about what others think of them. They believe in being themselves – they don't bother about whether they are liked or disliked for their personalities.
2. They stand up for their beliefs. They won't think twice about giving their honest opinion, even if they are aware that their point of view lies with the minority.
3. They are thick-skinned. This means they are not affected by others judging them harshly for their honest opinions.
4. They forge trusting, meaningful and healthy friendships. Honest people usually surround themselves with honest friends. They have faith that their friends will be truthful and upfront with them at all times.
5. They are trusted by their peers. They are seen as people who can be counted on for truthful and objective feedback and advice.

Importance of Honesty in Entrepreneurs

One of the most important characteristics of entrepreneurs is honesty. When entrepreneurs are honest with their customers, employees and investors, it shows that they respect those that they work with. It is also important that entrepreneurs remain honest with themselves. Let's look at how being honest would lead to great benefits for entrepreneurs.

- **Honesty and customers:** When entrepreneurs are honest with their customers it leads to stronger relationships, which in turn results in business growth and a stronger customer network.
- **Honesty and employees:** When entrepreneurs build honest relationships with their employees, it leads to more transparency in the workplace, which results in higher work performance and better results.
- **Honesty and investors:** For entrepreneurs, being honest with investors means not only sharing strengths but also candidly disclosing current and potential weaknesses, problem areas and solution strategies. Keep in mind that investors have a lot of experience with startups and are aware that all new companies have problems. Claiming that everything is perfectly fine and running smoothly is a red flag for most investors.
- **Honesty with oneself:** The consequences of being dishonest with oneself can lead to dire results, especially in the case of entrepreneurs. For entrepreneurs to succeed, it is critical that they remain realistic about their situation at all times, and accurately judge every aspect of their enterprise for what it truly is.

What are Work Ethics

Being ethical in the workplace means displaying values like honesty, integrity and respect in all your decisions and communications. It means not displaying negative qualities like lying, cheating and stealing.

Workplace ethics play a big role in the profitability of a company. It is as crucial to an enterprise as high morale and teamwork. This is why most companies lay down specific workplace ethic guidelines that must compulsorily be followed by their employees. These guidelines are typically outlined in a company's employee handbook.

Elements of a Strong Work Ethic

An entrepreneur must display strong work ethics, as well as hire only those individuals who believe in and display the same level of ethical behavior in the workplace. Some elements of a strong work ethic are:

- **Professionalism:** This involves everything from how you present yourself in a corporate setting to the manner in which you treat others in the workplace.
- **Respectfulness:** This means remaining poised and diplomatic regardless of how stressful or volatile a situation is.
- **Dependability:** This means always keeping your word, whether it's arriving on time for a meeting or delivering work on time.
- **Dedication:** This means refusing to quit until the designated work is done, and completing the work at the highest possible level of excellence.
- **Determination:** This means embracing obstacles as challenges rather than letting them stop you, and pushing ahead with purpose and resilience to get the desired results.
- **Accountability:** This means taking responsibility for your actions and the consequences of your actions, and not making excuses for your mistakes.
- **Humility:** This means acknowledging everyone's efforts and hard work, and sharing the credit for accomplishments.

How to Foster a Good Work Ethic

As an entrepreneur, it is important that you clearly define the kind of behaviour that you expect from each and every team member in the workplace. You should make it clear that you expect employees to display positive work ethics like:

- **Honesty:** All work assigned to a person should be done with complete honesty, without any deceit or lies.
- **Good attitude:** All team members should be optimistic, energetic, and positive.
- **Reliability:** Employees should show up where they are supposed to be, when they are supposed to be there.
- **Good work habits:** Employees should always be well groomed, never use inappropriate language, conduct themselves professionally at all times, etc.
- **Initiative:** Doing the bare minimum is not enough. Every team member needs to be proactive and show initiative.
- **Trustworthiness:** Trust is non-negotiable. If an employee cannot be trusted, it's time to let that employee go.

- **Respect:** Employees need to respect the company, the law, their work, their colleagues and themselves.
- **Integrity:** Each and every team member should be completely ethical and must display above board behaviour at all times.
- **Efficiency:** Efficient employees help a company grow while inefficient employees result in a waste of time and resources.

Tips



- Don't get angry when someone tells you the truth and you don't like what you hear.
- Always be willing to accept responsibility for your mistakes.

10.1.5 Creativity & Innovation : What is Creativity

Creativity means thinking outside the box. It means viewing things in new ways or from different perspectives, and then converting these ideas into reality. Creativity involves two parts: thinking and producing. Simply having an idea makes you imaginative, not creative. However, having an idea and acting on it makes you creative.

Characteristics of Highly Creative People

Some characteristics of creative people are:

- They are imaginative and playful
- They see issues from different angles
- They notice small details
- They have very little tolerance for boredom
- They detest rules and routine
- They love to daydream
- They are very curious

What is Innovation

There are many different definitions of innovation. In simple terms, innovation means turning an idea into a solution that adds value. It can also mean adding value by implementing a new product, service or process, or significantly improving on an existing product, service or process.

Characteristics of Highly Innovative People

Some characteristics of highly innovative people are:

- They embrace doing things differently
- They don't believe in taking shortcuts
- They are not afraid to be unconventional
- They are highly proactive and persistent
- They are organized, cautious and risk-averse

Tips



- Take regular breaks from your creative work to recharge yourself and gain fresh perspective.
- Build prototypes frequently, test them out, get feedback, and make the required changes.

10.1.6 Time Management: What is Time Management

Time management is the process organizing your time, and deciding how to allocate your time between different activities. Good time management is the difference between working smart (getting more done in less time) and working hard (working for more time to get more done).

Effective time management leads to an efficient work output, even when you are faced with tight deadlines and high pressure situations. On the other hand, not managing your time effectively results in inefficient output and increases stress and anxiety.

Benefits of Time Management

Time management can lead to huge benefits like:

- Greater productivity
- Better professional reputation
- Higher chances for career advancement
- Higher efficiency
- Reduced stress
- Greater opportunities to achieve goals

Not managing time effectively can result in undesirable consequences like:

- Missing deadlines
- Substandard work quality
- Stalled career
- Inefficient work output
- Poor professional reputation
- Increase in stress and anxiety

Traits of Effective Time Managers

Some traits of effective time managers are:

- They begin projects early
- They set daily objectives
- They modify plans if required, to achieve better results
- They are flexible and open-minded
- They inform people in advance if their help will be required
- They know how to say no
- They break tasks into steps with specific deadlines
- They continually review long term goals
- They think of alternate solutions if and when required
- They ask for help when required
- They create backup plans

Effective Time Management Techniques

You can manage your time better by putting into practice certain time management techniques. Some helpful tips are:

- Plan out your day as well as plan for interruptions. Give yourself at least 30 minutes to figure out your time plan. In your plan, schedule some time for interruptions.
- Put up a “Do Not Disturb” sign when you absolutely have to complete a certain amount of work.
- Close your mind to all distractions. Train yourself to ignore ringing phones, don’t reply to chat messages and disconnect from social media sites.

- Delegate your work. This will not only help your work get done faster, but will also show you the unique skills and abilities of those around you.
- Stop procrastinating. Remind yourself that procrastination typically arises due to the fear of failure or the belief that you cannot do things as perfectly as you wish to do them.
- Prioritize. List each task to be completed in order of its urgency or importance level. Then focus on completing each task, one by one.
- Maintain a log of your work activities. Analyze the log to help you understand how efficient you are, and how much time is wasted every day.
- Create time management goals to reduce time wastage.

Tips



- Always complete the most important tasks first.
- Get at least 7 – 8 hours of sleep every day.
- Start your day early.
- Don't waste too much time on small, unimportant details.
- Set a time limit for every task that you will undertake.
- Give yourself some time to unwind between tasks.

10.1.7 Anger Management: What is Anger Management

Anger management is the process of:

1. Learning to recognize the signs that you, or someone else, is becoming angry
2. Taking the best course of action to calm down the situation in a positive way

Anger management does not mean suppressing anger.

Importance of Anger Management

Anger is a perfectly normal human emotion. In fact, when managed the right way, anger can be considered a healthy emotion. However, if it is not kept in check, anger can make us act inappropriately and can lead to us saying or doing things that we will likely later regret.

Extreme anger can:

- **Hurt you physically:** It leads to heart disease, diabetes, a weakened immune system, insomnia, and high blood pressure.
- **Hurt you mentally:** It can cloud your thinking and lead to stress, depression and mental health issues.
- **Hurt your career:** It can result in alienating your colleagues, bosses, clients and lead to the loss of respect.
- **Hurt your relationships:** It makes it hard for your family and friends to trust you, be honest with you and feel comfortable around you.

This is why anger management, or managing anger appropriately, is so important.

Anger Management Strategies

Here are some strategies that can help you control your anger:

Strategy 1: Relaxation

Something as simple as breathing deeply and looking at relaxing images works wonders in calming down angry feelings. Try this simple breathing exercise:

1. Take a deep breath from your diaphragm (don't breathe from your chest)
2. Visualize your breath coming up from your stomach
3. Keep repeating a calming word like 'relax' or 'take it easy' (remember to keep breathing deeply while repeating the word)
4. Picture a relaxing moment (this can be from your memory or your imagination)

Follow this relaxation technique daily, especially when you realize that you're starting to feel angry.

Strategy 2: Cognitive Restructuring

Cognitive restructuring means changing the manner in which you think. Anger can make you curse, swear, exaggerate and act very dramatically. When this happens, force yourself to replace your angry thoughts with more logical ones. For instance, instead of thinking 'Everything is ruined' change your mindset and tell yourself 'It's not the end of the world and getting angry won't solve this'.

Strategy 3: Problem Solving

Getting angry about a problem that you cannot control is a perfectly natural response. Sometimes, try as you may, there may not be a solution to the difficulty you are faced with. In such cases, stop focusing on solving the problem, and instead focus on handling and facing the problem. Remind yourself that you will do your best to deal with the situation, but that you will not blame yourself if you don't get the solution you desire.

Strategy 4: Better Communication

When you're angry, it is very easy to jump to inaccurate conclusions. In this case, you need to force yourself to stop reacting, and think carefully about what you want to say, before saying it. Avoid saying the first thing that enters your head. Force yourself to listen carefully to what the other person is saying. Then think about the conversation before responding.

Strategy 5: Changing Your Environment

If you find that your environment is the cause of your anger, try and give yourself a break from your surroundings. Make an active decision to schedule some personal time for yourself, especially on days that are very hectic and stressful. Having even a brief amount of quiet or alone time is sure to help calm you down.

Tips for Anger Management

The following tips will help you keep your anger in check:

- Take some time to collect your thoughts before you speak out in anger.
- Express the reason for your anger in an assertive, but non-confrontational manner once you have calmed down.
- Do some form of physical exercise like running or walking briskly when you feel yourself getting angry.
- Make short breaks part of your daily routine, especially during days that are stressful.
- Focus on how to solve a problem that's making you angry, rather than focusing on the fact that the problem is making you angry.

Tips

- Try to forgive those who anger you, rather than hold a grudge against them.
- Avoid using sarcasm and hurling insults. Instead, try and explain the reason for your frustration in a polite and mature manner.

10.1.8 Stress Management: What is Stress

We say we are 'stressed' when we feel overloaded and unsure of our ability to deal with the pressures placed on us. Anything that challenges or threatens our well-being can be defined as a stress. It is important to note that stress can be good and bad. While good stress keeps us going, negative stress undermines our mental and physical health. This is why it is so important to manage negative stress effectively.

Causes of Stress

Stress can be caused by internal and external factors.

Internal causes of stress

- Constant worry
- Rigid thinking
- Unrealistic expectations
- Pessimism
- Negative self-talk
- All in or all out attitude

External causes of stress

- Major life changes
- Difficulties with relationships
- Having too much to do
- Difficulties at work or in school
- Financial difficulties
- Worrying about one's children and/or family

Symptoms of Stress

Stress can manifest itself in numerous ways. Take a look at the cognitive, emotional, physical and behavioral symptoms of stress.

Cognitive Symptoms	Emotional Symptoms
<ul style="list-style-type: none"> • Memory problems • Concentration issues • Lack of judgement • Pessimism • Anxiety • Constant worrying 	<ul style="list-style-type: none"> • Depression • Agitation • Irritability • Loneliness • Anxiety • Anger
Physical Symptoms	Behavioral Symptoms
<ul style="list-style-type: none"> • Aches and pain • Diarrhea or constipation • Nausea • Dizziness • Chest pain and/or rapid heartbeat • Frequent cold or flu like feelings 	<ul style="list-style-type: none"> • Increase or decrease in appetite • Over sleeping or not sleeping enough • Withdrawing socially • Ignoring responsibilities • Consumption of alcohol or cigarettes • Nervous habits like nail biting, pacing etc.

Tips to Manage Stress

The following tips can help you manage your stress better:

- Note down the different ways in which you can handle the various sources of your stress.
- Remember that you cannot control everything, but you can control how you respond.
- Discuss your feelings, opinions and beliefs rather than reacting angrily, defensively or passively.
- Practice relaxation techniques like meditation, yoga or tai chi when you start feeling stressed.
- Devote a part of your day towards exercise.
- Eat healthy foods like fruits and vegetables. Avoid unhealthy foods especially those containing large amounts of sugar.
- Plan your day so that you can manage your time better, with less stress.
- Say no to people and things when required.
- Schedule time to pursue your hobbies and interests.
- Ensure you get at least 7-8 hours of sleep.
- Reduce your caffeine intake.
- Increase the time spent with family and friends.

Tips

- Force yourself to smile even if you feel stressed. Smiling makes us feel relaxed and happy.
- Stop yourself from feeling and thinking like a victim. Change your attitude and focus on being proactive.

UNIT 10.2: Digital Literacy: A Recap

Unit Objectives



At the end of this unit, you will be able to:

1. Identify the basic parts of a computer
2. Identify the basic parts of a keyboard
3. Recall basic computer terminology
4. Recall the functions of basic computer keys
5. Discuss the main applications of MS Office
6. Discuss the benefits of Microsoft Outlook
7. Discuss the different types of e-commerce
8. List the benefits of e-commerce for retailers and customers
9. Discuss how the Digital India campaign will help boost e-commerce in India
10. Describe how you will sell a product or service on an e-commerce platform

10.2.1 Computer and Internet basics: Basic Parts of a Computer



Fig.10.2.1. Parts of a Computer

- **Central Processing Unit (CPU):** The brain of the computer. It interprets and carries out program instructions.
- **Hard Drive:** A device that stores large amounts of data.
- **Monitor:** The device that contains the computer screen where the information is visually displayed.
- **Mouse:** A hand-held device used to point to items on the monitor.
- **Speakers:** Devices that enable you to hear sound from the computer.
- **Printer:** A device that converts output from a computer into printed paper documents.

Basic Parts of a Keyboard



Fig.10.2.2. Parts of a Keyboard

- **Arrow Keys:** Press these keys to move your cursor.
- **Space bar:** Adds a space.
- **Enter/Return:** Moves your cursor to a new line.
- **Shift:** Press this key if you want to type a capital letter or the upper symbol of a key.
- **Caps Lock:** Press this key if you want all the letters you type to be capital letters. Press it again to revert back to typing lowercase letters.
- **Backspace:** Deletes everything to the left of your cursor.

Basic Internet Terms

- **The Internet:** A vast, international collection of computer networks that transfers information.
- **The World Wide Web:** A system that lets you access information on the Internet.
- **Website:** A location on the World Wide Web (and Internet) that contains information about a specific topic.
- **Homepage:** Provides information about a website and directs you to other pages on that website.
- **Link/Hyperlink:** A highlighted or underlined icon, graphic, or text that takes you to another file or object.
- **Web Address/URL:** The address for a website.
- **Address Box:** A box in the browser window where you can type in a web address.

Tips



- When visiting a .com address, there is no need to type http:// or even www. Just type the name of the website and then press Ctrl + Enter. (Example: Type 'apple' and press Ctrl + Enter to go to www.apple.com)
- Press the Ctrl key and press the + or - to increase and decrease the size of text.
- Press F5 or Ctrl + R to refresh or reload a web page.

10.2.2 MS Office and Email: About MS Office

MS Office or Microsoft Office is a suite of computer programs developed by Microsoft. Although meant for all users, it offers different versions that cater specifically to students, home users and business users. All the programs are compatible with both, Windows and Macintosh.

Most Popular Office Products

Some of the most popular and universally used MS Office applications are:

- **Microsoft Word:** Allows users to type text and add images to a document.
- **Microsoft Excel:** Allows users to enter data into a spreadsheet and create calculations and graphs.
- **Microsoft PowerPoint:** Allows users to add text, pictures and media and create slideshows and presentations.
- **Microsoft Outlook:** Allows users to send and receive email.
- **Microsoft OneNote:** Allows users to make drawings and notes with the feel of a pen on paper.
- **Microsoft Access:** Allows users to store data over many tables.

Why Choose Microsoft Outlook

A popular email management choice especially in the workplace, Microsoft Outlook also includes an address book, notebook, web browser and calendar. Some major benefits of this program are:

- **Integrated search function:** You can use keywords to search for data across all Outlook programs.
- **Enhanced security:** Your email is safe from hackers, junk mail and phishing website email.
- **Email syncing:** Sync your mail with your calendar, contact list, notes in OneNote and...your phone!
- **Offline access to email:** No Internet? No problem! Write emails offline and send them when you're connected again.

Tips



- Press Ctrl+R as a shortcut method to reply to email.
- Set your desktop notifications only for very important emails.
- Flag messages quickly by selecting messages and hitting the Insert key.
- Save frequently sent emails as a template to reuse again and again.
- Conveniently save important emails as files.

10.2.3 E-Commerce: What is E-Commerce

E-commerce is the buying or selling of goods and services, or the transmitting of money or data, electronically on the internet. E-Commerce is the short form for “electronic commerce.”

Examples of E-Commerce

Some examples of e-commerce are:

- Online shopping
- Online auctions
- Online ticketing
- Electronic payments
- Internet banking

Types of E-Commerce

E-commerce can be classified based on the types of participants in the transaction. The main types of e-commerce are:

- **Business to Business (B2B):** Both the transacting parties are businesses.
- **Business to Consumer (B2C):** Businesses sell electronically to end-consumers.
- **Consumer to Consumer (C2C):** Consumers come together to buy, sell or trade items to other consumers.
- **Consumer-to-Business (C2B):** Consumers make products or services available for purchase to companies looking for exactly those services or products.
- **Business-to-Administration (B2A):** Online transactions conducted between companies and public administration.
- **Consumer-to-Administration (C2A):** Online transactions conducted between individuals and public administration.

Benefits of E-Commerce

The e-commerce business provides some benefits for retailers and customers.

Benefits for retailers:

- Establishes an online presence
- Reduces operational costs by removing overhead costs
- Increases brand awareness through the use of good keywords
- Increases sales by removing geographical and time constraints

Benefits for customers:

- Offers a wider range of choice than any physical store
- Enables goods and services to be purchased from remote locations
- Enables consumers to perform price comparisons

Digital India Campaign

Prime Minister Narendra Modi launched the Digital India campaign in 2015, with the objective of offering every citizen of India access to digital services, knowledge and information. The campaign aims to improve the country's online infrastructure and increase internet connectivity, thus boosting the e-commerce industry.

Currently, the majority of online transactions come from tier 2 and tier 3 cities. Once the Digital India campaign is in place, the government will deliver services through mobile connectivity, which will help deliver internet to remote corners of the country. This will help the e-commerce market to enter India's tier 4 towns and rural areas.

E-Commerce Activity

Choose a product or service that you want to sell online. Write a brief note explaining how you will use existing e-commerce platforms, or create a new e-commerce platform, to sell your product or service.

Tips



- Before launching your e-commerce platform, test everything.
- Pay close and personal attention to your social media.

UNIT 10.3: Money Matters

Unit Objectives



At the end of this unit, you will be able to:

1. Discuss the importance of saving money
2. Discuss the benefits of saving money
3. Discuss the main types of bank accounts
4. Describe the process of opening a bank account
5. Differentiate between fixed and variable costs
6. Describe the main types of investment options
7. Describe the different types of insurance products
8. Describe the different types of taxes
9. Discuss the uses of online banking
10. Discuss the main types of electronic funds transfers

10.3.1 Personal Finance – Why to Save: Importance of Saving

We all know that the future is unpredictable. You never know what will happen tomorrow, next week or next year. That's why saving money steadily through the years is so important. Saving money will help improve your financial situation over time. But more importantly, knowing that you have money stashed away for an emergency will give you peace of mind. Saving money also opens the door to many more options and possibilities.

Benefits of Saving

Inculcating the habit of saving leads to a vast number of benefits. Saving helps you:

- **Become financially independent:** When you have enough money saved up to feel secure you can start making your choices, from taking a vacation whenever you want, to switching careers or starting your own business.
- **Invest in yourself through education:** Through saving, you can earn enough to pay up for courses that will add to your professional experience and ultimately result in higher paying jobs.
- **Get out of debt:** Once you have saved enough as a reserve fund, you can use your savings to pay off debts like loans or bills that have accumulated over time.
- **Be prepared for surprise expenses:** Having money saved enables you to pay for unforeseen expenses like sudden car or house repairs, without feeling financially stressed.
- **Pay for emergencies:** Saving helps you deal with emergencies like sudden health issues or emergency trips without feeling financially burdened.

- **Afford large purchases and achieve major goals:** Saving diligently makes it possible to place down payments towards major purchases and goals, like buying a home or a car.
- **Retire:** The money you have saved over the years will keep you comfortable when you no longer have the income you would get from your job.

Tips



- Break your spending habit. Try not spending on one expensive item per week, and put the money that you would have spent into your savings.
- Decide that you will not buy anything on certain days or weeks and stick to your word.

10.3.2 Types of Bank Accounts, Opening a Bank Account: Types of Bank Accounts

In India, banks offer four main types of bank accounts. These are:

- Current Accounts
- Savings Accounts
- Recurring Deposit Accounts
- Fixed Deposit Accounts

Current Accounts

Current accounts offer the most liquid deposits and thus, are best suited for businessmen and companies. As these accounts are not meant for investments and savings, there is no imposed limit on the number or amount of transactions that can be made on any given day. Current account holders are not paid any interest on the amounts held in their accounts. They are charged for certain services offered on such accounts.

Savings Accounts

Savings accounts are meant to promote savings, and are therefore the number one choice for salaried individuals, pensioners and students. While there is no restriction on the number and amount of deposits made, there are usually restrictions on the number and amount of withdrawals. Savings account holders are paid interest on their savings.

Recurring Deposit Accounts

Recurring Deposit accounts, also called RD accounts, are the accounts of choice for those who want to save an amount every month, but are unable to invest a large sum at one time. Such account holders deposit a small, fixed amount every month for a pre-determined period (minimum 6 months). Defaulting on a monthly payment results in the account holder being charged a penalty amount. The total amount is repaid with interest at the end of the specified period.

Fixed Deposit Accounts

Fixed Deposit accounts, also called FD accounts, are ideal for those who wish to deposit their savings for a long term in return for a high rate of interest. The rate of interest offered depends on the amount deposited and the time period, and also differs from bank to bank. In the case of an FD, a certain amount of money is deposited by the account holder for a fixed period of time. The money can be withdrawn when the period expires. If necessary, the depositor can break the fixed deposit prematurely. However, this usually attracts a penalty amount which also differs from bank to bank.

Opening a Bank Account



Opening a bank account is quite a simple process. Take a look at the steps to open an account of your own:

Step 1: Fill in the Account Opening Form

This form requires you to provide the following information:

- Personal details (name, address, phone number, date of birth, gender, occupation, address)
- Method of receiving your account statement (hard copy/email)
- Details of your initial deposit (cash/cheque)
- Manner of operating your account (online/mobile banking/traditional via cheque, slipbooks)

Ensure that you sign wherever required on the form.

Step 2: Affix your Photograph

Stick a recent photograph of yourself in the allotted space on the form.

Step 3: Provide your Know Your Customer (KYC) Details

KYC is a process that helps banks verify the identity and address of their customers. To open an account, every individual needs to submit certain approved documents with respect to photo identity (ID) and address proof. Some Officially Valid Documents (OVDs) are:

- Passport
- Driving License
- Voters' Identity Card
- PAN Card
- UIDAI (Aadhaar) Card

Step 4: Submit All your Documents

Submit the completed Account Opening Form and KYC documents. Then wait until the forms are processed and your account has been opened!

Tips

- Select the right type of account.
- Fill in complete nomination details.
- Ask about fees.
- Understand the rules.
- Check for online banking – it's convenient!
- Keep an eye on your bank balance.

10.3.3 Costs: Fixed vs Variable: What are Fixed and Variable Costs

Fixed costs and variable costs together make up a company's total cost. These are the two types of costs that companies have to bear when producing goods and services.

A fixed cost does not change with the volume of goods or services a company produces. It always remains the same.

A variable cost, on the other hand, increases and decreases depending on the volume of goods and services produced. In other words, it varies with the amount produced.

Differences Between Fixed and Variable Costs

Let's take a look at some of the main differences between fixed and variable costs:

Criteria	Fixed Costs	Variable Costs
Meaning	A cost that stays the same, regardless of the output produced.	A cost that changes when the output changes.
Nature	Time related.	Volume related.
Incurred	Incurred irrespective of units being produced.	Incurred only when units are produced.
Unit cost	Inversely proportional to the number of units produced.	Remains the same, per unit.
Examples	Depreciation, rent, salary, insurance, tax etc.	Material consumed, wages, commission on sales, packing expenses, etc.

Tips



- When trying to determine whether a cost is fixed or variable, simply ask the following question: Will the particular cost change if the company stopped its production activities? If the answer is no, then it is a fixed cost. If the answer is yes, then it is probably a variable cost.

10.3.4 Investment, Insurance and Taxes: Investment

Investment means that money is spent today with the aim of reaping financial gains at a future time. The main types of investment options are as follows:

- **Bonds:** Bonds are instruments used by public and private companies to raise large sums of money – too large to be borrowed from a bank. These bonds are then issued in the public market and are bought by lenders.
- **Stocks:** Stocks or equity are shares that are issued by companies and are bought by the general public.
- **Small Savings Schemes:** Small Savings Schemes are tools meant to save money in small amounts. Some popular schemes are the Employees Provident Fund, Sukanya Samriddhi Scheme and National Pension Scheme.
- **Mutual Funds:** Mutual Funds are professionally managed financial instruments that invest money in different securities on behalf of investors.
- **Fixed Deposits:** A fixed amount of money is kept aside with a financial institution for a fixed amount of time in return for interest on the money.
- **Real Estate:** Loans are taken from banks to purchase real estate, which is then leased or sold with the aim of making a profit on the appreciated property price.
- **Hedge Funds:** Hedge funds invest in both financial derivatives and/or publicly traded securities.
- **Private Equity:** Private Equity is trading in the shares of an operating company that is not publicly listed and whose shares are not available on the stock market.
- **Venture Capital:** Venture Capital involves investing substantial capital in a budding company in return for stocks in that company.

Insurance

There are two types of insurance – Life Insurance and Non-Life or General Insurance.

Life Insurance

Life Insurance deals with all insurance covering human life.

Life Insurance Products

The main life insurance products are:

- **Term Insurance:** This is the simplest and cheapest form of insurance. It offers financial protection for a specified tenure, say 15 to 20 years. In the case of your death, your family is paid the sum assured. In the case of your surviving the term, the insurer pays nothing.
- **Endowment Policy:** This offers the dual benefit of insurance and investment. Part of the premium is allocated towards the sum assured, while the remaining premium gets invested in equity and debt. It pays a lump sum amount after the specified duration or on the death of the policyholder, whichever is earlier.
- **Unit-Linked Insurance Plan (ULIP):** Here part of the premium is spent on the life cover, while the remaining amount is invested in equity and debt. It helps develop a regular saving habit.

- **Money Back Life Insurance:** While the policyholder is alive, periodic payments of the partial survival benefits are made during the policy tenure. On the death of the insured, the insurance company pays the full sum assured along with survival benefits.
- **Whole Life Insurance:** It offers the dual benefit of insurance and investment. It offers insurance cover for the whole life of the person or up to 100 years whichever is earlier.

General Insurance

General Insurance deals with all insurance covering assets like animals, agricultural crops, goods, factories, cars and so on.

General Insurance Products

The main general insurance products are:

- **Motor Insurance:** This can be divided into Four Wheeler Insurance and Two Wheeler Insurance.
- **Health Insurance:** The main types of health insurance are individual health insurance, family floater health insurance, comprehensive health insurance and critical illness insurance.
- **Travel Insurance:** This can be categorised into Individual Travel Policy, Family Travel Policy, Student Travel Insurance and Senior Citizen Health Insurance.
- **Home Insurance:** This protects the house and its contents from risk.
- **Marine Insurance:** This insurance covers goods, freight, cargo etc. against loss or damage during transit by rail, road, sea and/or air.

Taxes

There are two types of taxes – Direct Taxes and Indirect Taxes.

Direct Tax

Direct taxes are levied directly on an entity or a person and are non-transferrable.

Some examples of Direct Taxes are:

- **Income Tax:** This tax is levied on your earning in a financial year. It is applicable to both, individuals and companies.
- **Capital Gains Tax:** This tax is payable whenever you receive a sizable amount of money. It is usually of two types – short term capital gains from investments held for less than 36 months and long term capital gains from investments held for longer than 36 months.
- **Securities Transaction Tax:** This tax is added to the price of a share. It is levied every time you buy or sell shares.
- **Perquisite Tax:** This tax is levied on perks that have been acquired by a company or used by an employee.
- **Corporate Tax:** Corporate tax is paid by companies from the revenue they earn.

Indirect Tax

Indirect taxes are levied on goods or services.

Some examples of Indirect Taxes are:

- **Sales Tax:** Sales Tax is levied on the sale of a product.
- **Service Tax:** Service Tax is added to services provided in India.
- **Value Added Tax:** Value Added Tax is levied at the discretion of the state government. The tax is levied on goods sold in the state. The tax amount is decided by the state.
- **Customs Duty & Octroi:** Customs Duty is a charge that is applied on purchases that are imported from another country. Octroi is levied on goods that cross state borders within India.
- **Excise Duty:** Excise Duty is levied on all goods manufactured or produced in India.

Tips

- Think about how quickly you need your money back and pick an investment option accordingly.
- Ensure that you are buying the right type of insurance policy for yourself.
- Remember, not paying taxes can result in penalties ranging from fines to imprisonment.

10.3.5 Online Banking, NEFT, RTGS etc.:

What is Online Banking

Internet or online banking allows account holders to access their account from a laptop at any location. In this way, instructions can be issued. To access an account, account holders simply need to use their unique customer ID number and password.

Internet banking can be used to:

- Find out an account balance
- Transfer amounts from one account to another
- Arrange for the issuance of cheques
- Instruct payments to be made
- Request for a cheque book
- Request for a statement of accounts
- Make a fixed deposit

Electronic Funds Transfers

Electronic funds transfer is a convenient way of transferring money from the comfort of one's own home, using integrated banking tools like internet and mobile banking.

Transferring funds via an electronic gateway is extremely convenient. With the help of online banking, you can choose to:

- Transfer funds into your own accounts of the same bank.
- Transfer funds into different accounts of the same bank.
- Transfer funds into accounts in different banks, using NEFT.
- Transfer funds into other bank accounts using RTGS.
- Transfer funds into various accounts using IMPS.

NEFT

NEFT stands for National Electronic Funds Transfer. This money transfer system allows you to electronically transfer funds from your respective bank accounts to any other account, either in the same bank or belonging to any other bank. NEFT can be used by individuals, firms and corporate organizations to transfer funds between accounts.

In order to transfer funds via NEFT, two things are required:

- A transferring bank
- A destination bank

Before you can transfer funds through NEFT, you will need to register the beneficiary who will be receiving the funds. In order to complete this registration, you will require the following information:

- | | |
|------------------------------|--------------------------------|
| • Recipient's name | • Recipient's bank's name |
| • Recipient's account number | • Recipient's bank's IFSC code |

RTGS

RTGS stands for Real Time Gross Settlement. This is a real time funds transfer system which enables you to transfer funds from one bank to another, in real time or on a gross basis. The transferred amount is immediately deducted from the account of one bank, and instantly credited to the other bank's account. The RTGS payment gateway is maintained by the Reserve Bank of India. The transactions between banks are made electronically.

RTGS can be used by individuals, companies and firms to transfer large sums of money. Before remitting funds through RTGS, you will need to add the beneficiary and his bank account details via your online banking account. In order to complete this registration, you will require the following information:

- Name of the beneficiary
- Beneficiary's account number
- Beneficiary's bank address
- Beneficiary's bank's IFSC code

IMPS

IMPS stands for Immediate Payment Service. This is a real-time, inter-bank, electronic funds transfer system used to transfer money instantly within banks across India. IMPS enables users to make instant electronic transfer payments using mobile phones through both, Mobile Banking and SMS. It can also be used through ATMs and online banking. IMPS is available 24 hours a day and 7 days a week. The system features a secure transfer gateway and immediately confirms orders that have been fulfilled.

To transfer money through IMPS, the you need to:

- Register for IMPS with your bank
- Receive a Mobile Money Identifier (MMID) from the bank
- Receive a MPIN from the bank

Once you have both these, you can login or make a request through SMS to transfer a particular amount to a beneficiary.

For the beneficiary to receive the transferred money, he must:

1. Link his mobile number with his respective account
2. Receive the MMID from the bank

In order to initiate a money transfer through IMPS, you will need to enter the following information:

1. The beneficiary's mobile number
2. The beneficiary's MMID
3. The transfer amount
4. Your MPIN

As soon as money has been deducted from your account and credited into the beneficiary's account, you will be sent a confirmation SMS with a transaction reference number, for future reference.

Differences Between NEFT, RTGS & IMPS

Criteria	NEFT	RTGS	IMPS
Settlement	Done in batches	Real-time	Real-time
Full form	National Electronic Fund Transfer	Real Time Gross Settlement	Immediate Payment Service
Timings on Monday – Friday	8:00 am – 6:30 pm	9:00 am – 4:30 pm	24x7
Timings on Saturday	8:00 am – 1:00 pm	9:00 am – 1:30 pm	24x7
Minimum amount of money transfer limit	₹ 1	₹ 2 lacs	₹ 1
Maximum amount of money transfer limit	₹ 10 lacs	₹ 10 lacs per day	₹ 2 lacs
Maximum charges as per RBI	Upto 10,000 – ₹ 2.5 above 10,000 – 1 lac – ₹ 5 above 1 – 2 lacs – ₹ 15 above 2 – 5 lacs – ₹ 25 above 5 – 10 lacs – ₹ 25	above 2 – 5 lacs – ₹ 25 above 5 – 10 lacs – ₹ 50	Upto 10,000 – ₹ 5 above 10,000 – 1 lac – ₹ 5 above 1 – 2 lacs – ₹ 15

Tips



- Never click on any links in any e-mail message to access your online banking website.
- You will never be asked for your credit or debit card details while using online banking.
- Change your online banking password regularly.

UNIT 10.4: Preparing for Employment & Self Employment

Unit Objectives



At the end of this unit, you will be able to:

1. Discuss the steps to prepare for an interview
2. Discuss the steps to create an effective Resume
3. Discuss the most frequently asked interview questions
4. Discuss how to answer the most frequently asked interview questions
5. Discuss basic workplace terminology

Interview Preparation: How to Prepare for an Interview

The success of your getting the job that you want depends largely on how well your interview for that job goes. Therefore, before you go in for your interview, it is important that you prepare for it with a fair amount of research and planning. Take a look at the steps to follow in order to be well prepared for an interview:

1. **Research the organization that you are having the interview with.**
 - Studying the company beforehand will help you be more prepared at the time of the interview. Your knowledge of the organization will help you answer questions at the time of the interview, and will leave you looking and feeling more confident. This is sure to make you stand out from other, not as well informed, candidates.
 - Look for background information on the company. Try and find an overview of the company and its industry profile.
 - Visit the company website to get a good idea of what the company does. A company website offers a wealth of important information. Read and understand the company's mission statement. Pay attention to the company's products/services and client list. Read through any press releases to get an idea of the company's projected growth and stability.
 - Note down any questions that you have after your research has been completed.
2. **Think about whether your skills and qualifications match the job requirements.**
 - Carefully read through and analyze the job description.
 - Make a note of the knowledge, skills and abilities required to fulfill the job requirements.
 - Take a look at the organization hierarchy. Figure out where the position you are applying for fits into this hierarchy.
3. **Go through the most typical interview questions asked, and prepare your responses.**
 - Remember, in most interviews a mix of resume-based, behavioral and case study questions are asked.
 - Think about the kind of answers you would like to provide to typical questions asked in these three areas.
 - Practice these answers until you can express them confidently and clearly.

4. Plan your attire for the interview.

- It is always safest to opt for formal business attire, unless expressly informed to dress in business casual (in which case you should use your best judgement).
- Ensure that your clothes are clean and well-ironed. Pick neutral colours – nothing too bright or flashy.
- The shoes you wear should match your clothes, and should be clean and suitable for an interview.
- Remember, your aim is to leave everyone you meet with the impression that you are a professional and highly efficient person.

5. Ensure that you have packed everything that you may require during the interview.

- Carry a few copies of your resume. Use a good quality paper for your resume print outs.
- Always take along a notepad and a pen.
- Take along any information you may need to refer to, in order to fill out an application form.
- Carry a few samples of your work, if relevant.

6. Remember the importance of non-verbal communication.

- Practice projecting confidence. Remind yourself to smile and make eye contact. Practice giving a firm handshake.
- Keep in mind the importance of posture. Practice sitting up straight. Train yourself to stop nervous gestures like fidgeting and foot-tapping.
- Practice keeping your reactions in check. Remember, your facial expressions provide a good insight into your true feelings. Practice projecting a positive image.

7. Make a list of questions to end the interview with.

- Most interviews will end with the interviewer(s) asking if you have any questions. This is your chance to show that you have done your research and are interested in learning more about the company.
- If the interviewer does not ask you this question, you can inform him/her that you have some queries that you would like to discuss. This is the time for you to refer to the notes you made while studying the company.
- Some good questions to ask at this point are:
 - What do you consider the most important criteria for success in this job?
 - How will my performance be evaluated?
 - What are the opportunities for advancement?
 - What are the next steps in the hiring process?
- Remember, never ask for information that is easily available on the company website.

Tips

- Ask insightful and probing questions.
- When communicating, use effective forms of body language like smiling, making eye contact, and actively listening and nodding. Don't slouch, play with nearby items, fidget, chew gum, or mumble.

Preparing an Effective Resume: How to Create an Effective Resume



A resume is a formal document that lists a candidate's work experience, education and skills. A good resume gives a potential employer enough information to believe the applicant is worth interviewing. That's why it is so important to create a resume that is effective. Take a look at the steps to create an effective resume:

Step 1: Write the Address Section

The Address section occupies the top of your resume. It includes information like your name, address, phone number and e-mail address. Insert a bold line under the section to separate it from rest of your resume.

Example:

Khyati Mehta
Breach Candy, Mumbai – India
Contact No: +91 2223678270
Email: khyati.mehta@gmail.com

Step 2: Add the Profile Summary Section

This part of your resume should list your overall experiences, achievements, awards, certifications and strengths. You can make your summary as short as 2-3 bullet points or as long as 8-10 bullet points.

Example:

Profile Summary

- A Floor Supervisor graduated from University of Delhi having 6 years of experience in managing a retail outlet.
- Core expertise lies in managing retail staff, including cashiers and people working on the floor.

Step 3: Include Your Educational Qualifications

When listing your academic records, first list your highest degree. Then add the second highest qualification under the highest one and so on. To provide a clear and accurate picture of your educational background, it is critical that include information on your position, rank, percentage or CPI for every degree or certification that you have listed.

If you have done any certifications and trainings, you can add a Trainings & Certifications section under your Educational Qualifications section.

Example:

Educational Qualifications

- *<Enter qualification> <enter date of qualification> from <enter name of institute> with <enter percentage or any other relevant scoring system>.*

Step 4: List Your Technical Skills

When listing your technical skills, start with the skills that you are most confident about. Then add the skills that you do not have as good a command over. It is perfectly acceptable to include just one skill, if you feel that particular skill adds tremendous value to your résumé. If you do not have any technical skills, you can omit this step.

Example:

Technical Skills

- *<Enter your technical skill here, if applicable>*

Step 5: Insert Your Academic Project Experience

List down all the important projects that you have worked on. Include the following information in this section:

- | | | |
|-----------------|----------------|-----------------|
| • Project title | • Organization | • Platform used |
| • Contribution | • Description | |

Example:

Academic Projects

Project Title: *<Insert project title>*

Organization: *<Insert the name of the organization for whom you did the project>*

Platform used: *<Insert the platform used, if any>*

Contribution: *<Insert your contribution towards this project>*

Description: *<Insert a description of the project in one line>*

Step 6: List Your Strengths

This is where you list all your major strengths. This section should be in the form of a bulleted list.

Example:

Strengths

- Excellent oral, written and presentation skills
- Action-oriented and result-focused
- Great time management skills

Step 7: List Your Extracurricular Activities

It is very important to show that you have diverse interests and that your life consists of more than academics. Including your extracurricular activities can give you an added edge over other candidates who have similar academic scores and project experiences. This section should be in the form of a bulleted list.

Example:

Extracurricular Activities

- *< Insert your extracurricular activity here. E.g.: Member of _____, played (name of sport) at _____ level, won (name of prize/award) for _____>*

Step 8: Write Your Personal Details

The last section of your résumé must include the following personal information:

- Date of birth
- Nationality
- Gender & marital status
- Languages known

Example:**Personal Details**

- Date of birth: 25th May, 1981
- Gender & marital status: Female, Single
- Nationality: Indian
- Languages known: English, Hindi, Tamil, French

Tips

- Keep your resume file name short, simple and informational.
- Make sure the resume is neat and free from typing errors.
- Always create your resume on plain white paper.

Interview FAQs



Take a look at some of the most frequently asked interview questions, and some helpful tips on how to answer them.

Q1. Can you tell me a little about yourself?

Tips to answer:

- Don't provide your full employment or personal history.
- Offer 2-3 specific experiences that you feel are most valuable and relevant.
- Conclude with how those experiences have made you perfect for this specific role.

Q2. How did you hear about the position?

Tips to answer:

- Tell the interviewer how you heard about the job – whether it was through a friend (name the friend), event or article (name them) or a job portal (say which one).
- Explain what excites you about the position and what in particular caught your eye about this role.

Q3. What do you know about the company?

Tips to answer:

- Don't recite the company's About Us page.
- Show that you understand and care about the company's goals.
- Explain why you believe in the company's mission and values.

Q4. Why do you want this job?

Tips to answer:

- Show that you are passionate about the job.
- Identify why the role is a great fit for you.
- Explain why you love the company.

Q5. Why should we hire you?

Tips to answer:

- Prove through your words that you can not only do the work, but can definitely deliver excellent results.
- Explain why you would be a great fit with the team and work culture.
- Explain why you should be chosen over any other candidate.

Q6. What are your greatest professional strengths?

Tips to answer:

- Be honest – share some of your real strengths, rather than give answers that you think sound good.
- Offer examples of specific strengths that are relevant to the position you are applying for.
- Provide examples of how you've demonstrated these strengths.

Q7. What do you consider to be your weaknesses?

Tips to answer:

- The purpose of this question is to gauge your self-awareness and honesty.
- Give an example of a trait that you struggle with, but that you're working on to improve.

Q8. What are your salary requirements?**Tips to answer:**

- Do your research beforehand and find out the typical salary range for the job you are applying for.
- Figure out where you lie on the pay scale based on your experience, education, and skills.
- Be flexible. Tell the interviewer that you know your skills are valuable, but that you want the job and are willing to negotiate.

Q9. What do you like to do outside of work?**Tips to answer:**

- The purpose of this question is to see if you will fit in with the company culture.
- Be honest – open up and share activities and hobbies that interest and excite you.

Q10. If you were an animal, which one would you want to be?**Tips to answer:**

- The purpose of this question is to see if you are able to think on your feet.
- There's no wrong answer – but to make a great impression try to bring out your strengths or personality traits through your answer.

Q11: What do you think we could do better or differently?**Tips to answer:**

- The purpose of this question is to see if you have done your research on the company, and to test whether you can think critically and come up with new ideas.
- Suggest new ideas. Show how your interests and expertise would help you execute these ideas.

Q12: Do you have any questions for us?**Tips to answer:**

- Do not ask questions to which the answers can be easily found on the company website or through a quick online search.
- Ask intelligent questions that show your ability to think critically.

Tips

- Be honest and confident while answering.
- Use examples of your past experiences wherever possible to make your answers more impactful.

Work Readiness – Terms & Terminologies:

Basic Workplace Terminology

Every employee should be well versed in the following terms:

- **Annual leave:** Paid vacation leave given by employers to employees.
- **Background Check:** A method used by employers to verify the accuracy of the information provided by potential candidates.
- **Benefits:** A part of an employee's compensation package.
- **Breaks:** Short periods of rest taken by employees during working hours.
- **Compensation Package:** The combination of salary and benefits that an employer provides to his/her employees.
- **Compensatory Time (Comp Time):** Time off in lieu of pay.
- **Contract Employee:** An employee who works for one organization that sells said employee's services to another company, either on a project or time basis.
- **Contract of Employment:** When an employee is offered work in exchange for wages or salary, and accepts the offer made by the employer, a contract of employment exists.
- **Corporate Culture:** The beliefs and values shared by all the members of a company, and imparted from one generation of employees to another.
- **Counter Offer/Counter Proposal:** A negotiation technique used by potential candidates to increase the amount of salary offered by a company.
- **Cover Letter:** A letter that accompanies a candidate's resume. It emphasizes the important points in the candidate's resume and provides real examples that prove the candidate's ability to perform the expected job role.
- **Curriculum Vitae (CV)/Resume:** A summary of a candidate's achievements, educational background, work experience, skills and strengths.
- **Declining Letter:** A letter sent by an employee to an employer, turning down the job offer made by the employer to the employee.
- **Deductions:** Amounts subtracted from an employee's pay and listed on the employee's pay slip.
- **Discrimination:** The act of treating one person not as favourably as another person.
- **Employee:** A person who works for another person in exchange for payment.
- **Employee Training:** A workshop or in-house training that an employee is asked to attend by his or her superior, for the benefit of the employer.
- **Employment Gaps:** Periods of unemployed time between jobs.
- **Fixed-Term Contract:** A contract of employment which gets terminated on an agreed-upon date.
- **Follow-Up:** The act of contacting a potential employer after a candidate has submitted his or her resume.
- **Freelancer/Consultant/Independent Contractor:** A person who works for him or herself and pitches for temporary jobs and projects with different employers.
- **Holiday:** Paid time-off from work.
- **Hourly Rate:** The amount of salary or wages paid for 60 minutes of work.

- **Internship:** A job opportunity offered by an employer to a potential employee, called an intern, to work at the employer's company for a fixed, limited time period.
- **Interview:** A conversation between a potential employee and a representative of an employer, in order to determine if the potential employee should be hired.
- **Job Application:** A form which asks for a candidate's information like the candidate's name, address, contact details and work experience. The purpose of a candidate submitting a job application, is to show that candidate's interest in working for a particular company.
- **Job Offer:** An offer of employment made by an employer to a potential employee.
- **Job Search Agent:** A program that enables candidates to search for employment opportunities by selecting criteria listed in the program, for job vacancies.
- **Lay Off:** A lay off occurs when an employee is temporarily let go from his or her job, due to the employer not having any work for that employee.
- **Leave:** Formal permission given to an employee, by his or her employer, to take a leave of absence from work.
- **Letter of Acceptance:** A letter given by an employer to an employee, confirming the offer of employment made by the employer, as well as the conditions of the offer.
- **Letter of Agreement:** A letter that outlines the terms of employment.
- **Letter of Recommendation:** A letter written for the purpose of validating the work skills of a person.
- **Maternity Leave:** Leave taken from work by women who are pregnant, or who have just given birth.
- **Mentor:** A person who is employed at a higher level than you, who offers you advice and guides you in your career.
- **Minimum wage:** The minimum wage amount paid on an hourly basis.
- **Notice:** An announcement made by an employee or an employer, stating that the employment contract will end on a particular date.
- **Offer of Employment:** An offer made by an employer to a prospective employee that contains important information pertaining to the job being offered, like the starting date, salary, working conditions etc.
- **Open-Ended Contract:** A contract of employment that continues till the employer or employee terminates it.
- **Overqualified:** A person who is not suited for a particular job because he or she has too many years of work experience, or a level of education that is much higher than required for the job, or is currently or was previously too highly paid.
- **Part-Time Worker:** An employee who works for fewer hours than the standard number of hours normally worked.
- **Paternity Leave:** Leave granted to a man who has recently become a father.
- **Recruiters/Headhunters/Executive Search Firms:** Professionals who are paid by employers to search for people to fill particular positions.
- **Resigning/Resignations:** When an employee formally informs his or her employer that he or she is quitting his or her job.
- **Self-Employed:** A person who has his or her own business and does not work in the capacity of an employee.
- **Time Sheet:** A form that is submitted to an employer, by an employee, that contains the number of hours worked every day by the employee.

UNIT 10.5: Understanding Entrepreneurship

Unit Objectives



1. Discuss the concept of entrepreneurship
2. Discuss the importance of entrepreneurship
3. Describe the characteristics of an entrepreneur
4. Describe the different types of enterprises
5. List the qualities of an effective leader
6. Discuss the benefits of effective leadership
7. List the traits of an effective team
8. Discuss the importance of listening effectively
9. Discuss how to listen effectively
10. Discuss the importance of speaking effectively
11. Discuss how to speak effectively
12. Discuss how to solve problems
13. List important problem solving traits
14. Discuss ways to assess problem solving skills
15. Discuss the importance of negotiation
16. Discuss how to negotiate
17. Discuss how to identify new business opportunities
18. Discuss how to identify business opportunities within your business
19. Explain the meaning of entrepreneur
20. Describe the different types of entrepreneurs
21. List the characteristics of entrepreneurs
22. Recall entrepreneur success stories
23. Discuss the entrepreneurial process
24. Describe the entrepreneurship ecosystem
25. Discuss the purpose of the Make in India campaign
26. Discuss key schemes to promote entrepreneurs
27. Discuss the relationship between entrepreneurship and risk appetite
28. Discuss the relationship between entrepreneurship and resilience
29. Describe the characteristics of a resilient entrepreneur
30. Discuss how to deal with failure

10.5.1 Concept Introduction, (Characteristic of an Entrepreneur, types of firms / types of enterprises): Entrepreneurs and Entrepreneurship

Anyone who is determined to start a business, no matter what the risk, is an entrepreneur. Entrepreneurs run their own start-up, take responsibility for the financial risks and use creativity, innovation and vast reserves of self-motivation to achieve success. They dream big and are determined to do whatever it takes to turn their idea into a viable offering. The aim of an entrepreneur is to create an enterprise. The process of creating this enterprise is known as entrepreneurship.

Importance of Entrepreneurship

Entrepreneurship is very important for the following reasons:

1. It results in the creation of new organizations
2. It brings creativity into the marketplace
3. It leads to improved standards of living
4. It helps develop the economy of a country

Characteristics of Entrepreneurs

All successful entrepreneurs have certain characteristics in common.

They are all:

- Extremely passionate about their work
- Confident in themselves
- Disciplined and dedicated
- Motivated and driven
- Highly creative
- Visionaries
- Open-minded
- Decisive

Entrepreneurs also have a tendency to:

- Have a high risk tolerance
- Thoroughly plan everything
- Manage their money wisely
- Make their customers their priority
- Understand their offering and their market in detail
- Ask for advice from experts when required
- Know when to cut their losses

Examples of Famous Entrepreneurs

Some famous entrepreneurs are:

- Dhirubhai Ambani (Reliance)
- Dr. Karsanbhai Patel (Nirma)
- Azim Premji (Wipro)
- Anil Agarwal (Vedanta Resources)

Types of Enterprises

As an entrepreneur in India, you can own and run any of the following types of enterprises:

Sole Proprietorship

In a sole proprietorship, a single individual owns, manages and controls the enterprise. This type of business is the easiest to form with respect to legal formalities. The business and the owner have no separate legal existence. All profit belongs to the proprietor, as do all the losses - the liability of the entrepreneur is unlimited.

Partnership

A partnership firm is formed by two or more people. The owners of the enterprise are called partners. A partnership deed must be signed by all the partners. The firm and its partners have no separate legal existence. The profits are shared by the partners. With respect to losses, the liability of the partners is unlimited. A firm has a limited life span and must be dissolved when any one of the partners dies, retires, claims bankruptcy or goes insane.

Limited Liability Partnership (LLP)

In a Limited Liability Partnership or LLP, the partners of the firm enjoy perpetual existence as well as the advantage of limited liability. Each partner's liability is limited to their agreed contribution to the LLP. The partnership and its partners have a separate legal existence.

Tips



- Learn from others' failures.
- Be certain that this is what you want.
- Search for a problem to solve, rather than look for a problem to attach to your idea.

10.5.2 Leadership & Teamwork: Leadership and Leaders

Leadership means setting an example for others to follow. Setting a good example means not asking someone to do something that you wouldn't willingly want to do yourself. Leadership is about figuring out what to do in order to win as a team, and as a company.

Leaders believe in doing the right things. They also believe in helping others to do the right things. An effective leader is someone who:

- Creates an inspiring vision of the future.
- Motivates and inspires his team to pursue that vision.

Leadership Qualities That All Entrepreneurs Need

Building a successful enterprise is only possible if the entrepreneur in charge possesses excellent leadership qualities. Some critical leadership skills that every entrepreneur must have are:

1. **Pragmatism:** This means having the ability to highlight all obstacles and challenges, in order to resolve issues and reduce risks.
2. **Humility:** This means admitting to mistakes often and early, and being quick to take responsibility for your actions. Mistakes should be viewed as challenges to overcome, not opportunities to point blame.
3. **Flexibility:** It is critical for a good leader to be very flexible and quickly adapt to change. It is equally critical to know when to adapt and when not to.
4. **Authenticity:** This means showing both, your strengths and your weaknesses. It means being human and showing others that you are human.
5. **Reinvention:** This means refreshing or changing your leadership style when necessary. To do this, it's important to learn where your leadership gaps lie and find out what resources are required to close them.
6. **Awareness:** This means taking the time to recognize how others view you. It means understanding how your presence affects those around you.

Benefits of Effective Leadership

Effective leadership results in numerous benefits. Great leadership leads to the leader successfully:

- Gaining the loyalty and commitment of the team members
- Motivating the team to work towards achieving the company's goals and objectives
- Building morale and instilling confidence in the team members
- Fostering mutual understanding and team-spirit among team members
- Convincing team members about the need to change when a situation requires adaptability

Teamwork and Teams

Teamwork occurs when the people in a workplace combine their individual skills to pursue a common goal. Effective teams are made up of individuals who work together to achieve this common goal. A great team is one who holds themselves accountable for the end result.

Importance of Teamwork in Entrepreneurial Success

For an entrepreneurial leader, building an effective team is critical to the success of a venture. An entrepreneur must ensure that the team he builds possesses certain crucial qualities, traits and characteristics. An effective team is one which has:

1. **Unity of purpose:** All the team members should clearly understand and be equally committed to the purpose, vision and goals of the team.
2. **Great communication skills:** Team members should have the ability to express their concerns, ask questions and use diagrams, and charts to convey complex information.
3. **The ability to collaborate:** Every member should feel entitled to provide regular feedback on new ideas.
4. **Initiative:** The team should consist of proactive individuals. The members should have the enthusiasm to come up with new ideas, improve existing ideas, and conduct their own research.
5. **Visionary members:** The team should have the ability to anticipate problems and act on these potential problem before they turn into real problems.
6. **Great adaptability skills:** The team must believe that change is a positive force. Change should be seen as the chance to improve and try new things.
7. **Excellent organizational skills:** The team should have the ability to develop standard work processes, balance responsibilities, properly plan projects, and set in place methods to measure progress and ROI.

Tips



- Don't get too attached to your original idea. Allow it to evolve and change.
- Be aware of your weaknesses and build a team that will complement your shortfalls.
- Hiring the right people is not enough. You need to promote or incentivize your most talented people to keep them motivated.
- Earn your team's respect.

10.5.3 Communication Skills: Listening & Speaking: The Importance of Listening Effectively

Listening is the ability to correctly receive and understand messages during the process of communication. Listening is critical for effective communication. Without effective listening skills, messages can easily be misunderstood. This results in a communication breakdown and can lead to the sender and the receiver of the message becoming frustrated or irritated.

It's very important to note that listening is not the same as hearing. Hearing just refers to sounds that you hear. Listening is a whole lot more than that. To listen, one requires focus. It means not only paying attention to the story, but also focusing on how the story is relayed, the way language and voice is used, and even how the speaker uses their body language. The ability to listen depends on how effectively one can perceive and understand both, verbal and non-verbal cues.

How to Listen Effectively

To listen effectively you should:

- Stop talking
- Stop interrupting
- Focus completely on what is being said
- Nod and use encouraging words and gestures
- Be open-minded
- Think about the speaker's perspective
- Be very, very patient
- Pay attention to the tone that is being used
- Pay attention to the speaker's gestures, facial expressions and eye movements
- Not try and rush the person
- Not let the speaker's mannerisms or habits irritate or distract you

Importance of Speaking Effectively

How successfully a message gets conveyed depends entirely on how effectively you are able to get it through. An effective speaker is one who enunciates properly, pronounces words correctly, chooses the right words and speaks at a pace that is easily understandable. Besides this, the words spoken out loud need to match the gestures, tone and body language used.

What you say, and the tone in which you say it, results in numerous perceptions being formed. A person who speaks hesitantly may be perceived as having low self-esteem or lacking in knowledge of the discussed topic. Those with a quiet voice may very well be labelled as shy. And those who speak in commanding tones with high levels of clarity, are usually considered to be extremely confident. This makes speaking a very critical communication skill.

How to Speak Effectively

To speak effectively you should:

- Incorporate body language in your speech like eye contact, smiling, nodding, gesturing etc.
- Build a draft of your speech before actually making your speech.
- Ensure that all your emotions and feelings are under control.
- Pronounce your words distinctly with the correct pitch and intensity. Your speech should be crystal clear at all times.
- Use a pleasant and natural tone when speaking. Your audience should not feel like you are putting on an accent or being unnatural in any way.
- Use precise and specific words to drive your message home. Ambiguity should be avoided at all costs.
- Ensure that your speech has a logical flow.
- Be brief. Don't add any unnecessary information.
- Make a conscious effort to avoid irritating mannerisms like fidgeting, twitching etc.
- Choose your words carefully and use simple words that the majority of the audience will have no difficulty understanding.
- Use visual aids like slides or a whiteboard.
- Speak slowly so that your audience can easily understand what you're saying. However, be careful not to speak too slowly because this can come across as stiff, unprepared or even condescending.
- Remember to pause at the right moments.

Tips



- If you're finding it difficult to focus on what someone is saying, try repeating their words in your head.
- Always maintain eye contact with the person that you are communicating with, when speaking as well as listening. This conveys and also encourages interest in the conversation.

10.5.4 Problem Solving & Negotiation skills:

What is a Problem

As per The Concise Oxford Dictionary (1995), a problem is, “A doubtful or difficult matter requiring a solution”

All problems contain two elements:

1. Goals
2. Obstacles

The aim of problem solving is to recognize the obstacles and remove them in order to achieve the goals.

How to Solve Problems



Solving a problem requires a level of rational thinking. Here are some logical steps to follow when faced with an issue:

Step 1: Identify the problem

Step 2: Study the problem in detail

Step 3: List all possible solutions

Step 4: Select the best solution

Step 5: Implement the chosen solution

Step 6: Check that the problem has really been solved

Important Traits for Problem Solving

Highly developed problem solving skills are critical for both, business owners and their employees. The following personality traits play a big role in how effectively problems are solved:

- Being open minded
- Being proactive
- Having a positive attitude
- Asking the right questions
- Not panicking
- Focusing on the right problem

How to Assess for Problem Solving Skills

As an entrepreneur, it would be a good idea to assess the level of problem solving skills of potential candidates before hiring them. Some ways to assess this skill are through:

1. **Application forms:** Ask for proof of the candidate's problem solving skills in the application form.
2. **Psychometric tests:** Give potential candidates logical reasoning and critical thinking tests and see how they fare.
3. **Interviews:** Create hypothetical problematic situations or raise ethical questions and see how the candidates respond.
4. **Technical questions:** Give candidates examples of real life problems and evaluate their thought process.

What is Negotiation

Negotiation is a method used to settle differences. The aim of negotiation is to resolve differences through a compromise or agreement while avoiding disputes. Without negotiation, conflicts are likely to lead to resentment between people. Good negotiation skills help satisfy both parties and go a long way towards developing strong relationships.

Why Negotiate

Starting a business requires many, many negotiations. Some negotiations are small while others are critical enough to make or break a startup. Negotiation also plays a big role inside the workplace. As an entrepreneur, you need to not only know how to negotiate yourself, but also how to train employees in the art of negotiation.

How to Negotiate



Take a look at some steps to help you negotiate:

Step 1: Pre-Negotiation Preparation	Agree on where to meet to discuss the problem, decide who all will be present and set a time limit for the discussion.
Step 2: Discuss the Problem	This involves asking questions, listening to the other side, putting your views forward and clarifying doubts.
Step 3: Clarify the Objective	Ensure that both parties want to solve the same problem and reach the same goal.
Step 4: Aim for a Win-Win Outcome	Try your best to be open minded when negotiating. Compromise and offer alternate solutions to reach an outcome where both parties win.
Step 5: Clearly Define the Agreement	When an agreement has been reached, the details of the agreement should be crystal clear to both sides, with no scope for misunderstandings.
Step 6: Implement the Agreed Upon Solution	Agree on a course of action to set the solution in motion

Tips



- Know exactly what you want before you work towards getting it
- Give more importance to listening and thinking, than speaking
- Focus on building a relationship rather than winning
- Remember that your people skills will affect the outcome
- Know when to walk away – sometimes reaching an agreement may not be possible

10.5.5 Business Opportunities Identification: Entrepreneurs and Opportunities

“The entrepreneur always searches for change, responds to it and exploits it as an opportunity.”

Peter Drucker

The ability to identify business opportunities is an essential characteristic of an entrepreneur.

What is an Opportunity

The word opportunity suggests a good chance or a favourable situation to do something offered by circumstances.

A business opportunity means a good or favourable change available to run a specific business in a given environment, at a given point of time.

Common Questions Faced by Entrepreneurs

A critical question that all entrepreneurs face is how to go about finding the business opportunity that is right for them.

Some common questions that entrepreneurs constantly think about are:

- Should the new enterprise introduce a new product or service based on an unmet need?
- Should the new enterprise select an existing product or service from one market and offer it in another where it may not be available?
- Should the enterprise be based on a tried and tested formula that has worked elsewhere?

It is therefore extremely important that entrepreneurs must learn how to identify new and existing business opportunities and evaluate their chances of success.

When is an Idea an Opportunity

An idea is an opportunity when:

- It creates or adds value to a customer
- It solves a significant problem, removes a pain point or meets a demand
- Has a robust market and profit margin
- Is a good fit with the founder and management team at the right time and place

Factors to Consider When Looking for Opportunities

Consider the following when looking for business opportunities:

- | | |
|--|--------------------------------|
| • Economic trends | • Market trends |
| • Changes in funding | • Changes in political support |
| • Changing relationships between vendors, partners and suppliers | • Shift in target audience |

Ways to Identify New Business Opportunities

1. Identify Market Inefficiencies

When looking at a market, consider what inefficiencies are present in the market. Think about ways to correct these inefficiencies.

2. Remove Key Hassles

Rather than create a new product or service, you can innovatively improve a product, service or process.

3. Create Something New

Think about how you can create a new experience for customers, based on existing business models.

4. Pick a Growing Sector/Industry

Research and find out which sectors or industries are growing and think about what opportunities you can tap in the same.

5. Think About Product Differentiation

If you already have a product in mind, think about ways to set it apart from the existing ones.

Ways to Identify Business Opportunities Within Your Business

1. SWOT Analysis

An excellent way to identify opportunities inside your business is by creating a SWOT analysis. The acronym SWOT stands for strengths, weaknesses, opportunities, and threats.

SWOT analysis framework:



Fig.10.5.1. SWOT Analysis

Consider the following when looking for business opportunities:

By looking at yourself and your competitors using the SWOT framework, you can uncover opportunities that you can exploit, as well as manage and eliminate threats that could derail your success.

2. Establishing Your USP

Establish your USP and position yourself as different from your competitors. Identify why customers should buy from you and promote that reason.

Opportunity Analysis

Once you have identified an opportunity, you need to analyze it.

To analyze an opportunity, you must:

- Focus on the idea
- Focus on the market of the idea
- Talk to industry leaders in the same space as the idea
- Talk to players in the same space as the idea

Tips



- Remember, opportunities are situational.
- Look for a proven track record.
- Avoid the latest craze.
- Love your idea.

10.5.6 Entrepreneurship Support Eco - System:

What is an Entrepreneur

An entrepreneur is a person who:

- Does not work for an employee
- Runs a small enterprise
- Assumes all the risks and rewards of the enterprise, idea, good or service

Types of Entrepreneurs

There are four main types of entrepreneurs:

1. **The Traditional Entrepreneur:** This type of entrepreneur usually has some kind of skill – they can be a carpenter, mechanic, cook etc. They have businesses that have been around for numerous years like restaurants, shops and carpenters. Typically, they gain plenty of experience in a particular industry before they begin their own business in a similar field.
2. **The Growth Potential Entrepreneur:** The desire of this type of entrepreneur is to start an enterprise that will grow, win many customers and make lots of money. Their ultimate aim is to eventually sell their enterprise for a nice profit. Such entrepreneurs usually have a science or technical background.
3. **The Project-Oriented Entrepreneur:** This type of entrepreneur generally has a background in the Arts or psychology. Their enterprises tend to be focus on something that they are very passionate about.
4. **The Lifestyle Entrepreneur:** This type of entrepreneur has usually worked as a teacher or a secretary. They are more interested in selling something that people will enjoy, rather than making lots of money.

Characteristics of an Entrepreneur

Successful entrepreneurs have the following characteristics:

- They are highly motivated
- They are creative and persuasive
- They are mentally prepared to handle each and every task
- They have excellent business skills – they know how to evaluate their cash flow, sales and revenue
- They are willing to take great risks
- They are very proactive – this means they are willing to do the work themselves, rather than wait for someone else to do it
- They have a vision – they are able to see the big picture
- They are flexible and open-minded
- They are good at making decisions

Entrepreneur Success Stories

Dhiru Bhai Ambani

Dhirubhai Ambani began his entrepreneurial career by selling “bhajias” to pilgrims in Mount Girnar on weekends. At 16, he moved to Yemen where he worked as a gas-station attendant, and as a clerk in an oil company. He returned to India with Rs. 50,000 and started a textile trading company. Reliance went on to become the first Indian company to raise money in global markets and the first Indian company to feature in Forbes 500 list.

Dr. Karsanbhai Patel

Karsanbhai Patel made detergent powder in the backyard of his house. He sold his product door-to-door and offered a money back guarantee with every pack that was sold. He charged Rs. 3 per kg when the cheapest detergent at that time was Rs.13 per kg. Dr. Patel eventually started Nirma which became a whole new segment in the Indian domestic detergent market.

The Entrepreneurial Process

Let's take a look at the stages of the entrepreneurial process.

Stage 1: Idea Generation. The entrepreneurial process begins with an idea that has been thought of by the entrepreneur. The idea is a problem that has the potential to be solved.

Stage 2: Germination or Recognition. In this stage a possible solution to the identified problem is thought of.

Stage 3: Preparation or Rationalization. The problem is studied further and research is done to find out how others have tried to solve the same problem.

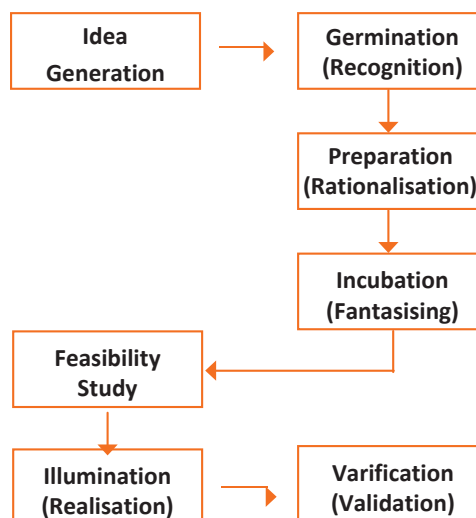
Stage 4: Incubation or Fantasizing. This stage involves creative thinking for the purpose of coming up with more ideas. Less thought is given to the problem areas.

Stage 5: Feasibility Study: The next step is the creation of a feasibility study to determine if the idea will make a profit and if it should be seen through.

Stage 6: Illumination or Realization. This is when all uncertain areas suddenly become clear. The entrepreneur feels confident that his idea has merit.

Stage 7: Verification or Validation. In this final stage, the idea is verified to see if it works and if it is useful.

Take a look at the diagram below to get a better idea of this process.



Introduction to the Entrepreneurship Ecosystem

The entrepreneurship support ecosystem signifies the collective and complete nature of entrepreneurship. New companies emerge and flourish not only because of the courageous, visionary entrepreneurs who launch them, but they thrive as they are set in an environment or 'ecosystem' made of private and public participants. These players nurture and sustain the new ventures, facilitating the entrepreneurs' efforts.

An entrepreneurship ecosystem comprises of the following six domains:

1. **Favourable Culture:** This includes elements such as tolerance of risk and errors, valuable networking and positive social standing of the entrepreneur.
2. **Facilitating Policies & Leadership:** This includes regulatory framework incentives and existence of public research institutes.
3. **Financing Options:** Angel financing, venture capitalists and micro loans would be good examples of this.
4. **Human Capital:** This refers to trained and untrained labour, entrepreneurs and entrepreneurship training programmes, etc.
5. **Conducive Markets for Products & Services:** This refers to an existence or scope of existence of a market for the product/service.
6. **Institutional & Infrastructural Support:** This includes legal and financing advisers, telecommunications, digital and transportation infrastructure, and entrepreneurship networking programmes.

These domains indicate whether there is a strong entrepreneurship support ecosystem and what actions should the government put in place to further encourage this ecosystem. The six domains and their various elements have been graphically depicted.

Early Customers

- Early adopters for proof-of-concept
- Expertise in productizing
- Reference customer
- First reviews
- Distribution channels

Leadership

- Unequivocal support
- Social legitimacy
- Open door for advocate
- Entrepreneurship strategy
- urgency, crisis and challenge

Government

- Institutions
e.g. Investment, support
- Financial support
- Research institutes
- Venture-friendly legislation
- e.g. Bankruptcy, contract enforcement, property rights, and labour

Networks

- Entrepreneur's networks

- Diaspora networks
- Multinational corporations

Labour

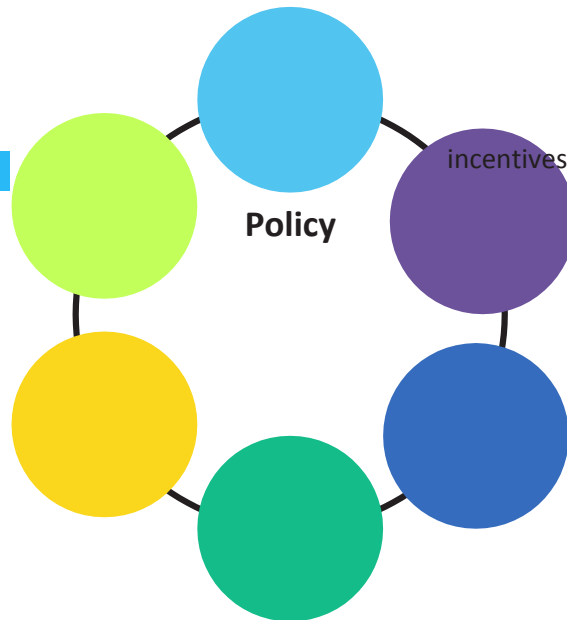
- Skilled and unskilled
- Serial entrepreneurs
- Later generation family

Educational Institutions

- General degrees (professional and academic)
- Specific entrepreneurship training

Infrastructure

- Telecommunications



Policy

incentives

Market

Finance

Entrepreneurship

Financial Capital

- Micro-loans
- Angel investors, friends and family
- Zero-stage venture capital
- Venture capital funds
- Private equity
- Public capital markets
- Debt

Success Stories

- Energy

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• Energy

Human
Capital

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Culture

- Visible successes
- Wealth generation for founders
- International reputation
- Tolerance of risk, mistakes, failure
- Innovation, creativity, experimentation
- Social status of entrepreneur
- Wealth creation

Societal
norms

- Tolerance

- Zones, incubation centers, clusters

Support Professions

- Legal
- Accounting
- Investment bankers

Non-Government Institution

- Entrepreneurship promotion in non-profits
- Business plan contests
- Conferences
- Entrepreneur-friendly association

- Ambition, drive, hunger

Fig.10.5.2. Entrepreneurship at a Glance

Every entrepreneurship support ecosystem is unique and all the elements of the ecosystem are interdependent. Although every region's entrepreneurship ecosystem can be broadly described by the above features, each ecosystem is the result of the hundred elements interacting in highly complex and particular ways.

Entrepreneurship ecosystems eventually become (largely) self-sustaining. When the six domains are resilient enough, they are mutually beneficial. At this point, government involvement can and should be significantly minimized. Public leaders do not need to invest a lot to sustain the ecosystem. It is imperative that the entrepreneurship ecosystem incentives are formulated to be self-liquidating, hence focusing on sustainability of the environment.

Make in India Campaign

Every entrepreneur has certain needs. Some of their important needs are:

- To easily get loans
- To easily find investors
- To get tax exemptions
- To easily access resources and good infrastructure
- To enjoy a procedure that is free of hassles and is quick
- To be able to easily partner with other firms

The Make in India campaign, launched by Prime Minister Modi aims to satisfy all these needs of young, aspiring entrepreneurs. Its objective is to:

- Make investment easy
- Support new ideas
- Enhance skill development
- Safeguard the ideas of entrepreneurs
- Create state-of-the-art facilities for manufacturing goods

Key Schemes to Promote Entrepreneurs

The government offers many schemes to support entrepreneurs. These schemes are run by various Ministries/Departments of Government of India to support First Generation Entrepreneurs. Take a look at a few key schemes to promote entrepreneurship:

Sl. Name of the Scheme

1. Pradhan Mantri MUDRA Yojana - Micro Units Development and Refinance Agency (MUDRA),
2. STAND UP INDIA
3. Prime Minister Employment Generation Programme (PMEGP)
4. International Cooperation
5. Performance and Credit Rating
6. Marketing Assistance Scheme
7. Reimbursement of Registration Fee for Bar Coding
8. Enable Participation of MSMEs in State/District level Trade Fairs and Provide Funding Support

9. Capital Subsidy Support on Credit for Technology up gradation
10. Credit Guarantee Fund for Micro and Small Enterprise (CGFMSE)
11. Reimbursement of Certification Fees for Acquiring ISO Standards
12. Agricultural Marketing
13. Small Agricultural Marketing
14. Mega Food Park
15. Adivasi Mahila Sashaktikaran Yojana

1. **Pradhan Mantri MUDRA Yojana**, - Micro Units Development and Refinance Agency (MUDRA),

Description

Under the aegis support of Pradhan Mantri MUDRA Yojana, MUDRA has already created its initial products/schemes. The interventions have been named 'Shishu', 'Kishor' and 'Tarun' to signify the stage of growth/development and funding needs of the beneficiary micro unit/entrepreneur and also provide a reference point for the next phase of graduation/growth to look forward to:

- a. Shishu: Covering loans upto Rs.50,000/-
- b. Kishor: Covering loans above Rs. 50,000/- and upto Rs.5 lakh
- c. Tarun: Covering loans above Rs. 5 lakh to Rs.10 lakh

Who can apply?

Any Indian citizen who has a business plan for a non-farm sector income generating activity such as manufacturing, processing, trading or service sector and whose credit need is less than Rs.10 lakh can approach either a Bank, MFI, or NBFC for availing of MUDRA loans under Pradhan Mantri Mudra Yojana (PMMY).

2. **Stand Up India**

Description

The objective of the Standup India scheme is to facilitate bank loans between Rs.10 lakh and Rs.1 crore to at least one Schedule Caste (SC) or Scheduled Tribe (ST) borrower and at least one woman borrower per bank branch for setting up a Greenfield enterprise. This enterprise may be in manufacturing, services or the trading sector. In case of non-Individual enterprises at least 51% of the shareholding and controlling stake should be held by either an SC/ST or Woman Entrepreneur.

Who can apply?

ST, SC & Women

3. **Prime Minister Employment Generation Programme (PMEGP)**

Description

The Scheme is implemented by Khadi and Village Industries Commission (KVIC), as the nodal agency at the National level. At the State level, the Scheme is implemented through State KVIC Directorates, State Khadi and Village Industries Boards (KVIBs) and District Industries Centres (DICs) and banks. The Government subsidy under the Scheme is routed by KVIC through identified banks for eventual distribution to the beneficiaries/entrepreneurs in their bank accounts.

Nature of assistance

The maximum cost of the project/unit admissible under manufacturing sector is Rs.25 lakh and under business/service sector is Rs.10 lakh. Levels of funding under PMEGP

Categories of beneficiaries under PMEGP	Beneficiary's contribution (of project cost)	Rate of Subsidy (of project cost)
Area (location of project/unit)		Urban Rural
General Category	10%	15% 25%
Special (including SC / ST / OBC / Minorities / Women, Ex-servicemen, Physically handicapped, NER, Hill and Border areas, etc.	05%	25% 35%

The balance amount of the total project cost will be provided by Banks as term loan as well as working capital.

Who can apply?

Any individual, above 18 years of age. At least VIII standard pass for projects costing above Rs.10 lakh in the manufacturing sector and above Rs.5 lakh in the business/service sector. Only new projects are considered for sanction under PMEGP. Self Help Groups (including those belonging to BPL provided that they have not availed benefits under any other Scheme), Institutions registered under Societies Registration Act,1860; Production Co-operative Societies, and Charitable Trusts are also eligible. Existing Units (under PMRY, REGP or any other scheme of Government of India or State Government) and the units that have already availed Government Subsidy under any other scheme of Government of India or State Government are NOT eligible.

4. International Cooperation**Description**

The Scheme would cover the following activities:

- Deputation of MSME business delegations to other countries for exploring new areas of technology infusion/upgradation, facilitating joint ventures, improving market of MSMEs products, foreign collaborations, etc.
- Participation by Indian MSMEs in international exhibitions, trade fairs and buyer-seller meets in foreign countries as well as in India, in which there is international participation.
- Holding international conferences and seminars on topics and themes of interest to the MSME.

Nature of assistance

ICScheme provides financial assistance towards the airfare and space rent of entrepreneurs. Assistance is provided on the basis of size and the type of the enterprise.

Who can apply?

- State/Central Government Organisations;
- Industry/Enterprise Associations; and
- Registered Societies/Trusts and Organisations associated with the promotion and development of MSMEs

5. Performance and Credit Rating for Micro and Small Enterprises

Description

The objective of the Scheme is to create awareness amongst micro & small enterprises about the strengths and weaknesses of their operations and also their credit worthiness.

Nature of assistance

Turn Over	Fee to be reimbursed by Ministry of MSME
Up to Rs.50 lacs	75% of the fee charged by the rating agency subject to a ceiling Rs.15,000/-
Above Rs.50 lacs to Rs.200 lacs	75% of the fee charged by the rating agency subject to a ceiling of Rs.30,000/-
Above Rs.200 lacs	75% of the fee charged by the rating agency subject to a ceiling of Rs.40,000/-

Who can apply?

Any enterprise registered in India as a micro or small enterprise is eligible to apply.

6. Marketing Assistance Scheme

Description

The assistance is provided for the following activities:

- Organizing exhibitions abroad and participation in international exhibitions/trade fairs
- Co-sponsoring of exhibitions organized by other organisations/industry associations/agencies
- Organizing buyer-seller meets, intensive campaigns and marketing promotion events

Nature of assistance

Financial assistance of up to 95% of the airfare and space rent of entrepreneurs. Assistance is provided on the basis of size and the type of the enterprise. Financial assistance for co-sponsoring would be limited to 40% of the net expenditure, subject to maximum amount of Rs.5 lakh.

Who can apply?

MSMEs, Industry Associations and other organizations related to MSME sector.

7. Reimbursement of Registration Fee for Bar Coding

Description

The financial assistance is provided towards 75% reimbursement of only one-time registration fee and 75% of annual recurring fee for first three years paid by MSEs to GS1 India for using bar coding.

Nature of assistance

Funding support for reimbursement of 75% of one time and recurring bar code registration fees.

Who can apply?

All MSMEs with EM registration.

8. Enabling Participation of MSMEs in State/District Level Trade Fairs and Provide Funding Support

Description

Provide marketing platform to manufacturing MSMEs by enabling their participation in state/district level exhibitions being organized by state/district authorities/associations.

Nature of assistance

1. Free registration for participating in trade fairs

Note: *The selection of participants would be done by the MSME-DIs post the submission of application.*

2. Reimbursement of 50% of to and fro actual fare by shortest distance/direct train (limited to AC II tier class) from the nearest railway station/bus fare to the place of exhibition and 50% space rental charges for MSMEs (General category entrepreneurs).
3. For Women/SC/ST entrepreneurs & entrepreneurs from North Eastern Region Govt. of India will reimburse 80% of items listed above in Point (2).

Note: The total reimbursement will be max. Rs.30,000/- per unit for the SC/ST/Women/Physically Handicapped entrepreneurs, while for the other units the max. limit will be Rs.20,000/- per person per MSME unit.

Note: *The participant is required to submit follow-up proofs post attending the event to claim reimbursement. The proofs can be submitted after logging in online under the section "My Applications" or directly contacting a DI office.*

Who can apply?

All MSMEs with EM registration.

9. Capital Subsidy Support on Credit for Technology Upgradation**Description**

MSMEs can get a capital subsidy (~15%) on credit availed for technology upgradation.

Nature of assistance

Financial assistance for availing credit and loan.

Who can apply?

1. Banks and financial institutions can apply to DC-MSME for availing support.
2. MSMEs need to directly contact the respective banks for getting credit and capital subsidy.

How to apply?

If you are a financial institution, click on the "Apply Now" button or else you can also directly contact the Office of DC-MSME. You can view the contact details of Office of DC-MSME. If you are an MSME, directly contact the respective banks/financial institutions as listed in the scheme guidelines.

10. Provision of Collateral Free Credit for MSMEs**Description**

Banks and financial institutions are provided funding assistance under this scheme so that they can in turn lend collateral free credit to MSMEs.

Nature of assistance

Funding support to banks and financial institutions for lending collateral-free credit to MSMEs.

Who can apply?

Banks and financial institutions can apply to office of DC-MSME/MSME-DIs for availing support. MSMEs need to directly contact the respective banks for getting credit.

11. Reimbursement of certification fees for acquiring ISO standards

ISO 9000/ISO 14001 Certification Reimbursement.

Description

The GoI assistance will be provided for one-time reimbursement of expenditure to such MSME manufacturing units which acquire ISO 18000/ISO 22000/ISO 27000 certification.

Nature of assistance

Reimbursement of expenditure incurred on acquiring ISO standards.

Who can apply?

MSMEs with EM registration.

12. Agricultural Marketing**Description**

A capital investment subsidy for construction/renovation of rural godowns.
Creation of scientific storage capacity and prevention of distress sale.

Nature of assistance

Subsidy @ 25% to farmers, 15% of project cost to companies.

Who can apply

NGOs, SHGs, companies, co-operatives.

13. Small Agricultural Marketing**Description**

Business development description provides venture capital assistance in the form of equity, and arranges training and visits of agripreneurs

Farmers' Agriculture Business Consortium

Business development description provides venture capital assistance in the form of equity, and arranges training and visits of agripreneurs.

Nature of assistance

Financial assistance with a ceiling of Rs.5 lakh.

Who can apply

Individuals, farmers, producer groups, partnership/propriety firms, SHGs, agripreneurs, etc.

14. Mega Food Park**Description**

Mechanism to link agricultural production and market to maximize value addition, enhance farmers income, create rural employment.

Nature of assistance

One-time capital grant of 50% of project cost with a limit of Rs.50 crore.

Who can apply

Farmers, farmer groups, SHGs.

15. Adivasi Mahila Sashaktikaran Yojana**Description**

Concessional scheme for the economic development of ST women.

Nature of assistance

Term loan at concessional rates upto 90% of cost of scheme.

Who can apply

Scheduled Tribes Women.

Tips



- Research the existing market, network with other entrepreneurs, venture capitalists, angel investors, and thoroughly review the policies in place to enable your entrepreneurship.
- Failure is a stepping stone and not the end of the road. Review yours and your peers' errors and correct them in your future venture.
- Be proactive in your ecosystem. Identify the key features of your ecosystem and enrich them to ensure self-sustainability of your entrepreneurship support ecosystem.

10.5.7 Risk Appetite & Resilience: Entrepreneurship and Risk

Entrepreneurs are inherently risk takers. They are path-makers not path-takers. Unlike a normal, cautious person, an entrepreneur would not think twice about quitting his job (his sole income) and taking a risk on himself and his idea.

An entrepreneur is aware that while pursuing his dreams, assumptions can be proven wrong and unforeseen events may arise. He knows that after dealing with numerous problems, success is still not guaranteed. Entrepreneurship is synonymous with the ability to take risks. This ability, called risk-appetite, is an entrepreneurial trait that is partly genetic and partly acquired.

What is Risk Appetite

Risk appetite is defined as the extent to which a company is equipped to take risk, in order to achieve its objectives. Essentially, it refers to the balance, struck by the company, between possible profits and the hazards caused by changes in the environment (economic ecosystem, policies, etc.). Taking on more risk may lead to higher rewards but have a high probability of losses as well. However, being too conservative may go against the company as it can miss out on good opportunities to grow and reach their objectives.

The levels of risk appetite can be broadly categorized as “low”, “medium” and “high.” The company’s entrepreneur(s) have to evaluate all potential alternatives and select the option most likely to succeed. Companies have varying levels of risk appetites for different objectives. The levels depend on:

- The type of industry
- Market pressures
- Company objectives

For example, a startup with a revolutionary concept will have a very high risk appetite. The startup can afford short term failures before it achieves longer term success. This type of appetite will not remain constant and will be adjusted to account for the present circumstances of the company.

Risk Appetite Statement

Companies have to define and articulate their risk appetite in sync with decisions made about their objectives and opportunities. The point of having a risk appetite statement is to have a framework that clearly states the acceptance and management of risk in business. It sets risk taking limits within the company. The risk appetite statement should convey the following:

- The nature of risks the business faces.
- Which risks the company is comfortable taking on and which risks are unacceptable.
- How much risk to accept in all the risk categories.
- The desired tradeoff between risk and reward.
- Measures of risk and methods of examining and regulating risk exposures.

Entrepreneurship and Resilience

Entrepreneurs are characterized by a set of qualities known as resilience. These qualities play an especially large role in the early stages of developing an enterprise. Risk resilience is an extremely valuable characteristic as it is believed to protect entrepreneurs against the threat of challenges and changes in the business environment.

What is Entrepreneurial Resilience

Resilience is used to describe individuals who have the ability to overcome setbacks related to their life and career aspirations. A resilient person is someone who is capable of easily and quickly recovering from setbacks. For the entrepreneur, resilience is a critical trait. Entrepreneurial resilience can be enhanced in the following ways:

- By developing a professional network of coaches and mentors
- By accepting that change is a part of life
- By viewing obstacles as something that can be overcome

Characteristics of a Resilient Entrepreneur

The characteristics required to make an entrepreneur resilient enough to go the whole way in their business enterprise are:

- A strong internal sense of control
- Strong social connections
- Skill to learn from setbacks
- Ability to look at the bigger picture
- Ability to diversify and expand
- Survivor attitude
- Cash-flow conscious habits
- Attention to detail

Tips



- Cultivate a great network of clients, suppliers, peers, friends and family. This will not only help you promote your business, but will also help you learn, identify new opportunities and stay tuned to changes in the market.
- Don't dwell on setbacks. Focus on what you need to do next to get moving again.
- While you should try and curtail expenses, ensure that it is not at the cost of your growth.

10.5.8 Success & Failures: Understanding Successes and Failures in Entrepreneurship

Shyam is a famous entrepreneur, known for his success story. But what most people don't know, is that Shyam failed numerous times before his enterprise became a success. Read his interview to get an idea of what entrepreneurship is really about, straight from an entrepreneur who has both, failed and succeeded.

Interviewer: Shyam, I have heard that entrepreneurs are great risk-takers who are never afraid of failing. Is this true?

Shyam: Ha ha, no of course it's not true! Most people believe that entrepreneurs need to be fearlessly enthusiastic. But the truth is, fear is a very normal and valid human reaction, especially when you are planning to start your own business! In fact, my biggest fear was the fear of failing. The reality is, entrepreneurs fail as much as they succeed. The trick is to not allow the fear of failing to stop you from going ahead with your plans. Remember, failures are lessons for future success!

Interviewer: What, according to you, is the reason that entrepreneurs fail?

Shyam: Well, there is no one single reason why entrepreneurs fail. An entrepreneur can fail due to numerous reasons. You could fail because you have allowed your fear of failure to defeat you. You could fail because you are unwilling to delegate (distribute) work. As the saying goes, "You can do anything, but not everything!" You could fail because you gave up too easily – maybe you were not persistent enough. You could fail because you were focusing your energy on small, insignificant tasks and ignoring the tasks that were most important. Other reasons for failing are partnering with the wrong people, not being able to sell your product to the right customers at the right time at the right price... and many more reasons!

Interviewer: As an entrepreneur, how do you feel failure should be looked at?

Shyam: I believe we should all look at failure as an asset, rather than as something negative. The way I see it, if you have an idea, you should try to make it work, even if there is a chance that you will fail. That's because not trying is failure right there, anyway! And failure is not the worst thing that can happen. I think having regrets because of not trying, and wondering 'what if' is far worse than trying and actually failing.

Interviewer: How did you feel when you failed for the first time?

Shyam: I was completely heartbroken! It was a very painful experience. But the good news is, you do recover from the failure. And with every subsequent failure, the recovery process gets a lot easier. That's because you start to see each failure more as a lesson that will eventually help you succeed, rather than as an obstacle that you cannot overcome. You will start to realize that failure has many benefits.

Interviewer: Can you tell us about some of the benefits of failing?

Shyam: One of the benefits that I have experienced personally from failing is that the failure made me see things in a new light. It gave me answers that I didn't have before. Failure can make you a lot stronger. It also helps keep your ego in control.

Interviewer: What advice would you give entrepreneurs who are about to start their own enterprises?

Shyam: I would tell them to do their research and ensure that their product is something that is actually wanted by customers. I'd tell them to pick their partners and employees very wisely and cautiously. I'd tell them that it's very important to be aggressive – push and market your product as aggressively as possible. I would warn them that starting an enterprise is very expensive and that they should be prepared for a situation where they run out of money.

I would tell them to create long term goals and put a plan in action to achieve that goal. I would tell them to build a product that is truly unique. Be very careful and ensure that you are not copying another startup. Lastly, I'd tell them that it's very important that they find the right investors.

Interviewer: That's some really helpful advice, Shyam! I'm sure this will help all entrepreneurs to be more prepared before they begin their journey! Thank you for all your insight!

Tips



- Remember that nothing is impossible.
- Identify your mission and your purpose before you start.
- Plan your next steps – don't make decisions hastily.

UNIT 10.6: Preparing to be an Entrepreneur

Unit Objectives



At the end of this unit, you will be able to:

1. Discuss how market research is carried out
2. Describe the 4 Ps of marketing
3. Discuss the importance of idea generation
4. Recall basic business terminology
5. Discuss the need for CRM
6. Discuss the benefits of CRM
7. Discuss the need for networking
8. Discuss the benefits of networking
9. Discuss the importance of setting goals
10. Differentiate between short-term, medium-term and long-term goals
11. Discuss how to write a business plan
12. Explain the financial planning process
13. Discuss ways to manage your risk
14. Describe the procedure and formalities for applying for bank finance
15. Discuss how to manage your own enterprise
16. List important questions that every entrepreneur should ask before starting an enterprise

10.6.1 Market Study / The 4 Ps of Marketing / Importance of an IDEA: Understanding Market Research

Market research is the process of gathering, analyzing and interpreting market information on a product or service that is being sold in that market. It also includes information on:

- Past, present and prospective customers
- Customer characteristics and spending habits
- The location and needs of the target market
- The overall industry
- Relevant competitors

Market research involves two types of data:

- Primary information. This is research collected by yourself or by someone hired by you.
- Secondary information. This is research that already exists and is out there for you to find and use.

Primary research

Primary research can be of two types:

- Exploratory: This is open-ended and usually involves detailed, unstructured interviews.
- Specific: This is precise and involves structured, formal interviews. Conducting specific research is the more expensive than conducting exploratory research.

Secondary research

Secondary research uses outside information. Some common secondary sources are:

- Public sources: These are usually free and have a lot of good information. Examples are government departments, business departments of public libraries etc.
- Commercial sources: These offer valuable information but usually require a fee to be paid. Examples are research and trade associations, banks and other financial institutions etc.
- Educational institutions: These offer a wealth of information. Examples are colleges, universities, technical institutes etc.

The 4 Ps of Marketing

The 4 Ps of marketing are Product, Price, Promotion and Place. Let's look at each of these 4 Ps in detail.

Product

A product can be:

- A tangible good
- An intangible service

Whatever your product is, it is critical that you have a clear understanding of what you are offering, and what its unique characteristics are, before you begin with the marketing process.

Some questions to ask yourself are:

- What does the customer want from the product/service?
- What needs does it satisfy?
- Are there any more features that can be added?
- Does it have any expensive and unnecessary features?
- How will customers use it?
- What should it be called?
- How is it different from similar products?
- How much will it cost to produce?
- Can it be sold at a profit?

Price

Once all the elements of Product have been established, the Price factor needs to be considered. The Price of a Product will depend on several factors such as profit margins, supply, demand and the marketing strategy.

Some questions to ask yourself are:

- What is the value of the product/service to customers?
- Do local products/services have established price points?
- Is the customer price sensitive?
- Should discounts be offered?
- How is your price compared to that of your competitors?

Promotion

Once you are certain about your Product and your Price, the next step is to look at ways to promote it. Some key elements of promotion are advertising, public relations, social media marketing, email marketing, search engine marketing, video marketing and more.

Some questions to ask yourself are:

- Where should you promote your product or service?
- What is the best medium to use to reach your target audience?
- When would be the best time to promote your product?
- How are your competitors promoting their products?

Place

According to most marketers, the basis of marketing is about offering the right product, at the right price, at the right place, at the right time. For this reason, selecting the best possible location is critical for converting prospective clients into actual clients.

Some questions to ask yourself are:

- Will your product or service be looked for in a physical store, online or both?
- What should you do to access the most appropriate distribution channels?
- Will you require a sales force?
- Where are your competitors offering their products or services?
- Should you follow in your competitors' footsteps?
- Should you do something different from your competitors?

Importance of an IDEA

Ideas are the foundation of progress. An idea can be small or ground-breaking, easy to accomplish or extremely complicated to implement. Whatever the case, the fact that it is an idea gives it merit. Without ideas, nothing is possible. Most people are afraid to speak out their ideas, out for fear of being ridiculed. However, if are an entrepreneur and want to remain competitive and innovative, you need to bring your ideas out into the light.

Some ways to do this are by:

- Establishing a culture of brainstorming where you invite all interested parties to contribute
- Discussing ideas out loud so that people can add their ideas, views, opinions to them
- Being open minded and not limiting your ideas, even if the idea who have seems ridiculous
- Not discarding ideas that you don't work on immediately, but instead making a note of them and shelving them so they can be revisited at a later date

Tips



- Keep in mind that good ideas do not always have to be unique.
- Remember that timing plays a huge role in determining the success of your idea.
- Situations and circumstances will always change, so be flexible and adapt your idea accordingly.

10.6.2 Business Entity Concepts: Basic Business Terminology

If your aim is to start and run a business, it is crucial that you have a good understanding of basic business terms. Every entrepreneur should be well versed in the following terms:

- **Accounting:** A systematic method of recording and reporting financial transactions.
- **Accounts payable:** Money owed by a company to its creditors.
- **Accounts Receivable:** The amount a company is owed by its clients.
- **Assets:** The value of everything a company owns and uses to conduct its business.
- **Balance Sheet:** A snapshot of a company's assets, liabilities and owner's equity at a given moment.
- **Bottom Line:** The total amount a business has earned or lost at the end of a month.
- **Business:** An organization that operates with the aim of making a profit.
- **Business to Business (B2B):** A business that sells goods or services to another business.
- **Business to Consumer (B2C):** A business that sells goods or services directly to the end user.
- **Capital:** The money a business has in its accounts, assets and investments. The two main types of capital are debt and equity.
- **Cash Flow:** The overall movement of funds through a business each month, including income and expenses.
- **Cash Flow Statement:** A statement showing the money that entered and exited a business during a specific period of time.
- **Contract:** A formal agreement to do work for pay.
- **Depreciation:** The degrading value of an asset over time.
- **Expense:** The costs that a business incurs through its operations.
- **Finance:** The management and allocation of money and other assets.
- **Financial Report:** A comprehensive account of a business' transactions and expenses.
- **Fixed Cost:** A one-time expense.
- **Income Statement (Profit and Loss Statement):** Shows the profitability of a business during a period of time.
- **Liabilities:** The value of what a business owes to someone else.
- **Marketing:** The process of promoting, selling and distributing a product or service.
- **Net Income/Profit:** Revenues minus expenses.
- **Net Worth:** The total value of a business.
- **Payback Period:** The amount of time it takes to recover the initial investment of a business.
- **Profit Margin:** The ratio of profit, divided by revenue, displayed as a percentage.
- **Return on Investment (ROI):** The amount of money a business gets as return from an investment.

- Revenue: The total amount of income before expenses are subtracted.
- Sales Prospect: A potential customer.
- Supplier: A provider of supplies to a business.
- Target Market: A specific group of customers at which a company's products and services are aimed.
- Valuation: An estimate of the overall worth of the business.
- Variable Cost: Expenses that change in proportion to the activity of a business.
- Working Capital: Calculated as current assets minus current liabilities.
- Business Transactions: There are three types of business transactions. These are:
 - Simple Transactions – Usually a single transaction between a vendor and a customer. For example: Buying a cup of coffee.
 - Complex Transactions – These transactions go through a number of events before they can be completed. For example: Buying a house.
 - Ongoing transactions – These transactions usually require a contract. For example: Contract with a vendor.

Basic Accounting Formulas

Take a look some important accounting formulas that every entrepreneur needs to know.

1. The Accounting Equation: This is value of everything a company owns and uses to conduct its business.

Formula:

$$\text{Assets} = \text{Liability} + \text{Owner's Equity}$$

2. Net Income: This is the profit of the company.

Formula:

$$\text{Net Income} = \text{Revenues} - \text{Expenses}$$

3. Break-Even Point: This is the point at which the company will not make a profit or a loss. The total cost and total revenues are equal.

Formula:

$$\text{Break-Even} = \text{Fixed Costs} / \text{Sales Price} - \text{Variable Cost per Unit}$$

4. Cash Ratio: This tells us about the liquidity of a company.

Formula:

$$\text{Cash Ratio} = \text{Cash} / \text{Current Liabilities}$$

5. Profit Margin: This is shown as a percentage. It shows what percentage of sales are left over after all the expenses are paid by the business.

Formula:

$$\text{Profit Margin} = \text{Net Income} / \text{Sales}$$

6. Debt-to-Equity Ratio: This ratio shows how much equity and debt a company is using to finance its assets, and whether the shareholder equity can fulfill obligations to creditors if the business starts making a loss.

Formula:

$$\text{Debt-to-Equity Ratio} = \text{Total Liabilities} / \text{Total Equity}$$

7. **Cost of Goods Sold:** This is the total of all costs used to create a product or service, which has been sold.

Formula:

$$\text{Cost of Goods Sold} = \text{Cost of Materials/Inventory} - \text{Cost of Outputs}$$

8. **Return on Investment (ROI):** This is usually shown as a percentage. It calculates the profits of an investment as a percentage of the original cost.

Formula:

$$\text{ROI} = \text{Net Profit} / \text{Total Investment} * 100$$

9. **Simple Interest:** This is money you can earn by initially investing some money (the principal).

Formula:

$$A = P(1 + rt); R = r * 100$$

Where:

A = Total Accrued Amount (principal + interest)

P = Principal Amount

I = Interest Amount

r = Rate of Interest per year in decimal; $r = R/100$

t = Time Period involved in months or years

10. **Annual Compound Interest:** The calculates the addition of interest to the principal sum of a loan or deposit.

Formula:

$$A = P (1 + r/n)^{nt}$$

Where:

A = the future value of the investment/loan, including interest

P = the principal investment amount (the initial deposit or loan amount)

r = the annual interest rate (decimal)

n = the number of times that interest is compounded per year

t = the number of years the money is invested or borrowed

for

10.6.3 CRM & Networking: What is CRM

CRM stands for Customer Relationship Management. Originally the expression Customer Relationship Management meant managing one's relationship with customers. However, today it refers to IT systems and software designed to help companies manage their relationships.

The Need for CRM

The better a company can manage its relationships with its customers, the higher the chances of the company's success. For any entrepreneur, the ability to successfully retain existing customers and expand the enterprise is paramount. This is why IT systems that focus on addressing the problems of dealing with customers on a daily basis are becoming more and more in demand.

Customer needs change over time, and technology can make it easier to understand what customers really want. This insight helps companies to be more responsive to the needs of their customers. It enables them to modify their business operations when required, so that their customers are always served in the best manner possible. Simply put, CRM helps companies recognize the value of their clients and enables them to capitalize on improved customer relations.

Benefits of CRM

CRM has a number of important benefits:

- It helps improve relations with existing customers which can lead to:
 - Increased sales
 - Identification of customer needs
 - Cross-selling of products
- It results in better marketing of one's products or services
- It enhances customer satisfaction and retention
- It improves profitability by identifying and focusing on the most profitable customers

6.3.4 What is Networking

In business, networking means leveraging your business and personal connections in order to bring in a regular supply of new business. This marketing method is effective as well as low cost. It is a great way to develop sales opportunities and contacts. Networking can be based on referrals and introductions, or can take place via phone, email, and social and business networking websites.

6.3.5 The Need for Networking

Networking is an essential personal skill for business people, but it is even more important for entrepreneurs. The process of networking has its roots in relationship building. Networking results in greater communication and a stronger presence in the entrepreneurial ecosystem. This helps build strong relationships with other entrepreneurs.

Business networking events held across the globe play a huge role in connecting like-minded entrepreneurs who share the same fundamental beliefs in communication, exchanging ideas and converting ideas into realities. Such networking events also play a crucial role in connecting entrepreneurs with potential investors. Entrepreneurs may have vastly different experiences and backgrounds but they all have a common goal in mind – they all seek connection, inspiration, advice, opportunities and mentors. Networking offers them a platform to do just that.

Benefits of Networking

Networking offers numerous benefits for entrepreneurs. Some of the major benefits are:

- Getting high quality leads
- Increased business opportunities
- Good source of relevant connections
- Advice from like-minded entrepreneurs
- Gaining visibility and raising your profile
- Meeting positive and enthusiastic people
- Increased self-confidence
- Satisfaction from helping others
- Building strong and lasting friendships

Tips



- Use social media interactions to identify needs and gather feedback.
- When networking, ask open-ended questions rather than yes/no type questions.

10.6.4 Business Plan: Why Set Goals

Setting goals is important because it gives you long-term vision and short-term motivation. Goals can be short term, medium term and long term.

Short-Term Goals

- These are specific goals for the immediate future.

Example: Repairing a machine that has failed.

Medium-Term Goals

- These goals are built on your short term goals.
- They do not need to be as specific as your short term goals.

Example: Arranging for a service contract to ensure that your machines don't fail again.

Long-Term Goals

These goals require time and planning.

They usually take a year or more to achieve.

Example: Planning your expenses so you can buy new machinery

Why Create a Business Plan

A business plan is a tool for understanding how your business is put together. It can be used to monitor progress, foster accountable and control the fate of the business. It usually offers a 3-5 year projection and outlines the plan that the company intends to follow to grow its revenues. A business plan is also a very important tool for getting the interest of key employees or future investors.

A business plan typically comprises of eight elements.

Elements of a Business Plan

Executive Summary

The executive summary follows the title page. The summary should clearly state your desires as the business owner in a short and businesslike way. It is an overview of your business and your plans. Ideally this should not be more than 1-2 pages.

Your Executive Summary should include:

- The Mission Statement: Explain what your business is all about.

Example: Nike's Mission Statement

Nike's mission statement is "To bring inspiration and innovation to every athlete in the world."

- Company Information: Provide information like when your business was formed, the names and roles of the founders, the number of employees, your business location(s) etc.
- Growth Highlights: Mention examples of company growth. Use graphs and charts where possible.
- Your Products/Services: Describe the products or services provided.
- Financial Information: Provide details on current bank and investors.
- Summarize future plans: Describe where you see your business in the future.

Business Description

The second section of your business plan needs to provide a detailed review of the different elements of your business. This will help potential investors to correctly understand your business goal and the uniqueness of your offering.

Your Business Description should include:

- A description of the nature of your business
- The market needs that you are aiming to satisfy
- The ways in which your products and services meet these needs
- The specific consumers and organizations that you intend to serve
- Your specific competitive advantages

Market Analysis

The market analysis section usually follows the business description. The aim of this section is to showcase your industry and market knowledge. This is also the section where you should lay down your research findings and conclusions.

Your Market Analysis should include:

- Your industry description and outlook
- Information on your target market
- The needs and demographics of your target audience
- The size of your target market
- The amount of market share you want to capture
- Your pricing structure
- Your competitive analysis
- Any regulatory requirements

Organization & Management

This section should come immediately after the Market Analysis.

Your Organization & Management section should include:

- Your company's organizational structure
- Details of your company's ownership
- Details of your management team
- Qualifications of your board of directors
- Detailed descriptions of each division/department and its function
- The salary and benefits package that you offer your people
- The incentives that you offer

Service or Product Line

The next section is the service or product line section. This is where you describe your service or product, and stress on their benefits to potential and current customers. Explain in detail why your product of choice will fulfill the needs of your target audience.

Your Service or Product Line section should include:

- A description of your product/service
- A description of your product or service's life cycle
- A list of any copyright or patent filings
- A description of any R&D activities that you are involved in or planning

Marketing & Sales

Once the Service or Product Line section of your plan has been completed, you should start on the description of the marketing and sales management strategy for your business.

Your Marketing section should include the following strategies:

- **Market penetration strategy:** This strategy focuses on selling your existing products or services in existing markets, in order to increase your market share.
- **Growth strategy:** This strategy focuses on increasing the amount of market share, even if it reduces earnings in the short-term.
- **Channels of distribution strategy:** These can be wholesalers, retailers, distributors and even the internet.
- **Communication strategy:** These can be written strategies (e-mail, text, chat), oral strategies (phone calls, video chats, face-to-face conversations), non-verbal strategies (body language, facial expressions, tone of voice) and visual strategies (signs, webpages, illustrations).

Your Sales section should include the following information:

- **A salesforce strategy:** This strategy focuses on increasing the revenue of the enterprise.
- **A breakdown of your sales activities:** This means detailing out how you intend to sell your products or services – will you sell it offline or online, how many units do you intend to sell, what price do you plan to sell each unit at, etc.

Funding Request

This section is specifically for those who require funding for their venture.

The Funding Request section should include the following information:

- How much funding you currently require.
- How much funding you will require over the next five years. This will depend on your long-term goals.
- The type of funding you want and how you plan to use it. Do you want funding that can be used only for a specific purpose, or funding that can be used for any kind of requirement?
- Strategic plans for the future. This will involve detailing out your long-term plans – what these plans are and how much money you will require to put these plans in motions.
- Historical and prospective financial information. This can be done by creating and maintaining all your financial records, right from the moment your enterprise started, to the present day. Documents required for this are your balance sheet which contains details of your company's assets and liabilities, your income statement which lists your company's revenues, expenses and net income for the year, your tax returns (usually for the last three years) and your cash flow budget which lists the cash that came in, the cash that went out and states whether you had a cash deficit (negative balance) or surplus (positive balance) at the end of each month.

Financial Planning

Before you begin building your enterprise, you need to plan your finances. Take a look at the steps for financial planning:

Step 1: Create a financial plan. This should include your goals, strategies and timelines for accomplishing these goals.

Step 2: Organize all your important financial documents. Maintain a file to hold your investment details, bank statements, tax papers, credit card bills, insurance papers and any other financial records.

Step 3: Calculate your net worth. This means figure out what you own (assets like your house, bank accounts, investments etc.), and then subtract what you owe (liabilities like loans, pending credit card amounts etc.) the amount you are left with is your net worth.

Step 4: Make a spending plan. This means write down in detail where your money will come from, and where it will go.

Step 5: Build an emergency fund. A good emergency fund contains enough money to cover at least 6 months' worth of expenses.

Step 6: Set up your insurance. Insurance provides long term financial security and protects you against risk.

Risk Management

As an entrepreneur, it is critical that you evaluate the risks involved with the type of enterprise that you want to start, before you begin setting up your company. Once you have identified potential risks, you can take steps to reduce them. Some ways to manage risks are:

- Research similar business and find out about their risks and how they were minimized.
- Evaluate current market trends and find out if similar products or services that launched a while ago are still being well received by the public.
- Think about whether you really have the required expertise to launch your product or service.
- Examine your finances and see if you have enough income to start your enterprise.
- Be aware of the current state of the economy, consider how the economy may change over time, and think about how your enterprise will be affected by any of those changes.
- Create a detailed business plan.

Tips



- Ensure all the important elements are covered in your plan.
- Scrutinize the numbers thoroughly.
- Be concise and realistic.
- Be conservative in your approach and your projections.
- Use visuals like charts, graphs and images wherever possible.

10.6.5 Procedure and Formalities for Bank Finance:

The Need for Bank Finance

For entrepreneurs, one of the most difficult challenges faced involves securing funds for startups. With numerous funding options available, entrepreneurs need to take a close look at which funding methodology works best for them. In India, banks are one of the largest funders of startups, offering funding to thousands of startups every year.

What Information Should Entrepreneurs Offer Banks for Funding

When approaching a bank, entrepreneurs must have a clear idea of the different criteria that banks use to screen, rate and process loan applications. Entrepreneurs must also be aware of the importance of providing banks with accurate and correct information. It is now easier than ever for financial institutions to track any default behaviour of loan applicants. Entrepreneurs looking for funding from banks must provide banks with information relating to their general credentials, financial situation and guarantees or collaterals that can be offered.

General Credentials

This is where you, as an entrepreneur, provide the bank with background information on yourself. Such information includes:

- **Letter(s) of Introduction:** This letter should be written by a respected business person who knows you well enough to introduce you. The aim of this letter is set across your achievements and vouch for your character and integrity.
- **Your Profile:** This is basically your resume. You need to give the bank a good idea of your educational achievements, professional training, qualifications, employment record and achievements.
- **Business Brochure:** A business brochure typically provides information on company products, clients, how long the business has been running for etc.
- **Bank and Other References:** If you have an account with another bank, providing those bank references is a good idea.
- **Proof of Company Ownership or Registration:** In some cases, you may need to provide the bank with proof of company ownership and registration. A list of assets and liabilities may also be required.

Financial Situation

Banks will expect current financial information on your enterprise. The standard financial reports you should be prepared with are:

- | | |
|-----------------------|--------------------------------|
| • Balance Sheet | • Profit-and-Loss Account |
| • Cash-Flow Statement | • Projected Sales and Revenues |
| • Business Plan | • Feasibility Study |

Guarantees or Collaterals

Usually banks will refuse to grant you a loan without security. You can offer assets which the bank can seize and sell off if you do not repay the loan. Fixed assets like machinery, equipment, vehicles etc. are also considered to be security for loans.

The Lending Criteria of Banks

Your request for funding will have a higher chance of success if you can satisfy the following lending criteria:

- Good cash flow
- Adequate shareholders' funds
- Adequate security
- Experience in business
- Good reputation

The Procedure



To apply for funding the following procedure will need to be followed.

1. Submit your application form and all other required documents to the bank.
2. The bank will carefully assess your credit worthiness and assign ratings by analyzing your business information with respect to parameters like management, financial, operational and industry information as well as past loan performance.
3. The bank will make a decision as to whether or not you should be given funding.

Tips



- Get advice on funding options from experienced bankers.
- Be cautious and avoid borrowing more than you need, for longer than you need, at an interest rate that is higher than you are comfortable with.

10.6.6 Enterprise Management - An Overview:

How to Manage Your Enterprise

To manage your enterprise effectively you need to look at many different aspects, right from managing the day-to-day activities to figuring out how to handle a large scale event. Let's take a look at some simple steps to manage your company effectively.

Step 1: Use your leadership skills and ask for advice when required.

Let's take the example of Ramu, an entrepreneur who has recently started his own enterprise. Ramu has good leadership skills – he is honest, communicates well, knows how to delegate work etc. These leadership skills definitely help Ramu in the management of his enterprise. However, sometimes Ramu comes across situations that he is unsure how to handle. What should Ramu do in this case? One solution is for him to find a more experienced manager who is willing to mentor him. Another solution is for Ramu to use his networking skills so that he can connect with managers from other organizations, who can give him advice on how to handle such situations.

Step 2: Divide your work amongst others – realize that you cannot handle everything yourself.

Even the most skilled manager in the world will not be able to manage every single task that an enterprise will demand of him. A smart manager needs to realize that the key to managing his enterprise lies in his dividing all his work between those around him. This is known as delegation. However, delegating is not enough. A manager must delegate effectively if he wants to see results. This is important because delegating, when done incorrectly, can result in you creating even more work for yourself. To delegate effectively, you can start by making two lists. One list should contain the things that you know you need to handle yourself. The second list should contain the things that you are confident can be given to others to manage and handle. Besides incorrect delegation, another issue that may arise is over-delegation. This means giving away too many of your tasks to others. The problem with this is, the more tasks you delegate, the more time you will spend tracking and monitoring the work progress of those you have handed the tasks to. This will leave you with very little time to finish your own work.

Step 3: Hire the right people for the job.

Hiring the right people goes a long way towards effectively managing your enterprise. To hire the best people suited for the job, you need to be very careful with your interview process. You should ask potential candidates the right questions and evaluate their answers carefully. Carrying out background checks is always a good practice. Running a credit check is also a good idea, especially if the people you are planning to hire will be handling your money. Create a detailed job description for each role that you want filled and ensure that all candidates have a clear and correct understanding of the job description. You should also have an employee manual in place, where you

put down every expectation that you have from your employees. All these actions will help ensure that the right people are approached for running your enterprise.

Step 4: Motivate your employees and train them well.

Your enterprise can only be managed effectively if your employees are motivated to work hard for your enterprise. Part of being motivated involves your employees believing in the vision and mission of your enterprise and genuinely wanting to make efforts towards pursuing the same. You can motivate your employees with recognition, bonuses and rewards for achievements. You can also motivate them by telling them about how their efforts have led to the company's success. This will help them feel pride and give them a sense of responsibility that will increase their motivation.

Besides motivating your people, your employees should be constantly trained in new practices and technologies. Remember, training is not a one-time effort. It is a consistent effort that needs to be carried out regularly.

Step 5: Train your people to handle your customers well.

Your employees need to be well-versed in the art of customer management. This means they should be able to understand what their customers want, and also know how to satisfy their needs. For them to truly understand this, they need to see how you deal effectively with customers. This is called leading by example. Show them how you sincerely listen to your clients and the efforts that you put into understand their requirements. Let them listen to the type of questions that you ask your clients so they understand which questions are appropriate.

Step 6: Market your enterprise effectively.

Use all your skills and the skills of your employees to market your enterprise in an effective manner. You can also hire a marketing agency if you feel you need help in this area.

Now that you know what is required to run your enterprise effectively, put these steps into play, and see how much easier managing your enterprise becomes!

Tips



- Get advice on funding options from experienced bankers.
- Be cautious and avoid borrowing more than you need, for longer than you need, at an interest rate that is higher than you are comfortable with.

10.6.7. 20 Questions to Ask Yourself Before Considering Entrepreneurship

1. Why am I starting a business?
2. What problem am I solving?
3. Have others attempted to solve this problem before? Did they succeed or fail?
4. Do I have a mentor¹ or industry expert that I can call on?
5. Who is my ideal customer²?
6. Who are my competitors³?
7. What makes my business idea different from other business ideas?
8. What are the key features of my product or service?
9. Have I done a SWOT⁴ analysis?
10. What is the size of the market that will buy my product or service?
11. What would it take to build a minimum viable product⁵ to test the market?
12. How much money do I need to get started?
13. Will I need to get a loan?
14. How soon will my products or services be available?
15. When will I break even⁶ or make a profit?
16. How will those who invest in my idea make a profit?
17. How should I set up the legal structure⁷ of my business?
18. What taxes⁸ will I need to pay?
19. What kind of insurance⁹ will I need?
20. Have I reached out to potential customers for feedback?

Tips



- It is very important to validate your business ideas before you invest significant time, money and resources into it.
- The more questions you ask yourself, the more prepared you will be to handle the highs and lows of starting an enterprise.

Footnotes:

1. A mentor is a trusted and experienced person who is willing to coach and guide you.
2. A customer is someone who buys goods and/or services.
3. A competitor is a person or company that sells products and/or services similar to your products and/or services.
4. SWOT stands for Strengths, Weaknesses, Opportunities and Threats. To conduct a SWOT analysis of your company, you need to list down all the strengths and weaknesses of your company, the opportunities that are present for your company and the threats faced by your company.

5. A minimum viable product is a product that has the fewest possible features, that can be sold to customers, for the purpose of getting feedback from customers on the product.
6. A company is said to break even when the profits of the company are equal to the costs.
7. The legal structure could be a sole proprietorship, partnership or limited liability partnership.
8. There are two types of taxes – direct taxes payable by a person or a company, or indirect taxes charged on goods and/or services.
9. There are two types of insurance – life insurance and general insurance. Life insurance covers human life while general insurance covers assets like animals, goods, cars etc.





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