KEY FEATURES

Latest Trending Technologies

Incorporates chapters on trending technologies

Additional Annexures

Information and updates about the latest topics in the field of computers

Project Work

Cross-curricular projects integrating knowledge, principles, and values of various disciplines

Online Links

To access more information on the given topics

Group Discussion

To help the students understand the topics in an interactive manner

Brain Developer & Worksheets

For self assessment of the concepts learnt

Incorporates NEP 2019 Guidelines in Activities and Projects

Life Skills and Values

Art Integration

Interdisciplinary

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CONTENTS

CHAPTER 1

NETWORKING CONCEPTS

LEARNING IN THIS CHAPTER

- Networking and its advantages
- Networking components
- Types of networks
- Networking architecture
- Network topologies
- Accessing a file from a shared drive
- Network security

In our daily life, we come across different types of networks. Let us understand this concept by some examples:

Example

- Network of roads, railway lines, canals, etc.
- Communication network of telephone system, which enables us to talk to anyone, anywhere, anytime
- Network of Banks/ATMs (Automated Teller Machines)
- Radio/Television network broadcast programs live across the globe
- Video conferencing allows discussions between people at distant/far off places
- Network of malls, schools, hospitals, etc., all over the country

Internet is an outcome of cyber networking. Imagine life without networking ... no phone, no television, no internet, etc. Computer networks have extended the power of a computer beyond the expanse of a room.

NETWORKING

A computer network can be defined as a group of computers and other peripheral devices that are linked together for the purpose of sharing data and hardware resources. For example, if one of the computers in a network has a printer attached to it, then all the computers in that network can access the printer and use it to print the documents as shown in Figure 1.1, where Computer A and B in a network can give the print command to the printer attached with Computer C.

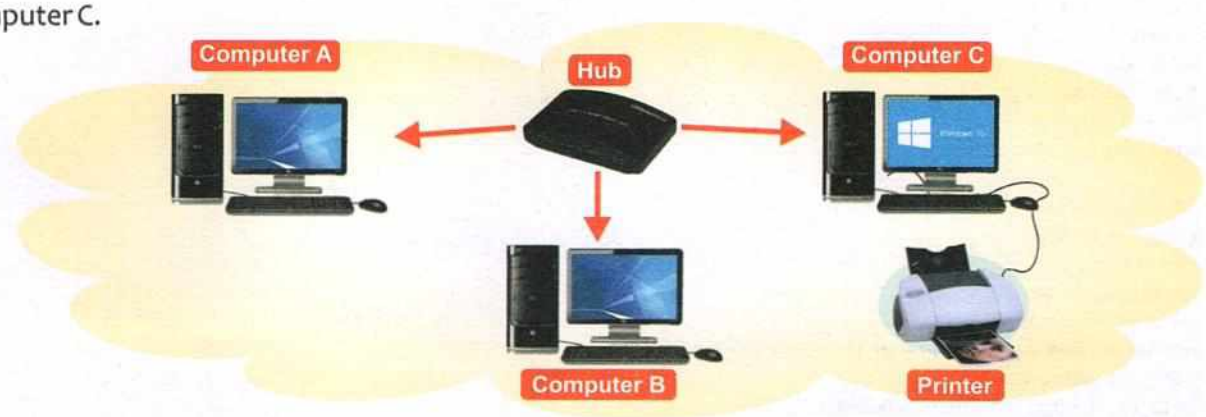


Figure 1.1: **A Computer Network**

The computers in a network can communicate with each other as well as work independently. Each computer in a network is called a **Node.** The computers in a network can be linked through cables, telephone lines, radio waves, or infrared light beams.

ADVANTAGES OF NETWORKING

Networking in computers brings efficiency, economy, and effectiveness in an organisation.

EFFICIENT USE OF STORAGE MEDIA

It is better to store a shareable application data on a network drive than a copy of the application on each user's storage device. It is better to have one big hard disk in the server than to have small hard disks in different computers.

PRESERVING INFORMATION

It is difficult to maintain regular backups on a number of stand-alone computers. When you keep backups on a central location, you have one place to look for the lost information.

REDUCTION IN HARDWARE COSTS

In a network, the hardware devices that are not used very often, like modems, printers, scanners, CD-writers, etc. can be shared. This reduces the cost of the hardware.

EFFICIENCY

In a network, the deletion, modification, or upgradation of the software/data is to be done at a single point only. This brings more efficiency and effectiveness into a working system.

REDUCES REDUNDANCY

A network reduces the need for hard copies of all documents. By sharing the soft copy of a file over the network, the need to share paper copies of reports or any other information can be eliminated or greatly reduced.

QUICKEST DOCUMENT DELIVERY

Networking provides a facility to instantly deliver soft copies from one computer to the other computers throughout the world.

NETWORKING COMPONENTS

To establish wired networking in a group of computers, you require some additional components that are as follows:

NETWORK CARD

A network card is used to physically attach a computer to a network, so that it can participate in network communication. **Ethernet Network Card** is the most commonly used network card. (Nowadays, most computer motherboards come with an inbuilt Network Card.)

Network Card

NETWORKING CABLE

Modern Ethernet networks use twisted pair cable containing eight wires. These wires

Let's Know More

When two users have simultaneous conversation via the internet, it is called **Conferencing**. When this process is supplemented by live video, it is called **Video Conferencing**.

Let's Know More

Intranet is a term, which refers to a computer network restricted to an organisation.

Extranet refers to a computer network that allows controlled access to an information source available on the internet.

Know the Fact

Bluetooth is a wireless technology used to interconnect mobile phones, computers, printers using short-range wireless connection. For more information, visit: www.bluetooth.com

Let's Know More

Protocols are certain sets of rules that determine how data should be transferred over networks, compressed, presented on the screen and so on.

are arranged in a special order, and an RJ-45 connector (similar in design, but bigger than the connector used with the telephone wire) is crimped at both the ends of the cable.

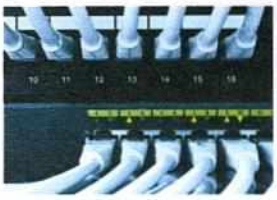
Networking Cable

MODEM

A modem enables you to connect your computer to the available internet connection over the existing telephone lines. It converts the digital signals of a computer into analog signals to enable their transmission via phone lines. At the destination, the receiving modem further converts the analog signal into digital signals so that the data can be understood at the receiving end. It comes as a separate part that can be installed on the Peripheral Component Interconnect (PCI) slots found on the mother board.

Modem

HUBS AND SWITCHES



Hubs and Switches

Network cards are used to send and receive data being transmitted over the Ethernet cables. When a network has more than two computers, you cannot directly connect all the computers together. You need an interface through which the computers can be connected, and the data can be sent and received. This function is performed by a **hub** or **switch**. Hubs were the preferred medium in earlier times, but now switches are used because of their better efficiency.

A Hub/Switch performs the following functions:

- It acts as a central point of connection for all the computers on a network. Every computer plugs into the hub/switch.
- It helps to arrange the ports in such a way that if a PC transmits data, the data is sent over the other computer through its network card.

Basically, the hub/switch is a box with a set of RJ-45 ports. Each computer on a network is connected to the hub/switch via the Ethernet cable.

To establish **Wireless Networking**, you require the following components:

- **Wireless Network Cards** are used instead of the normal network cards that are used in the wired networks. Most laptop computers come with the inbuilt wireless network cards. **Radio signals** are used for transferring data, therefore Ethernet cable is not required.

Routers

- **Access Points** or **Routers** have a wireless antenna, which increases the communication range of the radio signals. Access Points can also be used to join a wired network, thus making the network a combination of wired as well as wireless networks.

TYPES OF NETWORKS

Depending on the geographical area covered by a network, there are various types of computer networks, used worldwide, which are as follows:

PERSONAL AREA NETWORK (PAN)

PAN is a computer network that is mainly created for an individual person. It is used for communication among devices, such as laptops, mobile phones, PDA, or smartphones.

Personal area networks can either be wired or wireless. PAN generally covers a range of less than 10 metres (about 30 feet). You can use these networks to transfer files ncluding e-mails, calendar appointments, digital photos, and music.

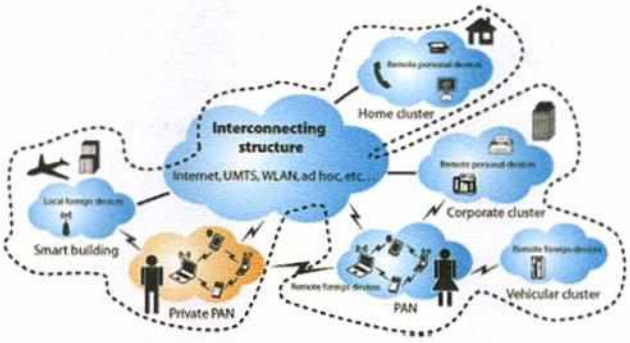


Figure 1.2: **Personal Area Network**

LOCAL AREA NETWORK (LAN)

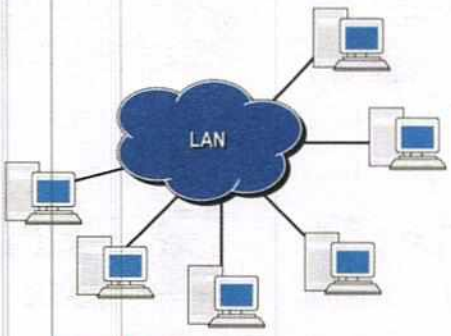


Figure 1.3: **Local Area Network**

In LAN, two or more computers and peripheral devices are connected within a small area, such as room, office building, or a campus. In Local Area Network, computer terminals are physically connected with wires. The data transmission speed is fast as compared to WAN. Since LAN is operated in a small area, it can be controlled and administered by a single person or an organisation.

METROPOLITAN AREA NETWORK (MAN)

MAN is a larger network than LAN. It is spread across a city. Since it covers a city, it is called **metropolitan**. The most common example of MAN is the city cable network or branches of a local bank in a city.

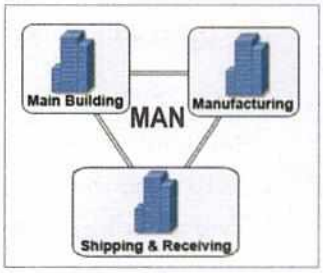


Figure 1.4: **Metropolitan Area Network**

WIDE AREA NETWORK (WAN)

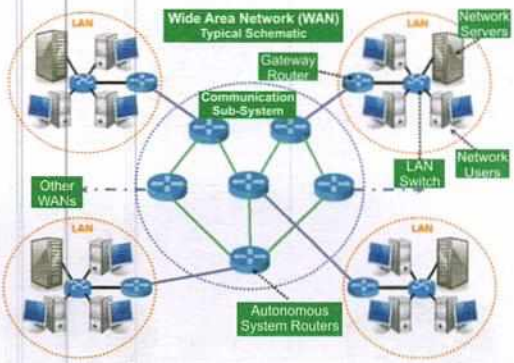


Figure 1.5: **Wide Area Network**

This kind of network connects two or more computers located at distant places. They are linked by communication facilities, like telecommunication or satellite signals. The most common example of WAN type network is telecom system. The usage of WAN is limited to very large organisations and government agencies. The main characteristic of WAN is that it requires a public telecommunication media to transfer data. The best examples of WAN are:

Example

- Internet and intranet in a large multinational company
- ATM facility
- National and multinational bank customer services

Know the Fact

Wireless is a means of communication that uses low powered radio waves to transmit data between devices.

Let's Know More

Wireless networking allows the networks to be deployed without cabling. Spaces, such as outdoor areas where cables cannot be laid; can have wireless networks.

Let's Know More

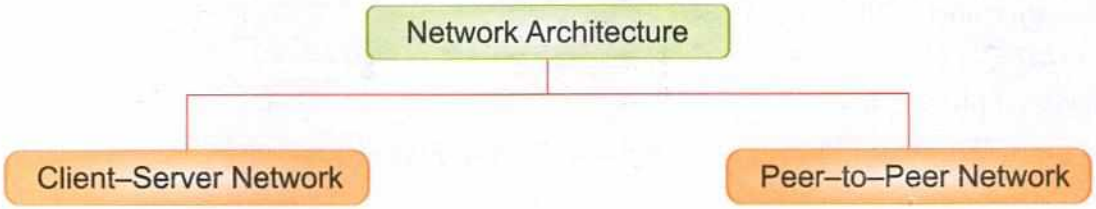
Wi-Fi stands for Wireless Fidelity. It represents Wireless Local Area Network. It was developed for mobile computer devices, like laptops, but is now used in PCs, video game consoles, smartphones, tablets to exchange data wirelessly over the computer networks. This technology, enables the radio signals to go further (300 feet approximately) with a faster rate of transmission.

Know the Fact

Wireless Access Point (WAP) is a device that connects wireless communication devices to form a wireless network.

NETWORKING ARCHITECTURE

Network architecture is an overall design of a computer network that describes how a computer network is configured and what strategies are being used in it. Network Architecture are mainly of following two types:



CLIENT–SERVER NETWORK

It is a network, where several computers called **clients** or **workstations** are connected to the main computer called the **server**.

A **server** is a computer that provides services to clients and controls access to hardware, software, and other resources. **Clients** are the computers that request services, like data retrieval, storage, etc., from the server.

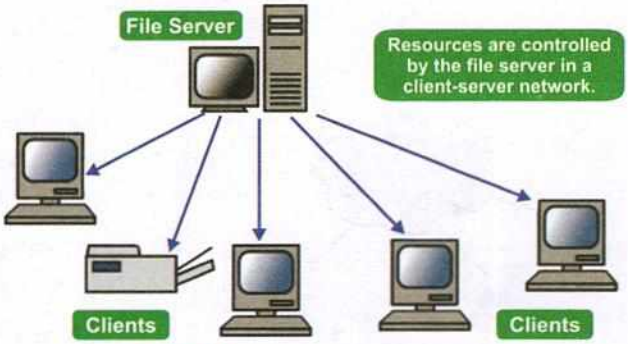


Figure 1.6: **Client-Server Architecture**

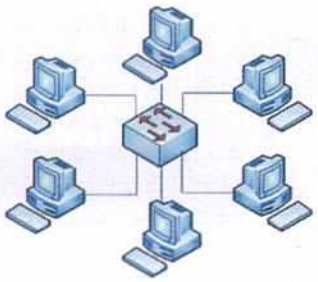


Figure 1.7: **Peer-to-Peer Network**

PEER-TO-PEER NETWORK

Peer-to-Peer is a network where a few computers having equal capacity and capabilities are connected together to use the resources available on the network. In peer-to-peer network, there is no central server, instead each computer can act as a server as well as a client.

NETWORK TOPOLOGIES

Network topology refers to the layout in which various components of a network, like nodes, links, peripherals, etc. are connected and communicate with each other. Topology can either be physical or logical. Physical topology is the physical layout of nodes, workstations, and cables in the network, whereas logical topology is the way how information flows between different components.

Network topologies are categorised into the following basic types:

POINT-TO-POINT

Point-to-point topology is the simplest form of network structure in which two nodes are directly connected with each other. This type of network is more suitable for small areas where computers are in close proximity. This technology provides a faster and reliable connection.

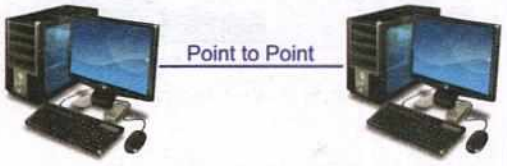


Figure 1.8: **Point to Point Topology**

BUS TOPOLOGY

This topology uses a single communication line or one main cable to which all nodes are directly connected. The main

cable acts as a backbone for the network. It transmits data only in one direction. In this type of structure one of the computers in the network acts as the computer server, that provides data to all the clients. This topology is used in small networks where cable requirement is relatively small. One of the disadvantages of such type of network is that if the main cable fails, the entire network becomes unusable. For this reason, this type of topology is not used for large networks, such as those covering an entire building.

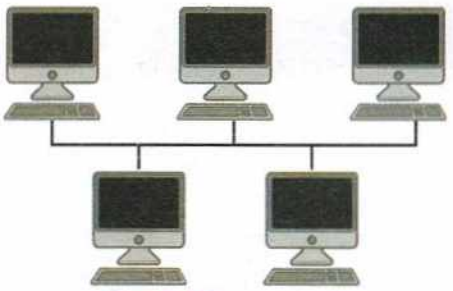


Figure 1.9: **Bus Topology**

STAR TOPOLOGY

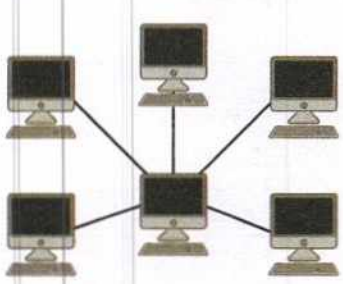


Figure 1.10: **Star Topology**

In star topology, each device is connected to a central computer using a point-to-point connection. The central server acts as a **Hub**. Devices communicate across the network by passing data through this hub. Star topology is very popular because the startup cost is low. It is easy to add a new device to the network as only one cable is required and configuration is simple. Moreover, the network is robust; if any one connection in the network fails, the other connections remain intact. But if the central hub fails, the entire network goes down.

RING TOPOLOGY

In ring topology, all the nodes in the network are connected in a circular manner. Each node connects to exactly two other nodes, forming a single-continuous pathway for signals, when one node sends message to the other node, which is not adjacent to it, data travels through all the intermediate nodes until it reaches its final destination. Ring topologies are used in both LAN and WAN setups. The main disadvantage of this topology is that if one workstation goes down, the entire network gets affected. Since data being transferred over the network has to pass through each workstation, this makes it slower than star topology.

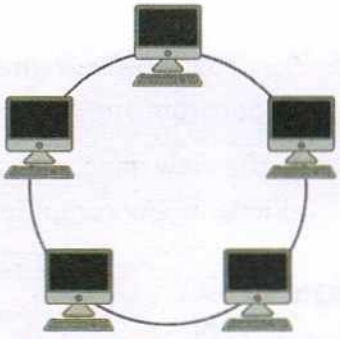


Figure 1.11: **Ring Topology**

TREE TOPOLOGY

Tree topology is one of the most common network setups that consists of a group of star-figured workstations connected to a linear bus backbone cable. In tree topology, one star network is connected to the other star networks. In a tree network, a cable failure in one of the star networks will isolate only the workstation that is linked to the central computer of that star network, whereas, all the other workstations will continue to function normally. If a central computer goes down, the entire workstations connected to it will suffer either degraded performance or complete failure, but the rest of the network will continue to function normally. In case the bus gets damaged, it causes disruption in the entire network. In the tree topology, the expansion of network is possible and easy but maintance becomes difficult.

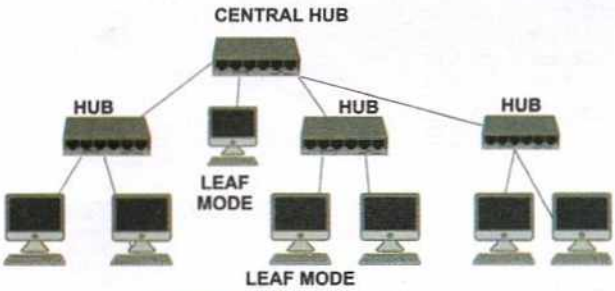


Figure 1.12: **Tree Topology**

MESH TOPOLOGY

In mesh network topology, each node is connected to every other node in the network. In this topology, every node not only sends its own signals but also relays data from the other nodes. This type of topology can handle a large volume of traffic. It is commonly used in wireless networks. In case, if one of the component fails, there is always an alternative present so that the data transfer does not get affected. Even expansion and modifications can be done in this topology without affecting other nodes. The overall cost of this network is extremely high as compared to the other network topologies.

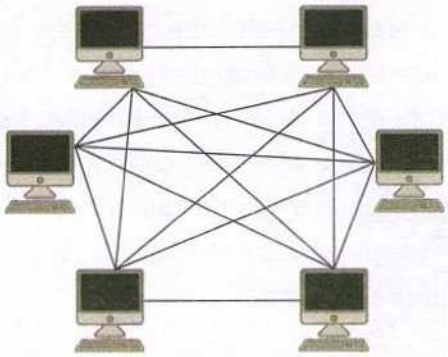


Figure 1.13: Mesh Topology

ACCESSING A FILE FROM A SHARED DRIVE

To access a file from a shared drive, follow the given steps:

- Double-click on the **Network** icon on the Desktop.
- The **Network** window will appear, in which a list of shared drives are displayed in the **Details** pane.
- Select the required shared drive to see its contents.
- Find the required file in the drive.
- If you want to open the file, double-click on it.
- To copy the file, right-click on it and select the **Copy** option from the Shortcut menu.
- In the **View** pane, select **This PC** icon to view the storage drives on your computer.

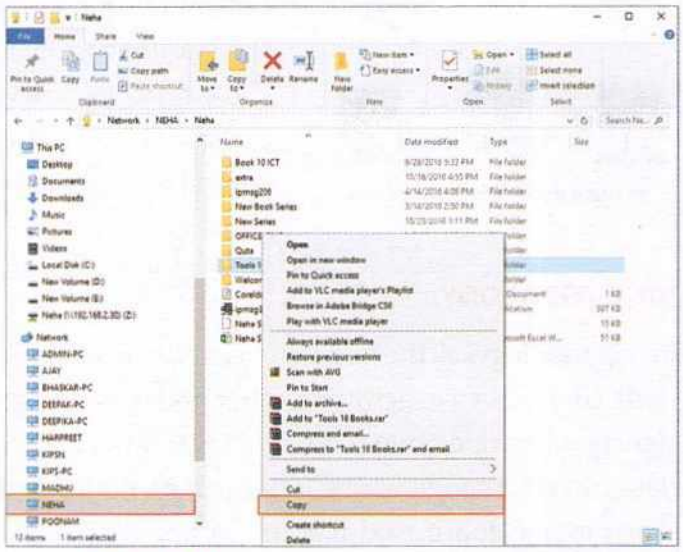


Figure 1.14: Finding a File in a Shared Drive

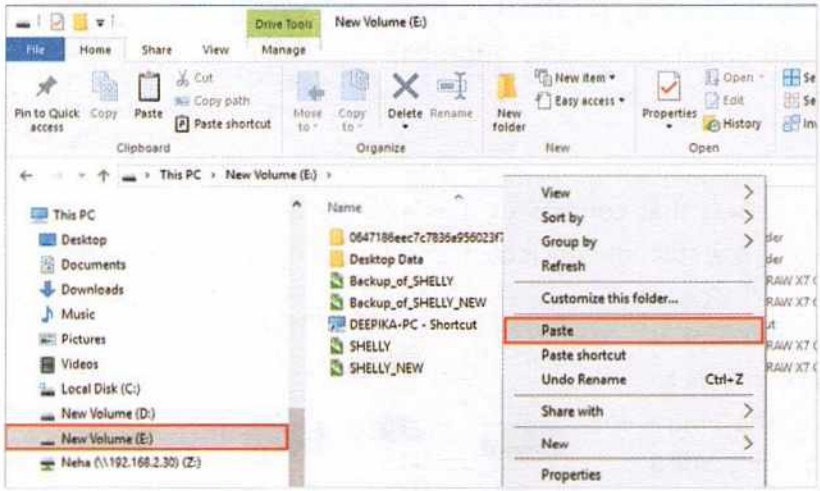


Figure 1.15: Pasting a File into the Selected Drive

- Now, click on the drive where you want to place the copied file.
- Right-click anywhere on the **Details** pane and select the **Paste** option.
- The file will be copied to the selected drive on your computer.

NETWORK SECURITY

Network Security means protecting data and resources from any unauthorised access. It is the most important aspect in computer networking. Since many users are accessing the same data, so you must ensure its proper

security. Only authorised persons can access or modify data. Consider the following points that may happen in any organisation:

- Some employees may try to change the data concerning their leave records, salaries, performance appraisals, etc.
- Accidental deletion of important data
- Former employees or some other people may try to harm the company's data
- People outside the company may try to access confidential data

Figure 1.16: Network Security

There are two general levels of network security. These are:

Login Security: You are given a unique login name and password.

Rights Security: Based upon your username, you are given rights, like Read-Only Access or Read-Write Access or No Access at all. A combination of rights can also be granted to the same user for different sets of data.

RECAP

- A computer network can be defined as a group of computers and other peripheral devices that are linked together for the purpose of sharing data and hardware resources.
- Networking in computers brings efficiency, economy, and effectiveness in an organisation.
- A modem enables you to connect your computer to the available internet connection over the existing telephone lines.
- PAN, LAN, MAN, and WAN are the various types of computer networks.
- Network architecture is an overall design of a computer network that describes how a computer network is configured and what strategies are being used.
- A server is a computer that provides services to clients and controls access to hardware, software, and other resources whereas, clients are the computers, which request services, like data retrieval, storage, etc., from the server.
- Network topology refers to the layout in which various components of a network like nodes, links, peripherals, etc., are connected and communicate with each other.
- Network security means protecting data and resources from any unauthorised access.

BRAIN DEVELOPER

SECTION - A

A. Fill in the blanks.

1. ..... is a computer network created for an individual person.
2. ..... system allows us to talk to any person in the world at any time.
3. A computer network enables two or more computers to share ..... and hardware .....
4. In a network, modification or upgradation of the software or data is done at a ..... only.
5. The computers that communicate with each other are called .....
6. A network maintained without using wires is called .....
7. ..... and ..... are the different types of networking.
8. Network ..... refers to the layout in which various components of a network are connected and communicate with each other.

HINTS

- LAN
- Data
- Resources
- MAN
- Wireless networking
- Communication
- Single point
- Nodes
- Topology
- PAN

B. State True or False.

1. Nodes and servers have the same function. ☐
2. Wi-Fi stands for Wireless Fidelity. ☐
3. Network cards are used to physically attach a computer with a network. ☐
4. WAN stands for Wide Area Network. ☐
5. In Client–Server network, there is no central server. ☐
6. Extranet refers to a computer network restricted to an organisation. ☐
7. In star topology, all the nodes in the network are connected in a circular manner. ☐

C. Application-based questions.

1. Mr Hemant has set up his office with 50 computers. He wants to connect computers and peripheral devices within his office building with wires. Which type of network should he use?

.....

2. Which type of network architecture is the most suitable, when a few computers, having similar power and capacity are, to be networked together?

.....

3. Arpita wants to attach her computer to a network so that it can participate in network communication. Which card should he use?

.....

4. Raman wants to send a few photographs and songs to one of his friends by interconnecting mobile phones, using short-range wireless connection. Which technology would be the most suitable for him?

.....

SECTION - B

A. Multiple-choice questions.

1. Which is the most commonly used network card?

   a. Wi-Fi b. Bluetooth c. Ethernet Network Card

2. The ..... are the certain sets of rules that determine how data should be transferred over the network.

   a. Protocols b. Network cards c. Both a and b

3. What do you call the computers that are connected to the server?

   a. Nodes b. Laptop c. PC

4. ..... security means protecting data and resources from any unauthorised access.

   a. Network b. Information c. Resource Sharing

5. ..... is a device that connects wireless communication devices to form a wireless network.

   a. WAN b. Wi-Fi c. WAP

6. Which network among the following requires a single communication line or one main cable?

   a. Bus Topology b. Star Topology c. Tree Topology

B. Answer the following questions.

1. What is networking? Give some common relevant examples.

.....

.....

.....

2. Differentiate between LAN and WAN.

.....

.....

.....

3. What do you understand by the term Network Security?

4. Explain Client–Sever network in your own words.

5. What do you understand by the term Network Topologies?

6. Differentiate between Peer-to Peer network and Client-Server network.

C. Define the following terms.

1. WAP

2. Star Topology

3. Server

4. Node

5. HUB

ACTIVITY SECTION

LAB SESSION

Perfection Through Practice

A. Create an informative presentation using PowerPoint 2016, on the topic: **Advantages of Networking**.

Apply the formatting and animation effects to make it impressive.

B. Try to access a file from a shared drive, and copy it into the selected drive on your computer.

GROUP DISCUSSION

For Concept Clarity

Divide the class into four groups and discuss the following topics:

- What is a computer network and why is it useful? Differentiate between the various types of networks.
- What sort of components are required to build a network?
- What are hubs, switches, and routers?
- How is Peer-to-Peer network different from Client–Server network?
- Differentiate between Star and Tree Topology.

PROJECT WORK

Using Creativity

Make an informative presentation on **Basic Networking Concepts**. Collect information about the various devices and components that are used for setting up the network, and about the types of networks.

ONLINE LINKS

Looking For More

To clarify the basics of networking concepts, visit the following websites:

- www.slideshare.net/makyong1/basic-concepts-of-computer-networks
- https://www.lifewire.com/computer-network-topology-817884

CHAPTER 2

LOG ON TO ACCESS

LEARNING IN THIS CHAPTER

- Concept of Database and DBMS
- Types and structure of Database
- Advantages of DBMS
- Access 2016 and its components
- Creating a Database
- Views of table, Adding a table
- Rules for naming a field
- Data Types, Setting of Data Types
- Field properties, Primary key
- Editing tables
- Sorting, Filtering, Searching of data
- Closing access, Opening an existing database

Information is an important factor to manage our routine activities, and so is its maintenance and management to plan well for the future. From a child to an old man, a professional to a homemaker, everyone needs information. However, data in its raw and unprocessed form is meaningless, but when such data is converted into information, it can be easily interpreted. Hence, it is essential to provide a structure to the available data in a computer system and organise it, which can be achieved with the help of a database.

A database is an organised collection of data. It helps us to enter, manage, access, and analyse a large amount of information, quickly and efficiently.

DATABASE AND DBMS

Unknowingly, you all use database in our daily life. You maintain your personal address diaries, wherein you record addresses and telephone numbers of your friends. You maintain the information alphabetically, so that whenever any information is needed, you could browse and extract the information quickly. From time to time, you keep on adding new addresses, and also update the contact numbers and postal addresses of your friends if there is any change. All these operations that you perform, like adding, updating, sorting, editing, deleting, etc., are the functions of a database.

Example Telephone directory, a dictionary, maintaining a list of students and their addresses, keeping their records pertaining to academic and co-curricular achievements, list of groceries in a grocery store, catalogue in a library, list of customers in a bank, maintaining employees' information in offices and organisations, etc., are the examples of different types of database.

It is very difficult to maintain a database manually when there are hundreds and thousands of records, as the chances of committing errors increase. A Database Management System (DBMS) is a computerised record keeping system that enables you to create, modify, store, and extract information from a database. It saves time and energy. The main function of a DBMS is to provide the users with efficient and reliable methods of data retrieval. Moreover, it reduces the chances of errors creeping into the database to a great extent. Therefore, data handling using DBMS becomes fast and efficient.

TYPES OF DATABASE

There are mainly two types of database:

FLAT FILE DATABASE : A **flat file database** refers to the data files that contain records, which have a small, fixed number of fields, without any structured relationship. For example, Microsoft Excel.

RELATIONAL DATABASE : A **relational database** stores the data in several tables and link those tables together to get a common piece of information. For example, Microsoft Access, Microsoft SQL, Oracle.

Quick Quiz

Give any real life example of database, apart from the one given in the chapter.

ELEMENTS OF DATABASE

A database contains a specific structure to store data. Let us study some basic terminologies used in a database that will help you in getting acquainted with the functioning of a DBMS.

1. **TABLES :** Tables are the building blocks of a database. They store the complete data in a structured manner, i.e., in the form of rows and columns. Every table has a finite number of columns and rows.

Elements of a Table

Fields: All the columns in a table are called fields. A field describes a particular attribute of all the records in a table. For example, the field that mentions the Roll No. of the table: 'Students', will store the roll numbers of all the students.

Records: The rows in a table are called records. A record contains the values for all the fields that belong to a single person or an entity. For example, when you enter data of all the fields, such as Roll No, F_Name, and Marks for a given student, it creates a new row in a table, which is called a record.

Data: A set of characters that represents a valid value is known as Data. For example: 3, Dipti, 90, 88 and 70 are the data values for the specific fields of the following table: 'Students'.

Let's Know More

Microsoft's SQL Server is an example of DBMS that serves database requests from multiple users.

Table: Students

Fields

Roll No	F_Name	English	Maths	Hindi
1	Sandeep	89	79	60
2	Nitin	65	80	77
3	Dipti	90	88	70

Records

Data

Figure 2.1: Elements of a Table

2. **QUERIES :** A database stores a vast amount of data, but queries help us to retrieve the filtered data based upon some conditions. Queries are also used to perform actions, such as delete, update, etc., on the data, based upon some criteria (conditions).
3. **FORMS :** Forms are the user friendly interfaces that facilitate the process of entering data in tables and queries. A form has an attractive interface that accepts data from the user and forwards it to the corresponding table or query.
4. **REPORTS :** Reports are used to display the selected data in a printable format. They

Quick Quiz

What is the difference between a file and a database?

collect the summarised data from one or more tables/queries and organise it in a printable form.

ADVANTAGES OF DBMS

Some of the key advantages of DBMS are as follows:

- A DBMS provides the users with efficient and reliable methods of data retrieval.
- It facilitates the reduction of data redundancy (duplication of data) and elimination of multiple copies of the same data at different locations.
- It increases the efficiency, speed, and flexibility in searching and accessing information, thus saving time and energy.
- DBMS facilitates sharing of data among different users based on their individual needs.
- In a DBMS, the data administration has a complete control over the database. It ensures that data is accessed only by the authorised users.
- A DBMS also supports the data integrity as it ensures that the stored data follows the customised standards of an organisation. Suppose, the maximum marks of an examination are set to 100, you can have rules to make sure that the database accepts the numbers only between the range of 0–100.

MICROSOFT ACCESS

Microsoft Access is the most popular and powerful Relational Database Management System (**RDBMS**) that serves as an integral part of the Microsoft Office suite application. It has a graphical user interface. It is used to organise and manipulate a large volume of data efficiently. It organises data in the form of tables. It provides the facility to create a relationship between these tables by using the common fields. A relational database, enables to prevent the duplication of data. Another important feature of Access is that you can add, update, delete, and view the data by using forms, find and retrieve the data in a desired way by using queries, and print the data in a specific layout by using reports. Some other popular RDBMS are Sybase, Oracle, and Structured Query Language (MySQL).

Let us understand the concept of relationship with the help of an example :

Example

To maintain the students' database in RDBMS; instead of entering all the records in a single table, you will split the fields into two tables having a common column, such as Roll No.

1. STUDENTS INFORMATION TABLE

The 'Students Information' table consists of information about students as displayed in the below given table. To enter the details of students' percentages and grades, you do not have to include all the fields in a separate table, which have already been included in the 'Students Information' table. You will take only a common field in the second table. By making a link on this common field, you can retrieve the desired set of records from both the tables.

Roll_No	F_Name	Father's_Name	Address	Tel_No	Date_of_Birth
101	Kabir	Mr. R. Nanda	675/4, Pkl	2577899	21-01-1991
102	Manas	Mr. J.R. Nanda	212/2, Pkl	2645624	16-09-1984
103	Ridhima	Mr. D.B. Bhatia	C-46/58, Noida	2570066	24-10-1992

2. MARKS TABLE

Notice that the values of the **Roll_No** field in the **Marks** table are the same as the values in the **Students Information** table. You can define a relationship between both the tables using a common field, i.e., Roll_No. Thus, by splitting information in separate tables, RDBMS reduces the duplication of data.

Roll_No	Percentage	Grade
101	89%	A
102	59%	B
103	70%	B

COMPONENTS OF MICROSOFT ACCESS 2016

Before learning about the various functions of Microsoft Access, let us get familiar with the various components of Microsoft Access window:

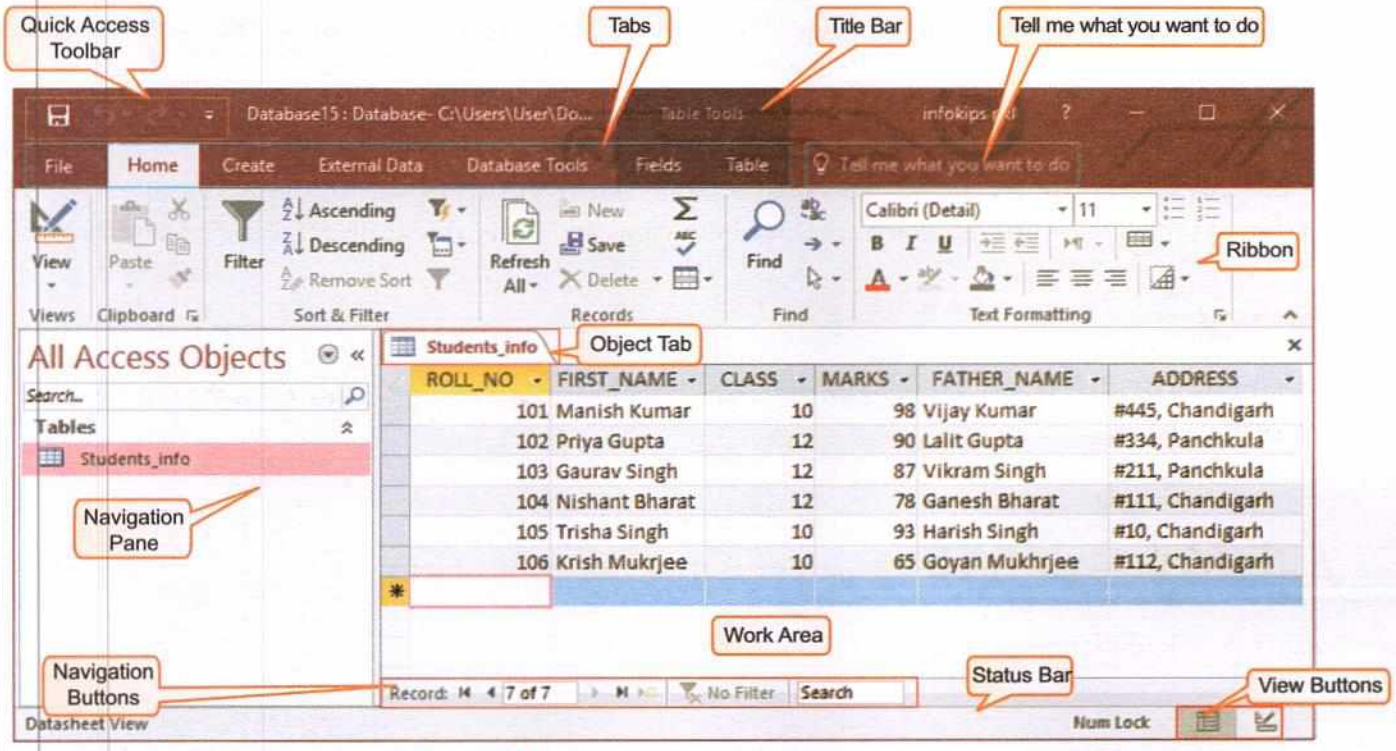


Figure 2.2: Components of Microsoft Access 2016

TITLE BAR

It is located at the top of the window and displays the name of the current database.

QUICK ACCESS TOOLBAR

This toolbar is present at the top–left corner of the Access window. It contains the most frequently used command buttons. By default, it has three buttons, which are Save, Undo, and Redo.

RIBBON

It contains various tabs, each with several groups of relevant commands. Some tabs appear when you work with certain objects like Forms. Such tabs are called **Contextual tabs**.

TELL ME WHAT YOU WANT TO DO

It is a new feature, which can be used to get quick help on topics that you are looking for or the commands that you want to use in your document.

NAVIGATION PANE

This pane is present on the left side of the Access window. It displays the name of the objects used in the database, such as Table, Queries, Forms, Reports, etc.

NAVIGATION BUTTONS

As the name suggests, it helps in navigating through the records. The Navigation buttons display the current record number in an object.

OBJECT TABS

The objects that you have opened in a database appear right above the work area in a tabbed form. Clicking on any tab displays the contents in the Work area. To close the current tab, click on the cross button ☒ on the right end of the bar.

STATUS BAR

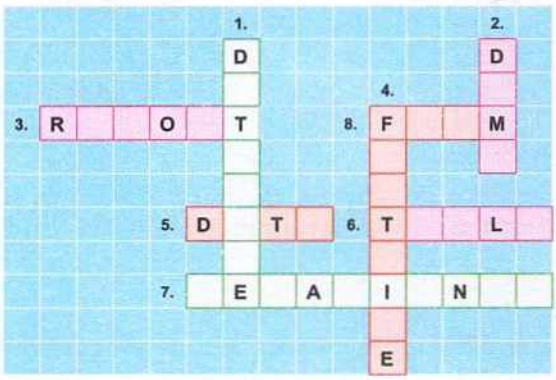
This bar is located at the bottom of the window. On its extreme left, it displays the name of the current view, and on its right, it displays four view buttons, which are Datasheet View, and Design View, PivotTable View and PivotChart View.

Access 2013

In Access 2013, no background colour is given on the top menu as in Access 2016. This colour helps the top menu stand out more clearly.

For Better Concept Clarity

A. Assess your knowledge on database with the hints given below:



DOWN

1. An organised collection of data. .....
2. A computerised record keeping system that provides the users with efficient and reliable methods of data retrieval. .....
4. A type of database having fields without any structured relationship. .....

ACROSS

3. A database object that displays the selected data in a printable format .....
5. A set of characters that represents a valid value .....
6. The building block of a database that displays data in the form of rows and columns .....
7. A type of database that prevents the duplication of data .....
8. A database object that provides user friendly interface to facilitate the data entry process .....

B. Consider the given table and answer the questions.

Teacher_Id	Name	Salary	Dept
1	Komal	15000	Physics
2	Priya	17000	Physics
3	Sanjay	18000	History
4	Vikram	14000	Biology
5	Vineet	18000	Maths
6	Monika	16000	Commerce

- What is the total number of records in the table?
- How many number of fields are there in the table?
- Name the teachers who work in the same department.
- How many teachers are earning more than 15,000?
- What is the Id of the teacher who works in the Maths department?

Let's Discuss

Field vs **Record**

Quick Quiz

What are the different database objects in Microsoft Access?

CREATING A DATABASE

In Microsoft Access there are two ways to create a database, either by using a template or creating a blank database. An Access template helps in creating a complete database application that is ready to use. It contains four main objects like Tables, Queries, Forms, and Reports, etc. that you need to perform a specific task.

Let's Know More

The overall design structure of the database is called the Database Schema, which describes the records and relationship among them.

CREATING A DATABASE USING TEMPLATES

One of the easiest way to create a table is to use a template. Follow the given steps to create a database using the template:

- Open Access 2016.
- You will find some listed templates on the right side of the window.
- Select the template from the displayed list. Here we have selected the **Updated: Students** template.
- You can get more templates by clicking on any category from the **Suggested searches** or use the search bar to look for the **Online templates**.
- The **Updated : Students** task pane appears on the screen.

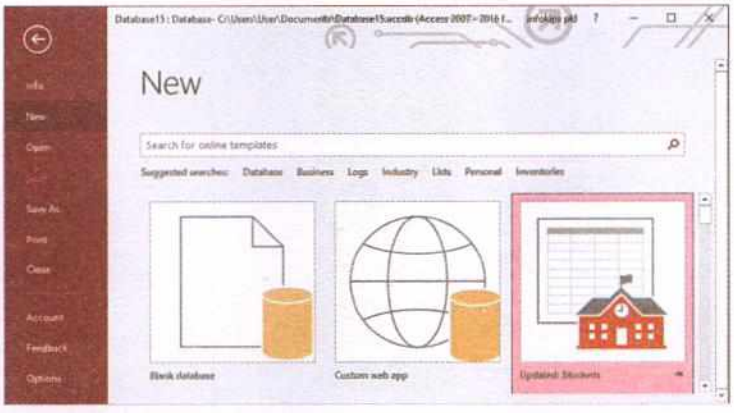


Figure 2.3: Selecting Updated: Students Template

Let's Discuss

Advantages of **RDBMS**

- Specify the file name in the **File Name** text box. You can either use the default location that Access displays below the File Name box or click on the folder icon to select another location.

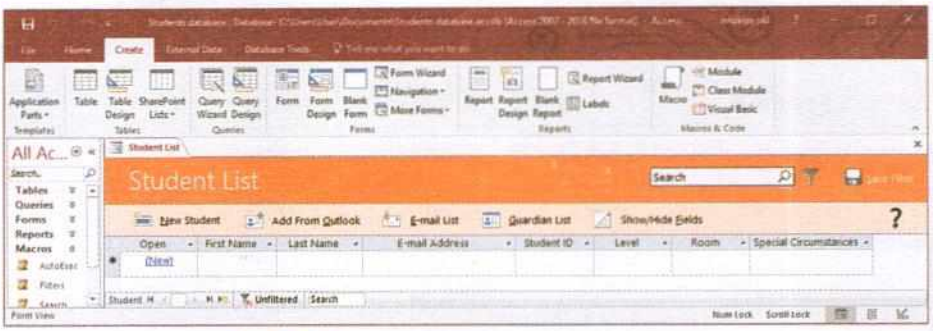


Figure 2.4: Displaying Table in Form View

- Click on the **Create** button. Access creates the database and displays the table in the **Form View**. It contains the fields which are relevant to the **Students database.**
- Click on the **Layout View** button on the right side of the **Status** bar. A new contextual tab - **Form Layout Tools** will appear on the **Title bar**.
- Select the **Add Existing Fields** button in the **Tools** group under the **Design** tab. The **Field List** task pane appears on the right side.
- Select the fields from the list that you want to include in the **Student List database.**
- Drag the selected field to the table and drop it where you want to position it, when the insertion point appears.

NOTE

Access suggests a file name in the **File Name** box, and also allows you to change it as per your requirement.

CREATING A BLANK DATABASE

You can also create a database from scratch. Follow the given steps to create a blank database:

- Click on the **Blank database** option.
- The **Blank database** window opens up that prompts you to specify the file name in the **File Name** text box. By default, a system generated database name appears in the **File Name** text box in the format [Database <n>] where n is a number that changes sequentially as the databases are created.
- If required, you can change the default location by clicking on the folder icon placed next to the **File Name** text box.
- Click on the **Create** button. A new database will be created along with an empty table named **Table1** displayed on the **Title bar**.
- The fields tab is selected by default. A new tab, i.e., **Table Tools** will be now visible on the **Title bar**.

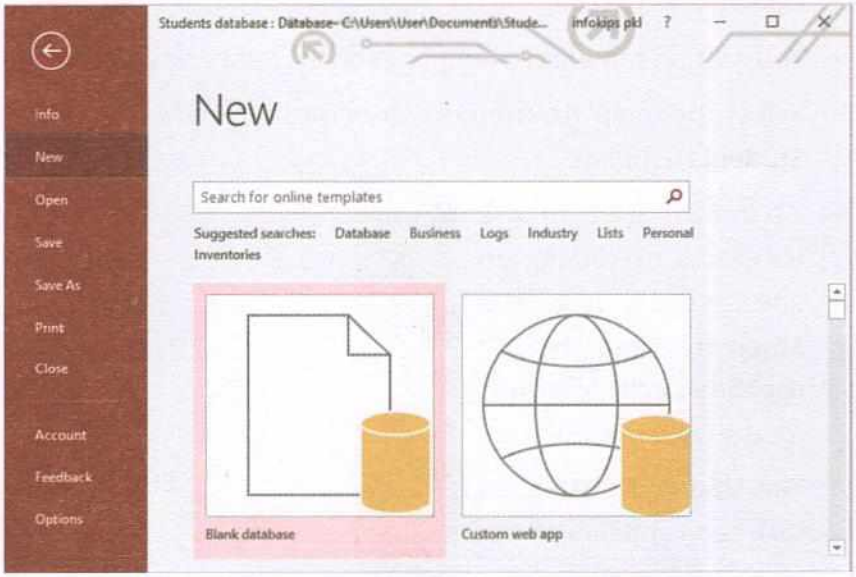


Figure 2.5: Selecting Blank Database Option

NOTE

When you open a new or existing database in MS Access 2016, the objects in your database - tables, forms, queries, reports etc., appear in the **Navigation Pane.** To view the objects, click on the drop-down arrow of **All Access Objects** in the **Navigation Pane.**

Let's Know More

The standard file name extension for database in Microsoft Office Access 2016 is the same as it is for MS Access 2013 and that is .accdb

VIEWS OF A TABLE

You can work on a table in two views: Design view and Datasheet view.

DESIGN VIEW

In Design View of the table, you can enter the field names, their data types and description. The Design View is divided into two parts:

Field Grid Pane

In this pane, you can define the field names, their data types, and description.

Field Properties Pane

This section is used to set properties for the fields defined in the table.

Quick Quiz

To save the database, press **Ctrl+S** key combination or choose the **Save** option from the **File** tab.

DATASHEET VIEW

Datasheet View is used to enter data in a table. This view displays the table as a grid. The fields are displayed as columns and the records are displayed as rows. The fields names are listed as the column header. When you double click on the table name in the Navigation Pane, it opens the table in the **Datasheet View.**

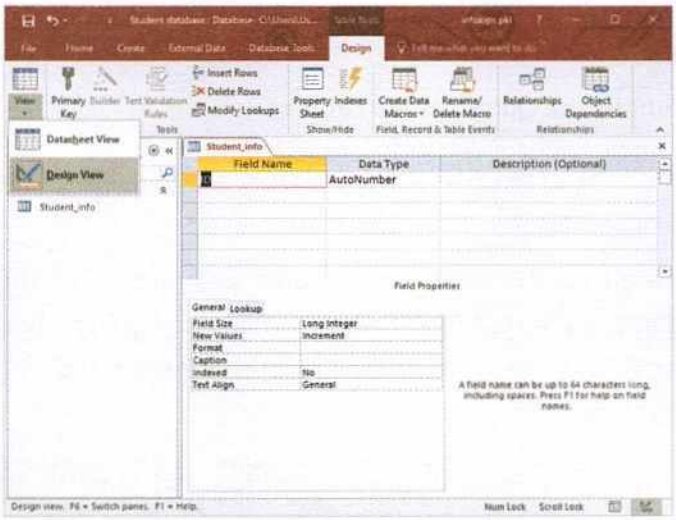


Figure 2.6: Displaying Table in Design View

SWITCHING BETWEEN VIEWS

Microsoft Access allows you to switch from one view to another by following either of the two options:

- Click on the **View** button present in the **Views** group either on the **Home** tab or **Fields** tab in the Views group and select the desired view. Or

  Click on the **Design View** or **Datasheet View** buttons at the right corner of the **Status** bar.

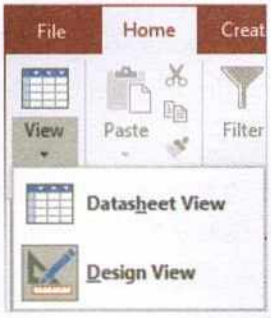


Figure 2.7: Views of a Table

Quick View

To quit Microsoft Access, press **Alt+F4** key combination.

ADDING A TABLE

Regardless of how you have created your database, you can add new tables to an existing database in various ways. These are:

- Adding tables in the Design view

Let's Know More

The **Datasheet View** allows you to enter data in a table. It looks like an Excel spreadsheet.

- Adding tables in the Datasheet view
- Adding tables using the Table Templates

ADDING TABLE IN DESIGN VIEW

Click on the **Table Design** button on the **Create** tab in the **Tables** group. A table will be created and opened in the **Design View**.

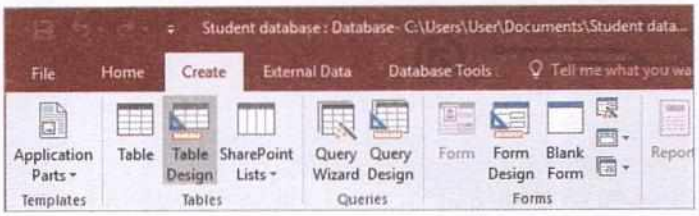


Figure 2.8: **Adding Table in Design View**

Adding Fields in Design View

- For each field in the table, type a name in the **Field Name** column and then press the Tab key to move to the **Data Type** column. By default, the **Short Text** data type appears in this column.
- In the **Description column** you can type a description for each field, which is optional. The description text is displayed on the Status bar when the cursor points to that field in the Datasheet view.
- After defining all fields, save the table by clicking on the **Save** option in the **File** tab. Or

  Select the **Save** present on the **Quick Access Toolbar**.
- Now to add data in the table, switch to the Datasheet view.

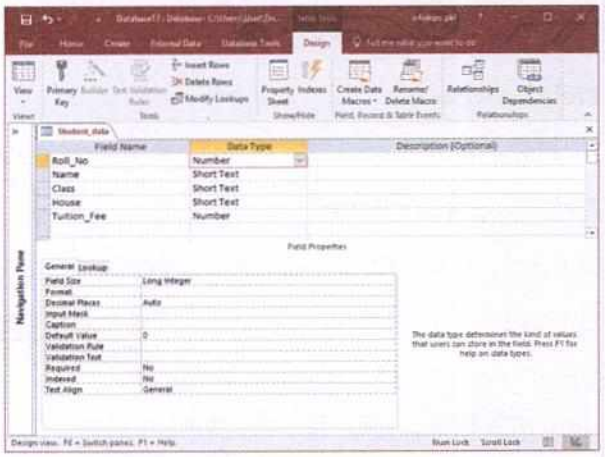


Figure 2.9: **Adding Fields in Design View**

ADDING TABLE IN DATASHEET VIEW

When you create a blank database, Access creates a table automatically. You can either customise this table or create another table by using the **Create** tab. To create a table in the Datasheet view, click on the **Create** tab and select the **Table** button in the **Tables** group. A new blank table will be created and opened in the **Datasheet View**.

Adding Fields in Datasheet View

- Access automatically creates the first field called **ID**. The Data type of this field is Autonumber, which means Access will automatically generate a sequential number in this field for each new record.

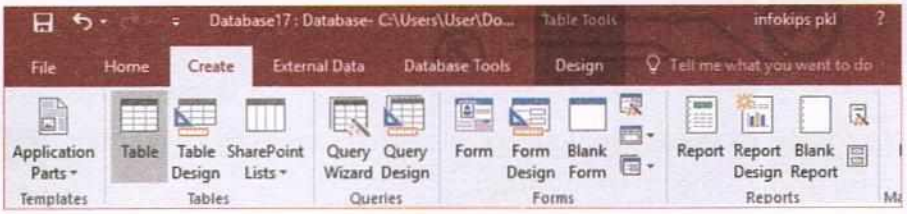


Figure 2.10: **Adding Table in Datasheet View**

- You can add a new cell to the table by entering data in the **Click to Add** column. Access will automatically assign a data type based on the data you enter.

Let us enter the first record:

- Click on the empty field below the **Click to Add** header. Enter the name of the student, e.g. Priya and then press either the Tab or the Enter Key. You will notice that Access has assigned value 1 to the **ID** field and named the second column as Field1.

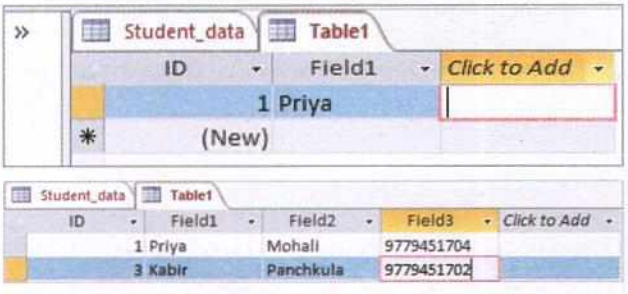


Figure 2.11: **Adding Fields in Datasheet View**

Now, the **Click to Add** label shifts to the third column. Observe that the icon in the row selector changes to a pencil, which indicates that the record has been changed but not saved. The asterisk (*) sign moves to the next row. Observe that two tabs **Fields** and **Table** appear on the ribbon under the **Table Tools** contextual tab.

- Enter the required data. Press the Tab key after each entry.
- Save the table by selecting the **Save** icon  present on the **Quick Access Toolbar**.

RULES FOR NAMING A FIELD

As you already know that a table has multiple fields and each field is unique to a table. Each field has its own name and data type. Following are some rules for naming a field:

- A field name can range from 1 to 64 characters.
- A field name can include letters, numbers, and some special characters. Generally, the underscore (_) sign is used.
- A field name cannot start with a blank space.
- A field name can be in the upper, lower, or mixed case.
- A field name cannot have a period (.), exclamation (!), brackets ([]), or the grave account.
- You can change the properties of a field name, i.e., storage size, format, and validation rule by specifying certain characteristics in the **Field Properties** pane.

DATA TYPES

Every table consists of fields and every field has its own set of properties, which describe the characteristics and behaviour of data added to that field. The most important property for a field is its data type. A field's data type determines what type of data you can enter into a field. For example, a field whose data type is 'Number' can only store numeric data and does not allow you to enter text data into it.

The following table depicts the available data types in Access 2016.

Data Types	Functions
Short Text	It is used to store text or a combination of text and numbers that does not require calculations, such as addresses and phone numbers. The fields with this data type can have a maximum of 255 characters.
Long Text	It stores text and numbers up to 65,536 characters. It is used for descriptive fields.
Number	It stores numeric information that you can use for calculations. A number data type can store integer values as well as decimal values. The maximum size of a number field can be 16 bytes.
Date/Time	It stores date and time values. You can display dates and times in various formats. The maximum size used by this data type is 8 bytes. Calculations related to date/time can be done in this field type.
Currency	This data type is used to store monetary data upto 8 bytes.
AutoNumber	It generates a sequential number whenever a new record is added to a table. The value in the AutoNumber field cannot be changed. It stores data as 4-byte values typically used to create an identify column, which uniquely identifies each record in a table.

Yes/No	It is used at places where the field can have only one possible value. It can either be True/False, Yes/No, or On/Off. For example, a student can either be a male or a female.
OLE Object	This is used to embed an object created in another application, such as Microsoft Word document, Excel spreadsheet, or PowerPoint presentation into the Access table. It stores up to 2 GB of data.
Hyperlink	The Hyperlink data type can store links to web pages, websites, files on an Intranet or LAN on your computer. It stores up to 1 GB of data.
Attachment	This data type allows you to attach images, spreadsheet files, documents, charts, and other types of supported files to the records in your database, much similar to the manner you attach files to the e-mails.
Calculated	This data type is used when a user creates table fields that calculate values. The calculations can include values from fields in the same table as well as built-in Access functions. This data type is used mostly in case of queries, forms, and tables.
Lookup Wizard	A Lookup wizard helps you to create a field whose values are chosen from the values in another table, query or list of values. By default, Access sets Lookup fields to the Number data type.

SETTING DATA TYPE FOR A FIELD

You can set the data types for the table fields by working in either **Datasheet View** or **Design View**.

SETTING DATA TYPE IN DATASHEET VIEW

When you create a field by entering data in **Datasheet View**, Access 2016 automatically assigns a data type to the field based on the data you have entered in the table. To define a specific data type for a field:

- Click on the drop-down arrow of the **Click to Add** header and choose the required data type from the displayed list. Or

  Click on the required data type that you want to assign to the field from the Data type gallery present in the **Add & Delete** group on the **Fields** tab.

- You can reset or change the data type of a field as and when required by clicking on its header and selecting the required data type from the **Data Type** drop down list in the **Formatting** group.

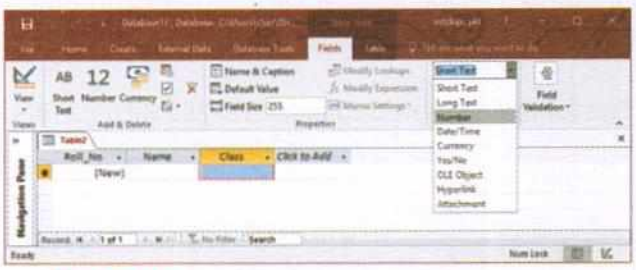


Figure 2.12: **Resetting Data Type in Datasheet View**

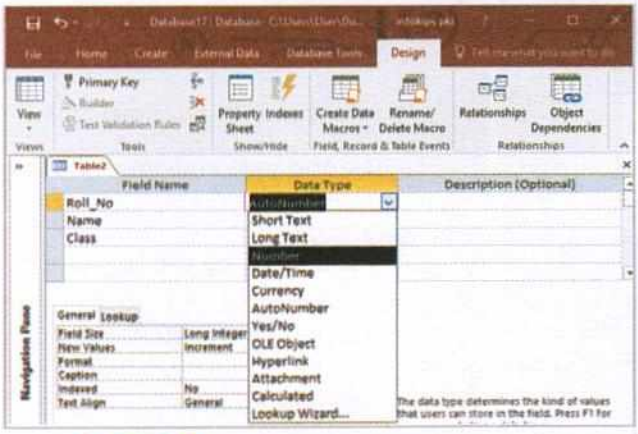


Figure 2.13: **Setting Data Type in Design View**

Tip

If you don't find the desired data type in the Data Type gallery, then click on the **More Fields** button present in the **Add & Delete** group.

SETTING DATA TYPE IN DESIGN VIEW

When you add fields to a table in the **Design View**, by default each field is assigned a **Short Text** Data type. To change or define a specific data type for a field:

Click on the drop-down arrow in the **Data Type** column of the field and select the desired data type from the displayed list.

FIELD PROPERTIES

A field property applies to a particular field in a table and defines the characteristics of that field. Each field in a table has its own set of properties that further defines the field and how it is used in the database. You can set the properties of a field in the **Design View** as well as in the **Datasheet View**.

TO SET FIELD PROPERTIES IN DESIGN VIEW

- Click on the field name for which you want to set the field properties.
- You will observe that the **General** tab is selected by default in the 'Field Properties' pane.
- Set the properties of all the fields as required.
- After finishing the task, you must save the table by clicking on the **Save** button on the **Quick Access Toolbar**. Or

  Click on the **File** tab and select the **Save** option.

Field Property	Description
Field Size	This property is used to specify the maximum size for the data stored. It is available for **Short Text, Number,** and **Autonumber** datatype.
Format	This property specifies the display layout of the field. it has different options for **Number, Date** and **Time,** and **Logical** data. You can select a predefined format or enter a custom format.
Input Mask	It specifies the pattern for the data to be entered in the field. For example, you can choose the input mask for a password field as *.
Caption	The Caption property specifies a label for a field to be displayed as the column heading whenever the table is displayed in Datasheet View. It can contain up to 2,046 characters.
Default Value	You can use the Default Value Property to specify a value that is automatically entered in a field when a new record is created. The user can either accept this value or enter a new value.
Validation Rule	With the help of this property you can limit the values that can be entered in the field. For example, if a field's validation rule is >0, then a negative value cannot be entered into that field.
Validation Text	This property lets you customise the error message that appears when you enter a value that violates the validation rule.
Required	You can use this property to specify if a value is required in a field. It accepts two values–**Yes** (to ensure that the field is not left blank during data entry), **No** (field can be left blank).

Let's Know More

You can also create a table by selecting the **Table Design** option in the **Tables** group under the **Create** tab. A new table opens in the **Design** View.

Quick Quiz

Press **CTRL + W** to save the changes and close the Table.

Let Us Recall

What is a Relational Database?

Let's Discuss

Short Text Data Type
vs
Long Text Data Type

PRIMARY KEY

Primary key is a standard feature of every database management system. A Primary key is a sort of a check on the table that every record in the table is unique. The field that is designated as the Primary key of a table neither can have duplicate data nor it can be left blank while entering the data.

Suppose, you have a Student table that contains records regarding students of a class. The students' Roll no. field can be set as a Primary key, since all the roll numbers are unique for each student. You cannot consider the students' Name field for Primary key as there is always a possibility that more than one student in a class might have the same name.

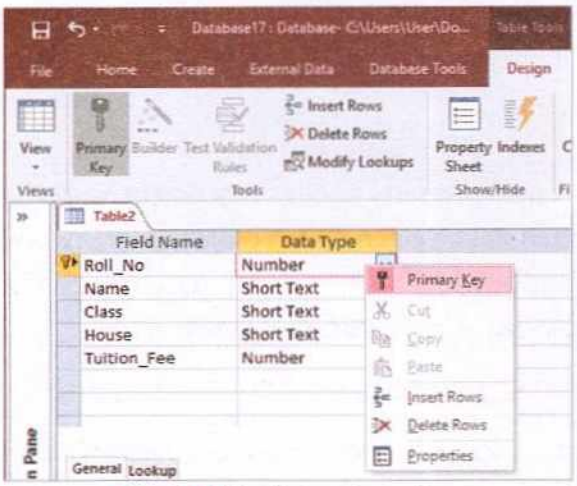


Figure 2.14: **Setting a Primary Key**

NOTE

If more than one field is combined to form a primary key, then it is called a **Composite** key.

Setting a Primary Key

To set the Primary key follow the steps given below:

- In **Design View**, click on the field that you want to set as the Primary key. The selected field will be highlighted. Click on the **Primary Key** button , present in the **Tools** group on the **Design** tab. Or

  Right-click on the field and select the **Primary Key** option from the Context menu.
- The field will be set as the **Primary key** indicated by a small key in the field selector column.

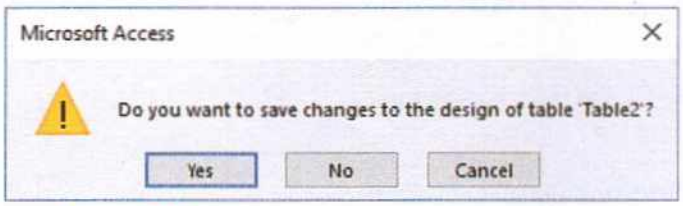


Figure 2.15: **MS Access Confirming to Save Table**

- Click on the **Close** button on the Table window.
- Access prompts a message window reminding us to save the changes.
- Click on the **Yes** button to save the changes.

The Primary key is a toggle key. To remove the Primary key check from a field, select that field and click on the **Primary Key** button.

EDITING TABLES IN ACCESS 2016

After entering data in a table, sometimes it is required to make changes in the database. This can be done in the following ways:

- To edit a record directly, scroll through the records or use the **Record Navigation** buttons to find the record to be edited.

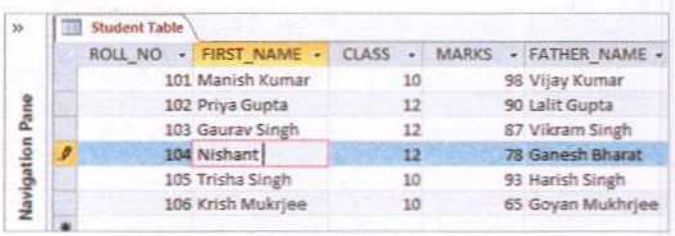


Figure 2.16: **Editing Records in a Table**

- Double-click on the cell where you want to make changes.
- Type the information into the field. A **pencil** icon appears in the extreme right in the record selector column to indicate the **Edit** mode.
- Click outside the record to apply the change.

INSERTING/DELETING FIELD IN DATASHEET VIEW

- Open a table in **Datasheet View**. Right-click on the field on the left of which you want to insert a new field. The Context menu appears.
- Select the **Insert Field** option.

Student Table

Field1	ROLL_NO	FIRST_NAME	CLASS	MARKS	FATHER_NAME	ADDRESS
	101	Manish Kumar	10	98	Vijay Kumar	#445, Chandigarh
	102	Priya Gupta	12	90	Lalit Gupta	#334, Panchkula
	103	Gaurav Singh	12	87	Vikram Singh	#21, Panchkula
	104	Nishant	12	78	Ganesh Bharat	#11, Chandigarh
	105	Trisha Singh	10	93	Harish Singh	#10, Chandigarh
	106	Krish Mukrjee	10	65	Goyan Mukhrjee	#11, Panchkula

Figure 2.17: Inserting a Field in Datasheet View

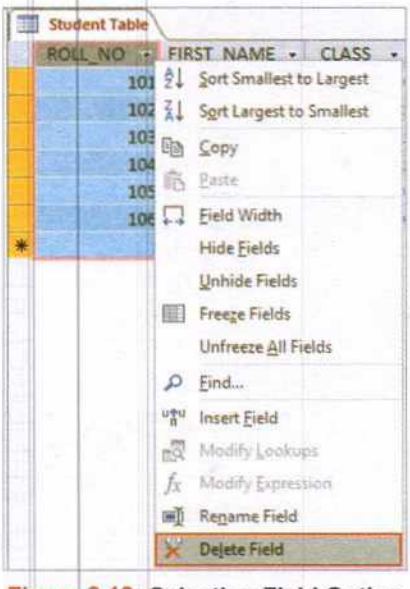


Figure 2.18: Selecting Field Option

- The new field named as **Field1** will be inserted on the left of the selected field.

Or

Select the field on the right of which you want to insert the new field.

- On the **Fields** tab in the **Add & Delete** group, choose the data type for the field.
- The new field named as **Field 1** will be inserted on the right of the selected field.

NOTE

Likewise you can delete a field in two ways:

- Right-click on the field to be deleted and select **Delete Field** option from the context menu. Or

  Select the field to be deleted and then click on the **Delete** option in the **Records** group on the **Home** tab.

MOVING A FIELD

- Click on the field header and Drag and drop the field to the desired location.
- While dragging you will a find a thick dark line appearing between the fields. This indicates the position where the field will be placed.
- As you release the mouse button, the selected field will be placed at the new location.

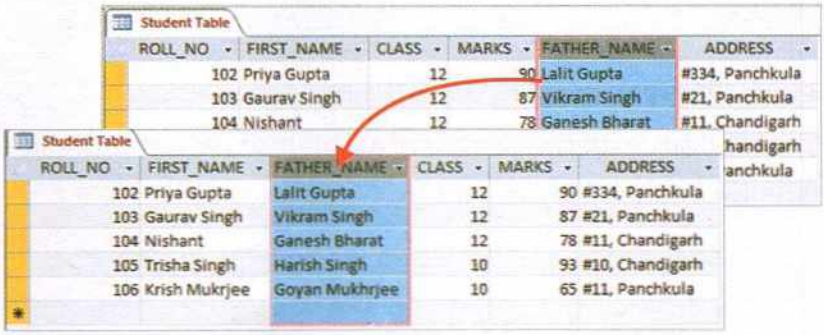
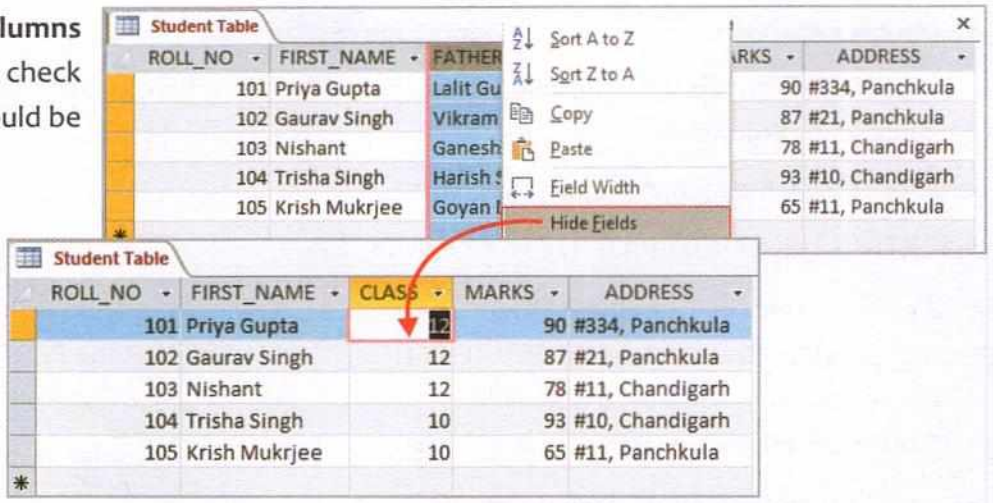


Figure 2.19: Moving a Field

HIDE/UNHIDE FIELDS

- Right-click on the column header that you want to hide and select **Hide Fields** option from the context menu.
- To unhide the fields, right-click on any column heading and select the **Unhide Fields** option from the context

menu to open the **Unhide Columns** dialog box. Select and clear the check boxes to control which fields should be visible.



NOTE

Likewise, you can Freeze or Unfreeze the columns.

Figure 2.20: Hiding the Field

SORTING DATA WITHIN A TABLE

You can sort data within a table with respect to a particular field either in an ascending or a descending order. To Sort the data, follow the steps given below:

- Select the field that you wish to sort.
- Click on the drop-down arrow next to the right of the field or right-click on the field.
- Select either the **Sort Smallest to Largest** or **Sort Largest to Smallest** option (if the field is numeric) or Select the **Sort A to Z** or **Sort Z to A** option (if the field is alphanumeric).
- Observe the change in the database.

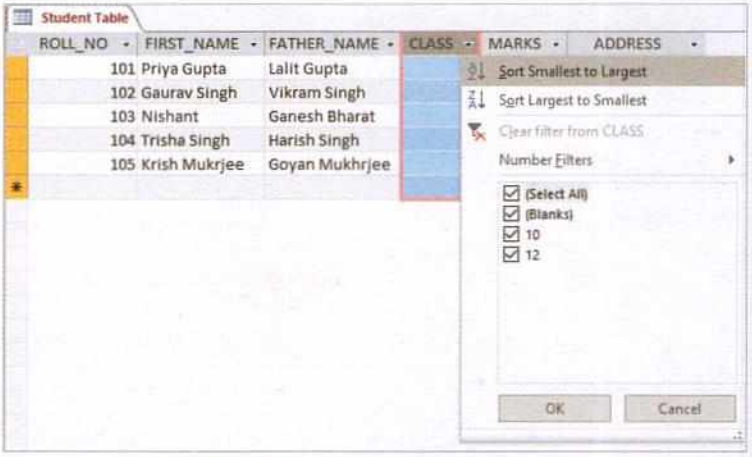


Figure 2.21: Sorting Data in a Table

Tip

- The Sort buttons–**Ascending** and **Descending** on the **Home** tab in the **Sort & Filter** group is another way to sort the data.
- To clear your sort, click on the **Remove Sort** command on the **Home** tab in the **Sort & Filter** group.

FILTERING IN A DATASHEET

You can display specific records of a table in datasheet with help of Filter option. The steps to filter data in a datasheet are as follows:

- Click on the drop-down arrow present at the right of the column header whose data you want to filter.
- By default, Access selects all the check boxes under the **Text Filters** option. Click on the **Select All** check box. All the selected check boxes will be deselected as shown in the Figure 2.23.
- Now, select the items that you want to display in your datasheet. You can select as many items as you want. Here, you are selecting

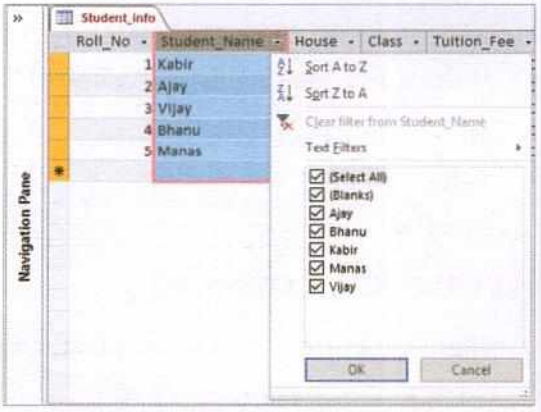


Figure 2.22: Filtering in a Datasheet

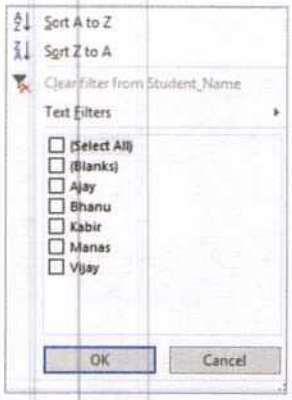


Figure 2.23: Deselected check boxes

the names of only three students.

- Click **OK**. The filter icon will appear at the right of the column header. It Indicates that the column is filtered. If you point at the Filter icon, Access shows the filter criteria.
- You can remove the filter, by clicking on the toggle **Filter** button in the **Sort & Filter** group on the **Home** tab.

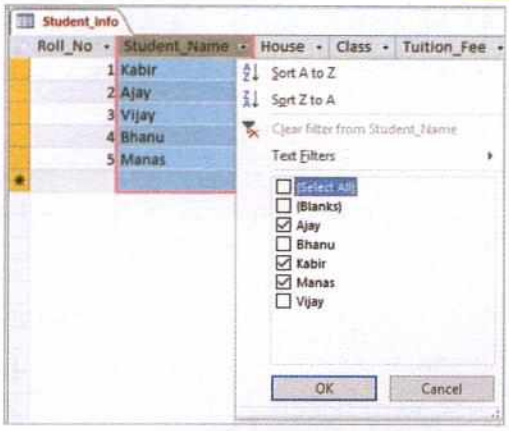


Figure 2.24: Selecting the Filter Criteria

Figure 2.25: Filtered Data

- You will observe that the datasheet is back to its original form.

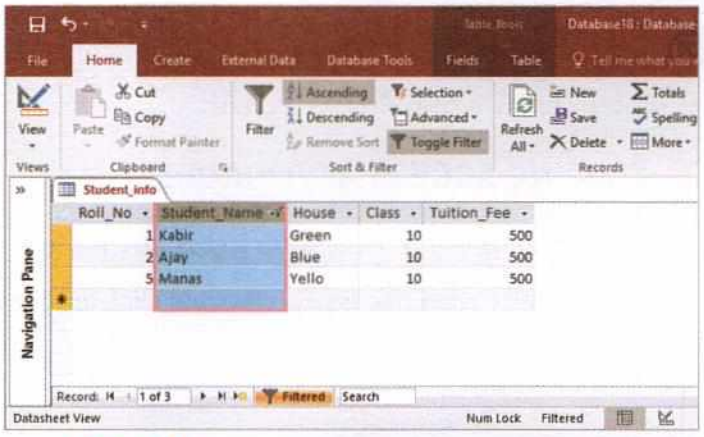


Figure 2.26: Displaying Data after Removing the Filter

ADVANCED FILTERING IN A DATASHEET

An Advanced Filter is quite similar to a multilevel sort in Microsoft Excel. An Advanced Filter can really help you to narrow down your records. This is like running a miniature query only on one table.

To apply an Advanced Filter:

- Select the **Class** column header. Click on the drop-down arrow present at the right of it.
- Select the **Number Filters** option. A cascading menu appears displaying the options as shown in Figure 2.27.

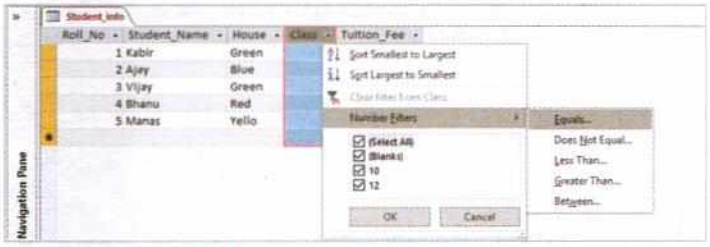


Figure 2.27: Number Filters Cascading Menu

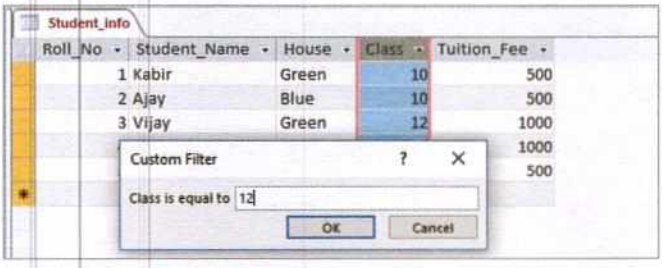


Figure 2.28: Specifying the Criteria

- This displays all the records of class 12 students.

- Select any of the options from the list. Here, you are selecting the **Equals** option.
- The **Custom Filter** dialog box appears. Type 12 in the 'Class is equal to' text box and click **OK**.

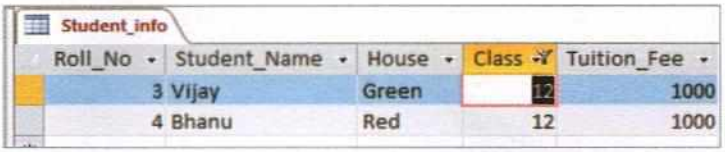


Figure 2.29: Output of Advanced Filtering

SEARCHING IN A DATABASE

There are times when you require a particular data in your datasheet. It becomes very difficult when you are not sure about its exact location. The Search box located at the bottom of the Access window makes it easy to search.

- Enter a part or whole word, phrase, date, or number in the Search box and press Enter.
- Access highlights the corresponding characters that matches your search as shown in Figure 2.30.
- To find the next matching record, press the Enter key again. Access finds all records that match that your search criteria anywhere in your datasheet.

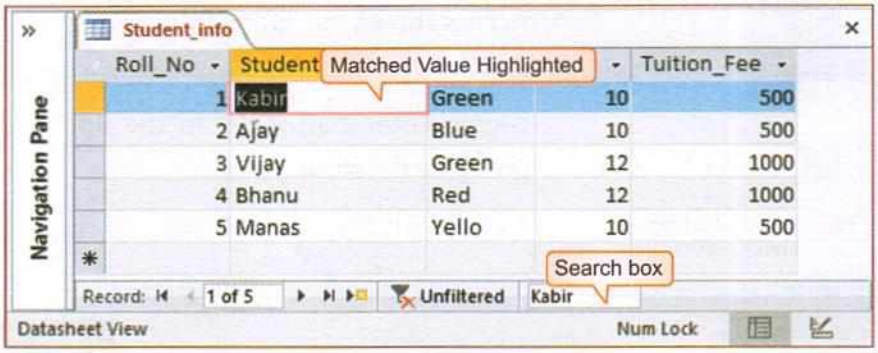


Figure 2.30: Searching in a Database

CLOSING ACCESS APPLICATION

- After finishing the work in Access, click on the **Close** option in the **File** tab to close the current database.
- To close Microsoft Access application, click on the **Close** button present at the extreme right of the Access window.

It is advisable to mention a short filename that relates to the information that you store in your database.

OPENING AN EXISTING DATABASE

- Select the **Open** option from the **File** tab.
- Select the database from the **Recent** list (if present) or click on the **Browse** folder and select the desired darabase from the **Open** dialog box. click on the Open button. The selected database will be opened.

Figure 2.31: Opening an Existing Database

RECAP

- A database is a collection of information stored in an organised way.
- Database is categorised as : Flat file database and Relational database.
- DBMS stands for Database Management System. It is an application software, which is used to create, modify, and extract data from a database. It manages and organises the records in the form of tables.
- Microsoft Access is the most popular and powerful RDBMS used to organise and manipulate data.
- Templates are pre-built database that focus on a specific task. They can be used instantly and also be downloaded.
- You can work on a table in two views: Design view and Datasheet view.
- A field's data type determines what type of data you can enter into a field.
- A field property applies to a particular field in a table and defines the characteristics of that field.
- A Primary key is a sort of a check on the table that every record in the table is unique.
- You can sort data within a table with respect to a particular field, either in an ascending or a descending order.

BRAIN DEVELOPER

SECTION - A

A. Fill in the blanks.

1. ..... is a collection of information stored in an organised way.
2. A computerised record keeping system that enables you to store, modify, and extract information from a database is known as .....
3. Microsoft Access is a ..... database.
4. ..... refers to the arrangement of data in an ascending or descending order.
5. A ..... key is a sort of check on the table that uniquely identifies each record in a table.
6. ..... data type is used for descriptive fields.
7. The ..... generates a sequential number, whenever a new record is added to a table.
8. ..... view displays the table as a grid.
9. ..... are the user friendly interfaces that facilitate the process of entering data in tables.
10. ..... collects the summarised data from one or more tables/queries and organise it in a printable form.

HINTS

- Sorting
- Primary
- Database
- DBMS
- Relational
- Report
- Datasheet
- AutoNumber
- Long Text
- Forms

B. State True or False.

1. The rows in a table are called records.
2. Currency data type is used to store monetary data.
3. An Access template helps in creating a complete database application, which is ready to use.
4. DBMS stands for Data Binding Management Software.
5. A table can have only one primary key.
6. It is not essential to specify data type for a field name.
7. OLE data type stores a link to a web page.
8. Toggle Filter button is located in the Sort and Filter group.

C. Application-based questions.

1. Supriya is given an assignment to add a new table in the existing database. Which option should she use to complete the task?

.....

2. Rohan wants to write the description for the fields of the table, which he is about to create. In which view he should work?

.....

3. Upasna is creating a table to store Students' details. Which property should she use for the fields to ensure that they are not left blank during data entry?

.....

4. Shivali has to answer some questions based on the following table structure. Help her in answering them:

Emp_name	Date_of_joining	Project_name	Emp_id	Salary	Designation
Rajesh	18/11/2015	Payroll_system	A001	20000	Project associate
Mansi	10/06/2012	MIS	A002	45000	Project lead
Shruti	30/07/2014	Employee_management	A003	35000	Project manager

(i) Identify the data type for the following fields :

Emp_id	Date_of_joining	Salary .....

(ii) List the employees as per their salaries, displaying the highest paid person at the top and the lowest paid person at the bottom. .....

(iii) Set the maximum number of characters to be entered in the field Project_name. .....

(iv) Which field can become the Primary key? .....

SECTION - B

A. Multiple-choice questions.

1. The standard file name extension for database in Access 2016 is .....

   a. .accdb b. .abbcd c. .addbc

2. There are mainly ..... types of database.

   a. Four b. Two c. Three

3. ..... is an application software that is used to create, modify, and extract data from a database.

   a. DBMS b. DBBS c. DDMS

4. Which data type has the largest storage capacity?

   a. Short Text b. Long Text c. Text

5. What is the maximum number of characters that can be used to define a field name?

   a. 62 b. 64 c. 46

6. Which icon indicates the edit mode in Access?

   a. Clip b. Pen c. Pencil

7. The area that displays the list of new or existing database objects like Tables, Forms is called .....

   a. Work area b. Navigation Pane c. Ribbon

B. Answer the following questions.

1. What is a Database? Give examples.

2. Differentiate between Flat File Database and Relational Database.

3. Define Tables. List the different elements of a Table.

4. What are Data Types? List the various data types available in Access 2016.

5. What do you understand by Sorting? How can you sort data in Access?

.....

.....

.....

6. What is the utility of Filter in a Datasheet?

.....

.....

7. Write short notes on the following:

a) Validation Text .....

.....

b) Caption Property.....

.....

ACTIVITY SECTION

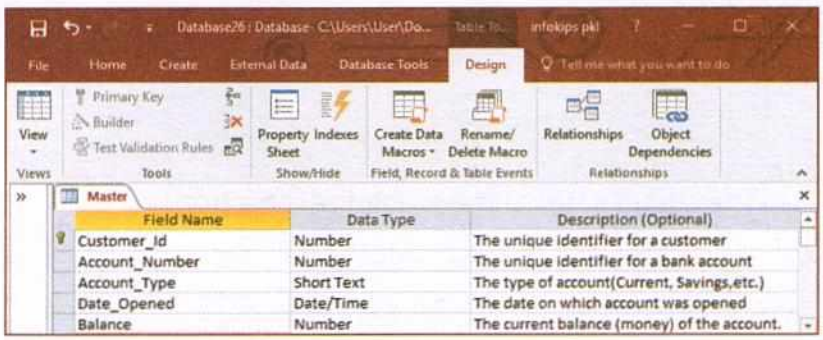
LAB SESSION

Perfection Through Practice

Create a table having the following fields using Blank database and name it as Bank Account.

Field Name	Description
Customer_ID	The unique identifier for a customer
Account_Number	The unique identifier for a customer
Account_Type	The type of account (Current, Savings, etc.)
Date_Opened	The date on which the account was opened
Balance	The current balance (money) of the account

The table structure is given below:



- Define a Primary key for the Accounts table.
- Set the Default value 1000 for the field Balance.
- Set the Field Size to 15 for the Account_Type Field.
- Enter 10 records in each field.
- Insert 1 more field Customer_Name after Customer_ID and enter data in it.
- Sort the table in the ascending order of Customer_Name.
- Filter the records and display only those where Balance > 15,000.
- Search for the record of a particular Customer_ID.
- Delete the last two records from the table.
- Save the table and close MS Access application.

GROUP DISCUSSION

For Concept Clarity

Conduct a group discussion on the topic:

- **Flat File Database** vs **Relational Database**
- **Data Types**

PROJECT WORK

Using Creativity

Create a database of your Teachers by defining the fields: ID, First Name, Last Name, Date of Birth, Department, Email, Address, City and ZIP/Postal Code. Enter 15 records in it.

ONLINE LINKS

Looking For More

To know more about Microsoft Access 2016, visit the site:

- http://www.gcflearnfree.org/access2016

CHAPTER 3

WORKING WITH QUERIES, FORMS, AND REPORTS

LEARNING IN THIS CHAPTER

- Query
- Setting a relationship between tables
- Creating a query
- Specifying simple and multiple criteria
- Creating a query in Query Wizard
- Forms
- Formatting a form
- Reports
- Exporting a report

The database of any organisation may contain a huge amount of data. Moreover, it may consist of multiple tables. When the number of records in a table increases, it becomes an uphill task for any user to extract specific records from that table. Microsoft Access provides us a solution for this problem through queries. A **Query** is a database object that allows you to to retrieve information from one or more database tables that meet a specific condition or criteria specified by you. The information retrieved on the basis of a specified criteria in the query is stored in a separate table, called the **Query table**.

QUERY

A query is a simple question that you ask to find a specific information from the database. Similarly in Access, when you build a query, you are defining specific search conditions. You can use queries to view, change, summarise, and analyse the specific data in different ways.

In our daily life, you make several types of queries to get specific information. For example, which students are scoring above 85% marks? Which students live in Sector - 4, Chandigarh? And so on... You can make quick decisions depending on that criteria. Let us understand the concept of queries with the help of the given example.

Example

In the **Students** table, you have records of **Class VIII** as well as **Class IX** students. Suppose, you want to extract the records of student(s) of **Class VIII** and **Class IX** who reside in Panchkula and Chandigarh, you can find this with the help of Queries.

Queries are made on tables and the results are displayed in the form of a table, i.e., in a group of rows and columns with the set of records that match the given condition.

Microsoft Access provides various types of queries: Select, Parameter, Crosstab, Action, and Structured Query Language (SQL) query.

Navigation Pane

Students

Roll_No	F_Name	Class	Address	City
101	Nisha	8	#81, Sector 3	Panchkula
102	Vivek	8	#89, Sector 2	Panchkula
103	Naman	8	#67, Sector 21	Panchkula
207	Gitika	9	#9, Sector 23	Chandigarh
208	Preet	9	#89, Sector 21	Chandigarh

Record: 6 of 6 | No Filter | Search

Datasheet View | Num Lock

Figure 3.1: Students Table

SETTING A RELATIONSHIP BETWEEN TABLES

Relationships are links that associate a field in one table with the same field in another table. In Access, you can store data in multiple tables. To bring that information together, you need to define relationships between the tables. Once you have defined the relationship between the tables, data from both the tables can be used by Query, Form, or Report.

A relationship works by matching a field with the same name in both the tables. In most cases, these matching fields are a **Primary key** from one table that uniquely identifies each record in a table, and a **Foreign key** in the other table.

(A foreign key is a value in one table that must match with the Primary key of another table.)

To create a relationship, make two tables one with the name **Students** that holds information about students, such as their Roll_No, F_Name, Class, Address, and City. And the other with the name **Marks** that holds the information about the students' Roll_No, Percentage and Grade. Open one of them in the **Datasheet View**.

Students

Roll_No	F_Name	Class	Address	City
101	Nisha	8	#81, Sector 3	Panchkula
102	Vivek	8	#89, Sector 2	Panchkula
103	Naman	8	#67, Sector 21	Panchkula
207	Gitika	9	#9, Sector 23	Chandigarh
208	Preet	9	#89, Sector 21	Chandigarh

Figure 3.2: **Students Table**

Observe there is one common field, i.e., Roll_No in both the tables.

Marks

Roll_No	Percentage	Grade
101	89	A
102	90	A+
103	95	A+
207	87	A
208	60	B

Figure 3.3: **Marks Table**

- Click on the **Database Tools** tab. Select the **Relationships** button from the **Relationships** group.
- The **Show Table** dialog box appears, select the required table and click on the **Add** button. The selected table will appear in the object **Relationships** window. Likewise, add another table to the **Relationships** window.
- You can activate the 'Queries' tab if your relationships are based on queries, or activate 'Both' tab if relationships are based on both-Tables and Queries.
- Click on the **Close** button to close the **Show Table** dialog box.

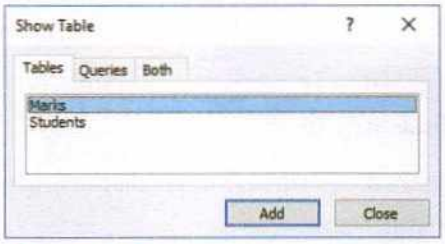


Figure 3.4: **Show Table Dialog Box**

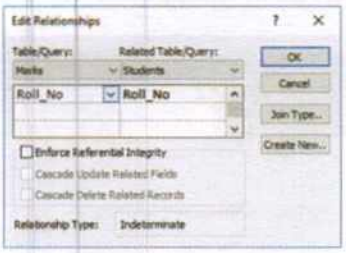


Figure 3.5: **Edit Relationships Window**

- Drag the Primary key of the parent table (e.g., **Students** Table) and drop it over the same field in the child table (e.g., **Marks** Table). In our example, Roll_No is the primary key.
- The **Edit Relationships** dialog box appears.
- Click on the **Create** button. Access creates the relationship between the tables.

- A line linking the two tables will appear indicating that both have been linked on the basis of the linked field.
- Click on the **Save** button on the **Quick Access Toolbar** to save the relationship and then close the Relationships window by clicking on the **Close** button on the **Relationships** group.

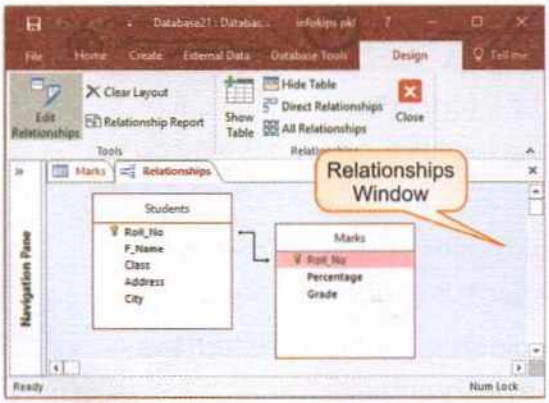


Figure 3.6: **Tables Added to the Relationships Window**

Let's Know More

A **Select query** retrieves data from one or more tables and displays the record set in a datasheet. You can also use a Select query to group the data, and calculate the sum, count the average, and other types of total.

Let's Know More

A **Parameter query** is a type of Select query that prompts you for input before it runs. The query then uses your input as criteria that controls the results. For example, you can design it to prompt for two dates. Access will then retrieve all data with values between the two specified dates.

Let's Know More

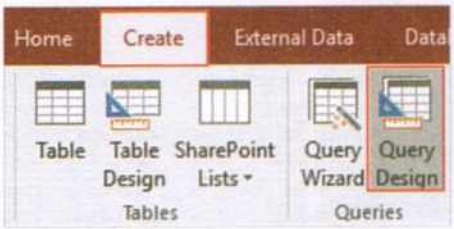
An **Action query** creates a new table or alters your data or database by adding, deleting, updating, and appending data to it.

After the relationship has been created between two tables, you must delete the relationship before you make modifications to the fields on which relationship is based. To delete a relationship, click on the line that connects the tables and press the **Delete** key.

CREATING A QUERY

Access provides two ways to create a Query:

- Query Wizard
- Query Design



CREATING A QUERY IN DESIGN VIEW

The **Design View** gives you more control over a query. It allows you to create a query from the scratch.

- Open the database and click on the **Create** tab on the Ribbon. Now, click on the **Query Design** button in the **Queries** group.
- The **Show Table** dialog box is displayed from which you can select the record source for your query that can be one or more **Tables** or **Queries** or a combination of the two.

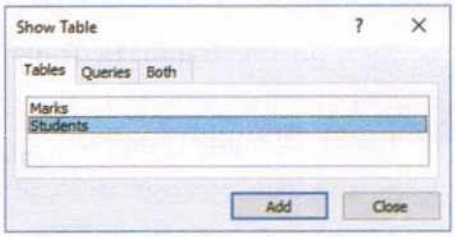


Figure 3.7: Selecting a Table

- Select the table from the **Show Table** dialog box on which you would like to run a query. Click on the **Add** button and then click on the **Close** button.
- The selected table appears as a small window displaying a list of fields in the upper section of the Query window, i.e., the **Object Relationship Pane.**
- Double-click on the field names you want to add in the query. They will be added to the **Design Grid** (the bottom section of the Query window). You can also add fields to the query by dragging them from the field list to the **Design Grid.** The Design grid is similar to a spreadsheet, with columns representing each field in the query.

Let us understand the **Design Grid.**

Field : The first row of the Design Grid displays the selected field names from the table.

Table : Beneath each field name is the name of the existing table.

Show : The Show row displays a check mark. The fields with check marks display the information when the query is run. To hide the field during run time, deselect the check mark by clicking on it.

Sort : This property is used to filter the data either in an ascending or descending order. It is optional.

Criteria : It contains the condition on the basis of which the records will be filtered in the Query output.

Or : This property is used to set multiple criteria in a query.

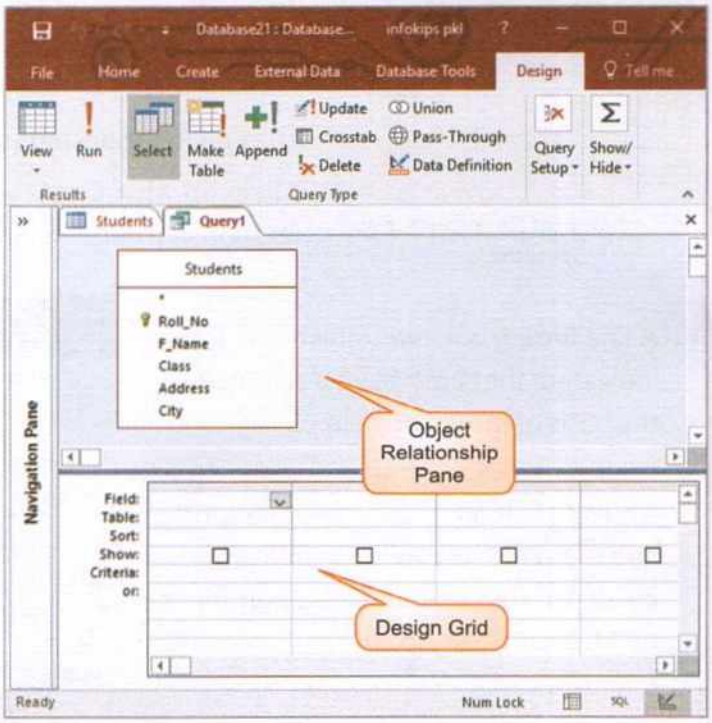


Figure 3.8: Adding Table in Query Window

SPECIFYING SIMPLE CRITERIA

You specify criteria in the **Criteria** row of the design grid. Specify the criteria value in the **Criteria** row and the data will be filtered accordingly in the query output.

Let us understand it with the help of the given example :

- To view the roll numbers and names of students of class VIII, double-click on the required fields in the table.
- Move the cursor to the **Criteria** row and type the criteria **=8** in the **Class** field column.
- Click on the **Sort** property in the **F_Name** column and set it in the **Ascending** order.
- Click on the **Close** button of the query window to save the query. A dialog box will appear asking you to save changes to the design of Query1. Click on the **Yes** button to save the changes. The **Save As** dialog box will appear. Specify the Query name and click **OK**.

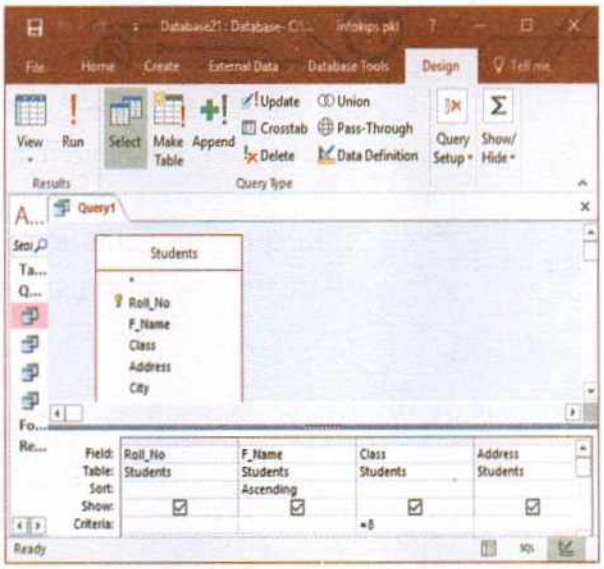
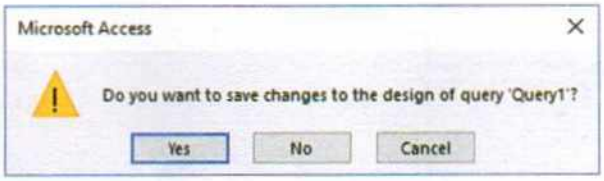


Figure 3.9: Specifying Simple Criteria

- The query name will appear in the Navigation Pane (Make sure you have selected the **All Access Objects** option from the drop-down menu in the **Navigation Pane**). Double-click on the query name to view the query output.
- The query result will be displayed in the **Datasheet View**, which looks like a table.



Tip

To view the query output without saving, click on the **Run** button in the **Results** group on the **Design** tab.

SPECIFYING MULTIPLE CRITERIA

To see information when either two or more alternate criteria are satisfied, you can make use of **or** criteria row in the design grid of the query.

- Suppose from a wide range of record you want to see the records of **Class 8** and **Class 9** only.

Let's Know More

A Cross-tab query uses row headings and column headings so that you can see your data in terms of two categories at once.

Let's Know More

To reopen the 'Show Table' dialog box, while creating relationship, click on the **Show Table** button on the **Design** tab in the **Relationships** group.

Know the Fact

All the tables you select to include in your query will appear as small windows in the **Object Relationship pane**. Each window contains a list of the available fields within those tables.

Know the Fact

To add all the fields present in a field list to the design grid, double-click on the top bar of the table's field list and drag it to the design grid.

Quick Quiz

To Zoom-in the current field in the **Datasheet View**, press **Shift+F2**.

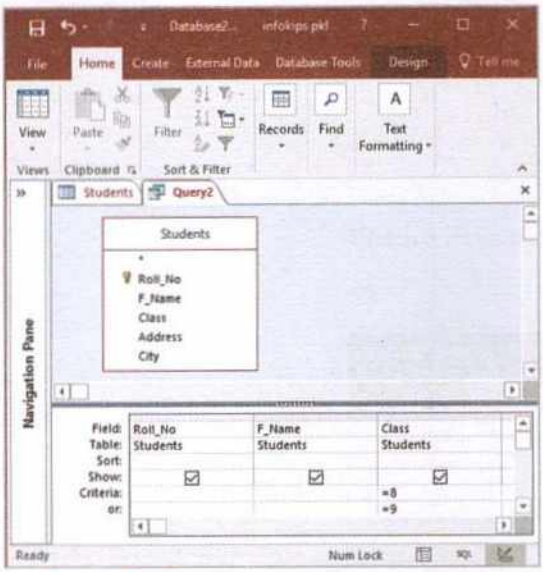
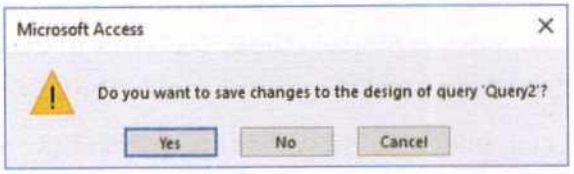


Figure 3.10: **Specifying Multiple Criteria**

- Move the cursor to the **Criteria** row and type the condition **=8** in **Class** field. Type the second condition **=9** in the **or** row of the same column.



- Now, run the query by clicking on the **Run** button on the **Design** tab.
- The query result will be displayed in the **Datasheet View**.
- If you want to save your query, click on the **Save** command in the Quick Access toolbar. When prompted to name it, type the desired name, and then click **OK**.

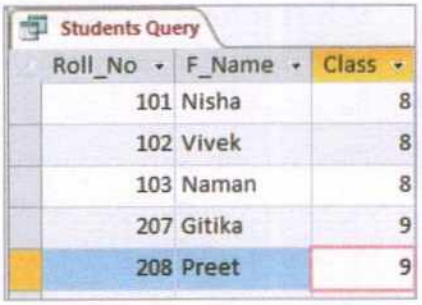


Figure 3.11: **Query Output**

CREATING A QUERY IN QUERY WIZARD

To create a query in Query Wizard:

- Click on the **Create** tab.
- Select the **Query Wizard** button in the **Queries** group.
- The **New Query** dialog box appears. The **Simple Query Wizard** option is selected by default. Click **OK**.

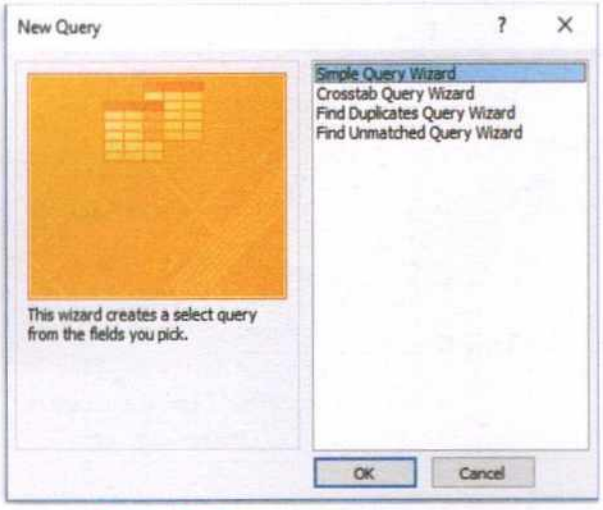


Figure 3.13: **New Query Dialog Box**

- The **Simple Query Wizard** screen appears as shown in Figure 3.14. Select the table that contains the data in the **Tables/Queries** list box.
- Now, add the fields that you want to have in the query result.

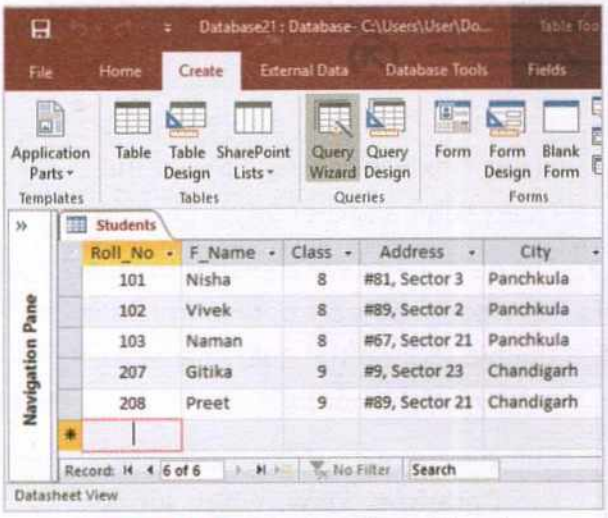


Figure 3.12: **Selecting Query Wizard**

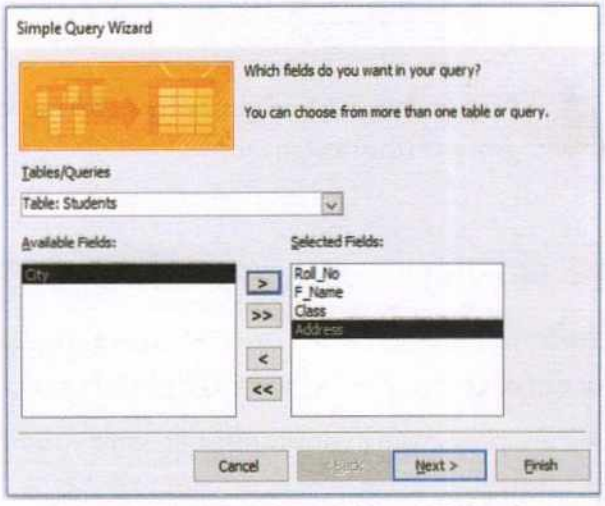


Figure 3.14: **Simple Query Wizard Dialog box**

TO ADD A FIELD

- Select the required field(s) in the **Available Fields** box.
- Click on the single forward arrow button [>] or just double-click on the field.
- You will notice that the selected field is shifted to the **Selected Fields** box.
- In case you want to add all the fields, then click on the double forward arrow button [>>] . It will shift all the fields at once.
- You can remove the selected fields from the **Selected fields** box. To remove them one by one, click on the single backward arrow button [<<] or to remove all at once, click on the double backward arrow button [<<] .
- Once you have selected the required fields, then click on the **Next** button.
- The Simple Query Wizard screen 2 of 3 appears, prompting you to either select the Details or Summary Query. Simply, click on the **Next** button.
- In the next step, Simple Query Wizard screen 3 of 3 appears. Enter a new Title for your query.
- Observe that the **Open the query to view information** radio button is selected by default.
- Now, click on the **Finish** button.
- The query result will appear in the **Datasheet View**. You will observe that the query name is visible in the Navigation pane.

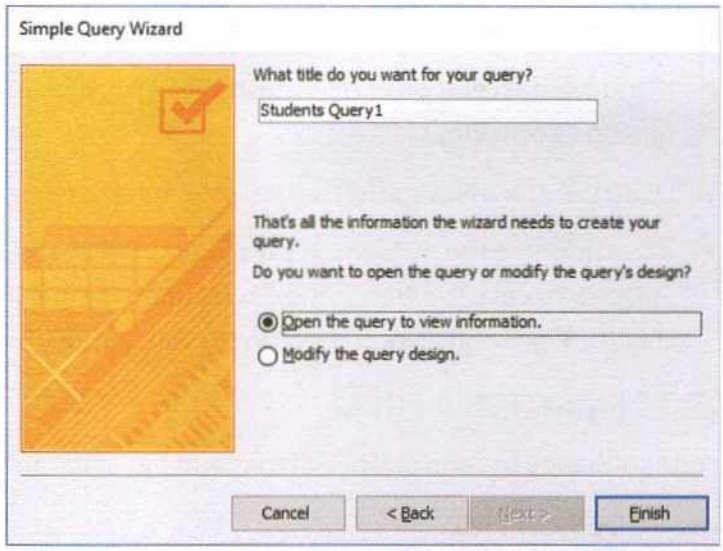


Figure 3.15: Adding Title for Query

FORMS

In general, a form is a piece of paper, on which a user fills the required information in the specific fields. Likewise, in Microsoft Access 2016, Forms work quite similar to it. Forms allow you to add and update data in one record at a time in a table. Although Access provides a Datasheet View, which is a convenient way of entering data, but it is not an appropriate tool for every data entry situation. Sometimes, when you work with different users and do not want to expose to the inner working of Access database, you may choose to use Access forms to create a better user friendly interface.

Any form you create from a table will let you view the data that is already in that table and you can also add new data. A form can have a different name from a table, yet it manipulates the same information and data to the corresponding table. If you change a record in a form, it will be reflected in a table also. Data can be inserted, updated, and deleted from a table by using a Form object.

You can work on a form in the following three views:

- **Form View** is used to enter, edit and view data.

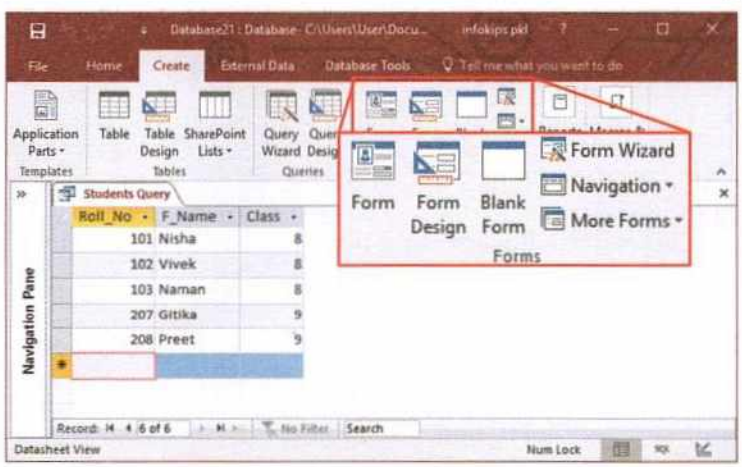


Figure 3.16: Displaying Different Options for Creating a Form

- **Design View** is used to adjust the design of your form. It gives you a more detailed view of the structure of a form, such as Header, Detail, and Footer sections.
- **Layout View** is used to change the appearance and size of various controls of a form.

CREATING A FORM

To create a form, select a table or query in the **Navigation Pane** that you want to use as the data source for the form.

- Click on the **Create** tab on the Ribbon. Select the **Form** option in the **Forms** group.
- A new form is created and opens in the **Layout** view, in which you can change the appearance of a form. You will notice that three new tabs: **Design, Arrange** and **Format** appear on the Ribbon.
- If you want to edit or enter data in the form, click on the **Home** tab > **View** button > **Form View**.
- Use the **Record Navigation bar** to move through the records in the form.
- After finishing the data entry, save your work by clicking on the **Save** option in **Quick Access Toolbar** or the **Save** option in the **File** tab. You will observe that the Form object gets added in the **Navigation Pane**.

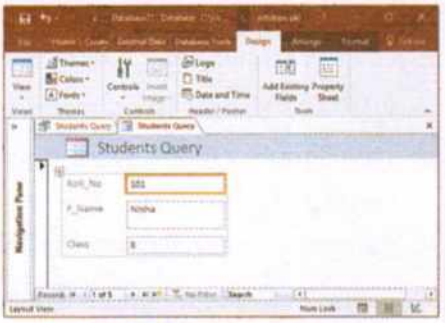


Figure 3.17: Formatting a Form Using Design Tab

FORMATTING A FORM

You can change the appearance of the form by using various options available on the **Design** and the **Format** tab.

USING DESIGN TAB

- Click on **Logo** in the **Header/Footer** group. The **Insert-Picture** dialog box appears. Select any picture and click **OK**.
- Click on **Title** in the **Header/Footer** group. Type 'Students Query' as the title for the form.
- Click on **Date and time** in the **Header/Footer** group. The **Date and Time** dialog box will appear. Choose the desired format of the Date and Time and click **OK**. You will find Date and Time placeholders in the Header section of the form. You can move these placeholders to the Footer section also if you want to display Date and Time there.

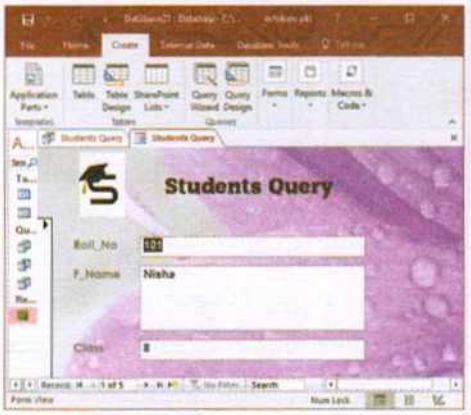


Figure 3.18: Formatted Form

- Click on **Themes** in the **Themes** group. Click on the desired theme from the drop-down menu.

USING FORMAT TAB

- Click on the **Background Image** in the **Background** group. The **Browse** button appears. Click on it. Locate and choose the picture in the **Insert Picture** dialog box and then click on the **Open** button.
- Select the field to which you want to apply conditional formatting, say 'Class'. Click on the **Conditional Formatting** option in the **Control Formatting** group. Click on **New Rule** in the **Conditional Formatting Rules Manager** dialog box. Under **Select a rule type**, select **Check values in the current record or use an expression**. Under **Edit the rule description**, select the rule, apply desired formatting, and click **OK**.

REPORTS

A report is an effective way to organise and summarise data for viewing or printing. A report can be created exactly in the same way as you have created a form. The only change is that after selecting the **Create** tab, click on **Report** in the **Reports** group. Access creates a report and places all fields of the selected table in the report.

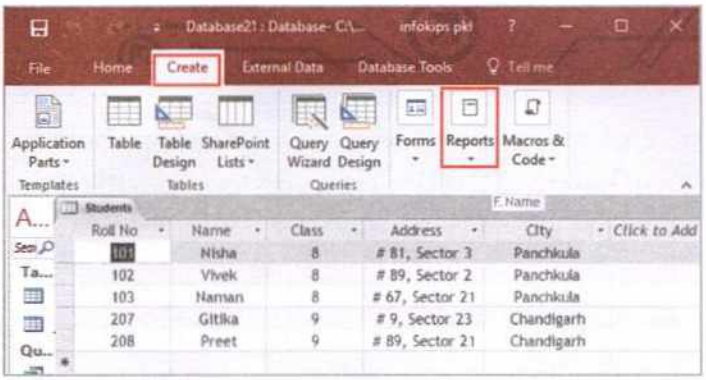


Figure 3.19: **Creating a Report**

Four new tabs appear on the Ribbon as soon as Report is created:

Design, Arrange, Format, and **Page Setup.**

- Click on the **Save** option on the **Quick Access Toolbar** to save the report.
- The Report object gets added in the **Navigation Pane.**

Following are the four different types of views in which a report can be displayed:

Report View : You can view data of the report in this view but cannot make any modification in the design.

Print Preview : This view allows you to see how the report will look like when printed.

Layout View : It provides a view that closely resembles what the report will actually look like to the user. In this view, you can also edit the design of the report to some extent such as change the size of various controls.

Design View : This view displays only the structure of the report that can be modified and customised as per the requirement. This view does not display the underlying data, but displays the expressions that are used to generate the content. For example, you may find Date () function on the Header section of the report but not the actual date.

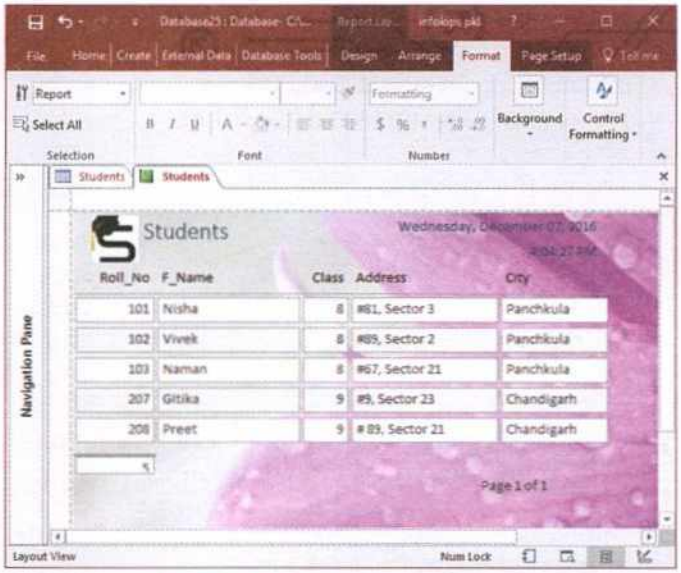


Figure 3.20: **Formatted Report**

FORMATTING A REPORT

Like Forms, you can format a report using different options present on the **Design** and **Format** tabs.

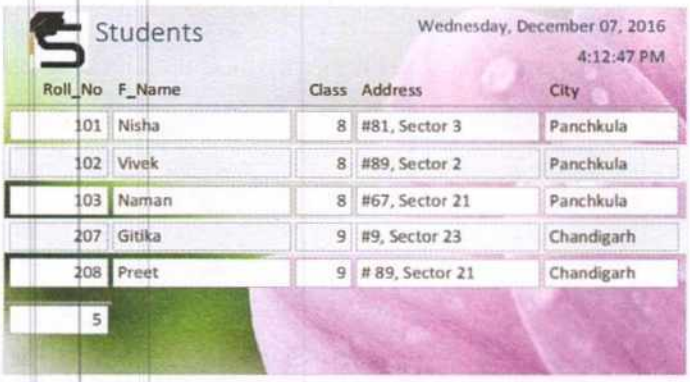


Figure 3.21: **Print Preview of a Report**

PRINTING A REPORT

To print a report, select the **File** tab and then click either on the **Print** option or select the **Print Preview View** option.

This view displays how the report will appear on a page. It also allows you to choose the Page orientation, Page setup, etc.

- If needed, modify the page size, margin width, and page orientation using the related commands on the **Ribbon.**

- Click on the **Print** option. The **Print** dialog box will appear. Set the desired print option and then click **OK**.

EXPORTING A REPORT

- Click on the drop-down arrow of the **View** button on the **Home** tab and select **Print Preview** from the drop-down list of options.
- The report will be opened in the **Print Preview** layout and the ribbon will display the commands related to the Print Preview layout.

Figure 3.22: Selecting Word Application

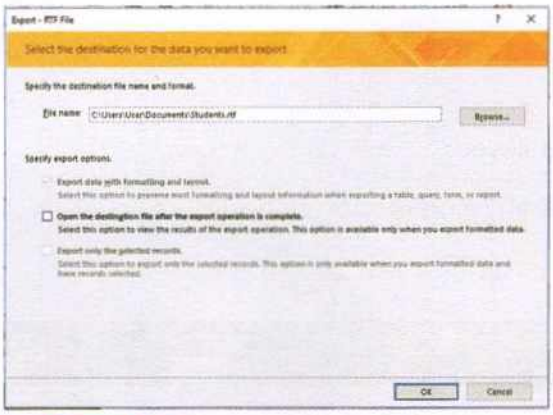


Figure 3.23: Export-RTF File Dialog Box

- On the **Data** group, click on the drop-down arrow of the **More** button and select **Word**.
- The **Export-RTF File** dialog box will appear on the screen. Select the location where you want to save the report and give a valid name to the report. You will also find some export options. select the options as per your requirement.
- Click **OK**.
- A final screen will appear on the screen notifying you about the successful completion of the exporting process.
- Click on the **Close** button.
- Locate the word file where the report has been exported and open it.

RECAP

- A Query is a database object that helps you to retrieve and view information from one or more database tables that meet a specific condition or criteria that is specified by you.
- Microsoft Access provides various types of queries: Select, Parameter, Crosstab, Action, and SQL query.
- Relationships are links that associate a field in one table with the same field in another table.
- Access provides two ways to create a query –through the Query Wizard and Query Design.
- The Criteria property contains the condition on the basis of which the records will be filtered in the Query output.
- A Form is a piece of paper on which a user fills the required information in the specific fields.
- Report is an effective way to organise and summarise the data for viewing or printing.

BRAIN DEVELOPER

SECTION - A

A. Fill in the blanks.

1. A ..... is a database object that helps you to retrieve and view information from one or more database tables.
2. In a query, the ..... property is used to set the condition on the basis of which the records are filtered.
3. You can set multiple criteria in a query using ..... property.
4. ..... property is used to filter the data either in an ascending or descending order.
5. ..... allows you to add and update data in a table, one record at a time.
6. A ..... is an effective way to organise and summarise data in a printed form.

HINTS • Or • Criteria • Sort • Form • Query • Report

B. State True or False.

1. Queries help us to retrieve information from one or more tables that meet a specific condition. ☐
2. A report is created exactly in the same way as Forms are created. ☐
3. To specify the multiple criteria, the Or property is used. ☐
4. You cannot run a query without saving it. ☐
5. The Sort property is used to filter the data either in an ascending or descending order. ☐
6. A relationship works by matching a field with the same name in two tables. ☐
7. Once a relationship is set, it cannot be deleted. ☐
8. The Form View is used to change the structure of your form. ☐

C. Application-based questions.

1. Swati created a database of her classmates and entered 30 records in it. Her teacher asked her to show the data of those students who have scored less than 50% marks. Suggest how she can apply this criteria.

.....

2. Johnson & Johnson company has a huge database of employees. The company wants to maintain the privacy of each employee and has given the instructions to computer operators to update each record, one at a time. Which database object should it use to perform this task?

.....

SECTION - B

A. Multiple-choice questions.

1. Which query allows addition, deletion, updation, and appending operations on data?

   a. Select query b. Action query c. Cross query

2. Which query prompts you for input before it runs?

   a. Cross tab query b. Parameter query c. Select query

3. Which option is used to change the appearance and size of various controls of a form?

   a. Design View b. Form View c. Layout View

4. How many views does Access provide to display a form?

   a. Two b. Three c. Four

5. Which key defines a relationship between two tables?

   a. Primary key b. Candidate key c. Secondary key

B. Answer the following questions.

1. What is a query? Name the parts of a query window.

2. What do you understand by Criteria?

3. Differentiate between a Form and Report.

4. What is a Form? How is it useful?

5. How can you export a Report to a Word file?

ACTIVITY SECTION

LAB SESSION

Perfection Through Practice

- Create a database on the **Information System** using the Design View.
- Use the fields, as given in the screenshot, in your database.
- Save the table with name **InfoSys**.
- The **InfoSys** table icon will appear in the Database window.
- Double-click on it to open and enter data of your relatives, friends, teachers, and the principal.
- Enter minimum 20 records in the table and save it.
- Further add 10 more records into the table using Form.
- Make a query to display the records where 'Date_of_Birth' falls in the month of November.
- Similarly, make a query to display the records with 'Anniversary' date falling in the month of December.
- Create a query to display the records in the descending order according to 'Date_of_Birth'.
- Make a query to retrieve the records having 'City' as Panchkula.
- Run the queries and save them.
- Generate a report for the above data and export it to the Word file.

S.No.	Field Name	Data Type	Field Size
1	Rec_ID	AutoNumber	N/A
2	Name	Short Text	50
3	Address	Short Text	100
4	City	Short Text	50
5	State	Short Text	50
6	PIN	Number	Long Integer
7	Mobile	Number	Long Integer
8	Date_of_Birth	Date/Time	N/A
9	Anniversary	Date/Time	N/A
10	Email_ID	Short Text	50

GROUP DISCUSSION

For Concept Clarity

Conduct a group discussion on the following topics:

Creating Query Using Query Wizard vs **Creating Query Using Query Design**

ONLINE LINKS

Looking For More

To know more about Forms and Reports, visit the following websites:

- https//www.quackit.com/microsoft_access/microsoft_access_2016/tutorial/create_a_query_in_microsoft_access.cfm
- https//www.lynda.com/Access-tutorials/Access-2016-Forms-Reports-Depth/455727-2.html

CHAPTER 4

ADOBE PHOTOSHOP CC

LEARNING IN THIS CHAPTER

- Introduction and features of Adobe Photoshop CC
- Starting Adobe Photoshop CC
- Components of Photoshop CC
- Creating a new file
- Inserting images
- Saving and closing a file
- Opening a file
- Selection tools
- Cropping tool
- Common painting tools

Students! You might have noticed that photographs in marriage albums, magazines, or catalogues of any cosmetic company are much different from the common pictures you click daily. A normal looking person looks ravishing, dull skin turns bright, wrinkles disappear from the face of old people, and eventually a person looks better in the pictures than they look in the real life.

Can you imagine how it all happens? Well, this alteration is made possible with the Photoshop software. **Adobe Photoshop**, popularly known as Photoshop, is a graphics editing program developed by Adobe Systems. Photoshop is widely-used by millions of graphic artists, web developers, photographers, as well as people who use it as a hobby. Most of the posters, magazine covers, book covers, brochures, etc., are created or edited with Photoshop. Due to the popularity of this software, it has been accepted as an industry standard for graphics professionals.

FEATURES OF PHOTOSHOP CC

- It has a **revised user-friendly** interface.
- **Photo editing** can be done more efficiently with very little efforts.
- It has **redesigned powerful tools** to:
  - enhance or change the colour of an image by adjusting the brightness and contrast, colour balance, hue and saturation levels, curves, etc.
  - crop or resize pictures without losing the quality of an image. Photoshop CC provides various options along with the Crop tool to make it work even better.
  - remove the unwanted object from the picture using the **Vanishing Point Tool.**
  - click and drag across an image to make fast selections with the new **Quick Selection Tool.**
- You can create graphics for web applications with reduced file size, thereby, helping in faster loading of the website. Files can be compressed by 10 to 50% of its original size. You can also make animated graphics, which is also known as Graphics Interchange Format (GIF).
- **Layer Effects** preserve the original state of an image while manipulating another version of it through another layer. You can add as many layers as you need.
- 3D effects incorporate completely new and improved extents to an object by introducing new **3D reflections, icons,** and **draggable shadows.**

- An improved **Print Window** simplifies printing options and eliminates the need for separate **Print** and **Print with Preview** commands.
- The new **Auto Align** and **Blend** features helps save time.
- The **Tool Recording using Actions** in Photoshop CC enables us to add brush strokes and different helpful tools.
- The new addition of the **Video Timeline Panel** enables you to add effects to the video clips in Photoshop.
- The **Blur Gallery** allows you to apply and combine three different kinds of blur and create effects.
- **Content Aware Patch** allows you to heal undesirable portions of an image.
- **Content Aware Move** enables you to select pixels and drag it to some other part of an image without using layers or masks. The magical part is that it fills the hole with matching elements from the existing background and shifts the pixels to a new location.
- A new **Adaptive Wide Angle Filter** enables you to straighten the curves and lines in photographs and quickly achieve effects on the images where there is a less space.

With the new **Powerful Vector Tools,** designers can now design and shape graphic elements more quickly and easily.

Know the Fact

Adobe Photoshop (1.0) was launched in 1990. Different versions of Photoshop have evolved till now from Photoshop (2.0) to Adobe Photoshop (19.1.16). The latest version, Photoshop (18.0.1) is popularly known as Adobe Photoshop CC. It was released in August, 2018.

STARTING ADOBE PHOTOSHOP CC

To start Photoshop, follow the sequence of steps given below:

Figure 4.1: Starting Adobe Photoshop CC

Fact File

The credit for the invention of Adobe Photoshop goes to **Thomas Knoll**, who invented the first version of Photoshop in 1987, which was known as **Display Program**.

COMPONENTS OF PHOTOSHOP CC

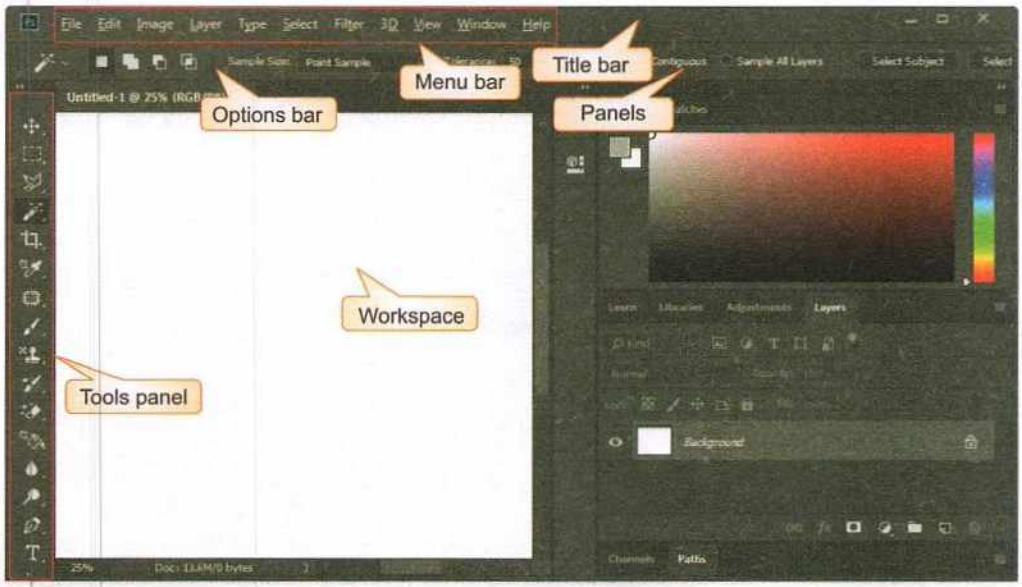


Figure 4.2: Components of Photoshop CC

Know the Fact

The default extension of Adobe Photoshop file is **.psd**.

MENU BAR

It is the top-most horizontal bar in Photoshop window that contains all the main menus of Photoshop, such as File, Edit, Image, Layer, Type, Select, Filter, 3D View, Window, and Help.

OPTIONS BAR CONTROL PANEL

The Options Bar Control Panel lies below the Menu bar. It displays the options related to the currently selected tool in the Tools panel.

DOCUMENT WINDOW

It is the area that displays the image file that you want to edit. The name of the image file appears as a tab at the top of the Document window.

PANELS

On the right side of the Photoshop window, there is a separate area for panels. Photoshop offers various panels that can either be grouped, stacked, or docked. By using various options from these panels, you can monitor and modify the properties of an image. Panels can be placed anywhere on the screen. To float them:

- click on the top of the panel.
- drag the panel while keeping the left mouse button pressed.

The most commonly used panels are as follows:

Color panel

The **Color panel** displays the colour values for the current foreground and background colours. You can use the sliders in the **Color panel** to change the foreground and background colours using different **color modes**. You can also select a foreground or background colour from the spectrum of colours, displayed at the bottom of the panel. It has Swatches tab to the right of it.

Swatches panel

The Swatches panel stores the most frequently used colours. You can easily add or delete customised colours from the Swatches panel.

Adjustments panel

The Adjustments panel helps you to apply an effect to a group of layers in a much easier way. Later on, you can edit that effect while preserving the original layers. The Adjustments panel has a Styles tab to its right.

Styles panel

The Styles panel allows you to view, select, and apply preset layer styles. By default, a preset style replaces the current layer style. You can also add your own style using the **Create New Style** icon.

History panel

You can access your document's history in the History panel and undo the changes easily.

Layers panel

The Layers panel in Photoshop displays all the layers in an image. It also shows the various effects applied to the layers.

Tools panel

The Tools panel is to the left side of the Photoshop window. It works like an artist's paint box and holds a variety of tools that help us to draw, paint, and manipulate the images.

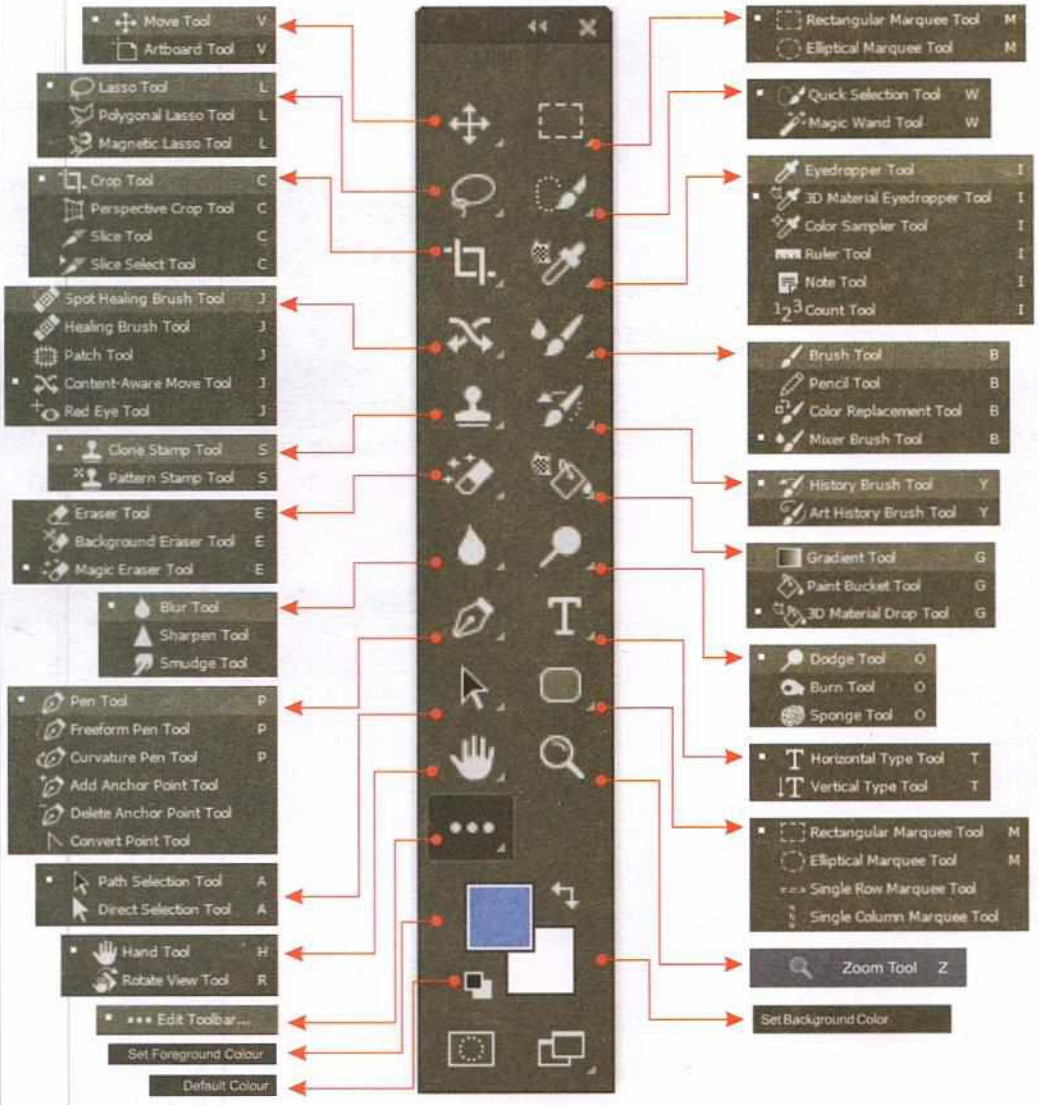


Figure 4.3: **Tools Panel**

Let's Know More

In **Photoshop CC,** you can customise your Tools Panel as per your need by using the **Edit Toolbar** tool in the **Tools Panel.**

Let's Know More

If the Tools panel is not visible on the screen, choose **Window** from the Menu bar and select the **Tools** option.

CREATING A NEW FILE

- Open Photoshop and create a new image file by selecting the **File > New** option.
- This will open the **New Document** dialog box. This dialog box allows you to:
  - create documents using the selected templates from **Adobe Stock** across several categories that include **Photo, Print, Art & Illustration, Web, Mobile, Film & Video** within the dialog box.

Figure 4.4: **New Document Dialog Box**

  - find more templates by using the **Search for more templates on Adobe Stock** search box.
  - quickly access files, templates, and items that you have recently accessed from the **Recent** tab.

- save your own custom presets for reuse in the **Saved** tab.

- Create a blank document using the **Blank Document Presets.**
- Click on the **Photo** category and select any preset. Change its settings as per your need in the **Preset Details** pane on the right.
- Specify the details like Name of the image file in the **Name** text box, set up the size (Width & Height) of an image file in different units of measurements, such as Pixels, Inches, Centimetres, or Points. Specify the value for resolution to determine the sharpness and clarity of an image in the **Resolution** text box. Mention the colour mode such as RGB, CMYK, or Grayscale in the **Color Mode** text box and provide the background colour of an image by defining either of the three options: White, Black or Background Color in the **Background Contents** section.
- Click on the **Create** button.
- A new blank Photoshop canvas will be created with a locked Background layer in the Layers panel.

Figure 4.5: Background Layer

INSERTING IMAGES

To insert any image, follow the given steps:

- Open a new file in Photoshop CC.
- Click on the **File** menu and choose either the **Place Embedded** or **Place Linked** option. Here, you have selected **Place Embedded** option.
- In the opened **Place Embedded** window, browse and select the image file that you want to insert. Click on the **Place** button.
- The image will appear in a grid.

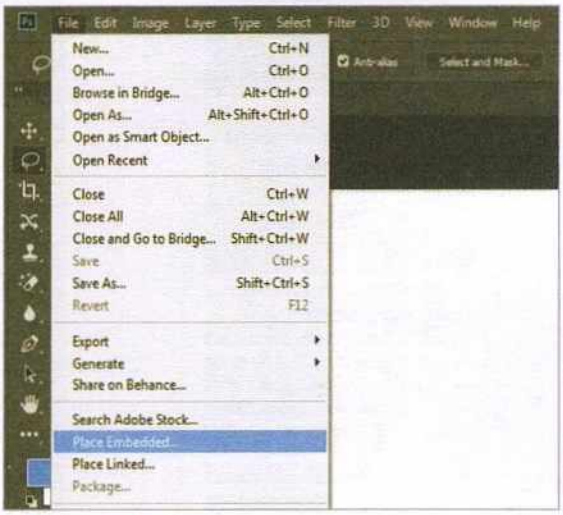


Figure 4.6: Selecting Place Embedded Option

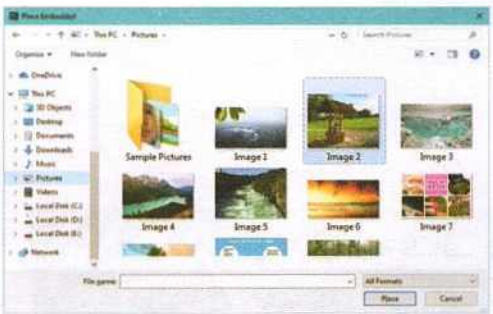


Figure 4.7: Place Dialog Box

- Click on the image and drag it to the point where you want to place it within the canvas.
- You can resize the image by dragging one of its corner nodes. To rotate the image, hover near the corner node till the rotate cursor ↻ appears and then drag it to rotate the image in clockwise or anti-clockwise direction.
- When you are satisfied with the placement, size and rotation of the image, double-click on the image.
- You will find that a new layer appears in the **Layers** panel where the image is placed. If the **Layers** panel is not visible, then select **Window > Layers.**

Figure 4.8: Selected Image

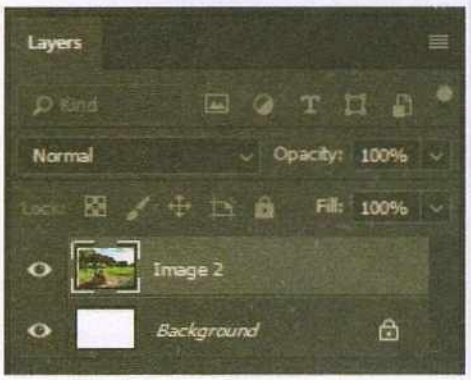


Figure 4.9: Displaying a New Layer

SAVING A FILE

- To Save the document, use the **File** > **Save** option.
- The **Save As** dialog box appears.
- Choose the location and specify a name in the **File name** text box. Click on the **Save** option.

CLOSING A FILE

- Click on the **File** menu and select the Close option. The file will be closed.

OPENING A FILE

- Click on the **File** menu and select the **Open** option. The **Open** dialog box appears. Now, browse and select the desired file and click on the **Open** button.
- The selected file will be opened.

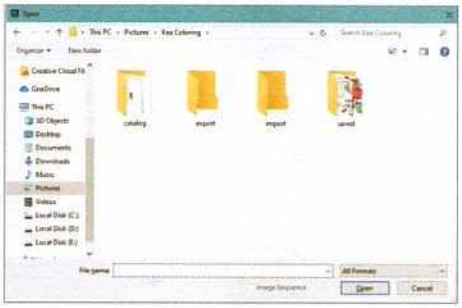


Figure 4.10: Open Dialog Box

SELECTION TOOLS

Selection tools are used to select an image or a part of it to perform cut, copy, edit, or retouching operations. Following are the various selection tools in Photoshop:

RECTANGULAR MARQUEE TOOL

It is used to select an image or a part of it in a rectangular, square, elliptical shape, or as a row/column that is one pixel wide.

- Click on the **Rectangular Marquee Tool** in the **Tools panel.** The cursor appears as a crosshair sign ⊕.
- Place the cursor on the image. Click and hold the left mouse button and then drag out a marquee to select the required part of the picture.

Figure 4.11: Rectangular Marquee Tool

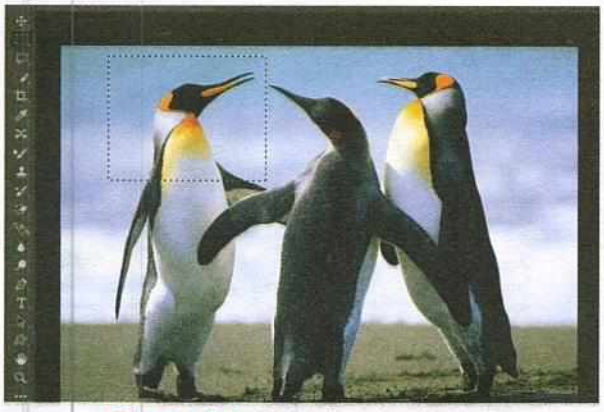


Figure 4.12: Selecting the Object

- You will notice that a dashed border has covered the selected object, as shown in Figure 4.12.
- Now, right click on the image layer and select the rasterize layer.
- Press the **Delete** key. Notice that the selected part of the image is deleted.

Let's Know More

Reveal The Hidden Tools

Some of the tools have a small white triangle at the bottom right corner indicating that more tools of the same kind are available in a pop-up menu. Click on it to view these hidden tools.

Know the Fact

A selected area is indicated on the screen by a blinking selection border, called **Marquee**.

Know the Fact

A **dock** is a collection of panels displayed together, generally in a vertical orientation. You can dock or undock panels by moving them into or out of a dock.

Know the Fact

To collapse or expand all panel icons in a column, click on the double arrow at the top of the dock.

Let's Know More

To collapse an expanded panel back to its icon, click on its tab, its icon, or the double arrow in the panel's title bar.

Do not save the edited image as it will spoil the original one.

LASSO TOOL

The Lasso Tool is a bunch of three very useful tools used for freehand selections: (1) Lasso Tool (2) Polygonal Lasso Tool (3) Magnetic Lasso Tool. Follow these steps to select a part of the image using the Lasso Tools:

Figure 4.13: **Lasso Tool**

- Open any image. Click on the tiny black triangle on the **Lasso Tool** icon or right-click on the icon. The three types of the Lasso Tool will appear.

Using Lasso Tool:

- Select the **Lasso Tool**.
- Choose one of the Selection options from the **Options** bar.
- Click and drag the mouse around the part of the image to be selected and mark the selection.
- Release the mouse at the end point. You will notice the selection as shown in Figure 4.14.

Figure 4.14: **Using the Lasso Tool**

Using Polygonal Lasso Tool:

It helps to make freehand selections, but its contour is made up of straight segments.

- Select the **Polygonal Lasso Tool**.
- Specify the options using the **Options** bar.
- Click on the image at any point near the object to be outlined.
- Click at the position where you want the first straight segment to end.
- Keep clicking to set the next end points of the subsequent segments until the whole object is outlined. Close the contour by clicking at the starting point.

Figure 4.15: **Using the Polygonal Lasso Tool**

Using Magnetic Lasso Tool:

When you use this tool, the border snaps to the edges of the defined areas in the image. The **Magnetic Lasso Tool** is especially useful for quickly selecting objects with complex edges set against high-contrast backgrounds.

- Select the **Magnetic Lasso Tool**. Click on any part of the image to be selected and drag the mouse pointer around the object to select it. You will find this tool dropping the 'Fastening Points' along the edges.
- Continue this process till you reach the starting point or double-click at the ending point. Observe the selection as shown in Figure 4.16.

Figure 4.16: **Using the Magnetic Lasso Tool**

QUICK SELECTION TOOL

This tool is used for quick selection. As you drag the mouse, the selection expands outwards. It finds and follows the defined edges in the image automatically.

The **Quick Selection Tool** is useful for selecting the parts of an image, which requires great precision to reach.

- Click on the **Quick Selection Tool** .
- Drag the mouse to make the desired selection.

Figure 4.17: Quick Selection Tool

Figure 4.18: Using the Quick Selection Tool

NOTE

If the **Quick Selection Tool** does not appear in the Tools panel, right-click on the **Magic Wand Tool** and select the **Quick Selection Tool** .

Magic Wand Tool

It is used to select the adjacent areas of the same colour in an image.

- Click on the **Magic Wand Tool** or press **W**. The pointer changes into symbol.
- Click on any part of the image. All the adjacent areas of pixels having the same colour will be selected, as shown in Figure 4.19. On selecting the **Magic Wand Tool**, the **Options** bar displays the following options:

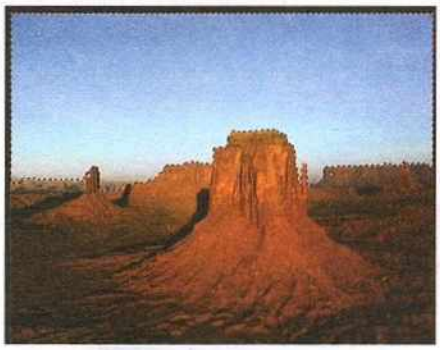


Figure 4.19: Using the Magic Wand Tool

Figure 4.20: Magic Wand Options Bar

- **Tolerance (0-255)** determines the colour range of the selected pixels. The higher the tolerance, wider will be the range of the selected pixels.
- **Anti-alias** produces a smooth edge by partially filling the edged pixels.
- **Contiguous** limits the selection to adjacent pixels only. While unchecking this option, all the pixels in the image within the same tolerance range will be selected.

MOVE TOOL

This tool is used to drag a selected part of an image to a new location in the image.

- Open any image and select the part to be moved (using Marquee/Lasso Tool).

Let's Know More

To add a floating panel or panel group to an icon dock, drag it in by its tab or title bar. (Panels are automatically collapsed to icons when added to an icon dock)

Quick View

When using either Lasso or Polygonal Lasso tools, you can toggle between the two by pressing the **Alt** key.

Let's Know More

The **Magic Wand Tool** can make and merge selections if you press the **Shift** key.

Quick View

In Photoshop CC, you cannot undo more than one action using **Undo** command in the **Edit** menu. To do so, press **Ctrl+Alt+Z** key combination.

- Select the **Move Tool** from the Tools panel or press **V**. The pointer changes to sign .
- While holding the left mouse button, drag the selected image to the point where you want to place it and release the mouse button.
- Notice the change, as shown in figures given below.

NOTE

- To copy a selected part of an image within the same image, press **Alt** key while dragging the selection.
- To copy a selected part of an image to another image, use the **Edit > Copy** and **Edit > Paste** options.

Figure 4.21: **Selecting an Image**

Figure 4.22: **Moving the Image**

Figure 4.23: **Copying the Image**

CROPPING TOOL

It is used to select a specified area that you want to focus on and removes the unwanted parts or everything outside the selected area of a picture.

Figure 4.24: **Crop Tool**

- Open an image. Select the **Crop Tool** from the **Tools** panel or press **C**.
- The pointer changes to the cropping symbol . While holding the left mouse button, drag it across the picture to make a rectangular selection. Release the mouse button when the selection is complete.
- The selected part of an image within your selection is known as **cropping area**.

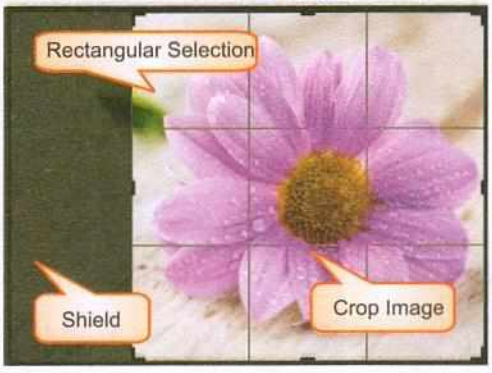


Figure 4.25: **Cropping Area**

Figure 4.26: **Cropped Image**

- The area outside the cropped area appears dark. This is called **shield**.
- To finish the cropping process, double-click inside the selection or press the **Enter** key.
- You will find that the selected image is cropped.

Photoshop CC provides a variety of Crop options in the **Options** bar.

These are **Perspective Crop Tool**, **Slice Tool**, and **Slice Select Tool.**

COMMON PAINTING TOOLS IN PHOTOSHOP

Adobe Photoshop is basically an image editing and retouching software, but you can also create artworks by using different Painting Tools, like **Gradient, Paint Bucket, 3D Material Drop** tools, etc.

Figure 4.27: Painting Tools

GRADIENT TOOL

The Gradient Tool allows you to fill an area with a range of colours in a specified pattern. It creates a blend of two or more colours. The gradients of colour can be filled with linear, radial, angle, reflected and diamond gradient.

Figure 4.28: Selecting the Image

- Open an image. With the help of the **Magic Wand Tool**, select the area with **Tolerance** setting of **90.**

Figure 4.29: Options bar

- Select the **Gradient Tool** from the Tools panel.
- Click on the drop-down arrow of the **Gradient picker** and select the desired gradient from the displayed options. You can also edit the gradient. To do so, click on the **Gradient picker** from the **Options** bar. The **Gradient Editor** dialog box will appear.
- Select the **Chrome** gradient option and click on the **OK** button.

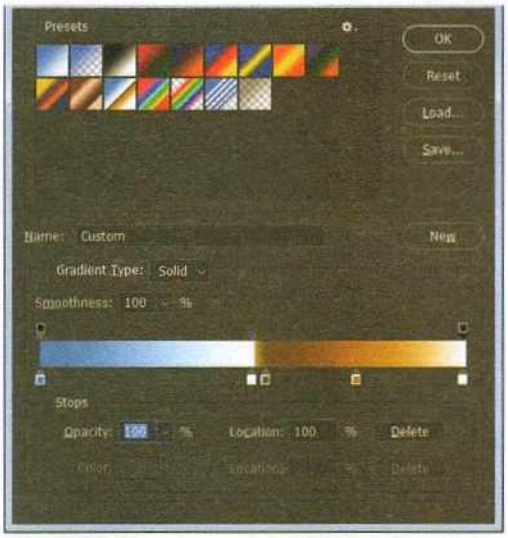


Figure 4.30: Gradient Editor Dialog Box

Figure 4.31: Gradient Applied on the Image

- Now, select the **Linear Gradient** from the **Options** bar.
- Click and drag the mouse pointer in the selected area. Notice that the selected gradient gets applied on the selected area.
- Press **Ctrl+D** to deselect the selection.

Let's Know More

Cropping is the process of removing portions of a photo to create focus or strengthen the composition.

Let's Know More

The **Slice Tool** is used to divide an image into multiple rectangular sections called **Slices.** These Slices can be easily moved, resized, aligned and optimized individually as separate files. After you create a Slice, you can select it by using the **Slice Select Tool**.

Quick View

You can press the **Esc** key or click the **Cancel** button in the Options bar to cancel the cropping of an image.

Let's Know More

You can easily change the brush tip size of the **Quick Selection Tool** by clicking on the **Brush Picker** drop-down menu in the **Options** bar, and type in a pixel size or drag the slider. You can also press the right bracket (]) to increase and press the left bracket ([) to decrease the brush tip size.

Paint Bucket Tool

It is used to fill an image or a part of it with different colours based on the tolerance or a range of colours.

Figure 4.32: **Selecting the Image**

- Open an image. With the help of the **Magic Wand Tool**, select the image area with **Tolerance** setting of **90.**
- Select the **Paint Bucket Tool** from the Tools panel and set the **Tolerance** to **100** to paint the whole selection.
- Click on the **Set foreground color** option. The **Color Picker (Foreground Color)** dialog box will appear. Select any colour of your choice, for example, pink and click **OK.**
- Now, click on the selected area of the image. The colour of the selected area will change to pink.

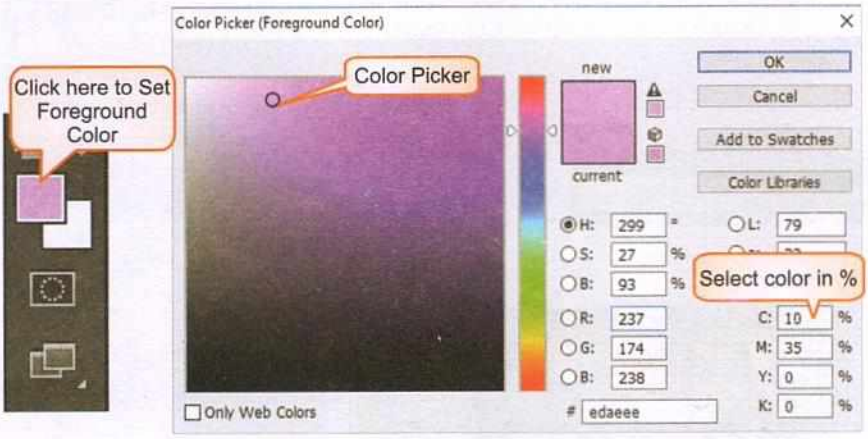


Figure 4.33: **Selecting the Foreground Color**

Figure 4.34: **Applying Paint Bucket Color**

RECAP

- Adobe Photoshop, popularly known as Photoshop, is a graphics editing program developed by Adobe Systems.
- Layer effects preserve the original state of an image while manipulating another version of it through another layer.
- Photoshop offers various panels that can be either grouped, stacked, or docked. These include Colors panel, Swatches panel, Styles panel, Tools panel, Layers panel, Adjustment panel, and History panel.
- The Selection tools are used to select an image or a part of it to perform cut, copy, edit, or retouching operations.
- The Magnetic Lasso Tool is especially useful for quickly selecting objects with complex edges set against high-contrast backgrounds.
- The Crop Tool is used to select a specified area that you want to focus and remove the unwanted parts outside the selected area of a picture.
- The Move Tool is used to drag a selected part of an image to a new location in the image.
- The Gradient Tool is used to fill an area with a range of colours in a specified pattern.

BRAIN DEVELOPER

SECTION - A

A. Fill in the blanks.

1. The ..... panel stores the most frequently used colours.
2. ..... allows you to heal undesirable portions of an image.
3. The ..... works like an artist's paint box, which holds all the drawing tools used to draw, paint, and manipulate the images.
4. The ..... tool is used to select a specified area that you want to focus on and removes the unwanted parts.
5. Some of the tools have a small ..... at the bottom right corner.
6. The ..... tool creates a blend of two or more colours.

HINTS • Tools panel • White triangle • Content aware patch • Swatches • Gradient • Crop

B. State True or False.

1. Lasso Tool is a bunch of three very useful tools that are used for freehand selections. ☐
2. The Menu bar is present on the bottom of the Photoshop window. ☐
3. Marquee is a blinking selection border. ☐
4. There are three types of Selection tools in Photoshop. ☐
5. The move tool is use to drag the selected part of an image to a new location in the image. ☐

C. Application-based questions.

1. Poonam is a wildlife photographer. In one of her photographs, she wants to focus only on one lion in the pride and remove the rest. Which tool can she use?

.....

2. Vidhya has inserted an image of penguins in her file. She wants to select an irregular area of the image. Suggest the tool that will serve her purpose.

.....

SECTION - B

A. Multiple-choice questions.

1. Which is the latest version of Adobe Photoshop?

   a. CS5 b. CS6 c. CC

2. Who invented Photoshop?

   a. Thomas Knoll b. Thomas Edison c. Thomas Cook

3. Which bar shows different options of the currently selected tool?

   a. Tool bar b. Options bar c. Menu bar

4. What is the default extension of an Adobe Photoshop file?

   a. .psd b. .phd c. .psh

5. Which tool is used to select the adjacent areas of the same colour in an image?

   a. Magic wand b. Lasso c. Crop

6. Which key combination is used to deselect the selected area?

   a. Ctrl+Q b. Ctrl+D c. Ctrl+Z

B. Answer the following questions.

1. What is Adobe Photoshop? Describe any two features of Adobe Photoshop.

2. Name the three options used with the Magic Wand Tool.

3. What do you understand by Cropping?

4. Differentiate between the Rectangular Marquee and Lasso Tool.

ACTIVITY SECTION

LAB SESSION

Perfection Through Practice

Create an image depicting the view of a forest in Photoshop CC.

- Open Adobe Photoshop CC and create a new file by selecting the **File > New** option.
- Select the **Gradient Tool** from the **Tools** panel. Select the **Foreground to Background** gradient from the **Gradient picker** in the **Options** bar.
- Now, click on the selected **Gradient**. The **Gradient Editor** dialog box will appear. Click on the **Color Stop** slider. The **Color** option will be enabled.
- Now, click on the Color box next to the **Color** option. The **Color Picker (Stop Color)** dialog box will appear.
- Select the sky blue color and click on **OK**. Click on the **Linear Gradient** option in the **Options** bar.
- Click and drag the mouse pointer in the vertical direction to create the sky background for your image.
- Search the Forest and Animal clipart images on the web and store them on your computer.
- Open the Forest clipart image in your file by clicking on the **File > Open** option. Select the Forest image and choose **Edit > Copy**. Now Paste it on the sky background image by selecting the **Edit > Paste** option.
- Open the Animal clipart image by selecting the **File > Open** option. Now use the **Magnetic Lasso Tool** to extract the image of the animal only.
- Press **Ctrl+Enter** to fix the selection nodes on the animal. Now copy and paste it on the sky background image.
- Use the **Move Tool** to place the animals at the desired position. Likewise repeat the steps 12 to 14 to paste other animals.
- The image depicting the Forest View is ready. Now save it by using the **File > Save** option.

GROUP DISCUSSION

For Concept Clarity

Discuss the various types of **Selection Tools**.

ONLINE LINK

Looking For More

To know more about Photoshop, visit the website:

http://www.photoshop.com/tutorials

CHAPTER 5

MORE ON PHOTOSHOP CC

LEARNING IN THIS CHAPTER

- Painting tools
- Retouching tools
- Using Image menu
- Drawing and Type tools
- Navigation tools
- Layers

Adobe Photoshop is basically used for retouching and editing the photographs to make them look attractive and appealing. Adobe Photoshop provides various Painting tools to retouch and edit an image, which are as follows:

PAINTING TOOLS

Figure 5.1: **Painting Tools**

BRUSH TOOL

Figure 5.2: **Brush Tool**

The Brush Tool is a basic tool that is used to create smooth strokes of the foreground colour in an image. You can set various options in the **Options** bar, which include:

Brush Preset picker: This option provides you with a large number of predesigned brush presets that you can use. You can also change the diameter of the brush by moving the size slider.

Mode: It allows you to select and set the painting mode from the drop-down list.

Opacity: This option allows you to set the level of transparency of the brush strokes.

Flow: The flow option determines how quickly the Brush tool applies the paint.

Follow these steps to use the Brush Tool:

- Open an image. Right click on the **Quick Selection Tool** and choose the **Magic Wand Tool** with tolerance settings of **32** and select the area where you want to apply the **Brush Tool** (as the grass area is selected in Figure 5.3).
- Select the **Brush Tool** from the **Tools panel** or press **B** on the keyboard.
- Select the desired brush style from the **Brush Preset picker**, say, **Grass** in the **Lagacy Brushes** option.

Figure 5.3: **Selecting the Grass Area in the Image**

- Click on the **Set foreground color** box in the **Tools** panel. The **Color Picker (Foreground Color)** dialog box will appear. Select the desired colour. Here, dark green colour has been chosen.
- Similarly, select light green background colour from the **Set background color** box. Click **OK**.
- Drag the pointer on the image while holding down the left mouse button so as to apply brush strokes.
- Notice the grass strokes being made on the selected portion of the image.
- Press **Ctrl+D** to deselect the selection.

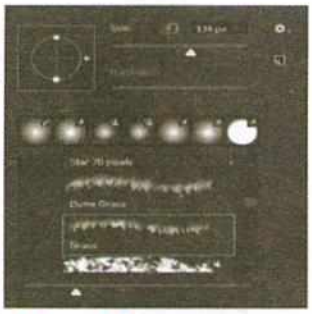


Figure 5.4: Brush Preset Picker

Figure 5.5: Brush Strokes made with Green Color

Tips

Foreground Colour is used to paint, fill, and also used for stroke selections. Background Colour is used to make Gradient fills and fill colour in the erased areas of the image. By default, the foreground colour is black and the background colour is white.

Pencil Tool

The Pencil Tool is used to draw freehand drawings with hard edges.

- Right-click on the **Brush Tool** and choose the **Pencil Tool** from the Tools panel.
- Select the required options for the tool from the **Options** bar.
- Click on the **Set foreground color** box in the **Tools** panel.
- The **Color Picker (Foreground Color)** dialog box will appear. Select the desired colour. Click **OK**.
- Drag the pointer to draw a desired shape as shown in Figure 5.6.

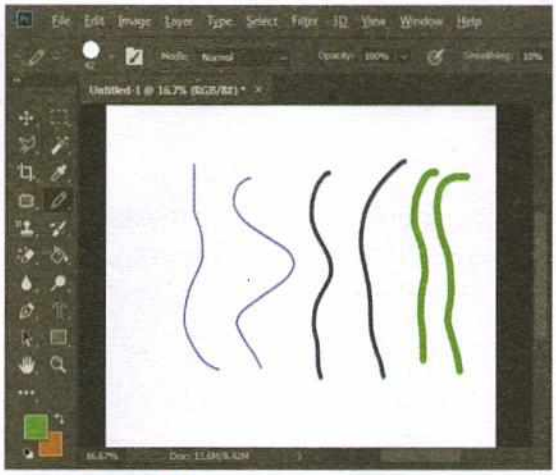


Figure 5.6: Using the Pencil Tool

Color Replacement Tool

This tool replaces the existing colour of an image with the foreground colour.

- Right-click on the **Brush Tool** and select the **Color Replacement Tool** from the flyout menu that appears.

Know the Fact

A brush can be upto 5000 pixels wide.

Quick View

Press the **Caps Lock** key if you want to see the brush size.

Let's Know More

Adobe Photoshop is available in 29 languages.

Know the Fact

Selections can be saved for future use. To save the selections, click on the **Select** menu > **Save Selections**. In 'Save Selections' dialog box, specify any name to your selection.

Quick View

To increase and decrease the brush size, press] and [keys respectively from the keyboard.

Let's Know More

The **History Brush Tool** paints a copy of the state or snapshot selected in the History panel into the current image window, whereas the **Art History Brush Tool** paints with styled strokes using the selected state or snapshot.

- The pointer shape changes to the target symbol ⊕. Choose an appropriate colour, say blue, from the **Set foreground color** box in the Tools panel.
- Now, drag the mouse pointer over the area of the image whose colour is to be replaced, such as the big red mushroom in Figure 5.7. As you drag the cursor, Photoshop continuously samples the colour that is under the cross hair in the centre of the mouse pointer and this colour will be replaced with the current foreground colour.

You can also select the replacement colour from the image itself. To do so:

- hold down the **Alt** key and the left mouse button to select any appropriate colour from the image. You will notice that the colour changes in the **Foreground color** box in the **Tools** panel.
- you can also specify various settings to control the behaviour of the **Color Replacement Tool** in the **Options** bar. Set the appropriate values for **Tolerance** and **Limits** in the **Options** bar.

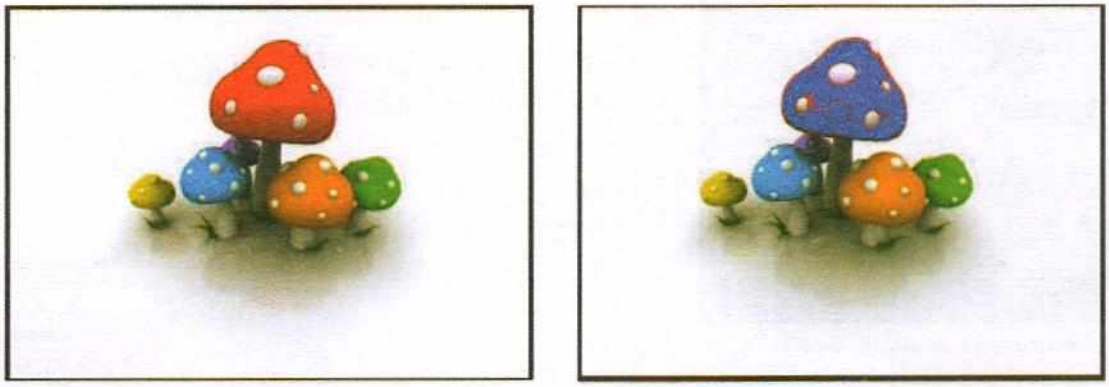


Figure 5.7: Use of Color Replacement Tool with Blue Foreground Color Selected

NOTE

Tolerance determines how closely the colours should be matched for sampling. The default value is 30%. Specifying a higher value selects the wide range of colours, whereas specifying a lower value selects the colours that are closer to the pixel.
Limits allow you to specify whether only the colour of the adjacent pixels containing the sample colour should be replaced or the colour of the non-adjacent areas should be replaced as well.

Mixer Brush Tool

This tool allows you to paint in a more realistic way by mixing colours on the canvas, combining colours on a brush and varying paint wetness accross a stroke.

- Right-click on the **Brush Tool** and select the **Mixer Brush Tool** from the **Tools** panel.
- Press the **Alt** key from the keyboard and click on a point in the image from where you want to load the paint for the brush. Here, you have loaded the brush with the blue colour of the background. Alternatively, you can select a foreground colour from the **Set Foreground color** box in the **Tools** panel.

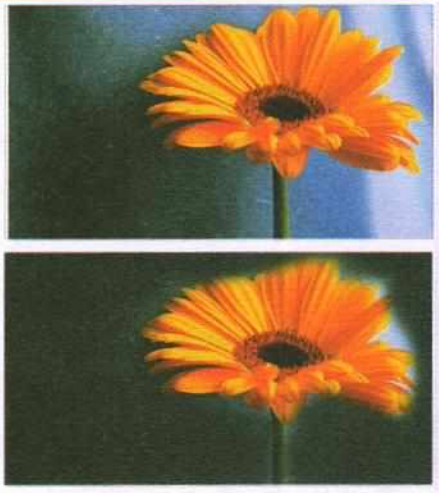


Figure 5.8: Use of Mixer Brush Tool

- You will observe that the **Current brush load** Swatch in the **Options** bar reflects the colour or the pattern that you have chosen from the canvas.
- Drag the mouse pointer on the image to paint with a mixture of Current brush load and the existing colour of the image as shown in Figure 5.8.

NOTE

The outcome of the **Mixer Brush Tool** depends on the values of Wet, Load, Mix, and Flow options in the **Options** bar.

RETOUCHING TOOLS

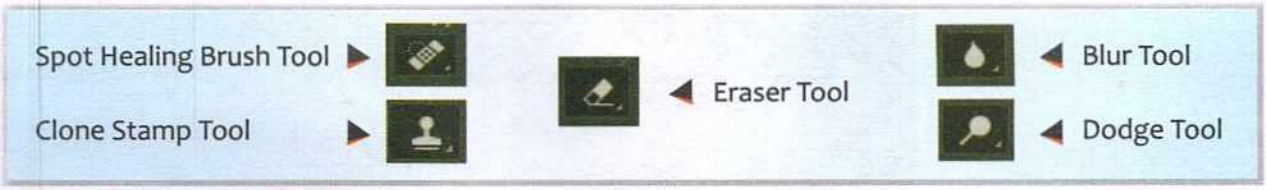


Figure 5.9: Retouching Tools

These tools help us to change the appearance of the selected areas of the image.

Figure 5.10: Spot Healing Brush Tool

SPOT HEALING BRUSH TOOL

This tool helps us to repair imperfections like blemishes, dark spots, scratches, or other unwanted elements from an image.

- Open an image. Select the **Spot Healing Brush Tool** .
- Choose the brush size from the **Options** bar.
- Click and drag over the spots to get it repaired.

Figure 5.11: Effect of Spot Healing Brush Tool

NOTE

Healing Brush Tool also works in a similar manner. The only difference between 'Spot Healing Brush Tool' and 'Healing Brush Tool' is that in the latter you have to define a source point and then paint over an imperfection. Press **Alt** key and click on the image to define a source point.

Patch Tool

Using **Patch Tool**, you can select the unwanted elements from an image and replace them with the matching content from the surroundings. This tool is quite similar to the Healing Brush tool except that with the Patch tool, you can define that selection where you want to apply the effects. To use this tool:

- Right-click on the **Spot Healing Brush Tool** and select the **Patch Tool** from the Tools panel.
- In the **Options** bar, click on the drop-down list adjacent to the **Patch** option and choose the **Content-Aware** patch mode from the displayed list.

Figure 5.12: Use of Patch Tool

- Drag a line with the Patch Tool around the part of the image to be replaced.
- Now, drag the selection over the area from which you want to generate the fill.

Content Aware Move Tool

This tool is used to select and move or extend any part of an image to another area within the same image without the use of layers and masks. As you move, the area left behind is filled using matching elements from the existing background.

- Right-click on the **Spot Healing Brush Tool** and select the **Content-Aware Move Tool** from the **Tools** panel.
- Drag the mouse pointer to select the area that is to be moved.
- Now, click and drag the selected area to a different location. Here, you have selected the cub.
- You will observe that the hole that is left behind gets filled with the matching elements from the surroundings.

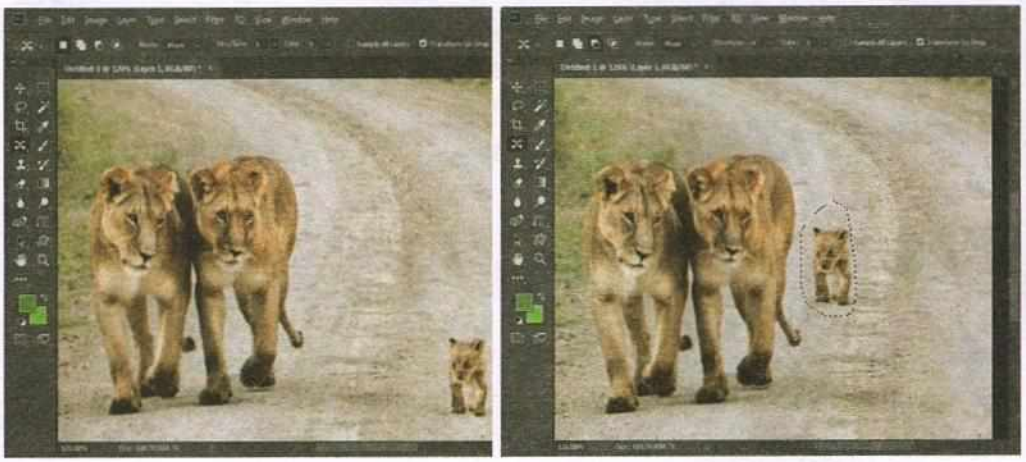


Figure 5.13: **Use of Content Aware Move Tool**

CLONE STAMP TOOL

This tool allows you to duplicate the part(s) of an image by taking the sample pixels from an image and cloning them onto another area. Cloning works better than copying as it retains soft edges on details and gives more realistic duplicate image.

Figure 5.14: **Clone Stamp Tool**

- Open an image and select the **Clone Stamp Tool** .
- Set the brush type, change its size or hardness, select the blend mode of your choice, set the opacity for stroke, and other options for the tool in the **Options** bar.
- To define a sampling source, hold down the **Alt** key. The cursor shape changes to the target symbol ⊕. Click on the area of the flower image to be cloned.
- Click and drag along the area where the cloned image is to be placed.
- While you drag, a plus sign + appears on the original flower image while a corresponding circle appears on the cloned image.
- Save the image and close it.

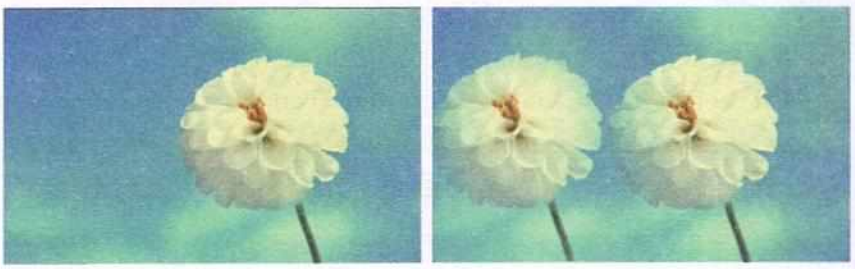


Figure 5.15: **Use of Clone Stamp Tool**

The **Pattern Stamp Tool** allows you to fill an area with a selected pattern. It works quite similar to the **Clone Stamp Tool** but the only difference is that after defining the appropriate options in the **Options** bar and selecting the pattern from the **Pattern picker**, you do not have to select the source point in the image. Place the pointer inside the area to be painted with a pattern and drag the mouse.

Let's Know More

Path and **Shape** tools are also termed as Drawing tools because they help in making complex shapes and drawings.

BLUR TOOL

Figure 5.16: **Blur Tool**

The Blur Tool is a great way to change the focus of the selected portion of the image. This tool softens the selected area of an image by giving it a blurred effect.

- Open any image in Photoshop.
- Click on the **Blur Tool** and select the desired Brush size and style from the **Brush Preset picker**. Specify the Effect Mode and set the strength for stroke from the **Options** bar.
- Drag the mouse pointer over the area that you want to blur.

Figure 5.17: **Use of Blur Tool**

Let's Know More

The **Eraser Tool** is used to erase pixels and changes them to either the background colour or transparent.

Sharpen Tool

The Sharpen tool is the contrast of the Blur tool. This tool lets you improve the clarity of your image by sharpening the outlines of an image more prominently.

Smudge Tool

The Smudge tool as the name implies, allows you to smudge the image around as if you have dragged your finger through the wet paint. This tool picks up the colour from where the stroke begins and spreads it in the direction you drag your mouse.

Figure 5.18: **Use of Smudge Tool**

Let's Know More

The **Dodge tool** is used to lighten the areas of an image, whereas the **Burn tool** is used to darken the area of an image.

NOTE

The Sharpen Tool and Smudge Tool are used in the same manner as the **Blur** tool.

DRAWING AND TYPE TOOLS

Figure 5.19: **Drawing and Type Tools**

Let's Know More

The **Path Selection Tools** are used to make shape or segment selections showing anchor points, direction lines, and direction points.

TYPE TOOL

Figure 5.20: Type Tool

The Type Tool is used to add text in an image. This tool provides plenty of settings to control the text properties.

- Click on the **Type Tool**
- Select the option like Font, Size, Color, Bold, Underline, or Italics from the **Options** bar.
- Click on the image where you want to add text.
- Type the desired text.
- Click the checkmark button on the **Options** bar to end text editing.

Warping Text

Warping is used to position the letters or text in different shapes. To use the Warp option, follow these steps:

- Select the **Type Tool** from the **Tools** panel and enter the text.
- Select the text and click on the **Create warped text** option from the **Options** bar.
- The **Warp Text** dialog box will appear as shown in Figure 5.21.
- Click on the drop-down arrow of the **Style** option and select the **Fish** style.
- Select the orientation of warp style–Horizontal or Vertical. If needed, specify values for additional options as given in the **Warp Text** dialog box.
- Click on the **OK** button to apply the Warp style.
- With the help of the **Move** Tool, place the text where you want to position it. Save your file for future use.

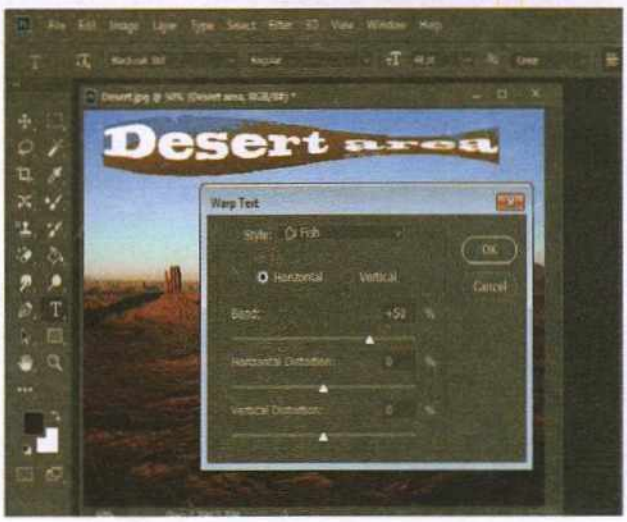


Figure 5.21: Creating Warping Text

SHAPE/LINE TOOLS

Adobe Photoshop provides various types of Shape tools for drawing both filled as well as unfilled shapes, including rectangles, ellipses, polygons, and custom shapes.

Figure 5.22: Using the Custom Shape Tool

- Open a new file.
- Right-click on the **Rectangle Tool** and select the **Custom Shape Tool**.
- Click on the drop-down arrow of the **Shape** menu in the **Options** bar.
- Select the required shape. For example, Flower 5.
- To access more shapes, you can click on the **Gear** icon on the right side of the Shape panel.

Figure 5.23: Options Bar

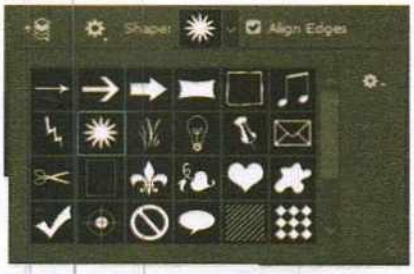


Figure 5.24: Shape Dialog Box

- Select the desired colour from the **Fill** option in the **Options** bar to fill colour in the shapes.
- Drag the mouse to draw the selected shape and after adjusting the size release the mouse button.

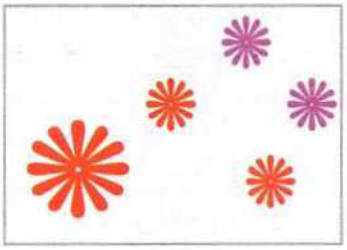


Figure 5.25: Different Flower Prints in Different Colours

Tip

The procedure for making different shapes is the same as making the Custom shape.

NAVIGATION TOOLS

Figure 5.26: Navigation Tools

There are two types of Navigation tools: **Zoom Tool** and **Hand Tool**. The Zoom tool is shaped like an old-fashioned magnifying glass and the Hand tool is shaped like a hand.

ZOOM TOOL: This tool lets you zoom in by clicking the Zoom tool on the image to view its magnified size or zoom out by pressing the **Alt** key on a keyboard while clicking the image. Observe the symbol within the magnifying glass, the cursor will change from a plus sign to minus sign.

HAND TOOL: When you zoom in, the image is usually too large to see it all at once. Hold down the left mouse button and move the **Hand tool** to move the image within the window.

Figure 5.27: Hand Tool

Tips

- Use **Ctrl +,** to Zoom In and **Ctrl -,** to Zoom Out.
- While an image is zoomed in, you can move the image by dragging the mouse while holding down the **Spacebar** key. The current icon will change to **Hand Tool** till the Spacebar key remains pressed.

USING IMAGE MENU

IMAGE ADJUSTMENT OPTIONS

Image Adjustment options are just like setting the colour settings of your television. Photoshop allows you to set the colour levels, contrast, brightness, and many more

Know the Fact

Adobe Photoshop provides a spelling checker facility. Go to **Edit > Check Spelling** to check the spelling mistakes.

Let's Know More

Besides Photoshop, Adobe company has also developed and published Abobe Photoshop Elements, Adobe Premiere Elements, and Photoshop Lightroom. Collectively these are branded as "The Adobe Photoshop Family".

Let's Know More

The **Red Eye Tool** removes the red reflection caused by a flash while clicking a photograph.

Let's Know More

The **Rotate View Tool** is used to rotate the canvas, non-destructively.

Know the Fact

The **Sponge Tool** is used to desaturate or saturate a part of an image. To desaturate means to reduce the intensity or richness of a colour, whereas saturate means to add more vibrant colours or brighten a picture.

settings of the image. Figure 5.28 shows the different settings options.

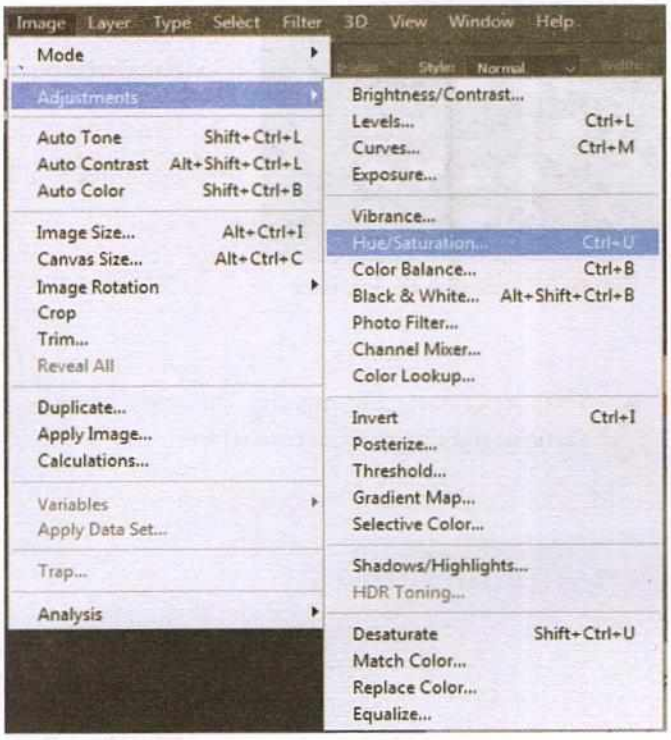


Figure 5.28: **Different Setting Options**

ADJUSTING HUE/SATURATION

This powerful tool is used to adjust the hue (colours in the image) and the saturation (the intensity of the colours), and also gives you control over the lightness. Follow the given steps to apply this tool on an image:

- Open an image in Photoshop CC.
- Select the image or a part of it by using the **Rectangular Marquee Tool**. Click on the **Image** > **Adjustments** > **Hue / Saturation** or press **Ctrl+U**.
- The **Hue/Saturation** dialog box will appear. Adjust the **Hue** settings to **-28, Saturation** to **+55** and **Lightness** to **+16**.
- You will notice the change in the colour of the selected image.

Figure 5.29: **Original Image**

Figure 5.30: **Hue/Saturation Dialog Box**

Figure 5.31: **Image after Changing the Hue/Saturation**

LAYERS

Layers are the transparent sheets that can hold objects and are stacked on top of each other. When you have a number of objects, it is always better to distribute the objects in different layers as it makes the work process much easier. You can draw and edit objects on one layer without affecting the objects on another layer. You can add a number of layers, hide and lock layers, change the position of layers, delete layers, and even customise the layers as well.

The Layers panel displays a small thumbnail view of all the layers in an image.

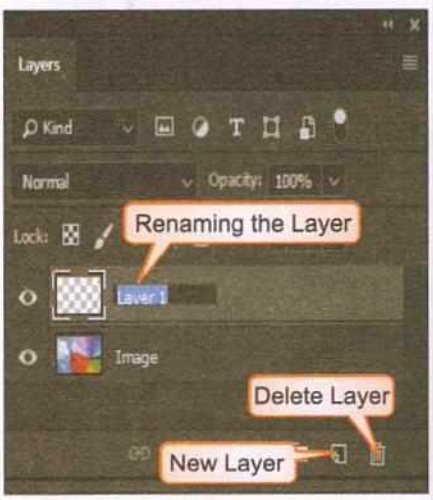


Figure 5.32: **Creating and Deleting a Layer**

ADDING A NEW LAYER

A new layer is created when you paste an object in your image.

To add a new layer, follow the given steps:

- Select the **Layer > New > Layer** option.
- The **New Layer** dialog box appears.
- Define name in the **Name** text box, and click **OK**.

Tips

You can also add a new layer by clicking on the **Create a new layer** button at the bottom of the **Layers** panel.

Know the Fact

The **Note Tool** is used to make notes that can be attached to an image.

RENAMING A LAYER

To rename a layer, double-click on the layer name in the Layers panel and type a new name.

DELETING A LAYER

- Select the layer that you want to delete.
- Right-click on it and select the **Delete Layer** option from the Shortcut menu.

Know the Fact

The **Ruler Tool** is used to measure the distances and angles in an image.

LAYER EFFECT AND STYLES

Photoshop provides a variety of effects, such as shadows, glow, bevel, emboss, and overlay. These effects change the appearance of the layer' contents. Layer effects are linked to the layer contents. When you move or edit the contents of the layer, the same effects are applied to the modified contents. For example, if you apply a drop shadow to a text layer and then add text, the shadow is added automatically to the new text. To apply the layer effects, follow the given steps:

Figure 5.33: **Selecting Layer Style Option**

- Select a layer in the **Layers** panel.
- Click on the **Add a layer style** button at the bottom of the **Layers** panel.
- Choose an effect from the displayed list.
- The **Layer Style** dialog box appears. Select the desired effect by clicking the corresponding check boxes on the left side of the dialog box.
- Likewise, select the appropriate options for the selected effect on the right side of the dialog box.

Quick View

You can create a new layer by using the **Shift+Ctrl+N** key combination.

- Click on **OK** to apply the effect. Observe that the applied effects will be reflecting below the layer name in the **Layers** panel.

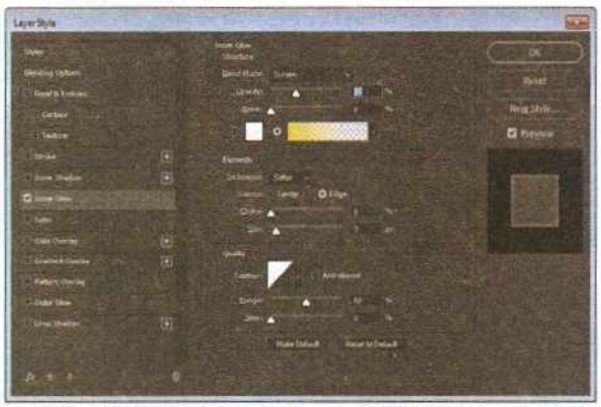


Figure 5.34: **Layer Style Dialog Box**

Let's Know More

Photoshop provides multiple Pen Tools that let you draw smooth-edged paths. The standard **Pen Tool** draws with great precision whereas the **Freeform Pen Tool** helps you make free hand drawings.

RECAP

- The Brush tool is a basic tool used to create smooth strokes of the foreground colour in an image.
- Pencil tool is used to draw freehand drawings with hard edges.
- Mixer Brush tool allows you to paint in a more realistic way by mixing colours on the canvas, combining colours on a brush, and varying paint wetness across a stroke.
- Spot Healing Brush Tool is used to repair imperfections like blemishes, dark spots, scratches, or other unwanted elements from an image.
- Patch Tool is used to select the unwanted elements from an image and replace them with the matching content from the surroundings.
- Content-Aware Move Tool is used to select and move, or extend any part of an image to another part of the same image and fill the area left behind using matching elements from the existing background.
- Clone Stamp Tool allows the user to duplicate the part(s) of an image by taking the sample pixels from an image and cloning them onto another area.
- The Blur Tool is a great way to change the focus of the selected portion of the image by giving it a blurred effect.
- Warping is used to position the letters or text in different shapes.
- Layers are the transparent sheets that can hold objects and are stacked on top of each other.

BRAIN DEVELOPER

SECTION - A

A. Fill in the blanks.

1. Adobe Photoshop is basically used for..... and ..... photographs to make them look attractive.
2. ..... Tool allows you to paint in a more realistic way by mixing colours on the canvas, combining colours on a brush, and varying paint wetness across a stroke.
3. Press ..... key if you want to see the brush size.
4. By default foreground colour is ..... and background colour is .....
5. ..... tool replaces the existing colour in an image with the foreground colour.
6. The ..... tool is used to select the unwanted elements from an image and replace them with the matching content from the surroundings.
7. There are two types of Navigation tools : ..... and ..... tool.

HINTS

- Hand
- Editing
- Zoom
- Caps Lock
- Black
- White
- Color Replacement
- Patch
- Mixer Brush
- Retouching

B. State True or False.

1. Warping text is used to position the letters or text in different shapes. ☐
2. Text Tool is used to add text to the image. ☐
3. A brush can be upto 2500 pixels wide. ☐
4. The Content-Aware Move Tool moves any part of a picture to another area by shifting it to another layer. ☐
5. Zoom Tool lets you see a magnified view of a picture. ☐
6. Path Tool helps in making complex shapes and drawings. ☐
7. Spot Healing Brush Tool is used to repair imperfections. ☐

C. Application-based questions.

1. Ali has designed a greeting card in Photoshop CC. He wants to change the colour of flowers from red to pink. Suggest him the suitable tool to do so.

.....

2. Vikram has inserted an image in a new file. He wants to duplicate the part of an image on the same layer. Suggest him the right tool to do so.

.....

SECTION -B

D. Multiple-choice questions.

1. Which key is pressed on the keyboard to define the source point while using the Healing Brush Tool?
   a. Shift b. Alt c. Ctrl
2. Which key helps us to move the image while the image is zoomed in?
   a. Ctrl Key b. Spacebar Key c. Shift Key
3. Which tool is used to create smooth strokes of the foreground colour?
   a. Color Replacement b. Path Type c. Brush
4. Which option is used to position the letters or text to different shapes?
   a. Color Replacement b. Brush c. Create Warped Text
5. Which tool is used to move the zoomed picture within the window?
   a. Hand tool b. Zoom tool c. Both
6. During Image Adjustments, which option is used to change the intensity of the colours of an image?
   a. Colour Setting b. Color Replacement c. Adjustments

E. Answer the following questions.

1. What is the use of Painting Tools? Name any five Painting Tools.

2. Differentiate between the Spot Healing Brush Tool and Healing Brush Tool.

3. What is the use of the Hue/Saturation dialog box?

4. What is the use of the Mixer Brush Tool? How can you apply it to an image?

5. What do you understand by the Warping of text?

6. Explain the utility of the Content-Aware Move Tool.

7. What do you understand by layers?

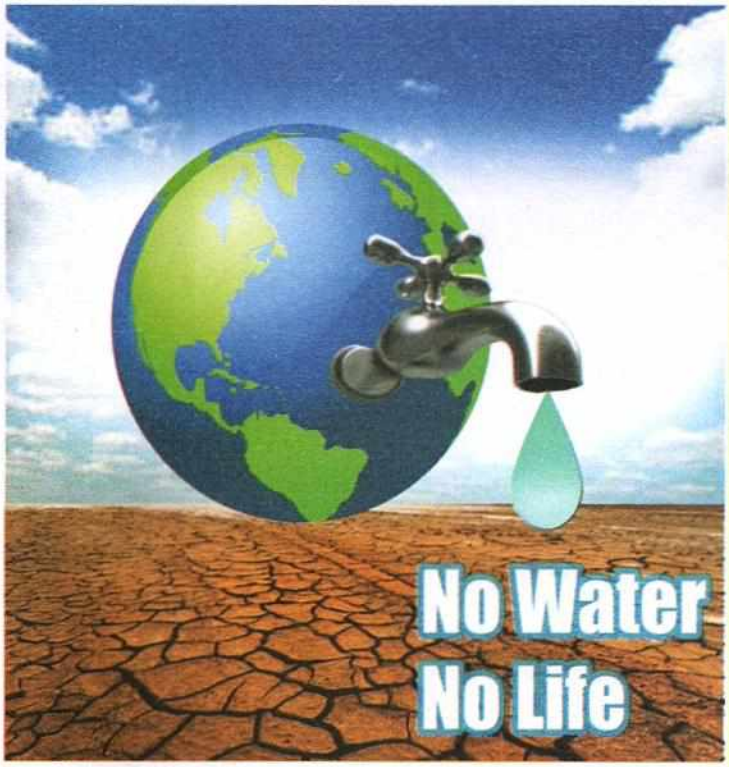
ACTIVITY SECTION

LAB SESSION

Perfection Through Practice

A. Create a Poster on 'Water Conservation' by using various tools in Photoshop CC.

- Open Adobe Photoshop CC and create a new file by selecting the **File > New** option.
- Search the 'Sky' image on the internet and store it in your computer.
- Open the sky background image by selecting the **File > Open** option.
- Likewise, open a 'Drought scene' image. Select the required part of it by using the **Marquee Tool**. Copy the selected part and paste it on the sky background image.
- If required, press **Ctrl+T** or select the **Edit > Free Transform** option to apply transformation on the selected area of the image. Drag the corner handle to reduce its size and place it at the desired position.
- Likewise, insert the images of the 'Earth' and a 'Tap' as shown in the screenshot.
- Right-click on the **Rectangle Tool** and select the **Custom Shape Tool** from the drop-down list.
- Click on the drop-down arrow of the **Shape** option on the **Options** bar and select the **Raindrop** shape. Drag the pointer to draw the Droplet of water under the Tap.
- Right-click on the Droplet layer and select the **Rasterize Layer** option from the drop-down list.

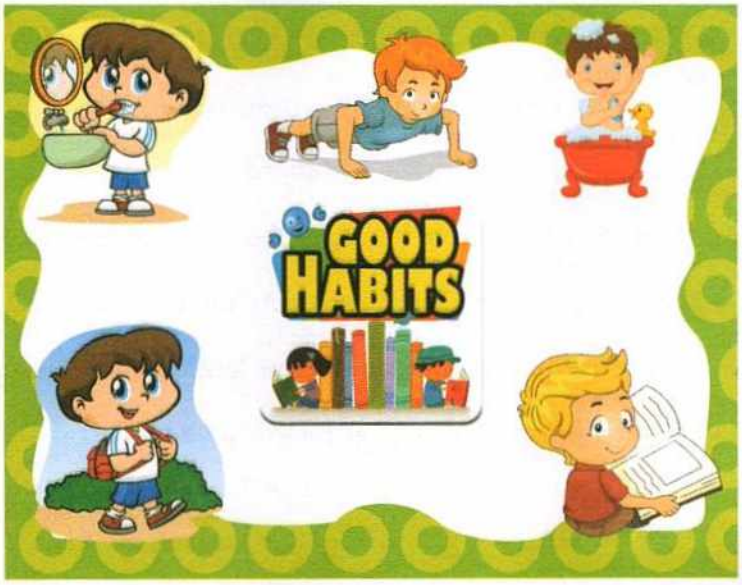


- Fill it using the **Gradient Tool.**
- Click on the **Type Tool** and type the text 'No Water No Life' at a suitable place on the image.
- Apply the **Drop shadow** effect to the text by clicking on the **Add a layer style** button at the bottom of the **Layers** panel.
- **Save** the file by giving it a suitable name.

B. Open and Edit an image depicting the Fun Time Scene in Photoshop CC.

- Search a relevant image by typing 'Playing kids' in the search box and open it in Photoshop.
- Using **Polygonal Lasso Tool,** select the boy holding the kite in the image.
- Choose **Select > Inverse** or Press **Ctrl+Shift+I** to invert the selection.
- Select the **Blur Tool** from the Tools panel and drag the mouse pointer to apply the blurred effect to the selection. Press **Ctrl + D** to deselect the image of the boy.
- Select the **Color Replacement Tool** from the **Tools** panel. Choose blue as the foreground colour and drag the mouse pointer to replace the colour of the boy's trouser.
- Use the **Clone Stamp Tool** to duplicate the clouds in the image. Clone these clouds to fill the empty area in the sky.
- Using **Polygonal Lasso Tool,** select the kite in the image.
- Now select the **Image > Adjustments> Hue/Saturation** option and adjust the **Hue** value to +14, **Saturation** to +17 and **Lightness** to -16 in the **Hue/Saturation** dialog box. Click on **OK**. Press **Ctrl+D** to deselect the selection.
- Right-click on the **Spot Healing Brush Tool** and select the **Content-Aware Move Tool** from the **Tools** panel.
- Drag the mouse pointer to select the girl on the extreme right of the image. Click and drag to place her on the left.
- Now select the **Smudge Tool** from the **Tools** panel and drag the mouse pointer over the boundary line of the kite to give it a smudging effect.
- **Save** the file by giving it a suitable name.

C. Create a poster on 'Good Habits' in Photoshop CC. Apply the suitable effects that you have learnt in the chaper.



HINTS
- Lasso Tool
- Magnetic Lasso Tool
- Paint Bucket Tool
- Move Tool

GROUP DISCUSSION

For Concept Clarity

Conduct a group discussion on the given topics:

- **Spot Healing Brush Tool** vs **Healing Brush Tool**
- **Clone Stamp Tool** vs **Pattern Stamp Tool**

ONLINE LINK

Looking For More

Online Link for More on Photoshop:
https://www.guru99.com/photoshop-tutorials.html

1 WORKSHEET

Chapters 1-5

A. Fill in the blanks.

1. When two users have simultaneous conversation via internet, it is called .....
2. Microsoft Access is a ..... database.
3. ..... is the process of removing portions of a photo to create focus or strengthen the composition.
4. A ..... key is a sort of check, which uniquely identifies each record in a table.
5. ..... are used to display the selected data in a printable form.
6. The ..... tool is used to draw free hand drawings.

HINTS • Primary • Cropping • Relational • Pencil • Reports • Conferencing

B. State True or False.

1. PAN is a kind of network that connects two or more computers located at far away places. ☐
2. The Dodge tool is used to lighten the areas of an image. ☐
3. Lasso tool is used selecting objects with complex edges. ☐
4. If more than one field is combined to form a primary key, then it is called a Composite key. ☐
5. The rows in a table are called Fields. ☐
6. A Query is a database object that allows you to to retrieve information from one or more database tables. ☐

C. Identify these tools and write their names in the given space.






D. Match the following shortcut keys.

To select the Move Tool	Ctrl + Alt + Z
To undo more than one action at a time	Alt + F4
To save the Database	L
To select the Lasso Tool	V
To quit Microsoft Access	Ctrl + S

2 WORKSHEET

Chapters 1-5

A. Choose the best answer.

1. The ..... are the certain sets of rules followed for data transferred over the network.
   a. Protocols b. Topologies c. None of these
2. What do you call the selected area, indicated on the screen with blinking selection border?
   a. Clipboard b. Marquee c. Cropping
3. A ..... is a type of query that prompts you for input before it runs.
   a. Action Query b. Parameter Query c. Crosstab Query
4. A set of characters that represents a valid value is known as ..... .
   a. Records b. Fields c. Data
5. Which among the following tool is used to lighten the areas of an image?
   a. Burn Tool b. Dodge Tool c. Blur Tool

B. Answer in one word.

1. Name the topology in which each device is connected to a central computer. .....
2. What do you call the computers that are connected to the server? .....
3. What is the default extension of Adobe Photoshop file? .....
4. Into how many types is a database is categorised? .....
5. Write the full form of RDBMS. .....

C. Answer the following questions.

1. State the difference between Star topology and Tree topology.

   .....

2. Explain the importance of the Patch tool.

   .....

3. How is a Query useful?

   .....

4. What is a Database? Give examples.

   .....

5. What do you understand by Layers?

   .....

CHAPTER 6

REVIEW PYTHON

LEARNING IN THIS CHAPTER

- Features of Python
- Installing Python on your computer
- Working modes of Python
- Variables
- Data types in Python
- type() Function
- input() Function
- Operators in Python
- Precedence of Operators
- Comments in Python
- Types of control structures
- Conditional Statements

Any task that you perform in your daily life consists of three steps–**Input, Processing,** and **Output**. Have you ever tried to make a clay toy? Let us see the process of creating a toy by following the given steps:

- Take raw clay.
- Mould the clay in to the desired shape.
- Finally, colour the toy and leave it to dry for some time.

So, you see that the formation of a toy is divided into three major steps. Raw clay is the **Input**. Moulding, colouring, and drying is the **Processing**; and the clay toy is the **Output**.

Figure 6.1: Formation of a Toy

A computer also works in the same manner. First, a computer accepts the data input by the user; then it processes the data, and finally, it gives you the output. A computer performs all these operations with the help of programs. A program is a step-by-step sequence of instructions that help the computer to perform the given tasks.

There are many programming languages that you can use to write the programs. For example, Python, C, C++, Java, etc. In your previous class, you have already studied Python language. This chapter will help you in recapitulating the previously learned concepts of Python.

FEATURES OF PYTHON LANGUAGE

Python is a general-purpose, high-level programming language, which uses variables without declaration. It is:

- Simple and interactive
- Platform independent

- Case sensitive
- Object-oriented
- Interpreted language

All these features make Python a popular language. It was created by Guido Van Rossum at Centrum Wiskunde & Informatica (CWI). It can be used for designing Console apps (where text-based application is involved like in C and C++ language), Desktop applications, Web applications, Mobile applications, Machine learning, Robotics, and performing scientific computing.

Some popular applications that are designed using Python are:

You Tube | Google | Dropbox | Instagram | Quora | Bittorrent

INSTALLING PYTHON ON YOUR COMPUTER

After installing Python, you will get the following screen:

You can download various Python distributes from www.python.org/download

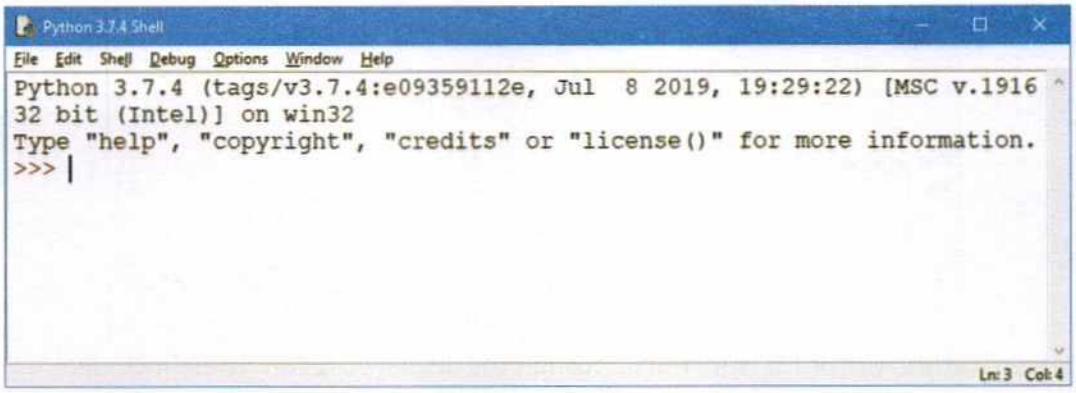


Figure 6.2: Python Shell

WORKING MODES OF PYTHON

Python works in two different modes:

- Interactive Mode
- Script Mode

INTERACTIVE MODE

In the Interactive mode of Python, the interpreter executes the statements, one by one. After the first statement is executed successfully, it moves to the next statement. It means that in the Interactive mode, the statements are executed, line by line, giving the output instantaneously.

To work in the Interactive mode, follow the process given below:

- Click on the **Start** button > scroll down to **Python 3.7 > IDLE(Python 3.7).**
- It will open the Python Shell Window where you will see the Python prompt (>>>)

Type the following commands in the interactive mode and see the output:

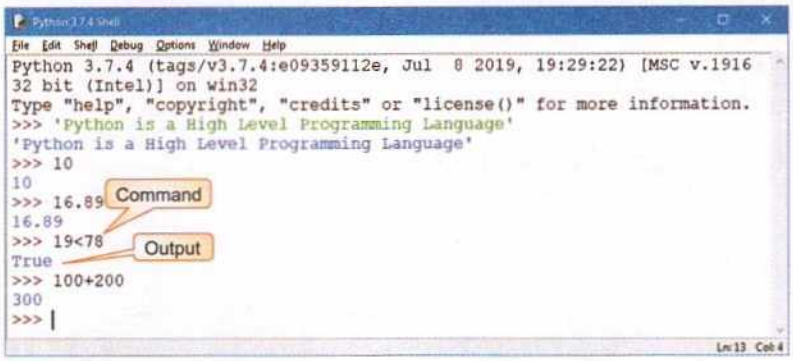


Figure 6.3: Interactive Mode

print() function

The print() function can be used in the Interactive mode as well as in the Script mode. It is used to display user-defined messages on the screen. Using the print function, you can also show the result of an expression, once it is processed.

There are many parameters or arguments that can be passed in the print() function. For example:

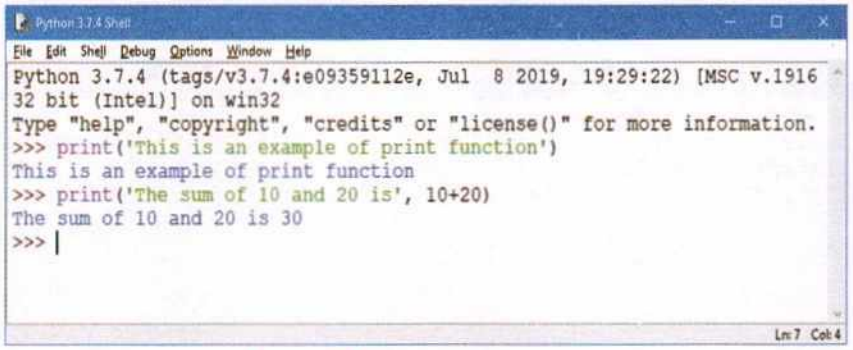


Figure 6.4: Using Print Function

You can use many separators with print() function to format the displayed result. These include:

- **',' (comma):** To print the next value after a space
- **'\n' (newline):** To print the new value in the next line
- **'\t' (tab):** To print the next value after a tab space (1 tab=5 spaces)

For example:

```
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul  8 2019, 19:29:22) [MSC v.
32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license()" for more informat
>>> print(10,20)
10 20
>>> print(10,'\t',20)
10      20
>>> print(10,'\n',20)
10
 20
>>>
```

Figure 6.5: Using Separators in Python

IDLE: IDLE is an integrated development environment for editing and running Python commands. If you type an arithmetic expression at the Python prompt and press the Enter key, the interpreter automatically evaluates it and displays the result. In this case, the interpreter acts as a simple calculator. It executes instructions one line at a time. In this mode, if you are evaluating an expression, it is not necessary to use the print() function. For example:

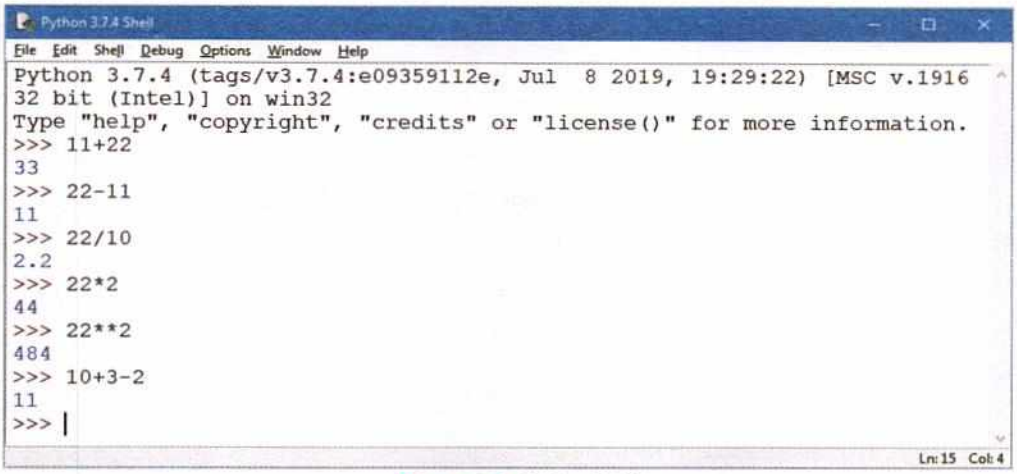


Figure 6.6: Using IDLE

SCRIPT MODE

In the Interactive mode, Python displays the results of expressions. In the Script mode, however, Python does not automatically display results. You use an interactive mode when you write small programs because the output in the Interactive mode is compressed between the statements and is not suitable for writing lengthy programs. So, to write lengthy programs, you use the Script mode in which you can create and edit programs. The files created in the Script mode can be saved for later use.

Writing a Program in Script Mode

To write a program in Script Mode, follow the given steps:

- Click on the **File > New File** option.
- A new file opens. Write the program and save your file by selecting the **File > Save** option.
- The files in Python are saved with the extension .py.
- Once your file is saved, you can open the same file by selecting the **File > Open** option and execute the file using **F5** key or click on **Run > Run Module** option.

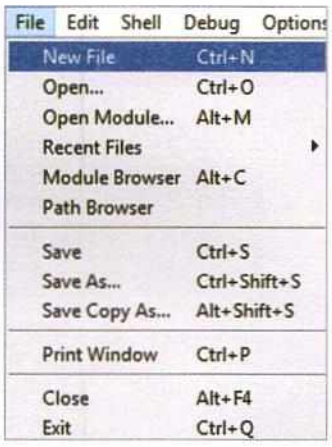


Figure 6.7: Opening a New File

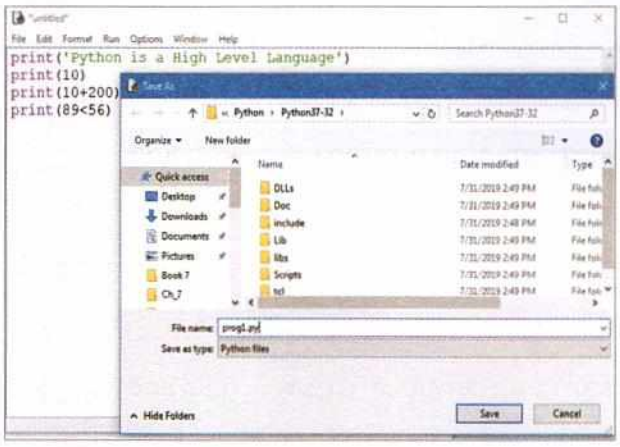
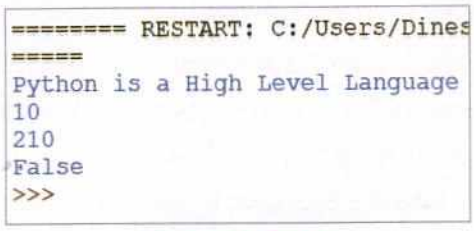


Figure 6.8: Saving a File

Figure 6.9: **Executing a File**



Displaying Output

Let's Know More

In Python programs, tab indentation is used in place of curly braces (used in other programming languages like C, C++, and Java), which brings clarity while reading codes.

VARIABLES

While creating programs in Python, you may require some storage location to hold the values to be used later. Whenever you need these values, you can draw them from the storage and use them for processing. These locations that are used to store values in memory are known as variables. A variable can store only one data value at a time. When a new value is stored in a variable, its previous value gets overwritten.

Example

```
a=10    # the value 10 is stored in the variable a.
b=20    # the value 20 is stored in the variable b.
c=a*b   # the product of a and b, i.e., 10*20=200 is stored in the variable c.
```

Know the Fact

The complete script is written in an editor, such as Notepad in Windows.

In the above example, a, b, and c are the variables that store the values 10, 20, and 100 respectively.

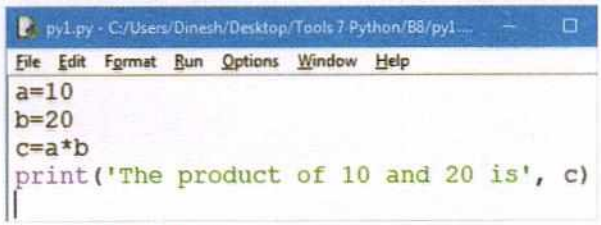
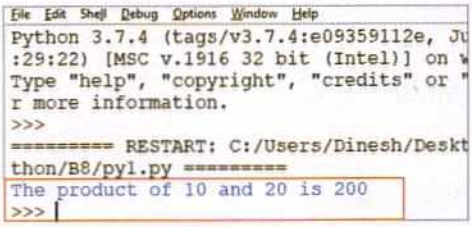


Figure 6.10: **Using Variables in a Program**



Printing the Values

Let's Know More

A keyword is a word that conveys a special meaning to the compiler.

RULES TO WRITE THE VARIABLE NAMES

When you are specifying any variable name, you need to follow certain rules:

- A variable name must start with an alphabet (capital or small) or an underscore (_).
- A variable name can consist of alphabets, digits, and underscore. No other character is allowed.
- A Python keyword cannot be used as a variable name.
- Space is not allowed in a variable name.

REMEMBER

- A variable name can be of any length.
- Variable names are case-sensitive (e.g., roll_num and Roll_num are different variable names).

Let's Know More

Python is an open-source software. This means that its source code is available to the public. You can download it, change it, use it, and distribute it. This property of a programing language is called Free/Libre and open source software (FLOSS).

Examples of some valid variable names are:
staffid, staff_address, minvalue, max_val, age1980, a45r
Following are the examples of some **invalid** variable names:

Invalid Variable Name	Reason
Book Name	Space is not allowed.
90Price	Variable name cannot start with a digit.
Book.Price	Dot is not allowed.
Book@Author	Special characters are not allowed.
min	'min' is a keyword in Python, so it cannot be used as a variable name.

DATA TYPES IN PYTHON

While writing a Python program, you need to work with different types of data. For example, if you have to enter the height of a person, you will be required to use the decimal value, but if you have to write the name of a person, then you need to use a string or a collection of characters.

The type of data value that can be stored in an identifier, such as a variable, is known as its data type. The data type of a value or a variable is an attribute that tells what kind of data a variable can have. Data types help in classifying different types of data values used in a program.

Python language has standard data types that are used to define operations performed on them and the storage method for each of them. The main data types used in Python are as follows:

S. No.	Data Type	Explanation
1.	int	It is used when you have to work with whole numbers (positive or negative). These can be : ➤ Plain integers: Store values of the range from -2147483648 to 2147483647 ➤ Long integers: Support the values that lie beyond the range of plain integers ➤ Bool: Represents logical values in the form of True and False. In Boolean, 0 represents False and 1 represents True.
2.	float	Represents floating point values
3.	string	Represents a collection of characters enclosed within single or double quotes

Examples of values and their data types are given below:

S. No.	Value	Type
1.	1500,-1986	int
2.	709,789, 17.234	float
3.	423.0	int
4.	'Python_Language'	str
5.	124<987	bool

type() FUNCTION

If you want to know what type of data you are working with, use the type() function. It is used to return the data type of a value. Look at the following example:

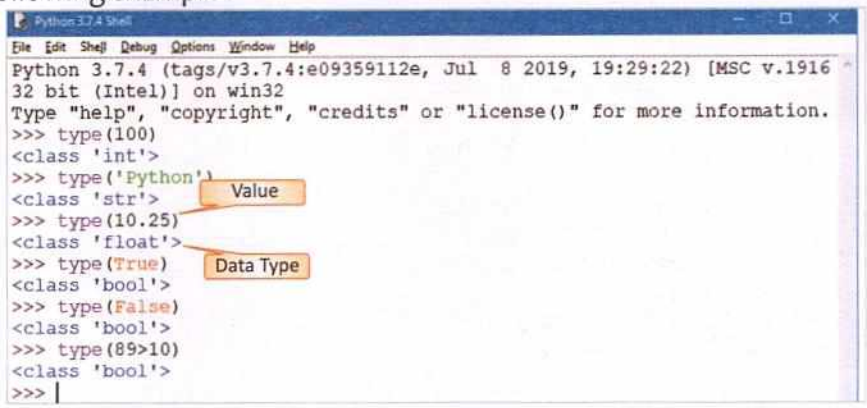


Figure 6.11: Using Type() Function

input() FUNCTION

In the earlier part of this chapter, you have used '=' (equal to sign), which is known as an **assignment** operator in Python. This operator is used to store a value in a variable. The value stored in a variable can be changed during the program execution. But to make the program user friendly, input() function is used, which allows the user to enter the value during the execution of the program as required.

Program 1:

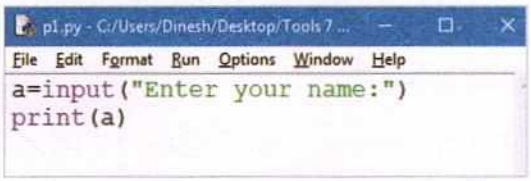
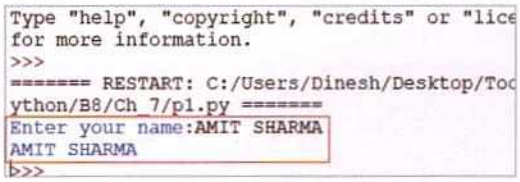


Figure 6.12: Using Input() Function With String Values



Output

Let us see what happens when you use input() function with integer and float values.

Program 2:

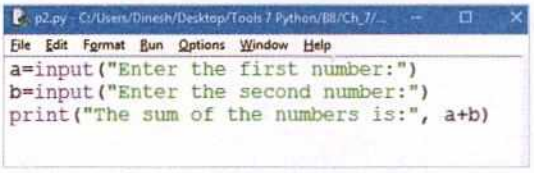
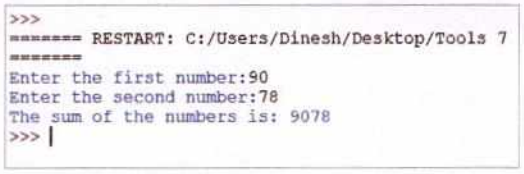


Figure 6.13: Using Input() Function to Add Integers



Numbers are Concatenated

In the above program, when you enter integer values and try to add them, the values are not added. Rather, they are joined together. Similarly, when you try to multiply these values, you will get an error as shown in the program given below.

Program 3:

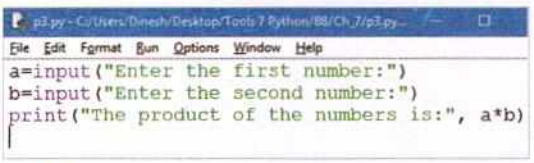
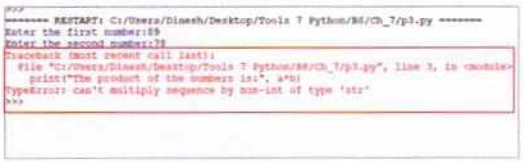


Figure 6.14: Using Input() Function to Multiply Integers



Displaying Error

This happens because the data type of a variable is a string by default, and a string can neither be added nor be multiplied. So, to convert this string into an integer or a float value, we use the functions int() and float(), respectively.

Program 4:

```
p4.py - C:/Users/Dinesh/Desktop/Tools 7 Python/B8/Ch_7/p4.py (3.7.4)
File Edit Format Run Options Window Help
a=int(input("Enter the first number:"))
b=int(input("Enter the second number:"))
print("The product of the numbers is:", a*b)
```

Figure 6.15: Input Values as Integers

```
Type "help", "copyright", "credits" or "licens
>>>
======= RESTART: C:/Users/Dinesh/Desktop/Tools
=====
Enter the first number:56
Enter the second number:43
The product of the numbers is: 2408
>>>
```

Output

OPERATORS IN PYTHON

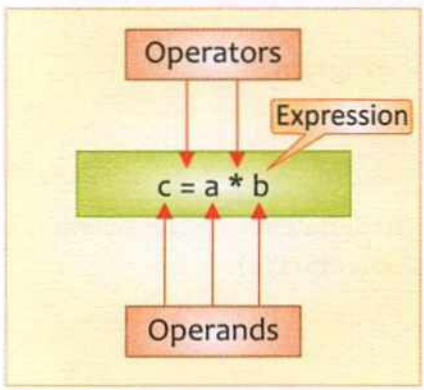
Now, the concept of variables and various data types in Python is clear to you. Let us perform some arithmetic and logical operations on the variables.

If a teacher asks you to find the product of two numbers, say, 20 and 30. What will you do? You will multiply these numbers, i.e., 20 * 30 and will get the result 600.

So, if a=20 and b=30, then the product will be calculated as follows:

c=a * b = 20 * 30 = 600

In the above expression, '*' is a symbol, which is used to multiply these two numbers. Similarly, in place of '*', if you use '+', you will get the sum of these numbers, i.e., 20+30 = 50.



Operators are used to perform different operations (Arithmetic, Relational, and Logical) on **operands** and give a meaningful result. For example, in the above expressions, you have used symbols like '+','*', and '=', which are called **operators**, and variables like a, b, and c, which are called **operands**.

Python provides different types of operators to work with. These are listed in the following table:

Operator	Function	Example
Arithmetic Operators	These operators are used to perform arithmetic operations on the data. These can be further classified as:	
	➤ Unary Operators: They work on a single operand. Unary + and Unary –	a=10, a=-10
	➤ Binary Operators: They work on two operands:	
	➤ Addition (+): To find the sum of the data values	30+20=50
	➤ Subtraction (-): To find the difference of the data values	100-30=70
	➤ Multiply (*): To find the product of the data values	10*2=20
	➤ Division (/): To divide the numbers and give the result in decimal form	10/4= 2.5
	➤ Integer Division (//): To divide the numbers and give the result in integer form	10//4=2
	➤ Modulus (%): To divide the numbers and give the remainder	10%3=1
	➤ Exponential (**): To find the powers of the numbers	3**4=81

Program 5:

```
a=int(input("Enter the first number:"))
b=int(input("Enter the second number:"))
print("The sum of the numbers is:",a+b)
print("The difference of the numbers is:",a-b)
print("The product of the numbers is:",a*b)
print("The quotient of the numbers is:",a/b)
print("The answer for the integer division is:",a//b)
print("The cube of the first number is:",a**3)
```

Figure 6.16: **Using Arithmetic Operators**

```
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul  8 2019, 20:34:20
(AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more
>>>
= RESTART: C:/Users/abhay/AppData/Local/Programs/Python/Pyt
Enter the first string:Good
Enter the second string:Afternoon
Two strings joined together: GoodAfternoon
The replication of the string: GoodGoodGoodGoodGoodGood
>>>
```

Output

String Operators

String operators work on the string values. These operators are of two types:

- Concatenation (+): It is used to join two string values.
- Replication (*): It is used to repeat a string for a number of times.

```
>>>'KIPS' + 'Learning'
>>>KIPSLearning

>>>KIPS*4->
>>>KIPSKIPSKIPSKIPS
```

Program 6:

```
a=input(("Enter the first string:"))
b=input(("Enter the second string:"))
print("Two strings joined together:",a+b)
print("The replication of the string:",a*6)
```

Figure 6.17: **Using String Operators**

```
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul  8 2019, 20:34:20)
(AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more in
>>>
= RESTART: C:/Users/abhay/AppData/Local/Programs/Python/Python
Enter the first string:Good
Enter the second string:Afternoon
Two strings joined together: GoodAfternoon
The replication ofthe string: GoodGoodGoodGoodGoodGood
>>>
```

Output

Assignment operators (=)

This operator is used to assign a value to a variable.

```
a= 290
```

The value 290 is assigned to the variable a.

Program 7:

```
a=100
b=200
c=a+b
print(c)
```

Figure 6.18: **Using Assignment Operators**

```
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul  8 20
4:20) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license
more information.
>>>
= RESTART: C:/Users/abhay/AppData/Local/Program
/Python37/Fig7.18.py =
300
>>>
```

Output

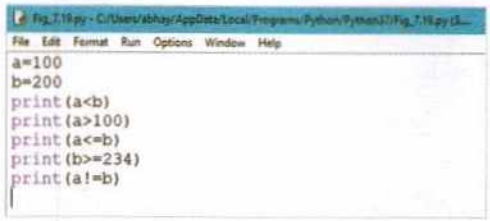
Relational Operators

These operators are used to show relationship between two operands. They compare the values assigned to the operands and give the output in a Boolean expression. These are:

- Less than: <
- Greater than: >
- Less than and equal to: <=
- Greater than and equal to: >=
- Not equal to: !=
- Equal to: = =

```
a=100
b= 30
a>b   True
a==b  False
```

Program 8:



```
a=100
b=200
print(a<b)
print(a>100)
print(a<=b)
print(b>=234)
print(a!=b)
```

Figure 6.19 Using Relational Operators

```
>>>
= RESTART: C:/Users/abhay/AppData/Local/Pro
Python/Python37/Fig_7.19.py =
True
False
True
False
True
>>>
```

Output

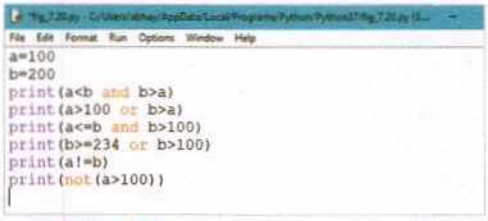
Logical Operators

These operators are used to combine two or more conditional statements. They provide the result in the form of True or False. These are of three types:

- **and:** Gives the result 'True' if all the specified conditions are true.
- **or:** Gives result 'True' if any one of the specified conditions is true.
- **not:** It reverses or negates the given condition. If the condition is True, it evaluates to False, and vice versa.

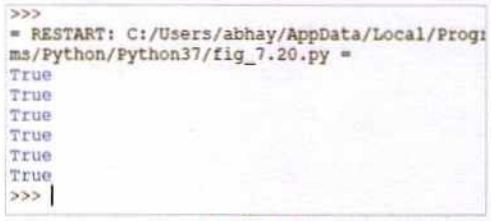
a=28
b=78
a<100 and b<a→ True and False → False
a<100 or b<a
True and False → True
not a<100 → not True →False

Program 9:



```
a=100
b=200
print(a<b and b>a)
print(a>100 or b>a)
print(a<=b and b>100)
print(b>=234 or b>100)
print(a!=b)
print(not(a>100))
```

Figure 6.20 Using Logical Operators



```
>>>
= RESTART: C:/Users/abhay/AppData/Local/Progr
ms/Python/Python37/fig_7.20.py =
True
True
True
True
True
True
>>>
```

Output

Let us observe the use of various operators in Python programs:

PRECEDENCE OF OPERATORS

The precedence of an operator refers to the order of priority in which the operators are evaluated in an expression. In case, two operators with the same precedence are the part of an expression, then associativity is taken into consideration. The **Associativity** of an operator determines the direction of operators from which side (either left to right or vice versa) the expression should be resolved.

Precedence of operators

Operators	Description
()	Parenthesis
**	Exponentiation
+x, -x	+ Unary, -Unary
*, /, //, %	Multiplication, Division, Floor Division, Modulus
+, -	Binary Addition, Subtraction
<, >, <=, >=, = =, !=	Relational Operators
not and or	Boolean/Logical operators

Remember: Use BODMAS rule to evaluate the operators in an expression.

(BODMAS: Brackets Off Divide Multiply Addition Subtraction).

COMMENTS IN PYTHON

Comments are the statements that are added to a program with the purpose of making the code easier to understand. Compilers and interpreters generally ignore comments during the execution of the program. If you add comments to your Python program, it will not show the text written in the comments in the output. Although comments are optional, they are needed from the users' perspective.

In Python, there are two types of comments:

- **Single Line Comments:** Single line comments are created by beginning a line with the hash (#) character and automatically terminated at the end of the line.
- **Multiline comments:** Sometimes your program may need to explain things in more details, which may exceed one line. Such comments are called multiline comments. You can provide multiline comments in a program by adding a delimiter (""") at the beginning and the end of the comment.

For example:

```
>>># This is a program used to calculate the simple interest.
>>>"""Program to enter the rate of interest, principle and time period.
     Use these variables to calculate the simple interest and
     Print the same."""
```

Remember: Single line comments appear in red colour and multiline comments appear in green colour.

TYPES OF CONTROL STRUCTURES

In a computer program, statements are generally executed in a sequential manner. However, at times, the user may need to change this order of execution by repeating or skipping the execution of a few statements, subject to a given condition. In such a situation, the flow of execution is altered by the use of **Control Statements.**

Before proceeding further, you must understand the different types of **constructs/statements** in programming that govern the flow of the control of a program.

There are different types of statements that control the flow of a program. These include:

- **Sequential Statements:** In Sequential construct, the statements in a program are executed in a sequential manner, where one statement is followed by the other, with no possibility of branching off to another action.

  For example, to calculate the area of a rectangle, first, enter the length and breadth of the rectangle, then calculate its area and print the result.

Program 10:

```
File Edit Format Run Options Window Help
l=int(input("Enter the length of the rectangle:"))
b=int(input("Enter the breadth of the rectangle:"))
ar=l*b
print("The area of the rectangle is:",ar)
```

```
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul  8 2019, 2
64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" f
>>>
= RESTART: C:/Users/abhay/AppData/Local/Programs/Pyt
l.py =
Enter the length of the rectangle:20
Enter the breadth of the rectangle:40
The area of the rectangle is: 800
>>>
```

Figure 6.21 : Program to Calculate Area of Rectangle **Output**

- **Conditional Statements:** In programming languages, conditional statements cause the program control to transfer to a specific location depending on the outcome of the conditional expression. Every decision involves a choice between the two alternatives **'Yes'** and **'No'** result. If a conditional statement is **true,** then one set of statements is executed, otherwise, the other set of statements is executed. For example, if a number is completely divisible by 2 then it is an even number, otherwise it is an odd number. You will be studying more about these statements in the coming section.
- **Iterative Statements:** These statements repeat a set of statements for a specific number of times as long as the given condition is true. When the given condition becomes false, the control comes out of the loop, and the repetition stops. For example, the loop will be repeated for ten times till the sum of the 10 natural numbers is calculated. You will learn more about these statements in the next chapter.

CONDITIONAL STATEMENTS

In a program, the statements are generally executed sequentially. However, at times, the user may need to change this order of execution, either by repeating or skipping the execution of a few statements, subject to a given condition. In such situations, the task can be performed by the use of **Control statements.**

The Conditional statements check the condition and execute the statements accordingly. Let us understand this concept with a simple example. Suppose, you want to withdraw some money from the ATM. You will be allowed to withdraw the money only if you enter the correct PIN number. Look at the plan of action based on the condition:

Condition	Plan of Action
If correct PIN is entered	You can withdraw the money
If incorrect PIN is entered	You cannot withdraw the money

Thus, observe that you can follow one plan of action if the condition is true, otherwise, the other plan of action is followed. Let us analyse it with the help of a flowchart.

A **flowchart** is a pictorial representation of the flow of steps or a procedure to solve a problem.

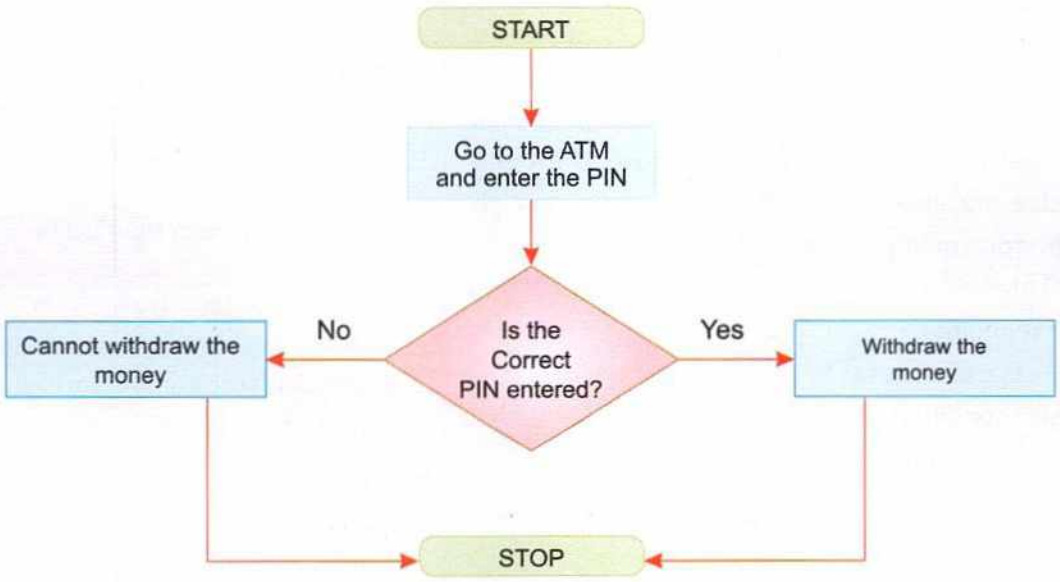


Figure 6.22: Flowchart Displaying the plan Action Based on a Condition

In the conditional statement, the most important element is the condition, based on which the decision is based. The execution of the statements depends on the evaluation of this condition. Let us understand the various conditional statements given below:

Statement	Explanation & Syntax	Example

if	This statement is used to evaluate only one condition. It performs a course of action if the condition evaluates to true, otherwise it skips the statements.
	Syntax:
	
	if <condition>:
	  statements set
		Program
		a=int (input ("Enter a number:"))
		b=int (input ("Enter another number:"))
		if a ==b:
		  print ("The numbers are equal")
		Output
		Enter a number: 34
		Enter another number: 34
		The numbers are equal

if...else	The if... else control structure is used when either of the two different actions are to be performed depending the result of the conditional expression. It works with two blocks: **if** and **else.** In case the conditional expression evaluates to **true,** the statements in the **if** block are executed, and if the result is **false,** then the statements in the **else** block are executed.
	Syntax:
	if <condition>:
	  statements set 1
	else:
	  statements set 2
		Program
		a=int (input("Enter the first number:"))
		b=int (input("Enter the second number:"))
		if a>b:
		  print (a,"is greater than",b)
		else:
		  print(b,"is greater than",a)
		Output
		Enter the first number : 456
		Enter the second number : 234
		456 is greater than 234

if...elif...else	Sometimes we need to work with multiple conditions. In this case, only using **if-else** construct does not serve the purpose. The **if-elif-else** statements provide a compact way to perform multiple tests on a condition.
	Syntax:
	if <condition>:
	  statements set 1
	elif <condition>:
	  statements set 2
	else:
	  statements set 3
		Program
		a=int (input("Enter the first number:"))
		b=int (input("Enter the second number:"))
		if a>b :
		  print (a,"is greater than",b)
		elif b>a:
		  print(b,"is greater than",a)
		else:
		  print("Both the numbers are equal")
		Output
		Enter the first number: 548
		Enter the second number: 548
		Both the numbers are equal

We can also check multiple conditions in the following manner:

```
if <condition>:
    statements set 1
elif <condition>:
    statements set 2
elif <condition>:
    statements set 3
elif <condition>:
    statements set 4
else:
    statements set 5
```

Program

```
a=int(input("Enter first number:"))
b=int(input("Enter second number:"))
c=input("Enter your choice of operator:")
if c=='+':
    print("The sum of the numbers is:",a+b)
elif c=='-':
    print("The difference of the numbers is:",a-b)
elif c=='*':
    print("The product of the numbers is:",a*b)
elif c=='/':
    print("The quotient of the numbers is:",a/b)
else:
    print("Wrong operator input")
```

Output

```
Enter first number: 100
Enter second number: 50
Enter your choice of operator *
The product of the numbers is : 5000
```

RECAP

- Python is a high-level language that is simple and interactive.
- It is used to design web applications, mobile applications, desktop applications, robotics, and performing scientific computing.
- Python works in two different modes–Interactive mode and Script mode.
- In Interactive mode, the statements are executed line by line giving the output instantaneously.
- Script mode is used to create and edit programs, which are executed as a file and can be saved for later use.
- The files in Python are saved with the extension .py.
- The type of data value that can be stored in an identifier, such as a variable, is known as its data type. The data type of a value or a variable is an attribute that tells what kind of data it can have.
- A variable is a storage location that stores the values that can be changed during the program execution.
- Operators are used to perform different operations (Arithmetic, Relational and Logical) on operands and give meaningful result.
- There are five types of operators used in Python: Assignment, Arithmetic, Relational, Logical, and String operators.
- Comments are the statements that are added to a program with the purpose of making the code easier to understand.
- In programming languages, Conditional statements cause the program control to transfer to a specific location depending on the outcome of the conditional expression.
- There are three types of constructs in a program that control the flow of the execution of statements in a program. These are: Sequential, Conditional, and Iterative.
- if, if... else, if... elif... else are the three types of conditional statements.

SECTION - A

A. Fill in the blanks.

1. The ..... of a variable is an attribute that tells what kind of data can a variable have.
2. There are ..... types of string operators.
3. The statements that govern the flow of a program are called .....
4. ..... are the statements that are written while programming but are not executed during the program execution.
5. ..... is the shortcut key to execute a program.

HINTS • Two • Data Type • Control Statement • F5 • Comments

B. State True or False.

1. Logical operators are used to assign a value to the variable.
2. The value of a variable cannot be changed during the program execution.
3. In Python, 'and' is an example of Logical operators.
4. Script Mode is used to create files in Python.
5. Python is a case-sensitive language.

SECTION - B

C. Multiple-choice questions.

1. Python can work in ..... different modes.

   a. Three b. Four c. Two d. Five

2. Concatenation is a ..... operator.

   a. String b. Integer c. Float d. Boolean

3. A single line comment can be created by using the ..... symbol.

   a. $ b. # c. & d. @

4. The ..... construct executes the statements in a sequential manner.

   a. Iterative b. Conditional c. Selection d. Sequential

5. The files in Python are saved with the extension.....

a..pyth b..py c..pthy d..python

D. Answer the following questions.

1. Write any two features of Python that make it user friendly.

.....

.....

.....

.....

2. What is the difference between the Interactive mode and the Script mode of Python?

.....

.....

.....

.....

3. What is the purpose of adding a comment in the program? What are the two ways used to add the comments?

.....

.....

.....

4. How is **if** statement different from **if... else** statement?

.....

.....

.....

5. Differentiate between the function of '+' operator when used with integer and string values.

.....

.....

.....

6. What is the difference between the a=10 and a==10?

.....

.....

.....

ACTIVITY SECTION

LAB SESSION

Perfection Through Practice

A. Rewrite the following statements after correcting them:

1.
```
a=100
b=20
if(a>b)
    print(a)
else
    print(b)
```

2.
```
x=290
y=300
if x>y and y<100
    print (x+10)
else if y>x or x<100:
    print(y+10)
else
    print(x+y)
```

3.
```
a='hello'
print(a*4)
```

B. Write the output of the following code segments:

1.
```
a=10
b=200
print(a>100 and b>200)
```

2.
```
a=23
b=25
print(a==100 or b<26)
```

3.
```
a=10
if a>100:
    print("Welcome")
else:
    print("KIPS")
```

4. a=10
   b=100
   print(a/b)
   print(a//b)
   print(a*3)
   print(a**3)
5. p="India"
   print(p+"Delhi")
   print(p*3)

C. Write the code for the following programs using the Script mode:

1. Create a program to check if a number is a **Buzz** number or not. (Buzz number is a number that ends with 7 or is divisible by 7).
2. Create a program to calculate and print the area of a rectangle if the user enters 1 and print the area of a square if the user enters 2.
3. Create a program to check whether a number is completely divisible by 10 or not.
4. Using Python script mode print your school name 5 times.
5. Create a program to check whether a character entered by the user is an uppercase character or a lowercase character.
6. Create a program to check if a number input by the user is a positive or a negative number.
7. Mayur Transport Company charges for a parcel as per the following tariff:

WEIGHT	CHARGES APPLIED
Upto 10 Kg	Rs. 15 Per Kg
For the next 20 kg	Rs. 25 Per Kg
Above 30 Kg	Rs. 35 Per Kg

Create a program to calculate the charge for a parcel by taking weight of the parcel as input.

GROUP DISCUSSION

For Concept Clarity

Conduct a group discussion on the topic **"Relational operators** vs **Logical operators"** and **"Conditional statements** vs **Sequential statements"**.

ONLINE LINKS

Looking For More

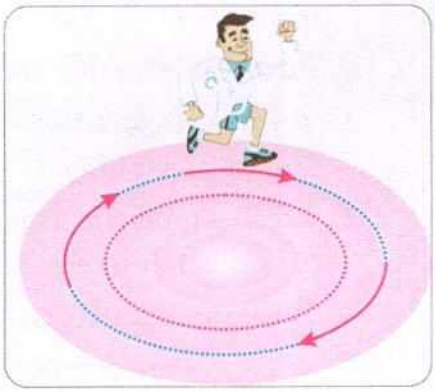
To know more about programming in Python, visit the following links:
https://www.tutorialspoint.com/python/python_basic_operators.htm
https://www.programiz.com/python-programming/operators

CHAPTER 7

ITERATIVE STATEMENTS IN PYTHON

LEARNING IN THIS CHAPTER

- Iterative Statements
- for Loop
- while Loop
- Infinite Loop
- Loop...else



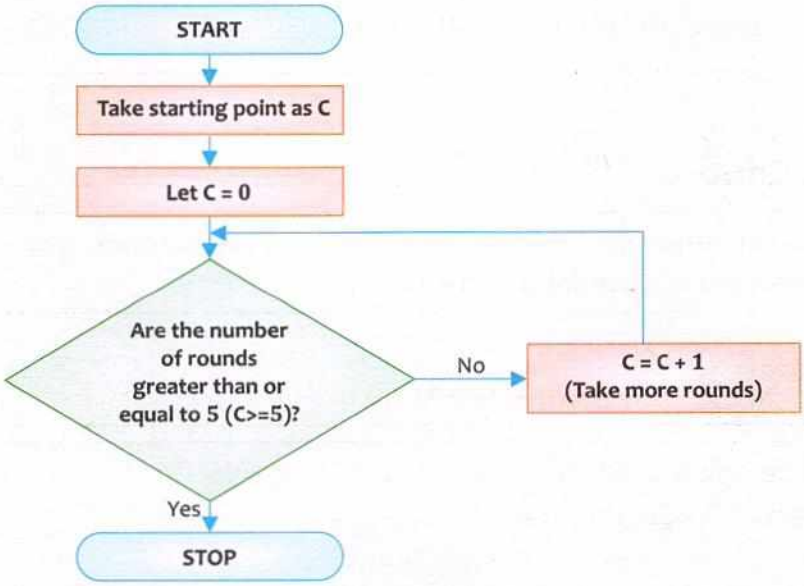
In the previous lesson, you reviewed the basic concepts of Python, its functions, operators, and conditional statements. In this chapter, you will learn about the Iterative statements. In a program, there are situations when you have to repeat one or more statements many times. This repetition can be carried out using loops in programming.

Let us understand the concept of a loop with the help of a real-life example. Suppose, your instructor instructs you to run and take five rounds of the playground to warm up. Before you start running, you fix a starting point. On reaching the starting point again, you complete one round. Then, you take the second round, and so on. This way you keep track of the number of rounds until the process of taking rounds gets completed.

Now, let us understand the concept of looping with the helps of the above example.

Let us say that the control variable is C. In this example, you have taken the initial value of C as 0. When you complete the first round, the value of C becomes 1, after the second round, its value becomes C = C + 1, i.e., 1 + 1 = 2, and so on. This value will get incremented each time the process repeats. After incrementing, the control variable, C will be checked against the maximum number of the repetitions, which is 5 in this case.

Let us understand this example with the help of a Flowchart:



This process will continue until the value of C becomes 5. It means, the loop will continue for five times and then it will terminate.

The advantage of using the looping technique in programming is that it reduces the number of instructions and also the memory space.

> **Let's Know More**
>
> A Control variable in a loop is used to store the initial value and gets incremented after every loop to reach its final value. A Control variable is also known as the Counter variable.

ITERATIVE STATEMENTS

The statements that keep repeating themselves as long as a given condition is **true** are called **Iterative Statements** or **Repetitive Statements.** As soon as the condition becomes **false**, the loop terminates. These are also called **Looping statements** or simply **Loops.**

An Iterative statement is based on three values:

- A start value (initial value), e.g., C=0
- A test condition, e.g., C<=5
- A step value (increment or decrement), e.g., C=C+1

Every loop works with the help of a variable known as the **Control variable**. The initial value is assigned to the Control variable at the beginning of the loop, then the final value of the Control variable is specified, and finally, the step value of the Control variable is defined, i.e., it is either incremented or decremented by the given value at each step to reach the final value.

In Python, there are two types of Iterative statements:

- for
- while

> **Let's Discuss**
>
> Conditional Statement
>
> vs
>
> Iterative Statements

for LOOP

The **for** loop is used when you are sure about how many times a loop body will be executed. It is also known as **definite loop.** In Python, the working of **for** loop is based on various operators and functions.

The syntax for using the **for** loop is:

for <variable> in <sequence>:

loop body (statements to be executed)

or

for <variable> in range (initial value, final value, step value):

Loop control — X=10 — X=20 — Default value is 1

loop body (statements to be executed)

> **Know the Fact**
>
> By default, the step value in a loop is incremented by 1.

Before proceeding further, let us first understand the concept of Membership Operators:

MEMBERSHIP OPERATORS

Membership operators play an important role in controlling the working of a loop. There are two membership operators, **in** and **not in**. Out of these, the **in** operator plays a significant role in the working of loops. Let us understand the **in** membership operator.

The 'in' Operator

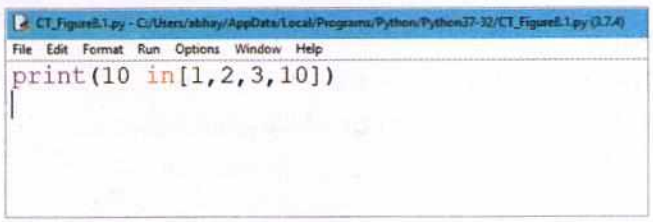
The **in** operator is used to check if a given value exists in the sequence or not. It evaluates to **true** if it finds a value in the specified sequence else it returns **false**.

Syntax:

Value in [sequence].

For example, if you want to check whether number 10 is present in a given sequence of numbers, [1,2,3,10], execute the following code:

Program 1:



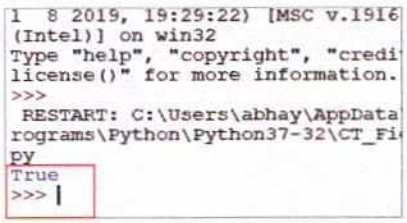
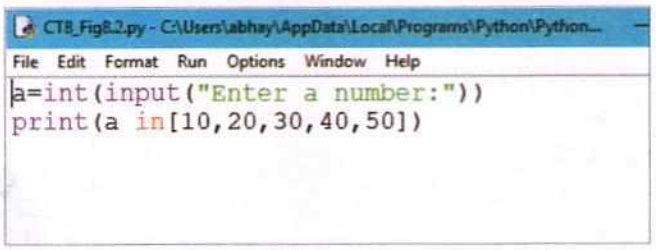


Figure 7.1: **Using 'in' Membership Operator** — **Output**

In the above example, the program checks whether the number 10 exists in the given list or not. If yes, the **in** operator will return the value **true**, otherwise, it will return a **false** value.

Similarly, if you want to check whether a number entered by the user is present in the given list or not, type the following code and observe the output:

Program 2:



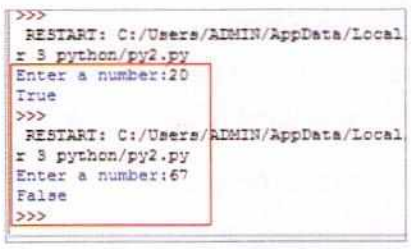
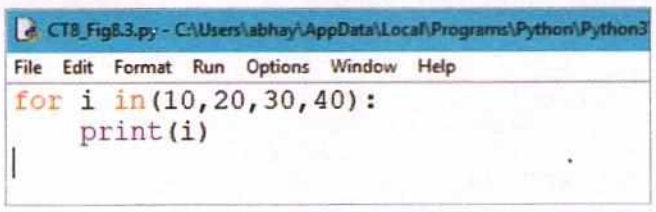


Figure 7.2: **Using 'in' Membership Operator** — **Output**

Using 'in' membership operator with 'for' loop

Consider the following example:

Program 3:



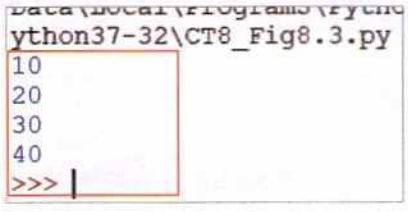


Figure 7.3: **'in' Membership Operator with 'for' Loop** — **Output**

The following steps are involved in the execution of the **for** statement:

Step 1: The **in** operator will first check if there is a value in the list. If yes, then **in** operator will return the value **true.** If the value returned by the **in** operator is **true** then the loop control variable **i** will be assigned a value from the sequence.

Step 2: The **print** statement will print the value assigned to the variable **i**.

NOTE

Every time the **in** operator returns **true,** a new value will be assigned to the variable **i**, and it will be printed. This process of printing values will continue until the last value in the sequence is used. The loop will terminate after printing the last value.

The range() Function

The range() function used with **for** loop in Python is helpful in generating a sequence of numbers in the form of a list. For example, range (10) will generate numbers from 0 to 9 (10 numbers).

Syntax:

range(initial value, final value, step value)

Here, the **initial value** is an integer specifying at which position to start, while the **final value** specifies the end, and the **step value** specifies either increment or decrement at each step to reach the final value. While using the **range()** function, the final value is always 1 less than the last value in the given sequence. The use of the **range()** function can be understood by the following example:

Program 4:

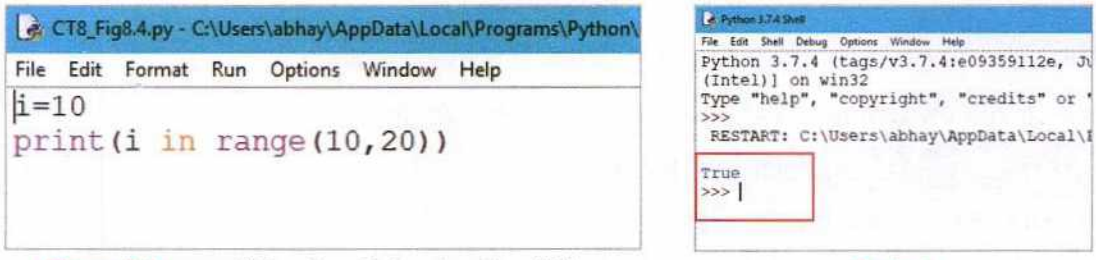


Figure 7.4: range() function Returning True Value **Output**

In the above code, the initial value of the variable **i** is **10** and the final value is **19** (20-1=19). Each time the loop executes, the value of **i** is incremented by **1**. So, the final sequence will be [10,11,12,13,14,15,16,17,18,19]. Now, the variable **i** (which in this case is 10) will be checked within this range. As '10' is present in the given range so the output of the program will be **true.**

Now, try some other range. The output of the program will change accordingly.

Program 5:

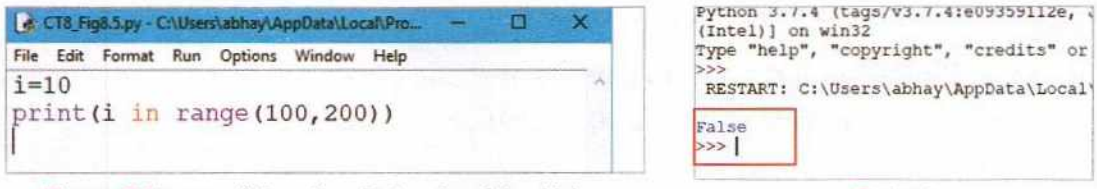


Figure 7.5: range() function Returning false Value **Output**

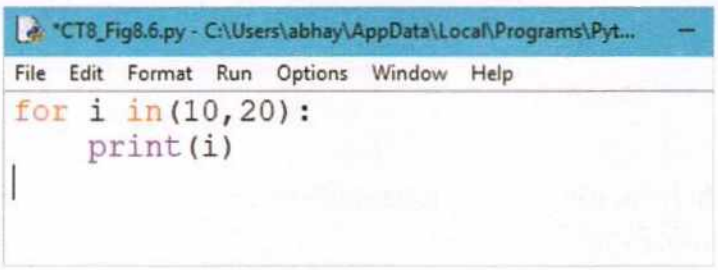
Step 1: The initial value of the **i** variable is assigned **10.**

Step 2: Using the **range()** function, a sequence is created with all the values between 100 and 199. The **in** operator will check whether the value of the variable **i** exists in the sequence or not. If the value does not exist in the sequence, the **in** operator will return **false.**

Using range() function in for loop:

You can use the **range()** function in **for** loop to iterate through a sequence of numbers.

Program 6:



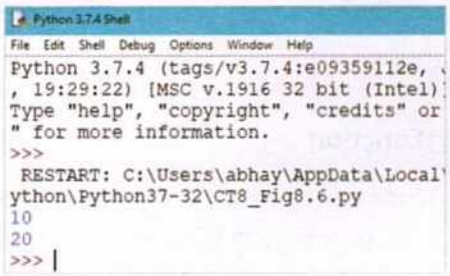


Figure 7.6: Using 'for' Loop with 'in' Operator **Output**

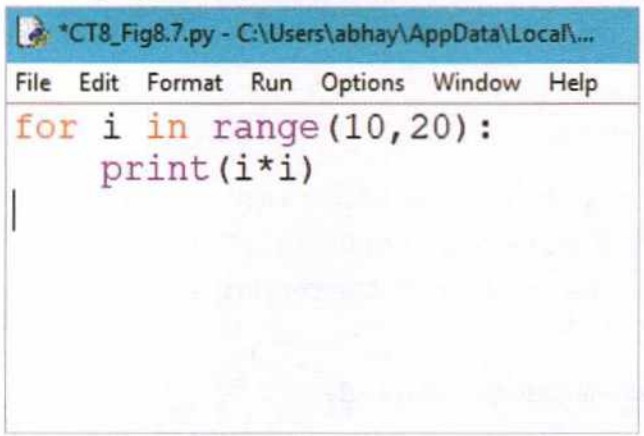
Step 1: The **for** loop executes. The initial value, 10 is assigned to the variable **i.**

Step 2: The value of **i,** i.e., 10 is printed.

Step 3: The counter variable is incremented. The next value, which is 20, is assigned to the variable **i** and the same is printed.

Now, let us see how the range() function works in **for** loop:

Program 7: Write a program to print the square of the numbers given in range.



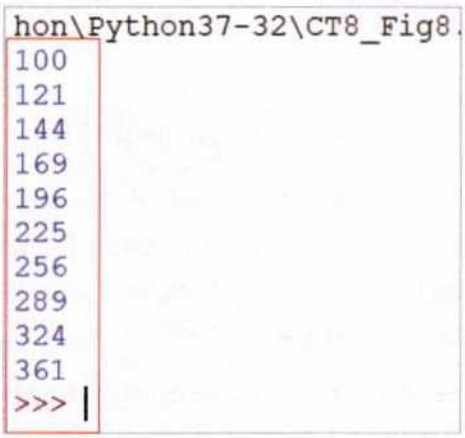


Figure 7.7: Using 'for' Loop with range() Function **Output**

When you use the range() function, it creates a sequence of all the values between the initial value and the 'final value - 1'. In this case, a sequence of values between 10 and 19 (20-1=19) is created, and the squares of all the values from 10 to 19 are printed.

Step 1: The **for** loop executes and the **range()** function creates a sequence of values between 10 and 19. The initial value, i.e., 10 is assigned to the variable **i**.

Step 2: The square of the value 10, i.e., 100 is printed.

Step 3: By default, the counter variable is incremented by 1 and its square gets printed.

Step 4: The step 3 continues till the last value in the sequence, i.e., 19 is assigned to the variable **i** and its square is printed.

Now, if you change the step value or increment the value in the range() function by 3, see what happens:

Program 8:

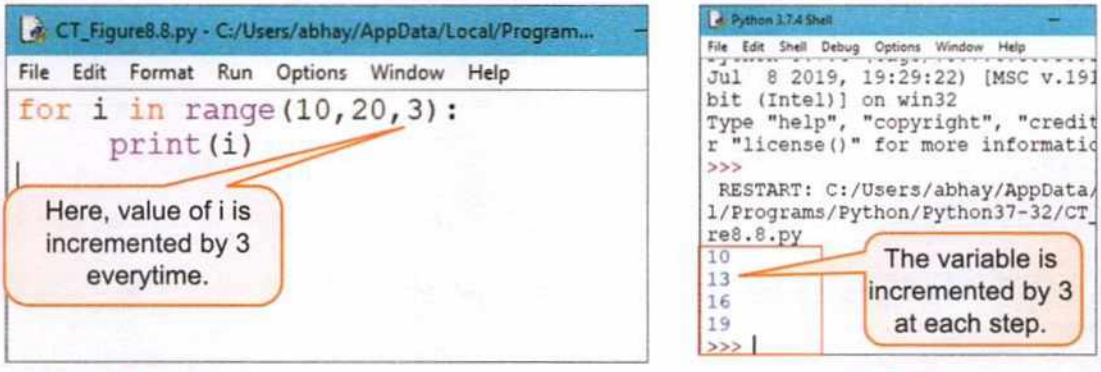


Figure 7.8: Changing Step Value in range() function **Output**

When you increment the step by 3, you will get the sequence [10,13,16,19].

Step 1: The **for** loop executes and the **range()** function creates a sequence of values between 10 and 19. The initial value, i.e., 10 is assigned to the variable **i**.

Step 2: The value 10 is printed.

Step 3: The counter variable is incremented by 3, the next value is assigned to **i**, i.e., 13 is printed.

Step 4: The step 3 continues till the last value in the sequence, i.e., 19 is assigned to the variable **i** and gets printed.

NOTE

The value of the counter variable can also be decremented to n number of steps. For example:
for i in range(20,10,-3)

Program 9: Write a program to find the Factorial of a number.

Factorial of 5 : 5 x 4 x 3 x 2 x 1 = 120.

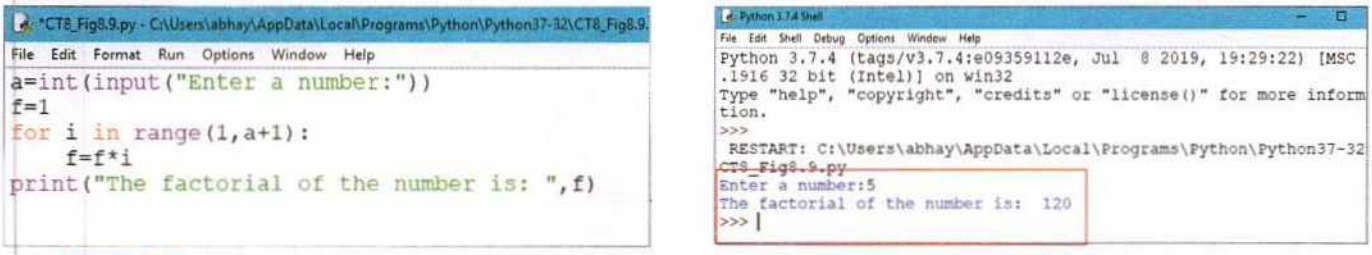


Figure 7.9: Printing Factorial of a Number **Output**

Step 1: The program asks a user to enter a number, let's say, 5.

Step 2: Assign the value 1 to variable **f**.

Step 3: Specify the range in **for** loop, i.e, 1 to a+1 (where the value entered by the user is stored in variable 'a'.).

Step 4: The factorial will be calculated as **f=f*i**.

Step 5: By default, each time the loop executes, the value of the variable **i** is incremented by 1.

Note: The variable **f** is assigned a new value each time the statement **f*i** is executed.

Step 6: Steps 4 and 5 are repeated till the last value of the counter variable is encountered.

Step 7: The final value of the factorial variable, i.e., **f** is printed.

Program 10: Write a program to print a Fibonacci Series.

A Fibonacci series is a series in which each number is the sum of the two preceding numbers, such as 0, 1, 1, 2,3, 5, 8, etc.

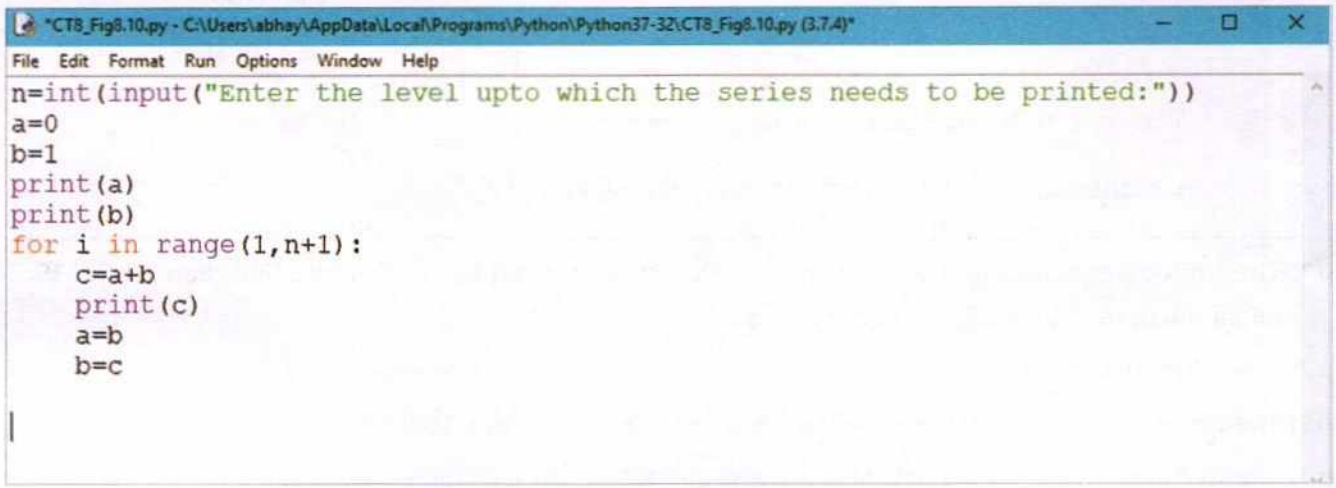


Figure 7.10: Fibonacci Series

```
python/py13.py
Enter the level upto which the series needs to be printed:8
0
1
1
2
3
5
8
13
21
34
>>>
```

Output

Step 1: The user is asked to enter a value for variable **n**.

Step 2: The variable **a** is initialised to 0.

Step 3: The variable **b** is initialised to 1.

Step 4: Initial value of **a** is printed.

Step 5: Initial value of **b** is printed.

Step 6: Now, the **for** loop executes from **1** up to **n+1.**

Step 7: The next value of the series is generated and printed by adding the previous two terms, i.e., **c=a+b.**

Step 8: The value of **b** is assigned to **a.**

Step 9: The value of **c** is assigned to **b**. Note, the value of **a** and **b** is updated every time when the loop is executed.

Step 10: The loop will terminate when the last value in the range, i.e., **n+1** is encountered.

while LOOP

The while loop is the simplest of all looping structures. In general, this loop can be applied to a program where the number of iterations is not known beforehand. The while loop keeps on executing the block of statement as long as the specified test condition evaluates to **true**.

While loop has four main components:

INITIALISATION

It is used to assign an initial value to the loop control variable, e.g., a=10.

CONDITION/ TEST EXPRESSION

This statement checks whether the loop body will be further executed or not. The loop keeps executing till the condition or the test expression is **true**.

LOOP BODY

It contains the set of statements that are required to iterate or repeat.

STEP VALUE

This statement keeps updating the loop control variable so that a final value is achieved and the loop terminates.

Remember

You must provide an initial value to the loop variable to execute the loop smoothly.

Syntax:

```
initialization
while<condition>:
    loop body
    updation
```

Let us understand the working of the **while** loop with the help of the following examples:

Program 11: Write a program to print the first 10 natural numbers.

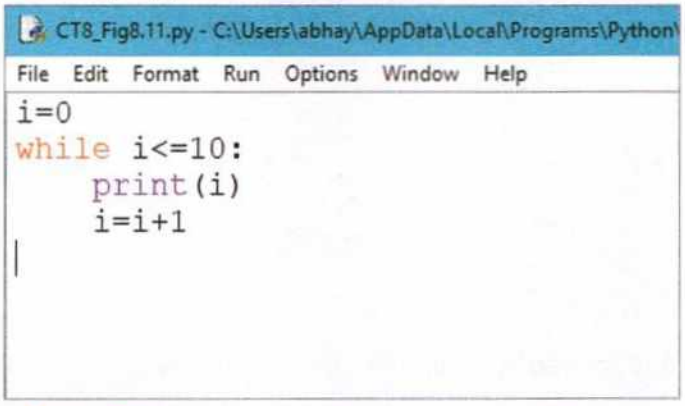
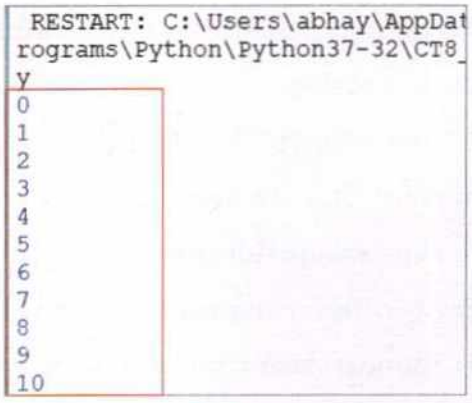


Figure 7.11: **Using while Loop to Print First 10 Numbers**



Output

Step 1: Initialise the variable **i** to **0**.

Step 2: Check the condition whether **i<=10**.

Step 3: If **i<=10,** print the value of **i**.

Step 4: Increment the value of **i** by **1**, i.e., **i=i+1**.

Step 5: This process will continue till the value of **i** is less than or equal to 10. The loop will terminate once the value of **i** becomes greater than 10.

Program 12: Write a program to print the square of numbers between 10 and 20.

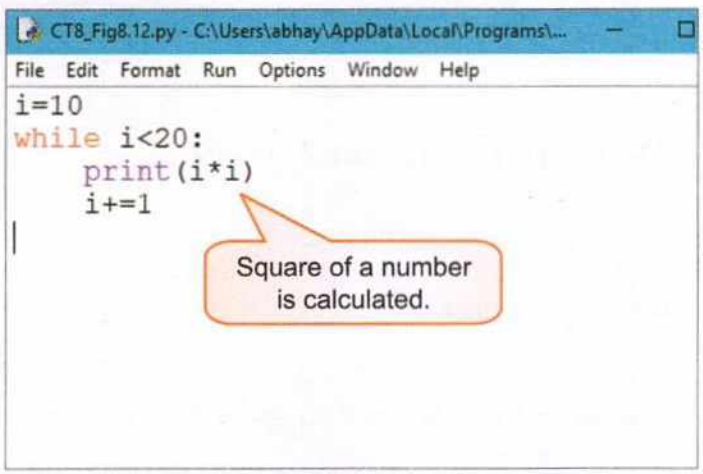
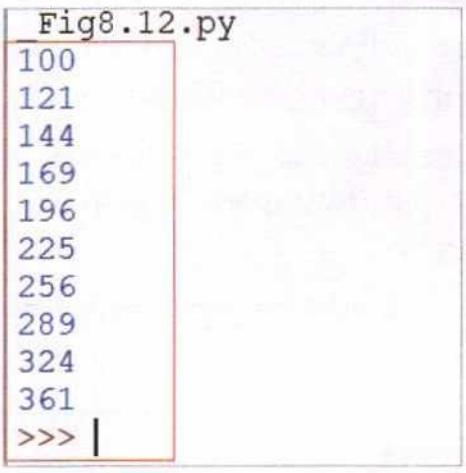


Figure 7.12: **Square of Numbers Using while Loop**



Output

Step 1: The variable **i** is assigned an initial value, 10.

Step 2: The condition **i<20** is checked.

Step 3: If the condition evaluates to true then the statement **print(i*i)** is executed.

Step 4: Each time the loop executes, the value of **i** is incremented by 1.

Step 5: The control shifts back to the while loop. The while condition is checked again. If the condition is **true** then steps 3 and 4 are repeated, and if the condition is **false**, the while loop terminates.

Program 13 : Write a program to print the multiples of 3 and their sum (in the range 10 to 30).

```
File Edit Format Run Options Window Help
i=10
s=0
while(i<=30):
    if i%3==0:
        print(i)
        s+=i
    i+=1
print("The sum of all the multiples of 3 in the range 10 to 30 is:",s)
```

Figure 7.13: **Sum of multiple of 3 using while loop**

```
Type "help", "copyright", "credits" or "license()" for more infc
rmation.
>>>
 RESTART: C:/Users/abhay/AppData/Local/Programs/Python/Python37-
32/CT8_Fig8.13.py
12
15
18
21
24
27
30
The sum of all the multiples of 3 in the range 10 to 30 is: 147
>>>
```

Output

Step 1: The variable **i** is assigned an initial value, 10.

Step 2: The variable **s** is assigned an initial value, 0. It will store the sum of all the multiples of 3.

Step 3: The condition **i<=30** is checked.

Step 4: If the condition evaluates to **true** then the if statement checks whether the variable is a multiple of 3 or not.

Step 5: If the condition is **true** then the counter variable is printed and is added to the previous value of s.

Step 6: Each time the loop executes, the value of **i** is incremented by 1.

Step 7: The control shifts back to the while loop. The **while** condition is checked again. If the condition is **true** then steps 4,5 and 6 are repeated, and if the condition is **false** then the while loop terminates.

Step 8: The final value of **s** is printed.

Program 14: Write a program to print the table of a number.

```
CT8_Fig8.14.py - C:/Users/abhay/AppData/Local/Progr...
File Edit Format Run Options Window Help
n=int(input("Enter a number:"))
i=1
while i<=10:
    print(n, '*' ,i, '=',n*i)
    i+=1
```

Figure 7.14: **Printing table of 6 using while loop**

```
r 3 python/py18.py
Enter a number:6
6 * 1 = 6
6 * 2 = 12
6 * 3 = 18
6 * 4 = 24
6 * 5 = 30
6 * 6 = 36
6 * 7 = 42
6 * 8 = 48
6 * 9 = 54
6 * 10 = 60
>>>
```

Output

Step 1: The user is asked to enter a number of his choice.

Step 2: The initial value **1** is assigned to the variable **i**.

Step 3: The while condition **i<=10** will be checked.

Step 4: If the condition evaluates to **true**, the statements after the while condition are executed and the product of **n** and **i** is printed.

Step 5: The value of **i** is incremented by 1.

Step 6: The control shifts back to the **while** loop. The while condition is checked again . If the condition is **true** then steps 4 and 5 are repeated and if the condition is **false**, the while loop terminates.

Program 15: Write a program to display no output when the test condition is **false.**

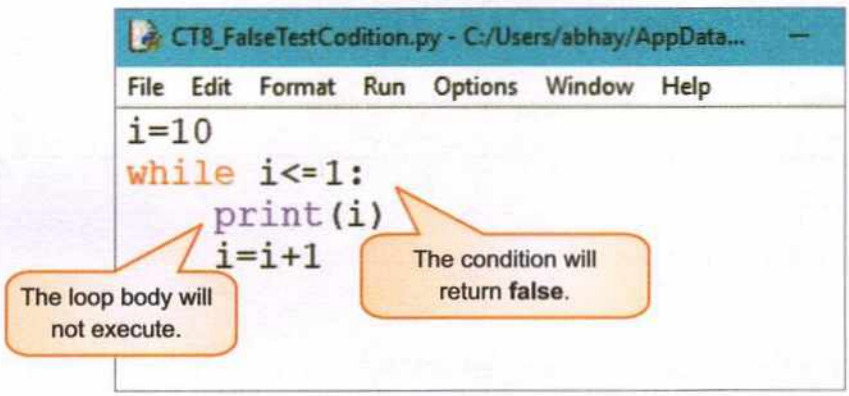
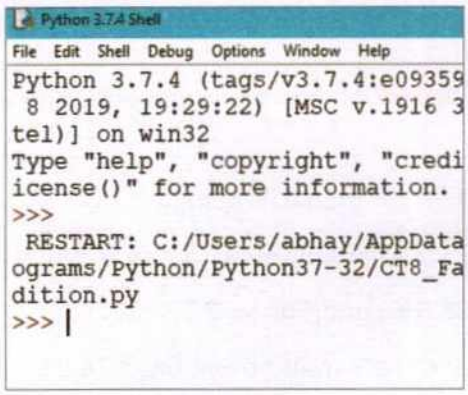


Figure 7.15: **False Test Condition in while Loop**



Output

In the above example, as the initial value of **i**, 10 is greater than 1, the condition will return **false**, and hence the loop body will not be executed even once. Hence, you do not get any output.

INFINITE LOOP

An infinite loop (or endless loop) is a sequence of instructions in a computer program, which loops endlessly. It happens either due to the loop having no terminating condition or having the condition that can never be met. Let's consider the following example:

Program 16: To create a program displaying endless loop

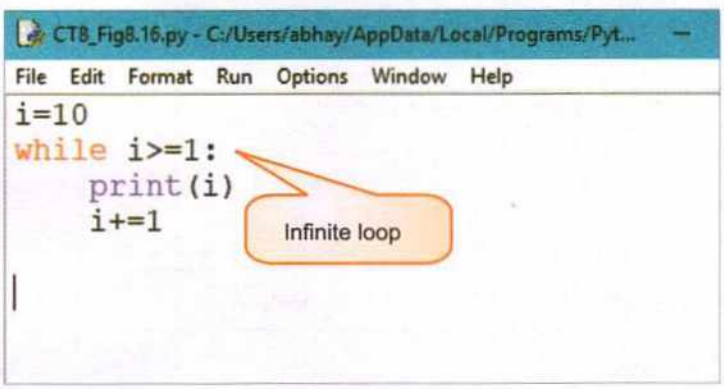
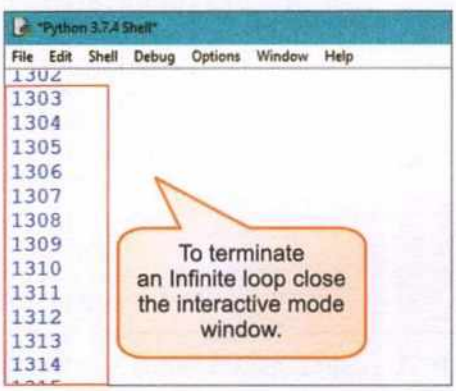


Figure 7.16: **Infinite Loop**



Output

In the given example, as per the condition, the loop will continue until the value of **i** is greater than or equal to 1. In the updation part, you are incrementing the value of **i** by 1 at every step and hence the loop variable **i** will always be greater than 1. This means that at no time will the loop variable be less than 1 and hence the loop body will execute infinitely.

To come out of the infinite loop, you have to terminate the interactive mode or program execution by closing the interactive mode window.

NOTE

If the control variable does not get updated to a final value, the condition remains true forever, and the loop continues infinitely.

Loop...else

A **for** loop or **while** loop can have an optional **else** block as well. The **else** part is executed if the loop terminates normally, i.e., if all the values in the sequence get used in a standard way without the loop being forcefully terminated. Both the loops, i.e., **for** and **while** loop can use **else** part. However, it is not mandatory to have an **else** block with the loop block. It is just a secure way to check that the loop has terminated normally.

Program 17: Write a program to print the sum of all even and odd numbers with in a range.

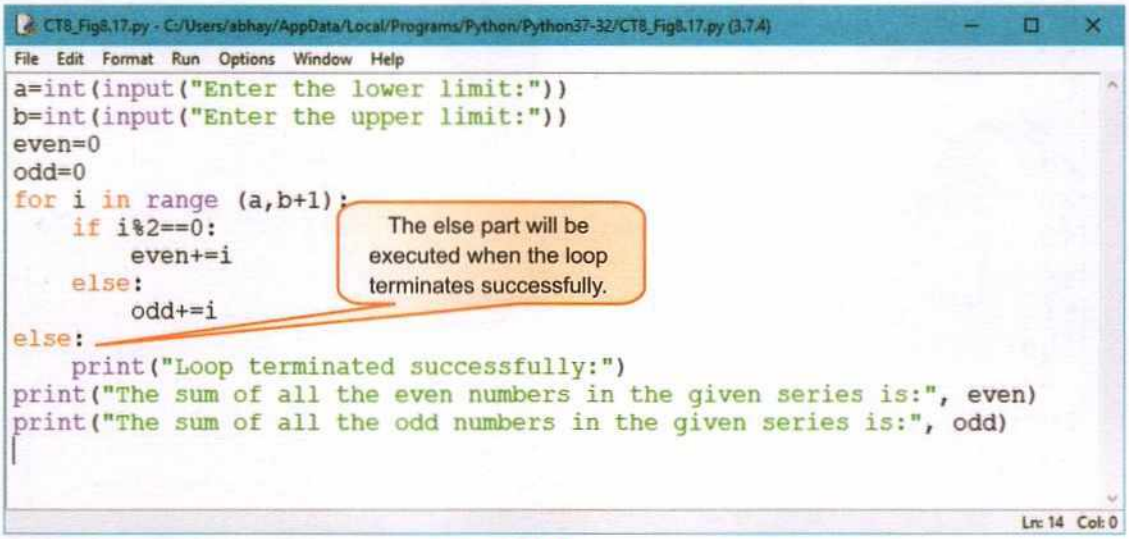
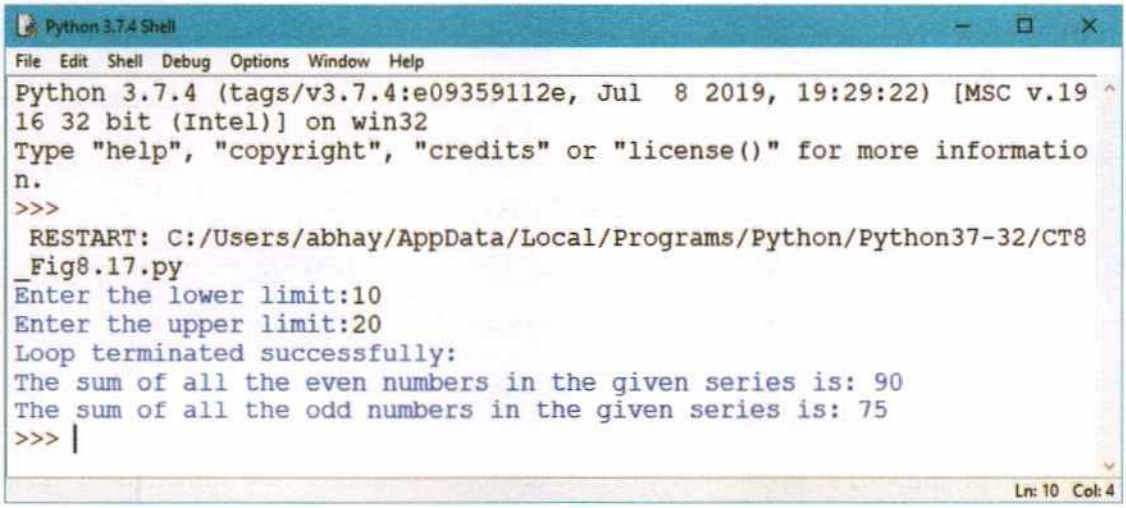


Figure 7.17: for...else



Output

Program 18: Write a program to print the series: 4 9 16.....100.

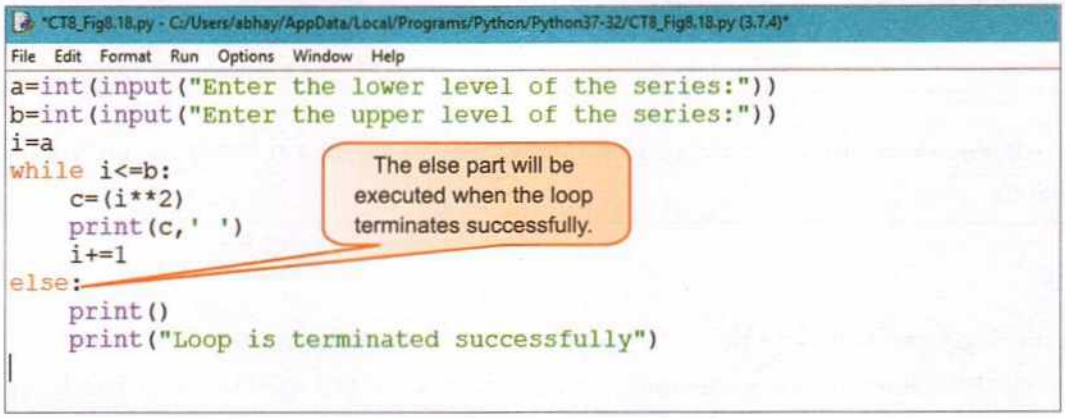


Figure 7.18: while .... else

```
y
Enter the lower level of the series:2
Enter the upper level of the series:10
4
9
16
25
36
49
64
81
100

Loop is terminated successfully
>>>
```

Output

RECAP

- In Python, iterative statements keep repeating a set of statements as long as the given condition is true.
- Iterative statements are also known as loops.
- There are two types of Iterative statements: **for** and **while** loop.
- **for** loop is generally used when you have to repeat a task a specified number of times or within a given range.
- The **in** operator checks whether a given value is a part of the specified sequence.
- The **range()** function produces a list of a sequence starting with an initial value up to a final value, updating the value at each step. By default, the value is incremented by 1.
- The **while** loop can be applied to a program where the number of iterations is not known beforehand. The while loop keeps on executing the block of statement as long as the specified test condition evaluates to true.

- The **while** loop has four main components: Initialisation, Condition, Loop body, and Step value.
- A **for** loop or a **while** loop can have an optional **else** block as well.
- The **else** part is executed if the loop terminates normally, i.e., if all the values in the sequence get used in a standard way without the loop being forcefully terminated.
- The **loop.... else** statement is optional to be used in a program. The **else** block simply makes sure that the loop is terminated normally.

SECTION - A

A. Multiple-choice questions.

1. Iterative statement is also known as ..... statement.
   a. Looping b. Conditional c. Selection d. Sequential
2. The ..... loop is used when you are sure about how many times a loop body will be executed.
   a. while b. for c. while...else d. while...not...else
3. If the condition in a loop is false in the first step itself, you get ..... .
   a. No output b. Infinite c. Error d. Normal
4. The ..... operator checks whether a given value lies within a given set of values.
   a. not in b. between c. range d. in
5. The ..... loop can be applied to a program where the number of iterations is not known beforehand.
   a. while b. while...else c. for...not...else d. for

B. Answer in one word.

1. Mention the other name for Iterative statements.
   .....
2. Name the two types of Iterative statements.
   .....
3. Name the two membership operators in Python.
   .....
4. Which function is used to check the range in a loop?
   .....

C. Answer the following questions.

1. What do you mean by Iterative statements? Give an example.

.....

.....

2. Why are **for** and **while** loops called entry controlled loops?

.....

.....

3. What is the use of membership operators in Python?

.....

.....

ACTIVITY SECTION

MY ACTIVITY

Perfection Through Practice

1. Rewrite the following code of statements after correcting the syntactical errors.

a.
```
a=integer(input("First number"))
b=10
for i in range(a:b):
    PRINT(a*b)
if (a>b) then
    print(a)
```

b.
```
i=10
while (i=>5):
    print(I)
    i=I+1:
```

2. Rewrite the following for loop program using the while loop.
```
a=int(input("Enter the first number"))
b=int(input("Enter the second number"))
for i in range(a,b,3):
    print(a*i)
print("Program Over")
```

3. Rewrite the following code of programs using the for loop.

a.

```
a=int(input("Enter a number"))
i=a
while i>=0:
    print(a*i)
    i=i-2
```

b.

```
x=10
y=100
if x==y:
    print (x)
elif y > x:
    print(y)
while x<10:
    print(x)
    x+=1
```

4. Write the output for the following code of statements.

a.

```
a=100
b=20
s=0
while a>=b:
    if a%5==0:
        s+=a
    a-=1
print(s)
```

b.

```
n=1
while n<5:
    print(n*n)
    n+=1
```

c.

```
n=10
while n<50:
    print(n+n)
    n+=10
```

5. Write the program code for the following:

a. To print the table of a number using 'for' loop

b. To print the sum of all the even numbers in the range entered by the user

c. To print the negative odd numbers between 1 to 30

CHAPTER 8

USING LISTS AND TABLES IN HTML 5

LEARNING IN THIS CHAPTER

- Introduction to lists
- Unordered and ordered list
- List properties
- Nested list
- Description list
- Tables
- Table properties

In the previous class, you were introduced to the basic formatting tags that were used for designing web page in HTML. You have also learnt about the usage of CSS to spruce up the appearance of these elements.

In this class, you will discuss some more tags to embed objects like Lists, Links, and Tables in our web page to make it look more appealing and professional.

LISTS

Whether it is the minutes of a meeting, a list of items, or the table of contents of a document, you will find the use of a list in all. A list is the most efficient way of presenting information in a precise manner. It helps in making important points standout more clearly, there by grabbing a visitor's attention. HTML supports different elements to create a list for displaying items in a specific order. A list can be defined in different styles. The types of list that HTML provides are:

- Unordered List
- Ordered List
- Description List

UNORDERED LIST

An unordered list is used when the items are not required to be displayed in any particular sequence. The list begins and ends with <ul and tags, respectively. It indents each item in the list and adds a bullet against each of them. It is also known as the **Bulleted** list. For example, a list of stationery items:

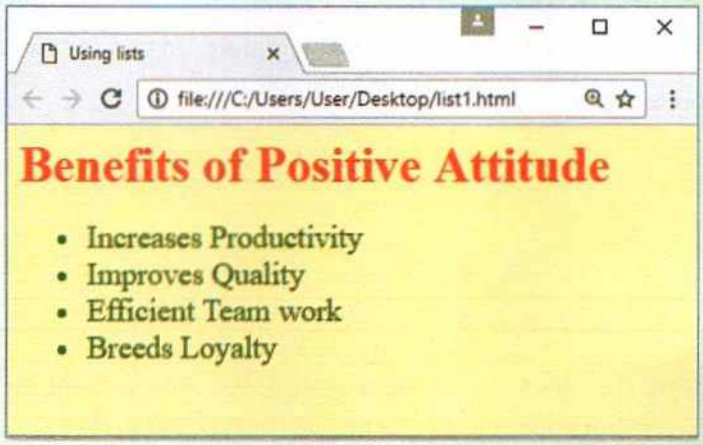
- Pen
- Eraser
- Pencil
- Stencil
- Clipboard

<LI> tag

To display the list of items given in any of the two list types, i.e., Unordered and Ordered list, <li> tag is used.

Let us have a look at the following example:

```
<html>
<head>
<title>Using lists</title><style type="text/css">
body{background-color:RGB(255,251,214)}
h1{color:red}
li{color:green}
</style>
</head><body>
<h1> Benefits of Positive Attitude </h1><ul>
<li> Increases Productivity
<li> Improves Quality
<li> Efficient Team work
<li> Breeds Loyalty</ul></body></html>
```



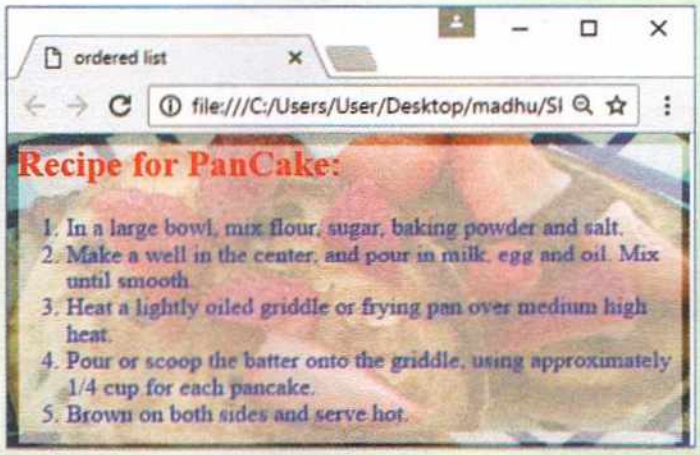
Let's Know More

You can also style lists with colours, to make them more noticeable.
For example: <style>
ol {background: Peachpuff; padding: 20px;}
li{background: silver; padding: 5px;}
</style>

ORDERED LIST

The ordered list is used to display the list of items in a specific order. An ordered list indents and gives a number to each item in the list, that is why it is also known as the **Numbered** list. The list begins and ends with <ol> and tags, respectively. Ordered lists are mostly used in situations where the order of the items is significant or where it is required to keep a count of the number of items. For example, in a recipe, if the steps are not demonstrated orderly, the end result would not be as desired.

```
<html>
<head>
<title>ordered list</title>
<style type="text/css">
body{background-repeat:no-repeat;background-image:url(pancake.jpg);
color:Blue;font-size:20px}
h1{color:Red}
</style>
</head>
<body>
<h1> Recipe for PanCake:
```



Let's Know More

The **<menu>** tag is used to create a menu list. **<menu>** denotes the start of the menu and **</menu>** denotes the end of the menu.

```
</h1>
<ol>
<li> In a large bowl, mix flour, sugar, baking powder and salt.
<li> Make a well in the center, and pour in milk, egg and oil. Mix until smooth.
<li> Heat a lightly oiled griddle or frying pan over medium high heat.
<li> Pour or scoop the batter onto the griddle, using approximately 1/4 cup for each pancake.
<li> Brown on both sides and serve hot.
</ol>
</body>
</html>
```

NOTE

When an ordered List is used, the <li> element will be rendered with a number. One can control the number's appearance with the <TYPE> attribute or applying CSS property LIST-STYLE-TYPE.

ATTRIBUTES OF <OL> TAG

Start Attribute

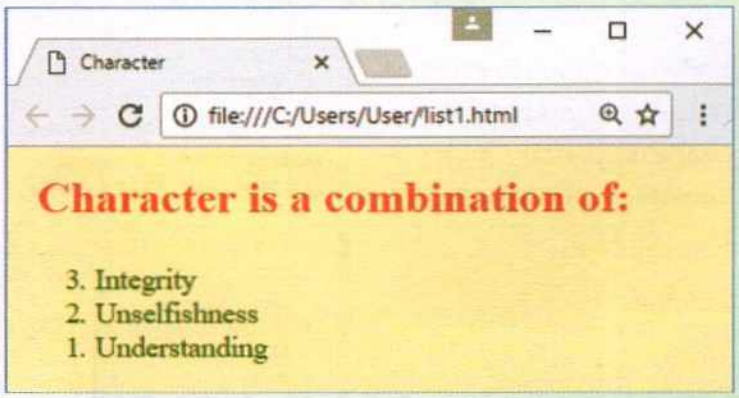
An ordered list automatically starts with number 1, but you can also start the list with a different number with the help of the Start attribute.

For example, if you write START = 101, the ordered list numbering will start from 101.

Reversed Attribute

This attribute specifies that the list order should be in the descending order.

```
<html>
<head>
<title>Character</title>
<style type="text/css">
body{background-color:RGB(255,251,214)}
h1{color:red}
li{color:green}
</style>
</head>
<body>
<h1> Character is a combination of: </h1>
<ol start=3 reversed>
```



```
<li> Integrity
<li> Unselfishness
<li> Understanding</ol>
</body>
</html>
```

Type Attribute

This attribute specifies the type of numbering or bullet used to mark items in the list. By default, its value is '1' for an ordered list and 'disc' for an unordered list.

SYNTAX:

For Unordered list: <ul type = "value">

where, value = disc|square|circle

For Ordered list: <ol type = "value">

where, value = A|a|I|i|1

UNORDERED LIST

Bullet Style	Result	Description
Disc	●	A filled circle (default)
Circle	○	A non-filled circle
Square	■	A filled square

ORDERED LIST

Number Style	Result	Description
<OL Type = "A">	A, B, C	Upper Case letters
<OL Type = "a">	a, b, c	Lower Case letters
<OL Type = "I">	I, II, III	Upper Case Roman Numbers
<OL Type = "i">	i, ii, iii	Lower Case Roman Numbers
<OL Type = "1">	1, 2, 3	Sequence of Numbers (default)

LIST PROPERTIES

LIST-STYLE-TYPE

Like Type attribute, this property specifies the bullet style that will be used as the type of list item marker.

SYNTAX: list-style-type:value

where, values for unordered list= none|disc|circle|square (disc is the default value)

and values for ordered list= decimal|decimal-leading-zero|lower-roman|upper-roman|lower-alpha|upper-alpha (decimal is the default value)

LIST-STYLE-IMAGE

With this property you can specify an image as the list item marker.

SYNTAX: list-style-image:value

where, value=url("path of the image")|none

LIST-STYLE-POSITION

You can specify the position of the list-item markers with the help of this property, i.e., to make them appear inside or outside the content flow.

SYNTAX: list-style-position:value

where, value=inside|outside

LIST-STYLE

This is the shorthand property wherein all the list properties can be specified in one declaration.

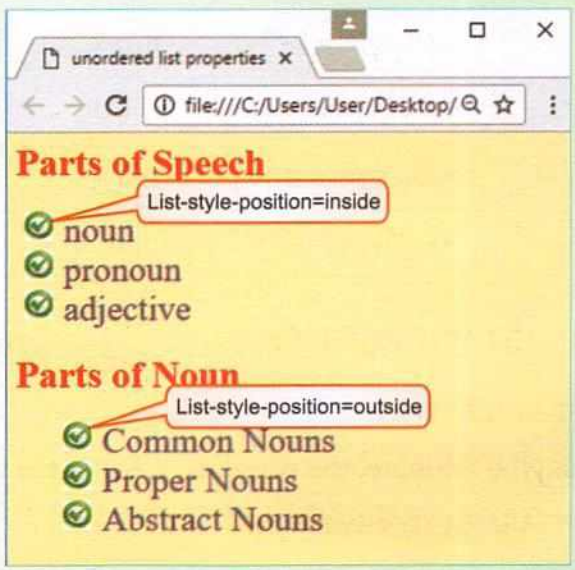
SYNTAX: list-style:value

where, value= value for list-style-type value for list-style-position value for list-style-image

NOTE

If one of the values is missing in the above short-hand property, the default value for the missing property will be inserted, if any.

```
<html>
<head>
<title>unordered list properties</title>
<style type="text/css">
body{background-color:RGB(255,251,214)}
ul{list-style-image:url("check.jpg")}
li{font-size:30px;color:purple;text-align:top}
h1{color:red}
</style>
</head>
<body>
<h1>Parts of Speech</h1>
<ul style=list-style-position:outside>
<li>noun
<li>pronoun
<li>adjective
</ul>
<h1>Parts of Noun</h1>
<ul style=list-style-position:inside>
<li>Common Nouns
<li>Proper Nouns
```

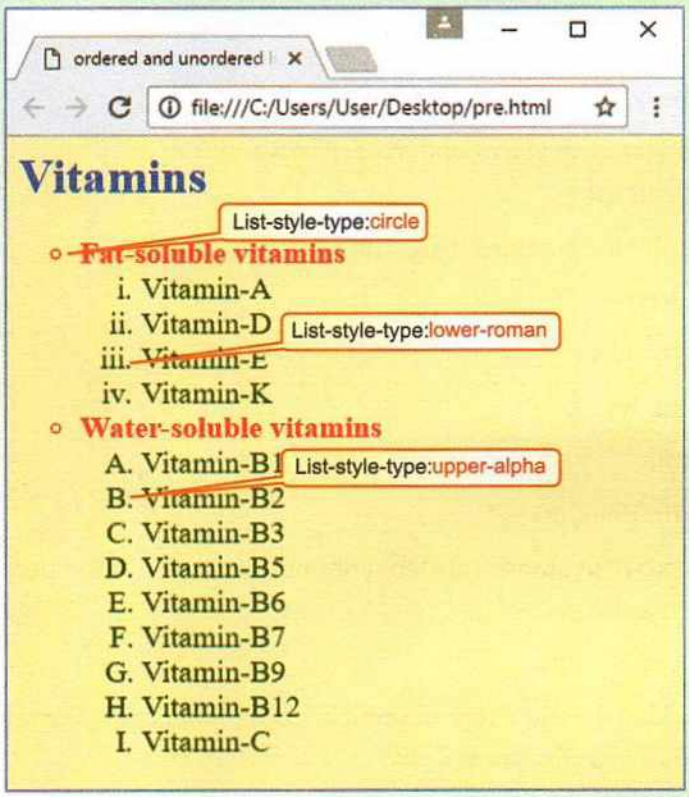


```
<li>Abstract Nouns
</ul>
</body>
</html>
```

NESTED LIST

A nested list is a list inside any other list. An ordered and unordered list can be nested within each other to form a multi-level list. To create a nested list, add a new list within the list as given below:

```
<html>
<head>
<title>ordered and unordered lists</title>
<style type="text/css">
body{background-color:RGB(255,251,214)}
ol{list-style-type:lower-roman;}
ul{list-style-type:circle;}
li{font-size:20px;}
h1{color:blue}</style></head><body>
<h1> Vitamins</h1>
<ul><li style=color:red><b>Fat-soluble vitamins</b>
<ol><li style=color:darkgreen>Vitamin-A
<li style=color:darkgreen>Vitamin-D
<li style=color:darkgreen>Vitamin-E
<li style=color:darkgreen>Vitamin-K
 </ol><li style=color:red><b>Water-soluble vitamins</b>
<ol style=list-style-type:upper-alpha>
<li style=color:darkgreen>Vitamin-B1
<li style=color:darkgreen>Vitamin-B2
<li style=color:darkgreen>Vitamin-B3
<li style=color:darkgreen>Vitamin-B5
<li style=color:darkgreen>Vitamin-B6
<li style=color:darkgreen>Vitamin-B7
<li style=color:darkgreen>Vitamin-B9
<li style=color:darkgreen>Vitamin-B12
<li style=color:darkgreen>Vitamin-C </ol></ul>
</body></html>
```

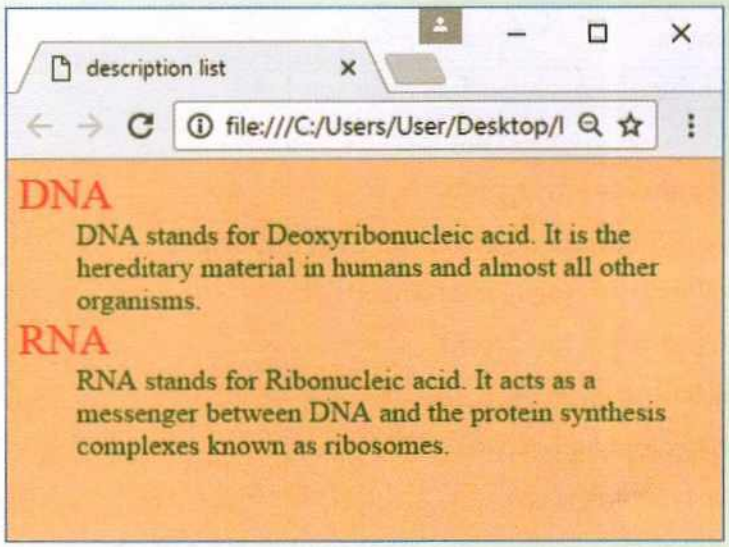


DESCRIPTION LIST

A description list consists of a term followed by its definition. It is used to present a glossary, list of terms, or other name/value lists. It starts and ends with <dl> and </dl> tag, respectively. The <dl> tag is used in conjunction with <dt> and <dd> tags where:

- <dt> helps in defining the terms or names
- <dd> helps in describing each term or name

```
<html>
<head>
<title>description list</title>
<style type="text/css">
body{background-color:peachpuff}
dt{text-transform:uppercase;color:red;font-size:30px}
dd{color:green;font-size:20px}
</style>
</head>
<body>
<dl>
<dt>dna</dt>
<dd>DNA stands for Deoxyribonucleic acid. It is the hereditary material in humans and almost all other organisms.</dd>
<dt>rna</dt>
<dd>RNA stands for Ribonucleic acid. It acts as a messenger between DNA and the protein synthesis complexes known as ribosomes.</dd>
</dl>
</body></html>
```



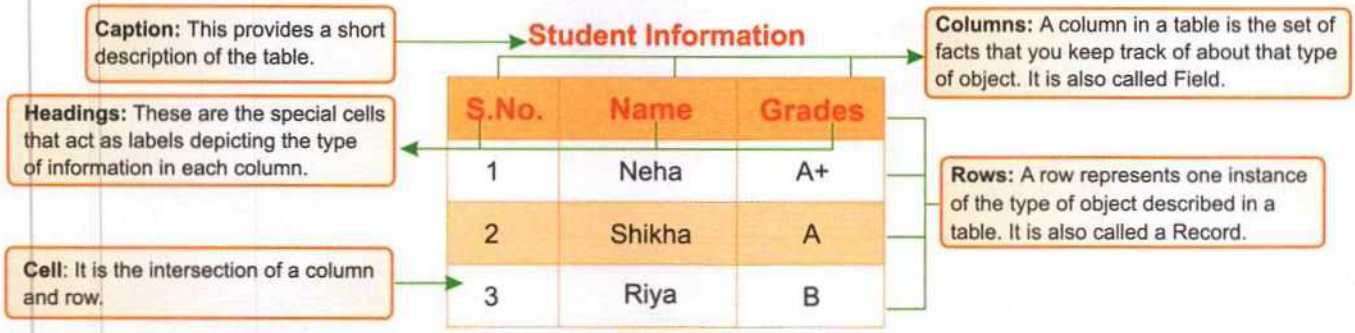
TABLES

Tables are extremely popular on the web because they are flexible and an attractive way of presenting information in the form of rows and columns.

ADVANTAGES OF TABLES

- Tables help present information or data in a comprehensive manner.
- Tables help in comparative analysis of data.
- Information displayed in tables is easier to read and quicker to evaluate.

Let us have a look at the various terms to define a table:



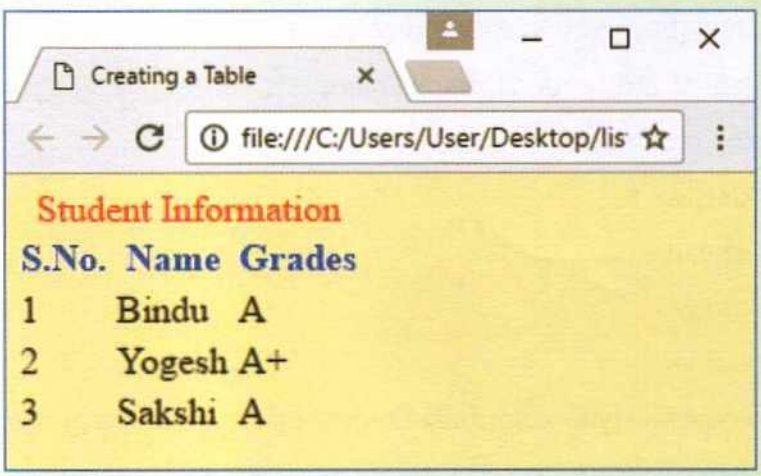
How to create a Table in HTML

To create a table in HTML, the <table> tag is used. Each table begins with a <table> tag and ends with </table> tag.

Each row in a table begins with the <tr> table row tag and ends with the </tr> tag. The rows must always be inside the <table> tag. The columns contain cells, each of which begins with the <td> table data tag and ends with the </td> tag. <td> tag must always be present inside the row tags <tr>. To specify a column heading, you use the <th> tag that also ends with the </th> tag. It makes the text bold. The <caption> tag is used to specify the title for the table.

Let us create the above given table in HTML using these tags:

```
<html>
<head>
<title>
Creating a Table
</title>
<style type="text/css">
body{background-color:rgb(255,251,214)}
th{color:blue}
</style>
</head>
<body >
<table>
<caption style= color:red> Student Information
</caption>
<tr>
<th>S.No.</th><th>Name</th><th>Grades</th>
</tr><tr>
<td>1</td>
```



```
<td>Bindu</td><td>A</td>
</tr><tr><td>2</td> <td>Yogesh</td><td>A+</td>
</tr><tr><td>3</td> <td>Sakshi</td><td>A</td>
</tr></table>
</body></html>
```

NOTE

The above table does not give the real appearance of a table, except that the data is depicted in rows and columns. To enhance its appearance, let us discuss the various table properties in the coming section.

TABLE PROPERTIES

The following properties can be applied in a table to enhance its look and appeal.

Border

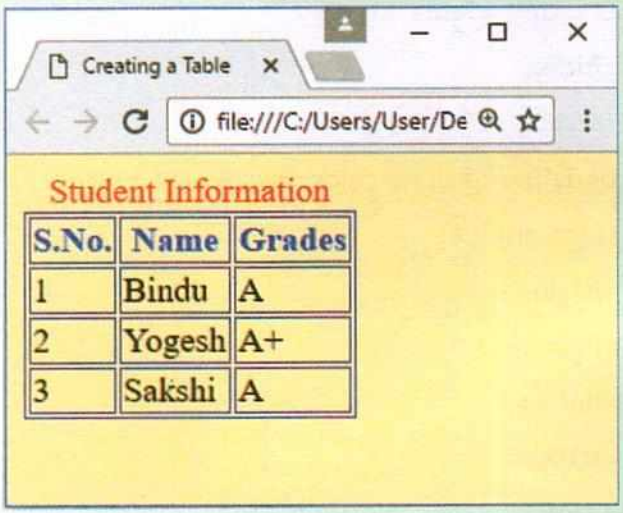
This property helps in specifying the border width, border style, and border-colour of the table and its cells.

SYNTAX: border:value

where, value = value for border-width value for border-style value for border-color

Let us apply this property on the above example:

```
<html>
<head>
<title> Creating a Table</title>
<style type="text/css">
body{background-color:rgb(255,251,214)}
table,th,td{border:1px solid blue}
th{color:blue}
</style>
</head>
<body >
<table>
<caption style= color:red> Student Information </caption>
<tr>
<th>S.No.</th><th>Name</th><th>Grades</th>
</tr><tr><td>1</td> <td>Bindu</td><td>A</td>
</tr><tr>
<td>2</td> <td>Yogesh</td><td>A+</td>
```



```
</tr><tr>
<td>3</td> <td>Sakshi</td><td>A</td>
</tr>
</table>
</body></html>
```

Horizontal and Vertical Alignment

The text-align and vertical-align properties are used to set the horizontal and vertical alignment of the text respectively, in a table. These properties are used with the <th> or <td> tag.

By default, the horizontal alignment for the contents of <th> is center-aligned and for <td> is left-aligned. The default value of vertical-alignment is set to middle alignment.

SYNTAX: text-align: value; ← Horizontal Alignment

where, value= left|center|right

vertical-align: value; ← Vertical Alignment

where, value= top|middle|bottom

Hover

This property, if enabled, highlights the table cell, row, or column with the specified colour when you hover your mouse over it. It is used with the <tr>, <th>, or <td> tag.

SYNTAX: tr:hover{background-color: cyan}

Table-layout

This property is used to set the layout for a table. It is used with the <table> tag.

Syntax: table-layout: value

where, value:auto|fixed|initial

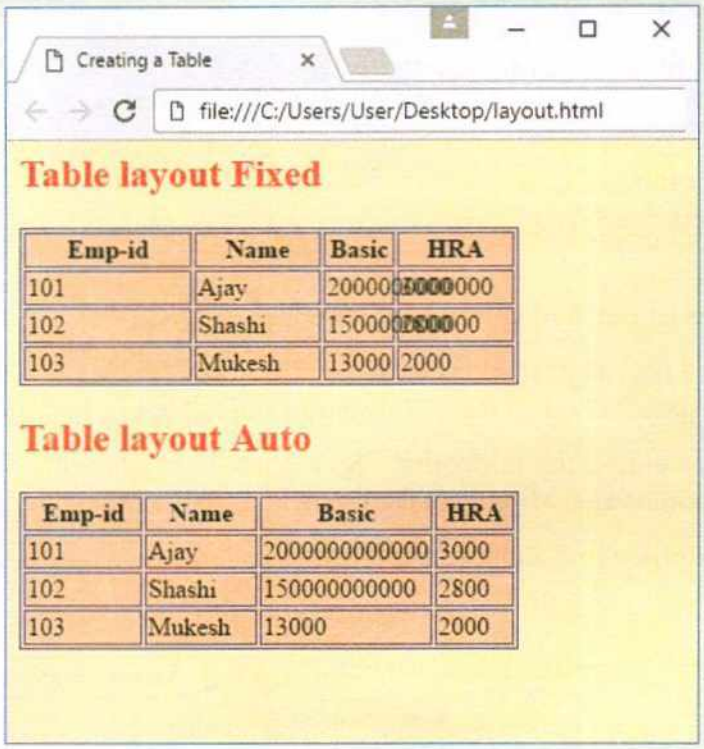
Auto: In this, the column width is set equal to the maximum width of the contents in the column.

Fixed: The column width depends on the table's width and the width of the columns, not on the contents of the cells.

Initial: The default value is used for the column width.

```
<html>
<head>
<title>Creating a Table</title>
<style type="text/css">
body{background-color:RGB(255,251,214)}
table,td,th{border:1px solid blue}
table{width:50%}
```

```
th{text-align:center}
td{vertical-align:middle}
tr:hover{background-color:cyan}
table{table-layout:fixed;background-
color:peachpuff}
h2{color:red}
</style></head>
<body ><table>
<h2> Table layout Fixed </h2>
<tr><th width=40%>Emp-id</th><th
width=30%>Name</th><th width=17%>Basic</th><th
width=28%>HRA</th>
</tr><tr>
<td>101</td> <td>
Ajay</td><td>2000000000000</td><td> 3000</td>
</tr><tr><td>
102</td><td>Shashi</td><td>150000000000</td><td>2800</td>
</tr><tr><td>103</td><td>Mukesh</td> <td>13000</td><td>2000</td>
</tr></table><table style=table-layout:auto>
<h2> Table layout Auto </h2><tr><th width=40%>Emp-id</th><th width=30%>Name</th><th
width=10%>Basic</th><th width=28%>HRA</th>
</tr><tr><td>101</td> <td> Ajay</td><td>2000000000000</td><td>  3000</td>
</tr><tr><td>102</td><td>Shashi</td><td>150000000000</td><td>2800</td>
</tr><tr><td>103</td><td>Mukesh</td> <td>13000</td><td>2000</td>
</tr></table>
</body></html>
```



Border-spacing

This property is used to specify the distance between the borders of the adjacent cells.

SYNTAX: border-spacing: value

where, value= horizontal spacing in px|cm vertical spacing in px|cm

Example: border-spacing:10px- horizontal and vertical spacing set to 10px

border-spacing:10px 20px- horizontal and vertical spacing set to 10px and 20px, respectively.

NOTE

If only one value is specified, it gets applied to both the horizontal as well as vertical spacing.

Border-collapse

With this property one can specify whether the table borders are to be collapsed into a single border or detached (as usual).

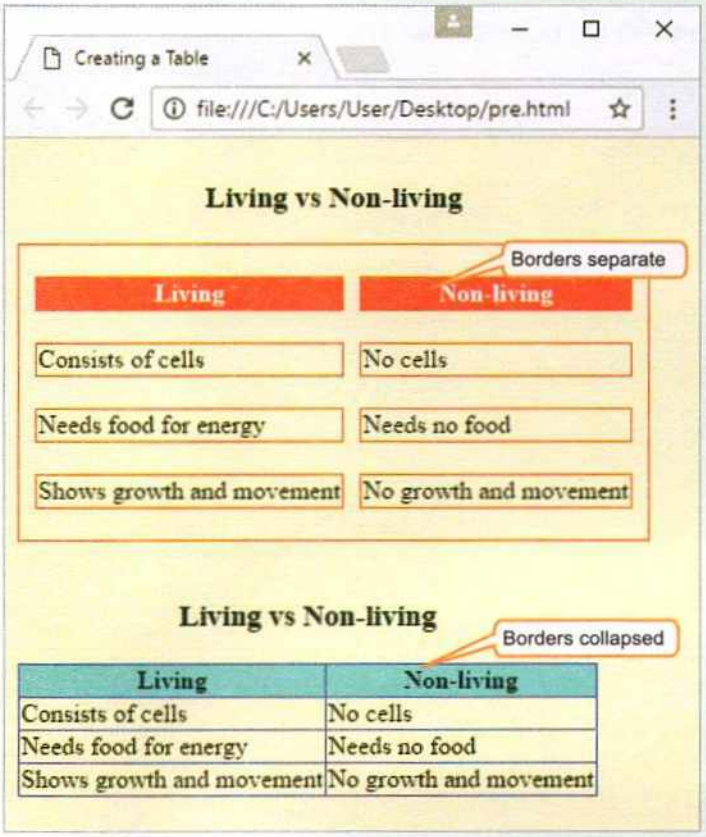
SYNTAX: border-collapse:value

where, value= separate|collapse

Example: border-collapse:collapse

```
<html>
<head>
<title>Creating a Table</title>
<style type="text/css">
body{background-color:RGB(255,251,214)}
table,td,th{border:1px solid red}
table{border-collapse:separate; border-spacing:10px 20px}
</style></head>
<body><table>
<caption><h3> Living vs Non-living </h3> </caption>
<tr><th style=background-color:Red;color:white> Living</th><th style=background-color:Red;color:white>Non-living</th>
</tr><tr>
<td>Consists of cells</td> <td>No cells</td>
</tr><tr>
<td>Needs food for energy</td> <td>Needs no food</td>
</tr><tr>
<td>Shows growth and movement</td> <td>No growth and movement</td>
</tr></table><br>
<table style=border-width:1px;border-style:solid;border-color:blue;border-collapse:collapse>
<caption><h3> Living vs Non-living </h3></caption>
<tr><th style=border-color:blue;background-color:cyan>Living</th><th style=border-color:blue;background-color:cyan>Non-living</th>
</tr><tr>
<td style=border-color:blue>Consists of cells</td>
```

Definition of the 2nd table starts here



```
<td style=border-color:blue>No cells</td>
</tr><tr>
<td style=border-color:blue>Needs food for energy</td> <td style=border-color:blue>Needs no food</td>
</tr><tr><td style= border-color:blue>Shows growth and movement</td> <td style=border-color:blue>No growth and movement</td>
</tr></table></body></html>
```

Caption-side

It specifies the placement of a table caption.

SYNTAX: caption-side:value

where, value= top(default)|bottom

Example: caption-side:bottom

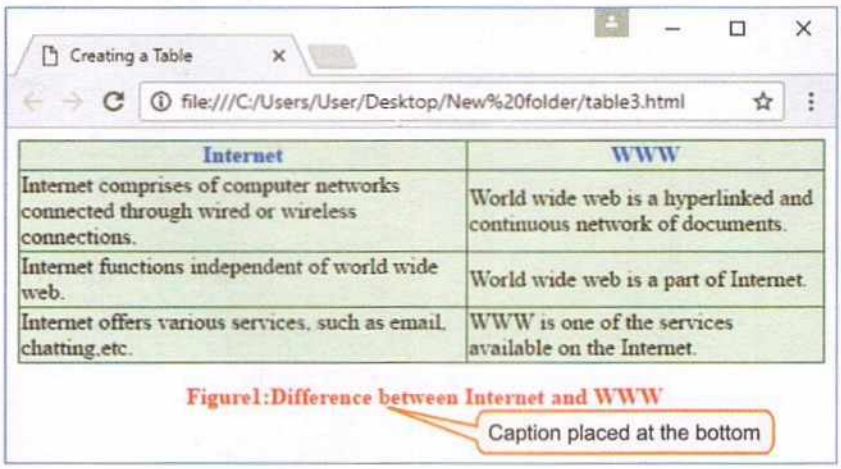
Empty-cells

This property helps in specifying whether or not the border and background are to be placed around empty cells in a table.

SYNTAX: empty-cells:value

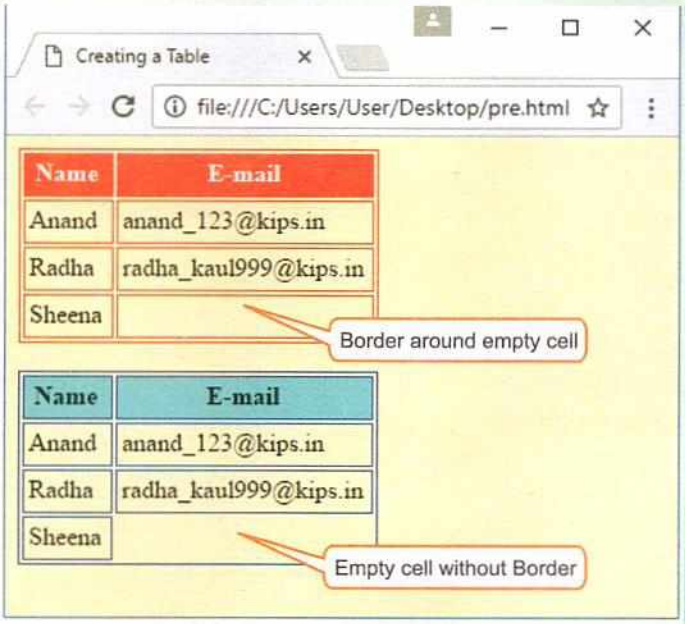
where, value= show(default)|hide

Example: empty-cells:hide




```
<html>
<head>
<title>Creating a Table</title>
<style type="text/css"> body{background-color:RGB(255,251,214)}
table,td,th{border:1px solid red}table{border-collapse:separate;empty-cells:show}
th,tr,td{padding:3px 5px 5px 3px}</style></head><body ><table>
<tr><th style=background-color:red;color:white>Name</th><th style=background-color:red;color:white>E-mail</th></tr><tr><td>Anand</td> <td>anand_123@kips.in</td>
```

```
</tr><tr><td>Radha</td> <td>radha_kaul999@kips.in</td>
</tr><tr><td>Sheena</td>
<td></td>
</tr></table><br><table
style=empty-cells:hide;border-
color:blue>
<tr><th style=border-
color:blue;background-
color:cyan>Name</th><th
style=border-
color:blue;background-
color:cyan>E-mail</th>
</tr><tr><td style=border-
color:blue>Anand</td>
<td style=border-
color:blue>anand_123@kips.in<
/td>
</tr><tr><td style=border-color:blue>Radha</td>
<td style=border-color:blue>radha_kaul999@kips.in</td>
</tr><tr><td style=border-color:blue>Sheena</td> <td style=border-color:blue></td>
</tr></table></body></html>
```



Let's Know More

You can display different elements inside a table. For example, we can include a paragraph, a list, a table, and a simple text inside a table.

```
<table><tr> <td>
<p> Include a
Paragraph</p>
<p>Good deeds bring
Good rewards</p>
</td>
<td>This cell contains a
table:
<table><tr>
<td>A</td><td>B</td>
</tr> <tr><td>C</td>
<td>D</td></tr>
</table></td>
</tr><tr><td>Here comes
the list <ul>
<li>Almonds</li>
<li>Cashews</li>
<li>Raisins</li>
</ul> </td> <td>A simple
text</td></tr> </table>
```

Height and Width

Using these properties, you can set the height and width of the table.

SYNTAX: height:value
width:value
where, value= length in px|cm|%

Example: height:100px
Width: 25%

Padding

This property helps in specifying the space between the border and content in a table.

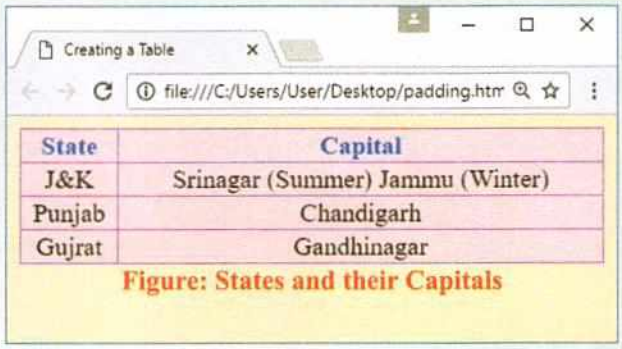
SYNTAX: padding: value
where, value= top padding|right padding|left padding|bottom padding in px|cm|%

Example: padding:2px 3px 3px 2px– top(2px),right(3px),left(3px),bottom(2px)
padding:2px 3px 3px--------- top(2px),right and left(3px), bottom(3px)
padding:2px 3px---------- top and bottom(2px), right and left(3px)
padding:2px---------- all four paddings of 2px each

Let's Know More

You can make a table cell span more than one column by using the colspan attribute.
For example:
<td colspan="2">
Similarly, a table cell can span more than one row with the help of rowspan attribute.
For example:
<td rowpan="2">

```
<html>
<head>
<title>Creating a Table</title>
<style type="text/css">
body{background-color:RGB(255,251,214)}
caption{caption-side:bottom}
table,td,th{border:1px solid magenta}
table{border-collapse:collapse;padding:5px;width:100%;height:30%;text-align:center;background-color:RGB(250,223,223)}
th{color:blue}
</style></head>
<body ><table>
<caption style=color:red> <b>Figure: States and their Capitals</b> </caption>
<tr><th>State</th><th>Capital </th>
</tr><tr><td>J&K</td> <td>Srinagar (Summer)
Jammu (Winter)</td></tr>
<tr><td>Punjab</td> <td>Chandigarh</td>
</tr><tr><td>Gujrat</td> <td>Gandhinagar</td>
</tr></table></body></html>
```



State	Capital
J&K	Srinagar (Summer) Jammu (Winter)
Punjab	Chandigarh
Gujrat	Gandhinagar

Figure: States and their Capitals

Let's Know More

You can define a special style for a particular table in an HTML document by using an id attribute of the table.

For example:

```
<style>table#t1
{width: 100%; background-color: lightgrey}</style>
<body><table
id= "t1">
<tr><th>Prod_id</th>
<th>Prod_nm</th>
</tr>
<tr>
<td>P001</td>
<td>Shirt</td>
</tr></table>
```

RECAP

- A list is the most efficient way of presenting information in a precise manner and helps in making important points standout more clearly.
- An unordered list is used when the items are not to be displayed in any particular sequence.
- The <li> tag is used to display the list of items contained in any of the two list types, i.e., unordered and ordered list.
- The ordered list is used to display the list of items in a specific order.
- The Reversed attribute of <ol> tag specifies that the list order should be in descending order.
- A nested list is a list inside any other list.
- A description list consists of a term followed by its definition and is used to present a glossary, list of terms, or other name/value lists.
- Tables are an attractive way of presenting information in the form of rows and columns.

BRAIN DEVELOPER

SECTION - A

A. Fill in the blanks.

1. A ..... is the most efficient way of presenting information in a precise manner.
2. An ..... list indents each item in the list and adds a bullet against each item.
3. The ..... property is used to specify the distance between the borders of the adjacent cells in a table.
4. The ..... attribute of <ol> tag puts the list in the descending order.
5. A ..... list is used to present a list of definitions for terms.

HINTS • Description • List • Unordered • Border-spacing • Reversed

B. State True or False.

1. An ordered list automatically starts with the number 0. ☐
2. The List-style-type property specifies the type of list item marker that will be used as a bullet. ☐
3. The <TR> tag must always be present inside the row tag <TD>. ☐
4. The tag <DT> is used to define the terms or names. ☐
5. The default value of empty-cells property is hide. ☐

C. Application-based questions.

1. Manas has created a table and he wants that the table borders should be collapsed into a single border. Which property should he use?

.....

2. Myrah wants to use an image as the list item marker for her list. Which property should she use to complete the task?

.....

SECTION - B

A. Multiple-choice questions.

1 Unordered lists is also known as ..... list.

a. bulleted b. numbered c. multilevel

2. By default, ordered list starts with .....

a. A b. 1 c. a

3. With ..... property, you can specify the position of the list-item markers.

a. List-style-position b. list-style-place c. list-position

4. In Description list, the ..... tag helps in describing each term or name.

a. <dl> b. <dd> c. <dn>

5. The ..... property helps in specifying the placement of a table caption.

a. caption-style b. caption-place c. caption-side

B. Answer the following questions.

1. Differentiate between <UL> and <OL> tags.

.....

.....

.....

2. Define the different types of lists supported by HTML5.

.....

.....

.....

.....

3. What are tables and which tags are used to create them?

.....

.....

.....

.....

4. Write short notes on:

a) List-style-image .....

.....

b) List-style .....

.....

c) Empty-cells .....

.....

ACTIVITY SECTION

LAB SESSION

Perfection Through Practice

- Create a web page to display the details of your classmates in tabular format.
- Set the background colour of the web page to yellow and the top margin of the web page to 75.
- Set Table border size to 3 pixels and border colour to 'Green'.
- Table Height should be 250 pixels and width should be 500 pixels.
- Create 5 columns in the table named as **S.No, Name, Birthday, E-mail ID,** and **Phone No.** The Caption of the table should be **My Classmates**. Apply heading style 1 to it.
- Create five rows in the table and enter records of your five classmates.
- Set the background colour and border colour of the heading row to 'Pink' and 'Green', respectively.
- Set CellPadding of the table to 5.

My Classmates

S.No.	Name	Birthday	E-mail ID	Phone No.
1	Nitin	12 June	nitin@yahoo.in	2234574
2	Apoorva	05 May	ap_va@kips.in	2115574
3	Devinder	12 April	devi@yahoo.in	2545321
4	Sakshi	09 March	sak_sh@yahoo.in	2458751
5	Abhishek	01 July	abhi@kips.in	2995651

GROUP DISCUSSION

For Concept Clarity

Divide the class into two groups and conduct a group discussion on the topic: **'CSS Properties of Lists'**.

PROJECT WORK

Using Creativity

Ask the students to create a web page displaying their personal profile, portraying their aim in life, hobbies and strengths that make them unique. Use the required HTML tags to beautify your web page including Lists and Tables.

ONLINE LINKS

Looking For More

To know more about types of lists and tables in HTML, visit the following sites:

- www.html-5-tutorial.com/ul-ol-tags.htm
- www.html-5-tutorial.com/table-tag.html

CHAPTER 9

IMAGES, LINKS, & FRAMES IN HTML 5

LEARNING IN THIS CHAPTER

- Inserting images
- The <IMG> Tag
- Linking web pages
- The Anchor <A> Tag
- CSS and Links
- Links as buttons
- Images as links
- Audio and video tag
- Frames, border & IFrame

In the previous chapter you learnt about the various types of lists and their properties. Besides that we also discussed how to present data in a tabular format. In this chapter, you will learn about the other important elements of a web page like Images, Anchor element, Links, Frames, etc.

INSERTING IMAGES

Besides text, you can display graphics, drawings, paintings, charts, maps, or photographs on a web page. These elements make the web page more informative and appealing. Images can be used as a navigational tool to help users browse through the internet. Web browsers support various graphic formats. The widely used formats are GIF, PNG, and JPEG formats.

There are two types of images: Inline and External image. The inline image is displayed when the web page is opened and inserted within a line of text whereas the external images are not displayed automatically with the other content on the web page. Instead, they are referenced externally and viewed separately by clicking on a link. To insert an inline image, the **<img>** tag is used. Whereas, to insert an external image, the **anchor tag <a>** is used that establishes a link to the image.

THE <IMG> TAG

The <img> tag is used to add images in an HTML webpage. It is an empty tag and requires different attributes to be specified with it. These attributes for the <img> tag tell the browser how to lay out the page so that the text can flow properly around the image.

DEFINING THE SOURCE OF AN IMAGE

To add and define the source of an image on a web page, the **src** attribute is used.

SYNTAX: <img src="Name or path of the image file"

While specifying the image file, one should be well aware of its name and location, i.e., where the file exists. Let us understand it with the help of following examples:

Example 1: If the image file, let us say "pic1.jpg", lies in the same folder, where the referring HTML file is located, then you can refer the image file by simply writing its name.

<img src="pic1.jpg">

Example 2: If the image file "pic1.jpg" lies in a directory other than the one in which HTML file is placed, then you can refer to the image by specifying full path of the file:

<img src="C:\Users\MyImages\Pictures\pic1.jpg">

Example 3: If the image file "pic1.jpg" does not lie in your computer rather is located in the images folder of the web server of Google, then you need to give full path of the file:

<img src=http://www.google.com/images/pic1.jpg>

SPECIFYING HEIGHT AND WIDTH FOR AN IMAGE

The HEIGHT attribute specifies height (in pixels) for an image either in the form of an integer or a percentage value.

The WIDTH attribute specifies width (in pixels) for an image either in the form of an integer or a percentage value.

```
<html>
<head>
<title> height and width </title> </head>
<body>
<img src= "camel.jpg" style= height: 70% ; width: 50%> <p>
Morphing is a special effect in motion pictures and animations that changes (or morphs) one image or shape into another through a seamless transition. Most often it is used to depict one person turning into another through technological means or as part of a fantasy or surreal sequence. </p>
</body>
</html>
```

ALIGNING IMAGE

To align an image to the right or left of a text, use the CSS property- **float.**

Example: <img src= " imag1.jpg " style = float:right;width:50px;height:50px>

Image will appear to the right of the text.

To align an image to top, bottom, or middle, use the CSS property **vertical-align.**

NOTE

In previous version of HTML, **align** attribute was used to align the images to left or right.

ALT ATTRIBUTE

Sometimes a browser on the user's computer does not display images due to some reasons (may be because of slow connection or error in the **src** attribute). In that case, you can display the text to provide a description about the image. The ALT attribute lets you specify the text as an alternate to the image. The only purpose of ALT attribute is to provide a description of the contents of an image file. It is generally used in case the user is having a text-based

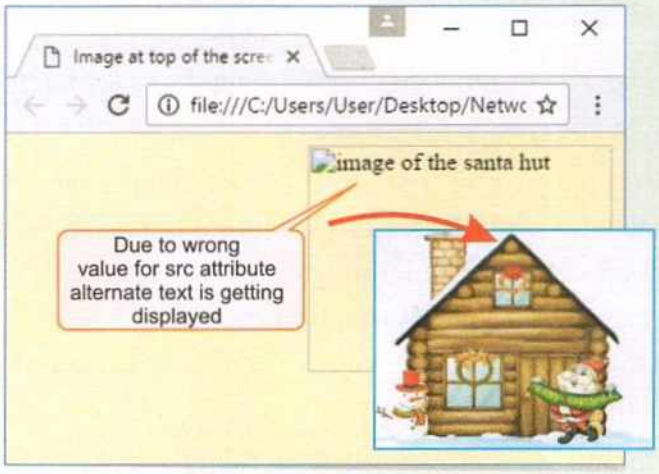
browser on his computer such as Lynx. It also proves to be useful when the user is a blind surfer for whom the browser is programmed to read aloud the alternate text instead of displaying the image. In many cases, people have the image display disabled on their browsers or use settings that do not support the automatic loading of images. In such cases as well, ALT attribute is used.

NOTE

The value for the ALT attribute is a text string of up to 1024 characters, enclosed in quotation marks if you include spaces or other punctuation.

```
<html>
<head>
<title> Image at top of the screen </title>
<style type="text/css">
body{background-color:RGB(255,251,214)}
</style></head>
<body>
<p><img src= "Santa Workshop.gif" alt= "image of the santa hut" style = float:right;width:200px;height:150px>
</p>
</body>
</html>
```

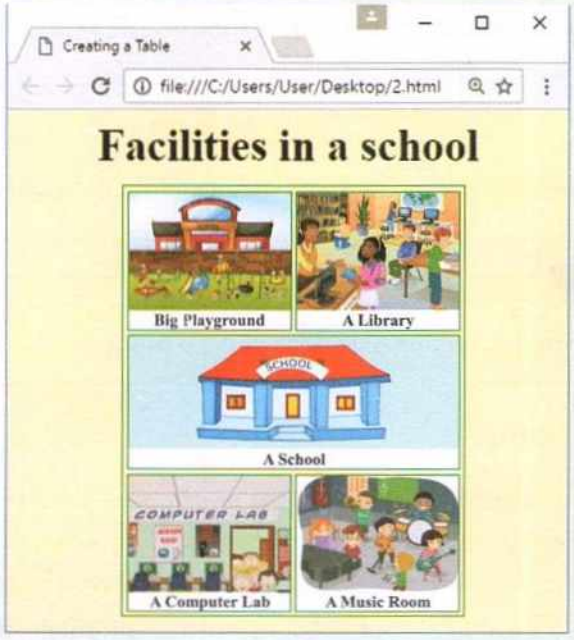
Santa Workshop.jpg ← Correct Source Value



IMAGES IN A TABLE CELL

You can also insert an image in a table cell. Let us understand it with the help of an example:

```
<html>
<head>
<title>Creating a Table</title>
<style type="text/css">
body{background-color:RGB(255,251,214)}
table,td,th{border:1px solid green;}
table{border-collapse:separate;}
td{text-align:center;}
</style>
</head>
<body>
<center><table>
```



```
<caption><h1>Facilities in a school</h1></caption>
<tr><td><img src="playground.jpg" style=width:100%><h3>Big Playground</h3></td>
<td><img src="library.jpg" style=width:100%><h3>A Library</h3></td>
</tr><tr><td colspan=2><img src="school.jpg" style=width:100%><h3>A School</h3></td>
</tr><tr>
<td><img src="complab.jpg" style=width:100%><h3>A Computer Lab</h3></td>
<td><img src="music.jpg" style=width:100%><h3>A Music Room</h3></td>
</tr>
</table></center>
</body></html>
```

LINKING WEB PAGES

A website consists of a number of web pages that give you access to related information. HTML renders a powerful feature of linking these web pages together. This feature is called **Hyperlinking**. Using these hyperlinks, one can open any linked web page on the internet in no time. When you hover the mouse pointer over a link, it will turn into a little hand.

TYPES OF LINKING

- Internal linking
- External linking

Internal linking: When one part of a web page is linked to another section on the same page, it is called the internal linking.

External linking: When one page is linked to another web page or website, it is called the external linking.

THE ANCHOR <A> TAG

In HTML, the Anchor tag <A>, is used to mark the text as a hyperlink, which a user can click to display the document, anchored to it. Being a container tag, it requires closing tag </A> to mark the end of the text or image. This tag is generally used to specify the following:

- The text or image that is clicked to activate the link
- The address that will be opened using the defined link

You can use hyperlinks in the following ways:

1. To jump from one section to another within the same web page
2. To link to another page within the same website
3. To link to another page or website anywhere in the world

HREF ATTRIBUTE

HREF is an attribute of <A> Anchor tag, which defines the document to which the link leads.

SYNTAX: CLICK HERE

where value =

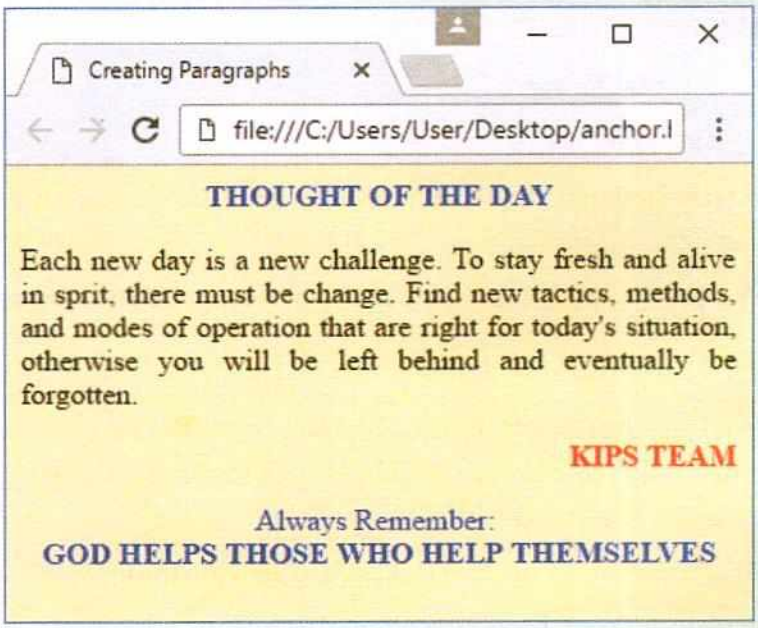
- Absolute URL– It points to another website (like <a href="http://www.google.com/ ">)
- A relative URL – It points to a file within a website (like <a href="Click.html">)
- Link to an email address(like <a href= "mailto:info@kips.in">)

NOTE

In the syntax given above, the text "CLICK HERE" is called **Hypertext.** Hypertext is a text that contains links to information (text, graphics, or media) on the same web page or some other web page. Browser displays this text as underlined and coloured.

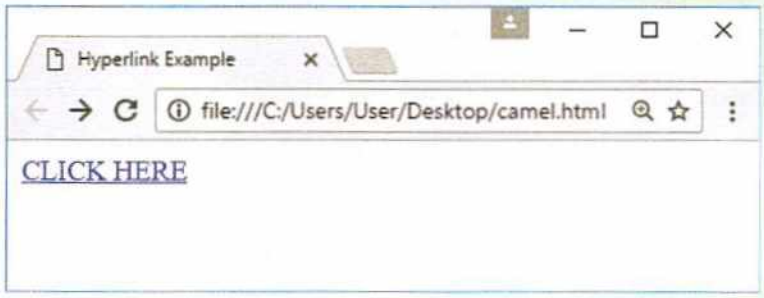
Type the following code and save the file with name click.html.

```
<html>
<head>
<title>
Creating Paragraphs
</title>
<style type="text/css">
body{background-color:RGB(255,251,214)}
</style>
</head>
<body>
<p style=text-align:center;color:blue> <b>
THOUGHT OF THE DAY </b></p>
<p style=text-align:justify> Each new day is a new
challenge. To stay fresh and alive in sprit, there
must be change. Find new tactics, methods,
and modes of operation that are right for
today's situation, otherwise you will be left
behind and eventually be forgotten. </p>
<p style=text-align:right;color:red> <b> KIPS TEAM </b> </p>
<p style=text-align:center;color:blue> Always Remember: <br>
<b> GOD HELPS THOSE WHO HELP THEMSELVES </b>
</p>
</body>
</html>
```



Now type the following program code in a new file and save the file with the name link.html.

```
<html>
<head>
<title>Hyperlink Example </title>
</head><body>
<a href = "click.html"> CLICK HERE </a>
</body>
</html>
```



NOTE

Remember, if the linked HTML document exists in a different folder, you must specify the complete path and name of the folder.

CSS AND LINKS

CSS affects the links differently depending on the state they are in. You can divide the link states in four categories:

- a:link – a normal, unvisited link
- a:visited – a link the user has visited
- a:hover – a link when the user moves the mouse over it
- a:active – an activated link the moment it is clicked

You can customise these link states by applying different text properties and colours to them.

NOTE

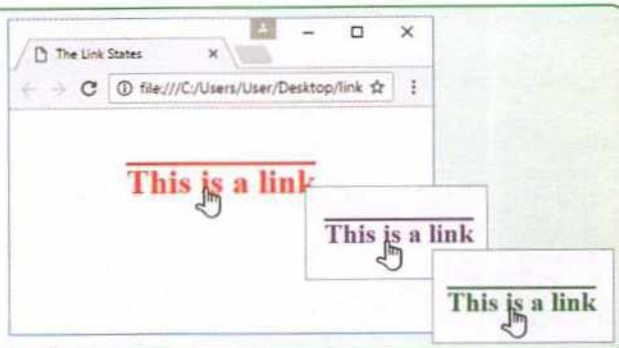
You can set the style for several link states in a single statement. While doing so, the following rules, regarding the order in which the states are to be mentioned, should be kept in mind.

- a:hover must come after a:link and a:visited
- a:active must come after a:hover

Let us use these link states:

```
<html>
<head>
<title> The Link States </title>
<style type="text/css">
body{text-align:center;margin-top:50}
a:link{color:red;text-decoration:overline}
a:visited{color:yellow}
a:hover{color:purple}
a:active{color:green}
```

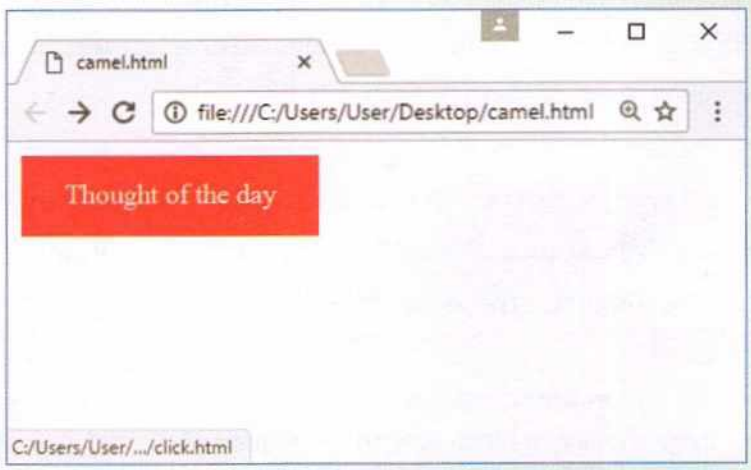
```
</style>
</head>
<body>
<a href="channel.nationalgeographic.com"><h1>This is a
link</h1></a>
</body></html>
```



LINKS AS BUTTONS

You can also display links as buttons using CSS styling. The following example demonstrates the same.

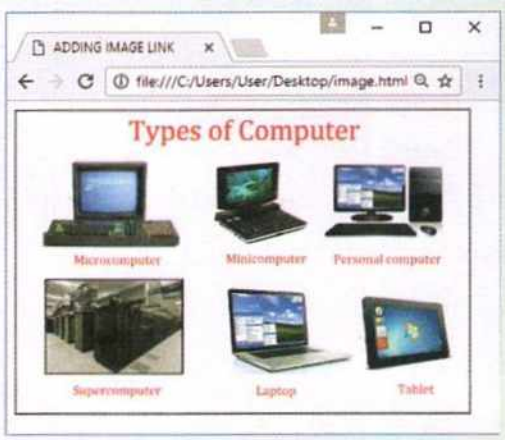
```
<html>
<head><style type="text/css">
a:link, a:visited {background-color: pink; color: white;
padding: 14px 25px;
text-align: center;
text-decoration: none;
display: inline-block;}
a:hover, a:active {background-color: red;}
</style></head>
<body>
<a href="click.html">Thought of the day</a>
</body></html>
```



IMAGES AS LINKS

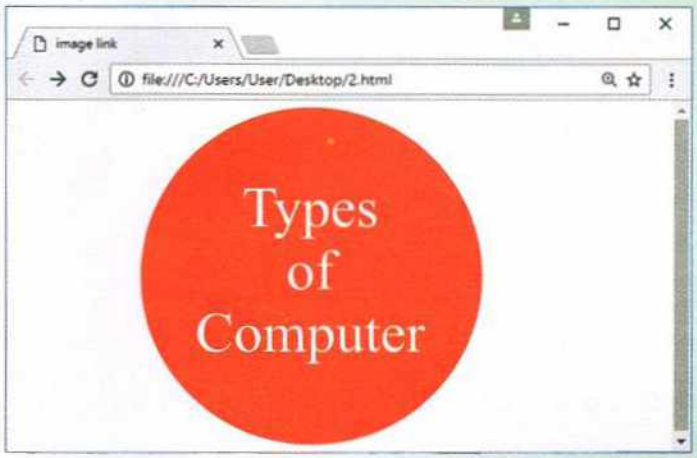
An image can also be used as a hyperlink to another document. Let us see an example. Type the following HTML code in the file image.html.

```
<html>
<head>
<title>ADDING IMAGE LINK</title>
</head>
<body>
<img src= "Types of Computer.jpg">
</body>
</html>
```



Now type the following HTML code and define the link for image.html file.

```
<html>
<head><title>image link</title>
</head>
<body>
<a href = image.html>
<img src = "Computer.jpg"
height=95% width=50%>
</a>
</body>
</html>
```



NOTE

Note that in the HTML code written above, you must replace Computer.jpg and Types of Computer.jpg with the name or path of the images you have in your computer.

AUDIO AND VIDEO

Until now, you have discussed various tags, which help us in enhancing the appearance of our web page. In this section, you will discuss the tags with which you will be able to incorporate multimedia in our web page and make it come alive. Multimedia refers to 'multiple mediums'- the ability to add bits of sound and moving pictures to the web page.

INSERTING AUDIO

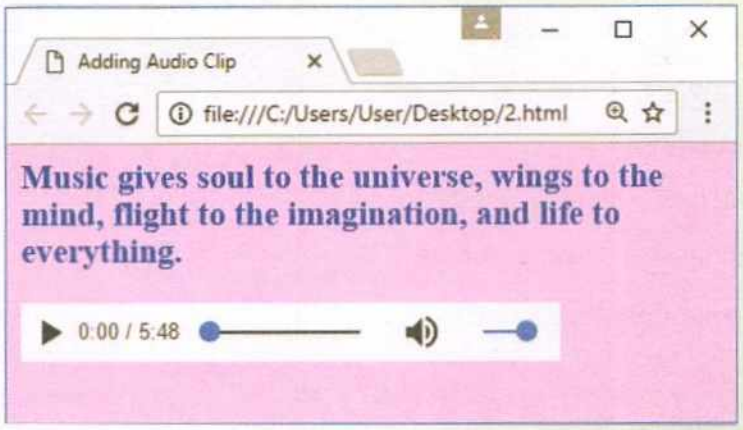
HTML5 defines a new tag-<audio> tag that specifies a standard way to insert an audio file in a web page. It can be used for any file format like.mp3, .ogg, .wav, etc.

The attributes of <audio> tag are given in the following table:

Attribute	Purpose
src	Specifies the URL of the audio file
controls	Displays the controls on the web page
autoplay	Plays the audio file automatically when the web page is loaded
loop	Replays the audio file

```
<html>
<head>
<title>Adding Audio Clip</title>
<style type="text/css">
```

```
body{background-color:RGB(250,214,229)}
</style>
</head>
<body >
<h3 style=color:blue> Music gives soul to the universe, wings to the mind, flight to the imagination, and life to everything. </h3>
<audio controls
src="C:\Users\User\Desktop\Kalimba.mp3" >
Your browser does not support the audio tag.
</audio></body>
</html>
```

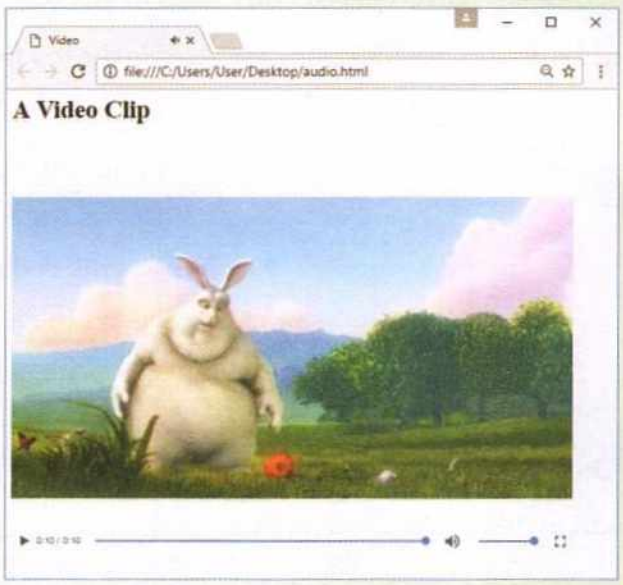


INSERTING VIDEO

You can insert video files in your HTML pages with the help of **Video** tag in a similar way. Supported file formats include: .mp4, .webm, .ogg, etc. Attribute associated with the <video> tag are given below.

Attribute	Purpose
src	Specifies the URL of the video file
controls	Displays the controls on the web page
autoplay	Plays the audio file automatically when the web page is loaded
height	Specifies the height of the video player displayed
width	Specifies the width of the video player displayed

```
<html>
<head>
<title> Video </title>
<body>
<h1> A Video Clip </h1>
<video controls src="C:\Users\User\Desktop\video1.mp4"
width="720" height="540" autoplay>
Your browser does not support the video tag.
</video>
</body>
</html>
```



NOTE

If the browser does not support <audio> and <video> tags, then any text lying between <audio> and </audio> and <video> and </video> tags will be displayed in the browser as such.

Let's Know More

You should always specify the width and height of an image. If width and height are not specified, the page will flicker at the time of image loading.

FRAMES

You have seen so far that an HTML document takes up the entire size of a browser window. But what if you want to display more than one HTML documents at once in a browser window? This can be achieved by using the concept of frames in HTML.

Frames are a way of organising your website. They enable the user to divide a page into a number of rectangular segments for different purposes.

Frames allow multiple HTML documents to be presented as independent windows within one browser window. This gives greater flexibility to design and maintain your site than simply dumping everything onto one page. Frames make your site interesting as you can include the site theme (image, logo, banners, etc.). The navigation menu in frames is not to be downloaded each time when you visit a new page, only you have to change the contents of the page.

Let's Know More

By default, a link will appear like this (in all browsers):

- An unvisited link is underlined and blue.
- A visited link is underlined and purple.
- An active link is underlined and red.

CREATING FRAME

In HTML5, frames can be created using <iframe> (Inline Frame) tag. An Inline frame is a new HTML document embedded inside the current HTML document. The attributes of <iframe> tag are:

Let's Know More

Before HTML5, audio and video files could only be played in a browser with a plug-in.

SRC

With the help of this attribute, you specify the path of the document that should be displayed in the inline frame.

SYNTAX: <iframe src=value>

where value=path of the document

HEIGHT & WIDTH

With these attributes, you can control the size of the inline frames.

SYNTAX: width=value in pixels

height=value in pixels

Let us use the inline frames in our HTML document.

Type the below given code for the main document.

Let's Know More

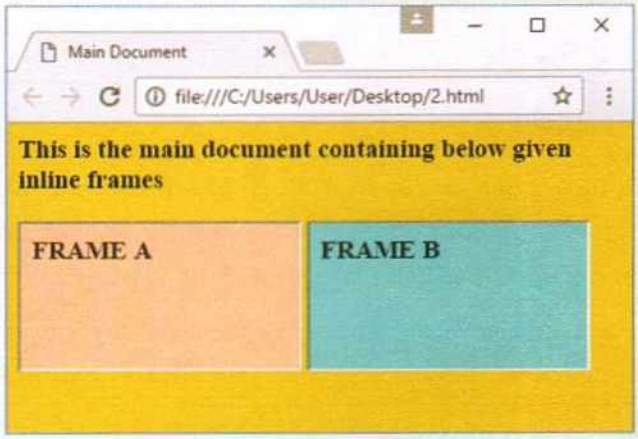
An iframe can be used as the target frame for a link by using the target attribute of the link. The target attribute must refer to the name attribute of the iframe.

For example:

```
<iframe src="testfile.html" name="iframe_1"></iframe>
<a href="http://www.google.com"target="iframe_1">Google</a>
```

```
<html>
<head>
<title>Main Document</title>
<style type="text/css">
```

```
body{background-color:yellow}
</style>
</head>
<body>
<h3> This is the main document containing below given inline frames </h3>
<iframe src="frame_a.html" height=200width=200></iframe>
<iframe src="frame_b.html" height=200 width=200></iframe>
</body>
</html>
```



NOTE

Before creating the above main document, you should first create two files with name 'frame_a.html' and 'frame_b.html'.

BORDER AND IFRAME

By applying CSS property-Border, you can display an inline frame with or without the border.

SYNTAX: Border: value for border-width |value for border-style |value for border-color

You can also apply individual border properties:

- border-width : value

  where value=thin, thick, medium, or a numeric value indicated in pixels.

- border-style : value

  where value can be none, hidden, dotted, dashed, solid, double, groove, ridge, inset, or outset

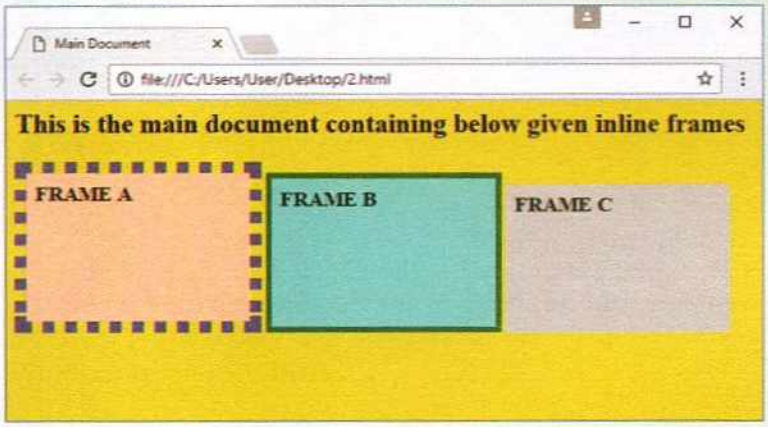
- border-color: value

  where value can be the name of the colour or its corresponding hexadecimal code.

Let us check out an example:

```
<html>
<head>
<title>Main Document</title>
<style type="text/css">
body{background-color:yellow}
iframe{border:10px dotted purple}
```

```
</style>
</head><body>
<h3> This is the main document containing below given inline frames</h3>
<iframe src="frame_a.html" height=200 width=200></iframe>
<iframe src="frame_b.html" height=200 width=200 style="border-width:5px;border-style:solid;border-color:green"></iframe>
<iframe src="frame_c.html" height=200 width=200 style="border:none"></iframe>
</body>
</html>
```



RECAP

- Web browsers support various graphic formats but the widely used formats are GIF, PNG, and JPEG formats.
- There are two types of images: Inline and External image.
- The inline image is displayed when the web page is opened and inserted within a line of text whereas an external image does not get displayed automatically with the other content on the web page.
- An inline image is inserted using the <img> tag whereas, to insert an external image, the anchor tag <a> is used that establishes a link to the image.
- There are two types of Linking: Internal linking and External linking.
- When one part of a web page is linked to another section on the same page, it is called the Internal linking while as when one page is linked to another web page or website, it is called the External linking.
- In HTML, the Anchor tag <A>, is used to mark the text as a hyperlink, which a user can click to display the document, anchored to it.
- You can divide link states in four categories:
  - a:link – a normal, unvisited link
  - a:visited – a link the user has visited
  - a:hover – a link when the user moves the mouse over it
  - a:active – a link the moment it is clicked
- You can also display links as buttons using CSS styling.
- You can insert audio and video files in an HTML document using <audio> and <video> tags, respectively.
- Frames allow multiple HTML documents to be presented as independent windows within one browser window.

BRAIN DEVELOPER

SECTION - A

A. Fill in the blanks.

1. Images can be added to the document with the help of ..... tag.
2. The ..... attribute lets you specify text as an attribute to the image.
3. ..... is linking the various web pages together.
4. When one part of a web page is linked to another section of the same page, it is called ..... linking.
5. ..... allow multiple HTML documents to be presented as independent windows within one browser window.
6. Groove is one of the possible values for the CSS property.....

HINTS • Hyperlinking • Internal • border-style • Alt • Frames • <img>

B. State True or False.

1. You cannot display photographs on a web page. ☐
2. <H> is used to mark the text as a hypertext link. ☐
3. The value for the alt attribute is a text string of 2000 characters. ☐
4. Any image can be used as a hyperlink to another document. ☐
5. You can insert an audio clip or file of any format like .mp3, .ogg, .wav, etc. in our web page with the help of the audio tag. ☐
6. In HTML5, frames can be created using <iframe>. ☐

C. Application-based questions.

1. Asmita has added few images in her web page but she wants to keep some provision for visually impaired people or users using text-based browsers so that they get the description for the images. Which attribute should she use to accomplish the task?

.....

2. Vikram is creating a website in which he wants to use different images as links to the webpages. He is also interested in adding some video clips in his website. Can you suggest him the required tags to include the above said elements in his website?

.....

SECTION - B

A. Multiple-choice questions.

1 ..... attribute of <A> tag defines the document to which the link leads.

a. href b. src c. ref

2. A ..... URL points to a file within a website.

a. Absolute b. Relative c. Internal

3. Which of the following specifies the colour of a link when it is clicked?

a. Visited b. Hover c. Active

4. ..... attribute of <audio> tag plays the audio file automatically when the web page is loaded.

a. Start b. Autoplay c. Auto

5. .webm is one of the supported file formats for ..... file.

a. Audio b. Video c. Frame

6. ..... allow multiple HTML documents to be presented as independent windows within one browser window.

a. Windows b. Screens c. Frames

B. Answer the following questions.

1. How images are added in an HTML document? What are the different attributes of an image element?

.....

.....

.....

2. What is the importance of associating alternate text with an image?

.....

.....

3. How can you link webpages in HTML? What are the different types of linking?

.....

.....

.....

.....

4. With the help of code, explain how audio and video clips can be added in an HTML document.

.....

.....

.....

5. Explain how frames are useful.

.....

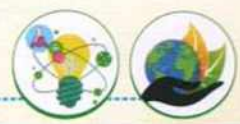
.....

.....

C. Answer in one word.

1. The tag that inserts an inline image on the web page. .....
2. The attribute of <img> tag that specifies the text as an alternate to the image. .....
3. The tag that marks the text as a hyperlink. .....
4. The attribute of <a> tag that defines the document to which the link leads. .....
5. The attribute of <video> tag that plays the video file automatically. .....
6. The CSS property that renders the inline frame borderless. .....

ACTIVITY SECTION



LAB SESSION

Perfection Through Practice

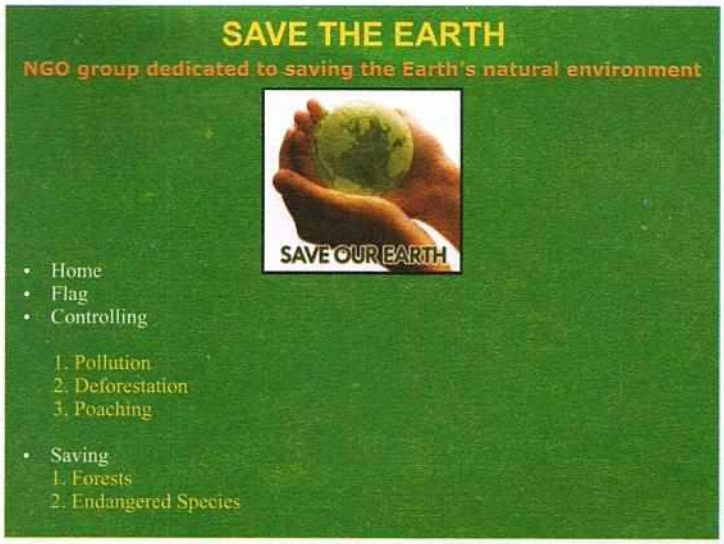
Write the HTML code to generate the following web page. (Use relevant tags and CSS properties)

INSTRUCTIONS

- Set the heading of the page as "Save the Earth". It should be in 'Arial' font and bold with size 6 and colour Yellow.
- The background colour of the page should be "Green".

- The subheading should be in "Verdana" font, bold, size 4 and colour Orange.
- The rest of the text should be in "Times New Roman" font, size 4 and colour White and Yellow.
- Select and place a suitable image on the web page.
- Use nested list for the links (as shown in the schreenshot).
- The pages linked with this page are as follows:

Home	:	Home.htm
FAQs	:	Faq.htm
Pollution	:	Poll.htm
Deforestation	:	Deforest.htm
Poaching	:	Poach.htm
Forests	:	Forest.htm
Endangered Species	:	Species.htm



- The categories 'Controlling' and 'Saving' in the unordered list are not linked to any page.

GROUP DISCUSSION — For Concept Clarity

Conduct a group discussion on the topic : **Link , its states, and the associated CSS properties**

PROJECT WORK — Using Creativity

Ask the students to create an HTML document on the topic **CSS TEXT** v/s **CSS FONTS**. The web page should contain two frames wherein one frame will display Text properties and the other Font properties. Use unordered list to display the properties in each frame.

ONLINE LINKS — Looking For More

To know more about Images and Frames, visit the following sites:

- www.html5-tutorials.org/html-basics/images/
- www.quackit.com/html_5/tags/html_iframe_tag.cfm

CHAPTER 10

APP DEVELOPMENT

LEARNING IN THIS CHAPTER

- Introduction to apps
- Types of apps
- Classfication of mobile apps
- Uses of common apps
- Downloading and installing an app from Google Play Store
- Developing your own app
- How to install Appy Pie app on your mobile

INTRODUCTION TO APPS

The word "app" is an abbreviation for application. An application is a software designed to do a specific job. An app enables you to do something specific like paint, draw, read maps, and barcodes, take photographs, play games, watch and edit videos, and a host of other activities, but within the technical limitations of your device. However, with the rapid rise in the use of smartphones these days, the word 'app' is mostly used to refer to the software that runs on mobile phones.

Since smartphones, tablets, and other mobile devices are nothing but small computers, an app works in pretty much the same way as the software does on a desktop or laptop. Since the computing power and memory of a smartphone are generally less than that of a standalone computer, the capabilities of the app are generally less than that of a similar software running on a PC. Most desktops do not have touchscreens capabilities, while all mobile devices have touchscreens. This changes the way the user interacts with the device. Instead of a keyboard and mouse, the user taps on the display, which works both as an input device as well as output device.

Apps are designed to work on different operating systems used by the various devices. An Android app is developed to work on phones and tablets that run on Android OS, whereas iPhone apps can be used on iPhones that use iOS. For better running of apps, the internet connection speed must be fast so that the app can be downloaded easily from the **Google Play Store** on Android phone or through **App Store** on iOS.

TYPES OF APPS

Apps can be broadly classified as Desktop apps, Web apps, or Mobile apps.

DESKTOP APPS

These apps can be used on a desktop or laptop. Generally, they do not need web access and run independently on a computer. To run a desktop app, it must first be installed on the desktop or laptop. The installed app is represented either by an icon on the computer screen or item on the Start menu. Examples of desktop applications are Word Processors, Spreadsheet, or even smaller apps like Paint or Notepad.

WEB APPS

These apps require an internet connection. They are usually browser-based and stored on a remote server. Users access them like any other webpage and then install them on their computer by creating a bookmark to that page. Web applications require minimum device memory as the application lies on the remote server. These applications can be utilised at whatever point needed from any device through the internet. For example, Google Maps, Instant messenger, etc.

MOBILE APPS

These apps run on a smartphone or tablet. Mobile apps have responsive web designs to adapt to the much smaller screen sizes and orientation of the mobile devices. These apps are usually smaller in size as mobile devices have limited memory. Some mobile apps may come preloaded on cell phones or tablets.

Keeping in view the device independence feature, software companies nowadays make diverse versions of the applications to be used as Desktop apps, Web apps, or Mobile apps.

Look at the examples given below:

Software	Desktop App	Web App	Mobile App
Photo Editing	**Photoshop** from Adobe is a photo editing software, which must be installed on a desktop or laptop. **Pixlr** is a free photo editing tool for desktop.	**Pixlr** also provides photo editing software as a web application available at https://pixlr.com/web **Sumo Paint** is another web based photo editing **application at** https://www.sumopaint.com/paint/	**Adobe Photoshop Express and Mobile Pixlr** are photo editing apps for mobile devices, which can be downloaded from either the **Google Play Store** or Apple's **App Store.**
Facebook	Facebook has no desktop application as it cannot be used without being connected to the Facebook site.	Facebook initially began as a Web based app. Posting messages or videos require you to be connected to the internet.	Facebook is available as a separate app. which can be downloaded from the **Google Play Store**, the **App Store**, and the likes.
Office Suites	**MS Office** is a very good example of desktop-based Office applications. This includes Word processing, Spreadsheet, and Presentation apps.	**Microsoft** allows the users to use their **Web-based Office** applications. **Google Docs** is an Office Suite, which does not have any desktop equivalent.	**Microsoft Office Mobile** and **Google Docs** allow a user to work on Office applications as apps. **Kingsoft** and **Polaris** also have mobile apps for Office use.
Games	Games like Solitaire and Minesweeper are available on all Windows-based computers. Other games too can be downloaded for use on desktops and laptops.	Desktop games can also be played online. The advantage of Web-based games is that they can be easily made Multiplayer.	These games are also available as mobile apps.

Media Players	Media player apps enable the users to play music or videos on their computers. **VLC Player** and **Windows Media Player** are some of the examples of freely available Media Players.	Many sites offer their services which allow you to play music, videos, listen to the radio, and even watch TV while online. You are also allowed the access to the content of these Web-based applications.	Media players are now included as a standard app on all smartphones. Besides **Windows Media Player** and **VLC Player**, other players are also available. All allow you to play your own media. Some even support search and download feature.
Maps	Google maps can be downloaded on the desktop computer. However, this app will only function when the internet access is available.	The browser based Google maps can be accessed by typing maps.google.com in the address bar of the browser.	The **Google maps** app is available in the **Google Play Store**.

CLASSIFICATION OF MOBILE APPS

Mobile apps can be further classified as Native Apps or Hybrid Apps.

NATIVE APPS

Mobile apps are usually developed for a specific Operating System and device. This is because each device may have different specifications like GPS, dual SIMs or cameras, memory, Bluetooth, Wireless Fidelity (WiFi), or Near-Field Communication (NFC). Apps that are developed keeping the device specifications in mind are known as **Native Apps**. Most Native Apps come pre-installed on the new phone, and can also be downloaded from the **Play Store** or **APP Store** and further installed on the device. Some Native Apps can run on the device without the use of the internet, but others may need the internet facility for full functionality. These apps have certain limitations. They are designed for a particular platform and expensive to develop and maintain.

HYBRID APPS

Hybrid Apps contain the features of both Web Apps and Native Apps. These apps can be downloaded from the **PlayStore** or **APP Store** and installed on the device. These apps require the device to be connected to the internet. Hybrid apps can be stored partly on the local device and partly on the remote server. Some hybrid apps can be operated offline also by using cached pages, however, they have limited functionality offline.

For example, the most popular gaming app, Candy Crush is a hybrid app that can be played on a mobile phone as well as the web.

USES OF COMMON APPS

Apps have become so prevalent today that a suitable one can be found for almost any job. Whether it is for learning, entertainment, social interactions, or even banking and e-commerce, there is an app for every purpose.

EDUCATIONAL APPS

With the rapid increase of mobile technology, learning with apps has become fun. There is a rapid spread of education to the remotest corners of the world. Today, students in the far-flung villages can easily access high quality educational resources.

There are apps for all levels of learning. Apps not only help us to learn new concepts, but also show us what is being taught in the classrooms. Students of all age groups can access a treasure chest of information on any topic.

Educational apps are equally useful for both students and teachers. The teachers are able to distribute study material quickly, conduct tests, and grade the students efficiently by using apps like **Google Classroom, Kahoot**, etc.

Parents too make use of the educational apps to interact more closely with the teachers and thus monitor the progress of their children.

In keeping with this trend, many online study resources like **Khan Academy, Byjus (Learning App)** as well as online study platforms like **EdX** and **Coursera** are now available via apps.

SOCIAL NETWORKING

In a world that is increasingly social and open, social media plays a significant role in communication. These social media apps let you post images, videos, and other updates to your profile, which can be shared with anyone. You can connect with anyone across the globe easily via such apps.

There are several types of social networking apps available today. Some of the most popular social networking apps are as follows:

Let's Know More

zomato

Zomato is a mobile app that lets you discover restaurants to eat-out at or order-in from. It provides information and reviews on restaurants, hotels, and food joints. You can also rate and review restaurants you have been to and share photos of your foodie moments, directly from the app.

Let's Know More

Candy Crush

In this game the players complete levels by swapping coloured pieces of candy on a game board to make a match of three or more of the same colour, eliminating and replacing those candies with new ones, which could potentially create further matches.

Let's Know More

saavn

It is one of the most famous online music apps. One can find his favourite songs, download them, listen to his favourite artists, make and share playlists, play radio or online music for any mood, song, or artist through this app.

WhatsApp

With over 1.5 billion active users, WhatsApp is one of the most popular instant messaging app, worldwide. Although initially started as a text messaging app, WhatsApp has rapidly grown and now offers high quality voice as well as video calling. It has a simple interface and many useful features that make it a very popular app.

Facebook

Facebook, with nearly 2.23 billion active users, continues to lead the social networking sites. It allows all the registered users to create their profile, post comments, exchange information, share links, photographs, chat, play games, etc. While initially, it was PC based, Facebook is now available as a pre-installed app on most of the mobile phones and tablets.

Twitter

Twitter is a social networking app where people communicate in short messages called tweets. Tweeting is sending short messages to anyone who follows you on Twitter, with the expectation that your messages are useful and interesting to someone in your audience.

Messages sent with this app were initially restricted to 140 characters. However, with the advent of smartphones, the users began to find this as an unnecessary hindrance, therefore, Twitter has now doubled this limit, i.e., the users now get 280 characters per tweet.

Other social networking apps

Instagram is another app that is used for social networking. This app specialises in sharing of photographs by the users.

LinkedIn is a networking app that specialises in the sharing of business and professional information.

Reddit is a social news aggregation app. Registered users can upload news, stories, or links, and other users can rate these stories by voting them up or down. The stories with the most up-votes are moved to the top of the category.

Instagram | LinkedIn | Reddit

ENTERTAINMENT APPS

Looking for some entertainment? If you have a smartphone, you will find a lot of entertainment apps on it. While many of these apps are free to use, some charge a fee for their premium services.

If you wish to watch a movie, catch up on your favourite TV serial, or watch some sports, you can install and use **Hotstar**.

Hotstar App

Are you a music lover? **Gaana, Hungama Music**, and several other apps bring your favourite tunes right to your device. Other apps are also available that allow a user to record and edit one's own music.

Gaana App

Do you fancy watching the latest blockbuster at your favorite multiplex? The **BookMyShow** app allows you to check timings, read reviews, and obtain tickets for plays, concerts, sports, and many other events.

If you are a game lover, you can enjoy many Gaming apps. These apps have a huge fan base from all the age groups. There are various categories in these apps like Sports, Strategy games, Action games, Racing games, Fighting games, etc.


BookMyShow App

BANKING AND FINANCE


HDFC Banking App

SBI Banking App

Banking Apps

Almost all banks have their own apps today. While banks have had an online presence for quite some time, now these apps allow quick and easy access to most of their services and products. One can check the balance in his account, open fixed deposits (FDs), pay utility bills, transfer money to another account, order a chequebook or a Demand Draft, and many other activities.

With the Indian Government encouraging the use of cashless transactions, digital wallet apps like **Paytm**, **Pockets** from ICICI bank, **Buddy** from SBI, and many more similar apps allow the users to make quick and easy monetary transactions.


ICICI Pockets


SBI Buddy

Paytm

Digital Wallet Apps


Moneycontrol

Moneycontrol

For the latest information on the Global and Indian stock markets, **Moneycontrol** app proves to be beneficial. It covers the Bombay Stock Exchange (BSE), National Stock Exchange (NSE) and also mutual funds, commodity, and currency markets. Using their Portfolio tracker, one can keep in touch with the swings of the market and take appropriate and timely decisions.

E-COMMERCE

Buying or selling of goods or services, using electronic means, is known as **E-Commerce**. The rapid increase in the use of mobile technology and the desire of people to get things done quickly has prompted e-commerce companies to opt for mobile apps to supplement their business. This segment has become so important that some e-commerce companies have started giving preference to app-based solutions and are discontinuing their e-commerce websites. Some of the most popular e-commerce apps that provide facility to shop online are **Flipkart, Amazon, Snapdeal,** and **Shopclues**.

DOWNLOADING AND INSTALLING AN APP FROM GOOGLE PLAY STORE

To download and install an app from Google Play Store, follow the steps given below:

- Tap on the **Play Store** icon on the screen of your device.

Figure 10.2:
Searching for an App

- Type the name of the app in the Search bar that you wish to download. If you do not know the specific name, type a general description of the job that the app does. For example, "educational apps for 8th std science".
- It will display the relevant list of apps. Now, select the most suitable one by tapping on the name of the app, for example, 'BYJU'S'.


Figure 10.1:The Play Store Icon on Mobile Phone

- Additional information about this app will be displayed including whether any fees need to be paid. Check out the reviews and comments of the previous users. If it meets your requirements, tap the **INSTALL** button to install the app on your device. The app will request you for permission to access specific information from your phone. Confirm your consent, and the app will be downloaded and installed on your phone.
- The app is now ready to use.

Figure 10.3: Installing the App

DEVELOPING YOUR OWN APP

Looking at the different apps available at Play Store is an amazing experience, but it may give you the impression that it is very difficult to make your own app, but it is not so. There are several sites that allow you to make your own app in a very short time.

REQUIREMENTS FOR DEVELOPMENT OF APPS

Here we will discuss the Android apps, but developing apps for the other platforms will also have similar requirements. If you want to build an app from scratch and have control over the design, a sound background in programming will be very helpful. To make an Android app, software such as Android Software Development Kit (Android SDK) is required. Knowledge of Java is needed since most Application Programming Interfaces (APIs) use Java. You may also need to learn Extensible Markup Language (XML), HTML, and CSS for designing an app.

Figure 10.4: Requirements for making an App

Several Integrated Development Environment (IDEs) are available that greatly simplify the process of an Android App Development. The **Android Studio** from Google is one such example, while **Eclipse** is another. Many IDEs come with their emulators to preview the working of your app, but the final testing of the app should be done on different mobile devices.

Figure 10.5: Popular IDEs for App Development

Is it possible to develop a simple app without prior knowledge of programming? The answer is yes. Many companies offer a user-friendly interface to develop Android apps without any prior knowledge of programming. Some of these companies offer free services that may be limited in usefulness, while others offer premium services, but for a fee. There are two ways to develop an app.

- An Android app can be developed using Web based app development software. Some of the websites that offer their app-builders are **Apps Bar** at **http://www.appsbar.com/**, **Appy Pie** at **https://www.appypie.com/**, **App Yet** at **http://www.appyet.com/**, and **AppMakr** at **https://www.appmakr.com/**. Many of these sites also offer the use of their App Stores to promote your app.

- Use an App-builder and make your own app on your smart phone. As discussed earlier, you can find apps for almost every need.
  - Tap on the **Google Play Store** icon. The Search box will be displayed along with the apps that are downloaded most often.
  - Type "free app builder" in the **Search** box and click on the **Search** button. Several app-builder apps will be listed.

Let us use **Appy Pie** to make a Quiz App in it. Appy Pie is a web-based app maker; providing various facilities for quickly making your own app. In addition to the basic pages and information for a simple app, Appy Pie also allows you to add pages, forms, social media links, login pages, and much more. Ready-made templates for applications ranging from business, social, messengers, taxi services, restaurants, educational, hotels, etc., make designing your app very easy. Follow the given steps to make your first app using the Appy Pie website:

1. In the address bar of the browser, type **https://www.appypie.com/**. Click on the **Get Started** button.
2. Give an appropriate name for your app, for example, **Quiz**, click on the **Next** button.
3. Now, select a category from the options given below. For example, **Education**. To view more categories, click on the **View more categories** option. Click on the **Next** button.

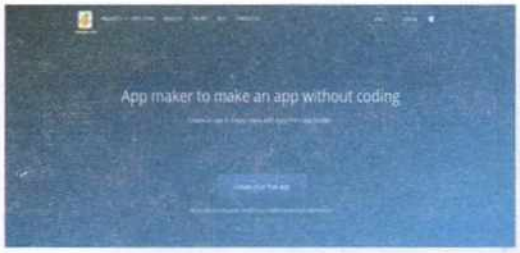


Figure 10.6: Creating an App

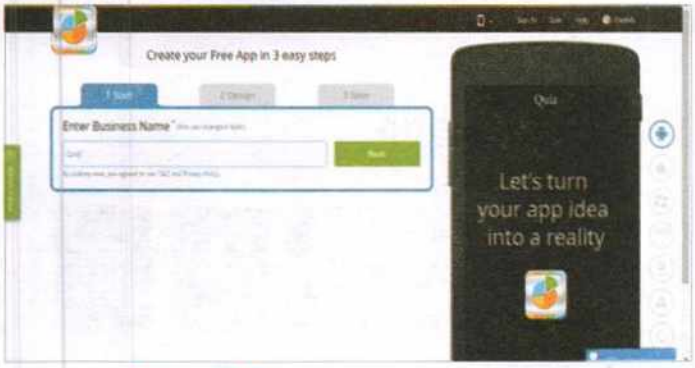


Figure 10.7: Entering the Name of App

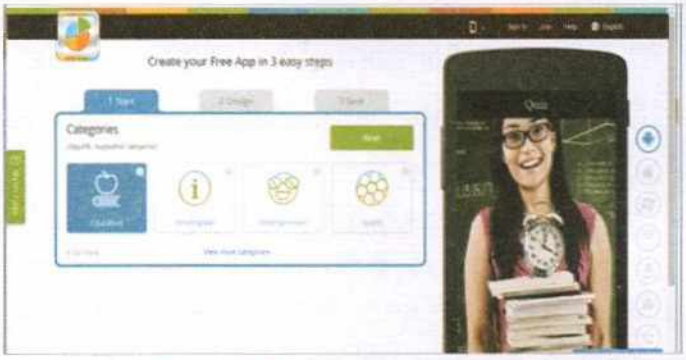


Figure 10.8: Selecting a Category

4. Choose a suitable design for your app from the various enlisted options. Let us say, **Matrix**. Click on the **Next** button.
5. You can see a preview of your work at any time on the right-side of the window or by clicking on any **Preview** icon, for example, **Android**.
6. Now, add pages into your app as desired. Under the **Suggested** tab, click on **Quiz** to insert a quiz page. Unwanted Pages can be deleted here.

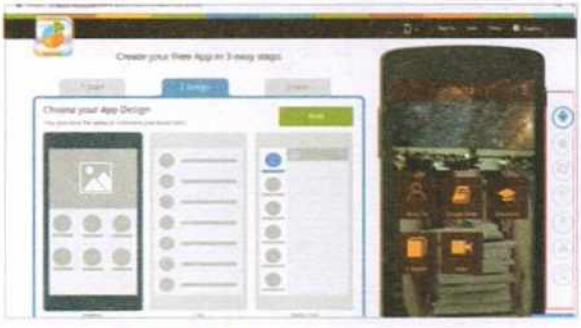


Figure 10.9: Selecting a Design

NOTE

Under the **Suggested** tab, you will find only those pages that are relevant to the category you have chosen.

7. Under the **Content** section on the **Quiz** page, click on the **Add Question** tab to add or edit questions. The **Quiz window** will be displayed.

8. Under the **Action** section, click on the **Manage Quiz Questions** icon . The **Add/Edit Questions (Quiz)** window will be displayed.

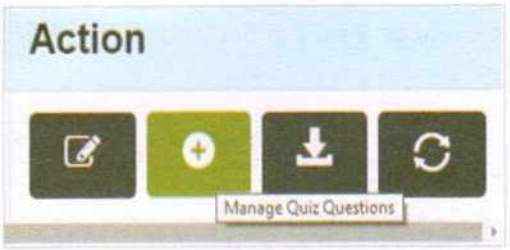


Figure 10.10:
Selecting the Manage Quiz Question

9. Add questions and answers. If you wish you can provide multiple options for each question using the **Add Answer** button. Put a tickmark in the check box to the right side of the correct answer. You can add an image, an audio, or a video also to the individual questions.

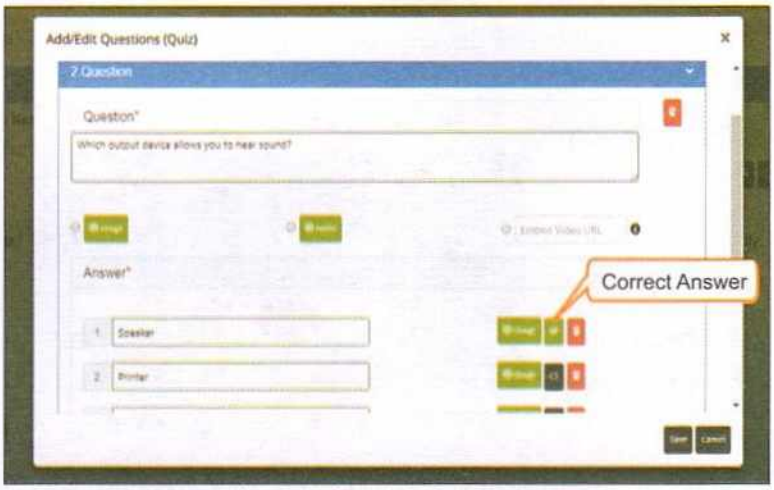


Figure 10.11: Add/Edit Questions (Quiz) Dialog box

10. Proceed to add more questions to your quiz. Click on **Save**, once you have added all the questions.

11. Click on the **Quiz Settings** icon on the quiz window to control the way the quiz operates. Under this tab, you can control whether the quiz will generate random questions, the minimum passing score, time limit for the quiz, etc. Click on the **Save** button when you are done. Close the **Quiz** window.

12. Now, continue the process by clicking on the **Save & Continue** button.

13. You now have to Login or Sign up, if you have not done so far. Next step requires you to choose the plan for your app. To choose a free plan, move the cursor towards the Address bar of the window. A pop-up will appear. Click on the **Start FREE Plan Now** button.

Figure 10.12: Selecting Quiz Settings Icon

14. A **Congratulations** window will be displayed.

Figure 10.13: Selecting the Editor Option

15. Now, click on the drop-down arrow adjacent to the **Welcome** tab, displayed on the extreme top right corner of the window. Select **My Apps > Editor** option.

16. Select the **Design Customization** tab. Here, you can choose an icon for your app by selecting the **App Logo** thumbnail. Choose any icon from the available list or you may use the **Upload App Icon** option to upload your own icon.

17. Click on the **Choose Background** thumbnail and choose any screen of your choice. Similarly, splash screen of the app can also be customised as per your choice by selecting any option from the **Choose Splash** thumbnail.

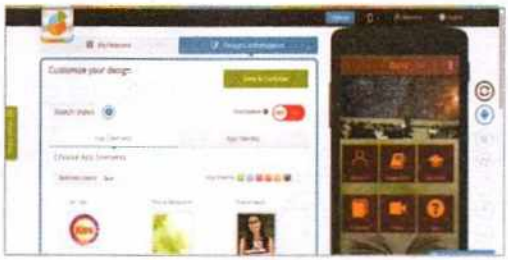


Figure 10.14: Selecting the Background and Splash Screen

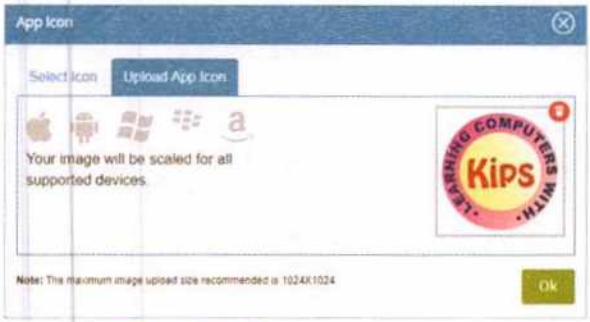


Figure 10.15: Uploading an Icon

18. Click on the **Save & Continue** tab when done.

19. You can now proceed to build your app. Click on the **Continue to My Apps** tab.

20. Select the **Test App** icon under the **My Apps** section.

21. Your app starts getting built. A message appears as shown in Figure 10.16. It may take a few minutes for the app to get ready for download. Appy Pie mails you the download link when the app is ready.

Figure 10.16: 'App is Getting Built Massage Box'

Figure 10.17: Selecting the Click to Download Tab

22. Download your application by clicking on the given link or scanning the QR code.

23. Now, select any one of the three options shown in Figure 10.18 and proceed to download the selected version of your app.

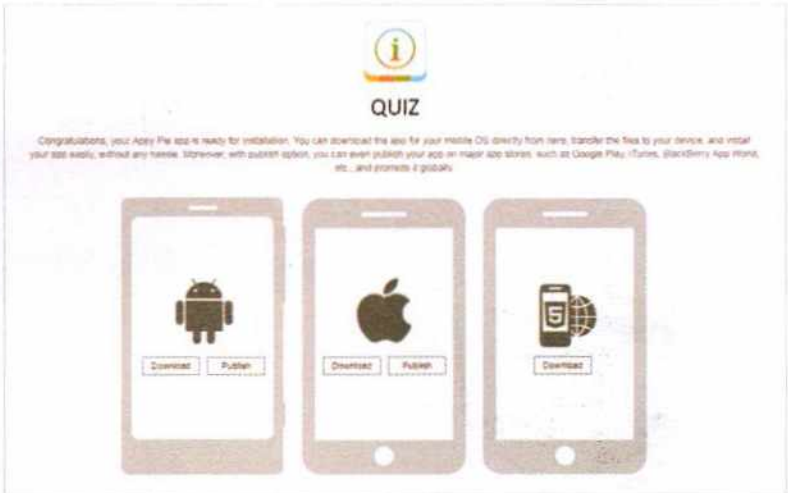


Figure 10.18: Selecting the OS to Download or Publish the App

Fact File

Flipkart is a popular e-commerce company headquartered in Bangaluru. It was founded in 2007 by Sachin Bansal and Binny Bansal. There are over 100 million registered users of Flipkart in India.

Let's Know More

Bharat Interface for Money (BHIM) is an android application that enables fast, secure, and reliable cashless payments through your mobile phone. The app is directly linked to the user's bank account. It was developed by National Payments Corporation of India (NPCI) and launched by the Prime Minister of India, Mr. Narendra Modi, on 30 December 2016.

HOW TO INSTALL APPY PIE APP ON YOUR MOBILE

- The simple way to install your app is to send the app to your **e-mail id.**
- Click on the **Email** icon as shown in Figure 10.17. Enter your e-mail id and click on the **Send** button.
- You will get a mail on your e-mail id from Appypie.
- Open the mail on your mobile phone and click on the given link.
- You will get the instructions for downloading and installing the app.
- Click on the **Launch** button. This will download the app on your device.
- When the download gets completed, tap the **Install** button to install the app on your device.
- Now, open the installed app.

NOTE

Before you install the app, make sure that the **Unknown Sources** box is checked to allow the installation of non-market application.

RECAP

- The word app is an abbreviation for application. The software designed to do a specific job is known as an Application.
- Apps are broadly classified into three categories: Desktop apps, Web apps, and Mobile apps.
- Mobile apps are usually developed for a specific operating system and device.
- Hybrid Apps combine the features of Web apps and Native apps.
- Buying or selling of goods or services using electronic means is known as e-commerce.
- Appy Pie is a web-based app that facilitates in making customised apps quickly.

SECTION - A

A. Fill in the blanks.

1. ..... combine features of both Web apps and Native apps.
2. The abbreviation of the word 'application' is ..... .
3. Before installing an app on our device, the manufacturer of the app will ask for certain ..... .
4. The Facebook app is an example of a ..... app.
5. The e-commerce app that was founded by Sachin Bansal and Binny Bansal is ..... .
6. ..... apps do not need web access and run independently on a computer.
7. You can pay utility bills using a ..... app.

HINTS • App • Permissions • Flipkart • Hybrid Apps • Desktop • Banking • Social Networking

B. State True or False.

1. Google Maps is an e-commerce website. ☐
2. SDK stands for Software Design Kit. ☐
3. Hungama Music app brings your favourite tunes right to your device. ☐
4. Mobile apps are usually smaller in size as mobile devices have limited memory. ☐
5. Install SBI Buddy on your mobile device for the latest information on the global and Indian markets. ☐

C. Application-based questions.

1. Sneha and her parents are planning to go for a movie. She wants to book the tickets online. Which app can she use to do the same?

.....

2. Mannat had a school trip last month where she clicked various photographs. Now, she wants to share these photographs with her friends. Which app should she use?

.....

SECTION - B

D. Multiple-choice questions.

1. Reddit is a social networking site that is also called a ..... app.

   a. News Aggregator b. Banking c. Video sharing

2. ..... is an app that lets you build your own apps.

   a. NFC App b. Reddit c. Appy Pie

3. Some app-builder apps let you build your own apps without the thorough knowledge of .....

   a. OS b. Programming Language c. Both of these

4. Hotstar is an ..... app.

   a. Education b. Entertainment c. Social Networking

5. Buying or selling goods or services using electronic means is known as .....

   a. Money control b. Finance c. E-Commerce

E. Answer the following questions.

1. How can you broadly categorise the apps? Explain any one category of apps.

   .....

   .....

   .....

2. What are the requirements for developing an app by scratch?

   .....

   .....

   .....

3. What is the difference between Hybrid apps and Native apps?

   .....

   .....

   .....

4. Distinguish between a Desktop app and a Mobile app.

   .....

   .....

   .....

5. How can you download and install an app from the Google Play Store?

6. Explain the importance of Educational Apps. Give an example to support your answer.

7. With the help of suitable examples, explain the Photo editing tasks that can be done using Desktop, Web, or Mobile Apps.

LAB SESSION

Perfection Through Practice

Create a Mobile app 'Go Goa' for mobile phones, which will provide information about the tourist destination 'Goa'.

- Open the site **https://www.appypie.com/**. The home page of the Appy Pie app builder site opens. Click on the **Get Started** button.
- Enter the App name (e.g., GO GOA) and click on the **Next** button. Now, choose the **Travel** category from the list of displayed options. Click on **Next**.
- Follow the same procedure as discussed in the chapter and then select any **Design** from the displayed list including fonts, colours, and sizes of various components of pages that you have designed. Click on **Next**.

- Choose the **Design Customization** tab. A new screen appears.
- Now, choose the **App Logo, Background,** and **Splash** screen one after another.
- Click on the **My Features** tab. Add other pages to your app that are more suitable for a travel app. For example, Map.
- Provide the mailing address of the place that you want to show on the map or enter the Latitude & Longitude of the place.
- The map of the place of interest will be displayed. Click on **Add More** to have additional maps in your app.
- Once you have added all the maps, click on the **Add Feature** button.
- Click on the **Suggested** tab that will suggest the pages appropriate for the category you have chosen.
- Here, you can select **Events, Folder**, etc., for the app by clicking on the respective tabs, let us say, you select the **Folder** tab.

- Change the name and folder icon by clicking on them, respectively.
- Websites can be added as pages which will be placed in the folder that has just been made. Icons for the pages that you add can either be used from the gallery that Appy Pie provides or can upload your own icons and images.
- Click on the **Add Feature** button and from the **Information** tab, select the **Website** option. A website page will be added to the app. Give a name to the website (e.g., Calangute Beach, Goa) and the URL where the information will be linked to, (e.g., https://en.wikipedia.org/wiki/Calangute).
- Additional websites can be added and customised as required. You can also provide information about restaurants, tourists spots, etc., by clicking on the **Add More** button.
- Click on the **Save & Continue** tab when you are done.
- Sign in your account. Choose the **Free Plan**.
- You will get a welcome message and can now click on the **Continue to My Apps** button to check the app that you have just created.
- Now, click on the **Test App** option. If it is okay, you can download the **.apk** file.

GROUP DISCUSSION

For Concept Clarity

Conduct a group discussion on the topic: **"Various types of Apps"**.

ONLINE LINK

Looking For More

To know more about App Development, visit the following websites:

- https://en.wikipedia.org/wiki/Mobile_app_development
- https://developer.android.com/training/basics/firstapp/

3 WORKSHEET

Chapters 6-10

A. Fill in the blanks.

1. When one part of a web page is linked to another section of the same page, it is called ..... linking.
2. .....determines how closely the colours should be matched for sampling.
3. In the ..... mode of Python, the processor executes statements one by one.
4. The ..... function is used to display user-defined messages on the screen.
5. Every loop works with the help of a variable known as the .....
6. The ..... loop can be applied to a program where the number of iterations is not known beforehand.
7. The .....apps are usually smaller in size as mobile devices have limited memory.

HINTS • Tolerance • print() • Internal • Interactive • Control variable • while • Mobile

B. State True or False.

1. A comma operator is used to print the next value after a tab space in Python. ☐
2. The in operator is used to check if a given value exists in the sequence or not. ☐
3. It is not necessary to use print() statement in IDLE environment. ☐
4. The condition statement checks whether the loop body will be further executed or not. ☐
5. The 'else' part is executed if the 'for' block terminates normally. ☐
6. You do not require any prior knowledge of programming for developing Android apps by scratch. ☐
7. Google maps cannot be downloaded on the desktop computer. ☐

C. Give an example for each of the following.

1. Social Networking Site: .....
2. Entertainment App: .....
3. Micro-blogging Site: .....
4. Global and Indian stock markets App: .....
5. E commerce App: .....
6. Cashless payments App: .....

4 WORKSHEET

Chapters 6-10

A. Multiple-choice questions.

1. A ..... URL points to a file within a web site.

   a. absolute b. relative c. internal

2. Which of the following is a valid variable name .....

   a. Stu Name b. 25Bday c. b80k

3. If the condition in a loop is false in the first step, you get .....

   a. No output b. Infinite c. Error

4. Buying or selling goods or services using electronic means is known as .....

   a. Money control b. Finance c. E-Commerce

B. Answer in one word.

1. The other name for iterative statements. .....
2. The mode of programming used for writing large programs. .....
3. Name the list used to display the list of items in a specific order. .....
4. Name an app used to pay the utility bills. .....
5. Name the tag in HTML that is used to mark the text as a hyperlink. .....

C. Answer the following questions.

1. What is the difference between Hybrid apps and Native apps?

   .....

   .....

2. What is the importance of associating alternate text with an image?

   .....

   .....

3. What is the difference between interactive and script mode?

   .....

   .....

4. What do you mean by iterative statements? Name them.

   .....

   .....

ACCESS

- Create a database named 'Information System'.
- Create a table in it consisting of the following fields:

S.No.	Field Name	Data Type
1	Rec_ID	Auto Number
2	Name	Text
3	Relationship	Text
4	Address	Text
5	City	Text
6	State	Text
7	PIN	Number
8	Home_Phone	Number
9	Office_Phone	Number
10	Mobile	Number
11	Date_of_Birth	Date/Time
12	Anniversary	Date/Time
13	E-mail_ID	Text

- Save the table with the name 'Info_Sys'.
- Collect all the information of your relatives, friends, teachers, and the principal.
- Enter minimum 30 records in the table.
- Select the field 'Mobile'. Drag it and place it after the 'PIN' field.
- Rename the field 'Date_of_ Birth' to 'DOB'.
- Sort the data in 'DOB' column in an ascending order.
- Filter the table and display the data of those friends whose birthdays fall in the month of November.
- Hide the column 'Office_Phone'.
- Create a query to:
  - Display the records of friends who reside in your city.
  - Display the records with Anniversary date falling in the month of December.
  - Retrieve the records of those friends who have their e-mail account in Gmail.
- Run the queries one by one and save the database.

PHOTOSHOP CC

Project : Create a Poster on the topic **Save the Girl Child** in Photoshop CC.

- Open a new file in Photoshop CC.
- Using the **Paint Bucket Tool**, paint a blue-coloured background on the canvas.
- Select the **Brush Tool**, choose the **Splatter 24 pixels** brush type from the **Brush Preset picker** and set the brush size to **100 pixels** in the **Options** bar.
- Select the white colour and apply the brush on the background to give it the look of the Sky.
- Search the images of an egg, baby girl, and broken egg on the Internet and store it in your computer.
- Open the egg image in your file. Using the **Polygonal Lasso Tool**, select the egg to remove the unwanted area. Now, copy and paste it on the background image.
- Press **Ctrl + T**. The handles can be seen on the egg. Now, resize and place it at the desired position. Rename this layer as 'Egg'.
- Likewise, open the image of the baby girl. Copy and paste it on a new layer created in the background image. Rename this new layer as 'Baby girl'.
- Select the **Lasso Tool** and draw an irregular shape over the egg's surface to display the broken part of the egg shell. Now, press the **Delete** key to delete the selection.
- Now, use the **Move Tool** to place the baby over the broken area as shown in the screenshot.
- Drag the **Baby girl** layer below the **Egg** layer.
- Select the **Burn Tool** and move the pointer over the bottom area of the baby girl's image to display the effect that the baby is inside the egg shell.
- Choose the dark egg colour as the Foreground colour. Use the **Pencil Tool** to display the cracking of the egg's surface.
- Insert a new layer and draw a circle on it to cover the cropped area of the egg. Ensure that the circle should not be bigger than the circumference of the egg. Fill the circle of the egg with dark shade.
- Drag the layer below the **Baby girl** layer.
- Open the image of the broken egg in your file. Use the **Magnetic Lasso Tool** to select the required part, and paste it on the background image.
- Now, select the background layer, choose the white colour and with the **Soft Round Pressure Opacity Brush** Tool paint a small elliptical area.
- Use the **Text Tool** to type the text 'Girls are Precious. Take them out of the Shell to see the World...' over the elliptical area.
- Again use the **Text Tool** to type the caption 'SAVE THE GIRL CHILD!' at the bottom of the poster.
- The poster is ready. Save it by giving a suitable name.

HTML

Project: Create a website on the topic, **"Ramayana-The Epic"**.

- Make your website appealing and attractive by including elements and attributes that you have learnt in your HTML chapters like Paragraphs, Lists, Tables, Images, Hyperlinks, etc.
- Home page of your website should look like the one shown in **Figure 1**.
  - It should briefly display the story of the **Epic Ramayana**, along with an appealing background and a hyperlink "**THE SEVEN KANDAS**", to move to the next web page.

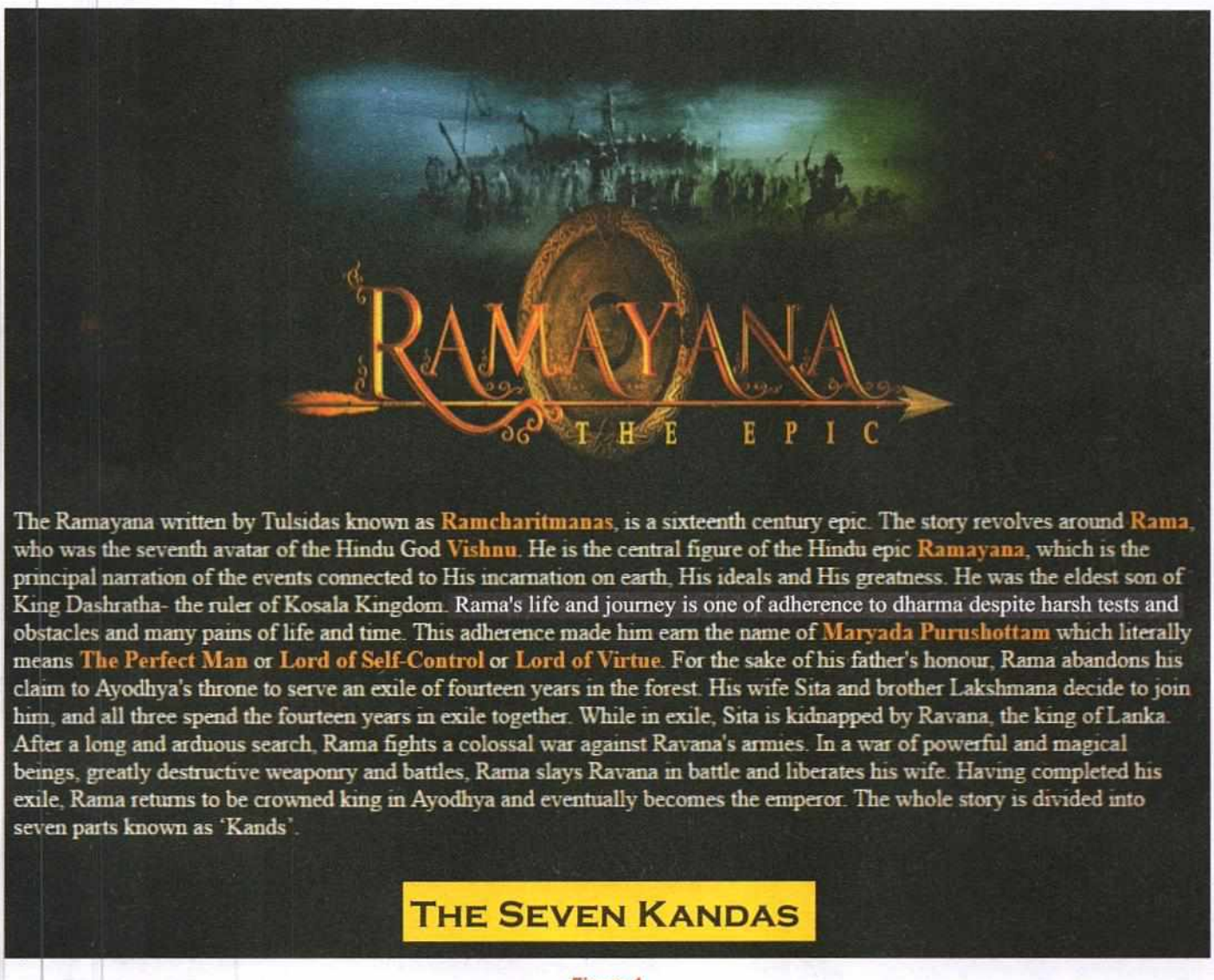


Figure 1

- The second page should depict seven images, each related to a particular Kanda.

Hint: Use the HTML Table elements to arrange the images.

- Arrange and display the images as shown in **Figure 2.** Keep the image depicting **Bala Kanda** in the centre.
- All the images should behave as hyperlinks leading to their respective pages, each describing the particular Kanda (as shown the linked page of Bala Kanda in **Figure 3**).

- Make the navigation user-friendly by incorporating hyperlinks so that the user can return to the homepage or other pages easily (**Back** and **Home Page** button in **Figure 2** and **3**).
- A brief description of each Kanda is given below for your reference. Elaborate the description of each Kanda by gathering information from the internet.

Figure 2

- **Bala Kanda:** This Kanda includes the description of the boyhood and adolescence of Lord Rama.
- **Ayodhya Kanda:** This Kanda describes the exile of Lord Rama into the forest for 14 years for the sake of his father, King Dashratha's honour.
- **Aranya Kanda:** It includes information about Rama's life in the forest and the abduction of Sita by Ravana.
- **Kishkindha Kanda:** This Kanda describes Rama's sojourn in Kishkindha, the search for Sita, and the killing of Bali.
- **Sundara Kanda:** In this Kanda, you will find a description of the arrival of Lord Rama and his allies in Lanka; the superhuman feats of Hanuman including setting Lanka ablaze.
- **Yuddha Kanda:** This gives information about the defeat of Ravana, the release of Sita, their returning to Ayodhaya, and the coronation of Rama.
- **Uttara Kanda:** Here, you will find the details of the exile of Sita, the birth of Luva and Kusha, their battle with Rama to catch hold of the horse of Ashvamedha Yajna, Sita's final refuge in the arms of Mother Earth, and Rama's ascent into Heaven.

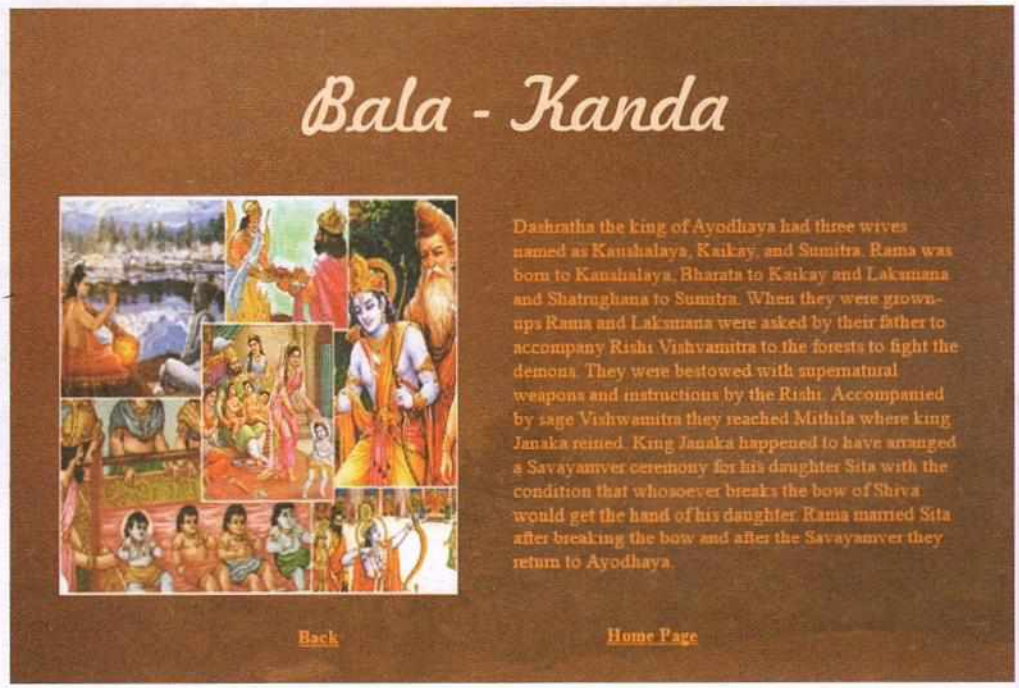


Figure 3

PYTHON

Project: Hotel Mount View, Manali has announced seasonal discounts for its membership holders. The hotel provides three types of membership – Gold, Diamond, and Platinum. The membership codes for Gold, Diamond, and Platinum are 1, 2, and 3, respectively. The hotel has two types of rooms – Deluxe and Super Deluxe. The codes for Deluxe and Super Deluxe rooms are 'D' and 'S', respectively.

Create a program that will accept the Name of a Customer, Membership Code, Room Code, Number of Rooms, and Number of Days from the user and displays the Bill amount, Discount, and Payable Amount as per the given rates.

Room/Membership	Gold	Diamond	Platinum
Deluxe	5%	15%	25%
Super Deluxe	10%	20%	30%

Tariff per Day: Deluxe – 2500, Super Deluxe – 4200

A. Conditions to evaluate:

- Write the code to input customer name, membership code, number of rooms and number of days.
- Write the code to check value of the membership code and apply the respective discount. Initialise the value of the corresponding variables as shown in the following table.

Membership Code	Discount Percentage	Value of Variable
1	Deluxe Room=5%	discountDeluxe=5
	Super Deluxe Room=10%	discountSupDeluxe=10
2	Deluxe Room=15%	discountDeluxe=15
	Super Deluxe Room=20%	discountSupDeluxe=20
3	Deluxe Room=25%	discountDeluxe=25
	Super Deluxe Room=30%	discountSupDeluxe=30

After initialising the values of the variables, (discountDeluxe and discountSupDeluxe), get input for the type of rooms as 'D' for the Deluxe room and 'S' for the Super Deluxe room.

- Check the value of the Room type and calculate the payable amount as follows:

Tariff Per Day = value

Bill Amount = Tariff per Day x No. of Rooms x No. of Days

Discount Amount = Bill Amount x Discount on type of Room / 100

Payable Amount = Bill Amount – Discount Amount

B. Display the output in the given format.

```
Enter Membership Code:2
Enter Customer Name:Abhay
No of Rooms:2
No of Days:4
Enter Rooms Code(D\S):S
**************************************************************
                                Hotel Mount View
                          Manali(Himachal Pradesh)
**************************************************************
                Customer Name: Abhay
                 Membership Code: 2
**************************************************************
                 Dear Abhay you own Super Deluxe membership.
                 Seasonal Discount on Super memebrship is 20%
**************************************************************
                                 Tarrif Detail
**************************************************************
                 Tariff per Day: 4500
                 No of Rooms: 2
                 No of Days: 4
**************************************************************
                 Total Payable Amount: 28800.0
>>>
```

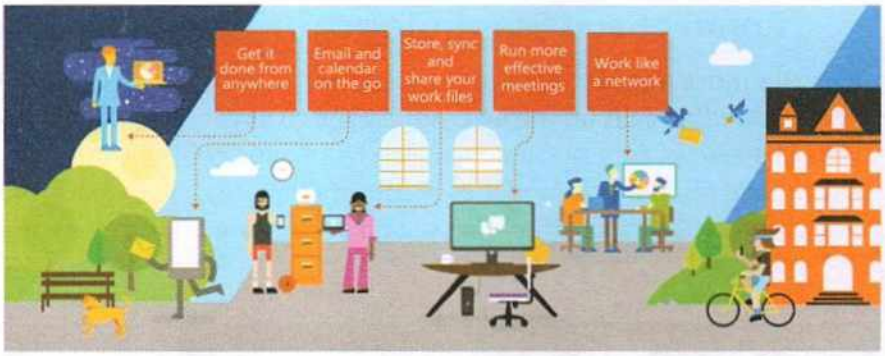
QUICK GLIMPSE OF OFFICE 365

Office 2016 suite contains applications, such as Word, Excel, PowerPoint, and Outlook which are available as a one-time purchase for use on a single PC.

Office 365 is a suite of services offered by Microsoft. It is a web based subscription service, where you have to pay a monthly or yearly fee to avail the various services it provides. Office 365 subscription plans include Office 365 Home, Office 365 Personal, Office 365 University, Office 365 for Mac, Office 365 for Business, etc. With each plan, you can install the 2016 versions of Word, Excel, PowerPoint, Outlook, and OneNote (Access and Publisher are also included for PC users).

With the subscription of Office 365, you get:

- The latest version of Office applications that are updated regularly, as and when a new version is released. Office 365 can be installed on up to 5 devices.
- One Drive cloud storage (free up to 1 TB) that enables you to store all the documents in one place and allows you to access these documents at anytime and anywhere. Therefore, it is easier than ever to create, edit, and share the documents at one go.
- Free 60 minutes of Skype calling per month, which will help you to stay in touch with your friends around the globe.
- Office Mobile Apps to get the things done on any device - PCs, Macs, tablets (including iPad and Android tablet).



KEY FEATURES OF OFFICE 365

Work smarter with the built-in Word Researcher and Editor

The Researcher feature helps you to find and use the content, related to your topic, right within your Word document. It uses the Bing Knowledge Graph to extract the relevant content from the web and provides safe and credible information.

The Editor feature, on the other hand, provides intelligent suggestions for proof-reading and editing as you type in a document.

Find the right command in seconds with Tell Me

It's easier than ever to find the feature you need. Just type what you want to do in the intelligent "Tell me what you want to do" search box and go directly to the command you need.

Put your best foot forward with PowerPoint Designer and Morph

PowerPoint Designer is an intelligent, built-in tool that helps you to create high-quality slides in seconds. The new Morph transition effect creates cinematic motion in one click, seamlessly animating between the slides.

Keyboard, touch, or pen - it works the way you do

Touch and inking capabilities give flexible options for reviewing, editing, and presenting the views.

OneNote

Organise and Share Your Work

OneNote is a digital notebook that helps you in making quick notes either handwritten or typed. It provides you with the flexibility to assemble and organise your notes, images, audio, and video clippings together in one location on your computer. You can share your notebook with anyone you desire and work on your projects also at the same time.

SharePoint

Keep Projects Together

It is a platform, offering different services. You can use SharePoint to store and organise documents and collaborate with anyone in real time. You can sign-in to SharePoint from any device, like desktop or mobile phones and can use it to have access to any information.

skype

Connect and Stay in Touch

It is the most popular application used for making voice and video calls on the Internet. Skype to Skype calls are always free but you can also use Skype to call mobile phones and landlines at affordable rates. You can also use it for instant messaging or chatting.

yammer

Connect across your Company

It is a private social network within a company or an organisation that allows the team members to share information, to have group discussions, and build a body of knowledge that is instantly accessible by any co-worker at anytime and anywhere.

Sway

Turn your Ideas into Stories

It helps in creating and sharing dynamic and interactive reports, presentations, newsletters, and personal stories. The built-in design templates help to enhance its look. It also provides you with a safe browsing tool to search relevant images, audio clips, videos, and other contents that you can drag and drop right into your creation. It is extremely easy to share a Sway with your family and friends without signing in or downloading additional software. Sway for Windows 10 is available for download in the Windows Store.

Delve

Discover exactly what you need

Microsoft Delve, previously code-named "Oslo", helps you in searching your e-mails, meetings, contacts, social networks, and corporate documents stored across Office 365. It uses "machine learning" artificial intelligence to provide you with the stuff you need to see. You do not have to remember the title of a document and its location. Delve brings the right information to you proactively based on what you are working with. It shows you the documents no matter where they are stored in the cloud but you can only see the content that has been shared with you.

Office lens

A Scanner in the Pocket

- Office Lens, one of the incredible apps available with Office 365, acts like a scanner and makes digital copies of the captured printed documents, business cards, posters, etc.
- One can also use it to take pictures of the notes from whiteboards or blackboards in the classroom or meeting. This app digitises these pictures and helps in cropping and refining their quality to make them clear and readable.

  This app provides the option to convert the captured images to PDF, Word, or PowerPoint files which are automatically saved to OneDrive. Besides that, the images can be saved to OneNote or on the local drive of the device also.
- It makes use of OCR technology (Optical Character Recognition) to recognise the printed or handwritten text so that one can search for words in images and then copy and edit them.

Office Remote

Turn your Phone into a Smart Remote

- Office Remote is another free app which turns your phone into a smart remote that interacts with Word, Excel, and PowerPoint files on your PC.
- **In PowerPoint:** you can start the PowerPoint presentation, move to the next slides, check out the speaker notes, view slide thumbnails and jump to a slide, play and pause the embedded audio and video files, etc.
- **In Word:** you can scroll through a Word document, jump to headings and comments section, change the zoom levels, screen up and down, etc.
- **In Excel:** you can switch between worksheets, move up and down the worksheet, change the zoom level, etc.
- This app works both with Windows as well as Android phones.

Smart Forms 365

Convert your Paper Forms into Mobile Forms

- It is a data collection app which facilitates in creating professionally looking forms.
- It supports various templates to make the form design user friendly and attractive. It works in offline mode also.
- After creating forms, you can collect data through various means such as sharing web link with desired users, sharing the code with other Smart Forms 365 users, etc.
- Filled data can be easily exported to other formats so that it can be reused.
- Filled forms can be sent to OneNote, with the result that the forms can be viewed on multiple devices.
- It can be used to create short courses, assessments of mark sheets, surveys, take structured notes, lesson plan. Medical professionals can use it to record Patient Medical History, trainee assessments, etc.

Artificial Intelligence

AI: Our Constant Companion

Have you ever wondered how does Amazon recommend a book to you? How is YouTube able to know your taste so well that it suggests exactly the video that would match your interest?

Do you know that when your father is using Google Maps for navigation or mother is calling an Uber cab for her shopping spree, they are actually using Artificial Intelligence (AI)! AI-powered Google Maps help us in finding congestion-free routes. While booking a cab on Uber, both the price and car that matches your ride request is decided by AI.

The films or TV series that Netflix recommends for you is based on algorithms that are keeping a watchful eye on you. These companies and their algorithms know exactly what you have recently watched. They also know about your most recent purchase from an online store. Based on the knowledge they gather on you; they are able to suggest similar things that you might enjoy.

Any video game that you play has some sort of AI element built into it. Let us presume that you begin to play a popular game like PUBG. Initially, you play against a couple of AI-powered bots. As the game advances, you move on to play against real players. However, you are actually playing against AI bosses even when you are playing a single person story-mode game. Another related example of AI is the Middle Earth series of games. In this series, all your enemies are AI-controlled. They keep evolving constantly, based on their interaction with you and the other gaming elements.

Characteristics to show Intelligent Behaviour

Various AI experts have listed certain characteristics that exhibit intelligent behaviour. Now, use the given checklist to find out your intelligence quotient.

Do you have:

- the creative ability to adopt new concepts and ideas?
- the understanding of the external world?
- the thirst to acquire new knowledge?
- memory retention and recall skills?
- the ability to draw similarities and differences among different situations?
- the aptitude to draw inference with the help of the available information?
- the skill to respond to a situation in a flexible fashion?
- the talent to employ step-by-step approach for solving complex problems?

FUN TO KNOW !

AI has the potential to offer $15.7 trillion to the global economy by 2030.

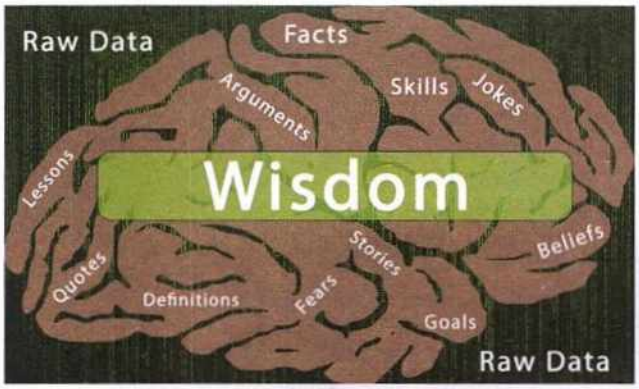
Need for AI

Computers are very quick and useful when it comes to the following:

- Numerical computation
- Information storage
- Performing repetitive tasks efficiently, without complaining or getting bored

Humans outshine computers when it comes to the following:

- Understanding the behaviour of people
- Predicting the outcome of an event merely by observing
- Common sense and reasoning
- Drawing conclusions
- Understanding emotions
- Evaluating new ideas



Most of the problems that you encounter in your daily lives require the use of common sense and reasoning. Your actions also depend on your visual and verbal understanding. You may need to derive useful meaning even out of incomplete information. Situations may arise where you have to use your own instincts to solve a problem at hand. It is impossible to prepare a complete list of all possible problems in the real world. Hence, it is not viable to write programming solutions for each kind of problem. In such a case, AI comes handy.

Developing Intelligent Systems

AI deals with symbolic rather than numeric processing, heuristics (past experience) and rule of thumb for problem solving. AI is a way to make machines think and behave intelligently. So that –

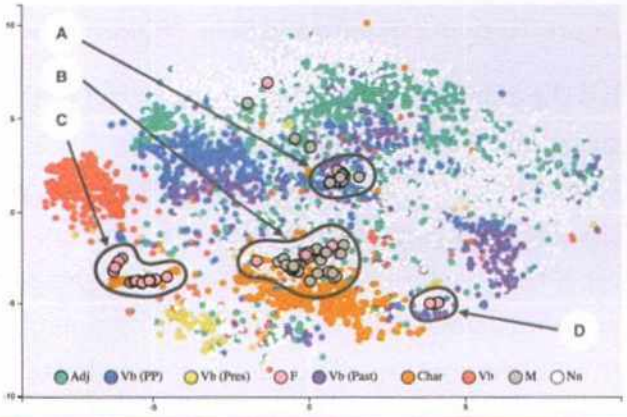
- The machines can function like the intelligent human brain
- Understand the world around them
- React to situations in the same way as humans do

FUN TO KNOW !

Facebook developed DeepFace that could identify human faces in digital images with an accuracy of 97.35

AI Domains

1. Data
2. Computer Vision
3. Natural Language Processing



While using Facebook, Instagram or Snapchat, the feeds that you see on your timeline to the app notifications that you receive, AI is playing an important role. While browsing the internet, you must have noticed several ads that pop up on your screen. AI is used to learn about your purchase

preferences. You are then served ads based on the data collected about you. In fact, the global digital ad industry is projected to cross a whopping 300 billion mark in 2019.

FUN TO KNOW !

Facebook developed DeepFace that could identify human faces in digital images with an accuracy of 97.35

Applications of AI

AI has become an important part of our everyday life. Some of its applications are as follows:

- Smart cars and drones
- Expert systems in finance and marketing
- Robotics
- Social media
- Travel and navigation
- Healthcare industry
- Security and surveillance
- Smart homes

FUN TO KNOW !

Honda's Asimo is the world's most advanced bipedal humanoid robot.

FUN TO KNOW !

In 2014, GoVivace's speaker identification system successfully searched for an individual among millions of speakers.

ACTIVITY TIME

Ice Breaker Activity - Dream Smart Home Idea

'Home is where the Heart is.' A real, perfect AI-powered house is probably just a decade away. All you young students, must be brimming with new ideas already! So, design a rough layout of the floor plan of your dream smart home and share your ideas with your classmates.

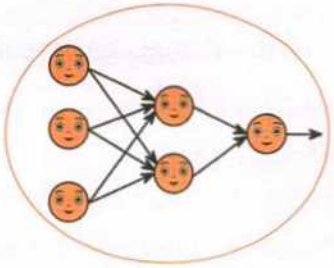
AI systems: The new World Champs

In 1997, IBM's Deep Blue beat chess champion Gary Kasparov in a 3.5: 2.5 match. In 1997, Logistello, a program that plays the game Othello, beat the world champion Takeshi Murakami in a 6:0 match. In 2011, the IBM Watson system beat Brad Rutter and Ken Jennings in the quiz show Jeopardy securing first place and bagging a prize of $1 million. In 2016, Google's AlphaGo beat the world champion Lee Sodol, with 4:1, while playing the game Go.

In 2017, Waymo started testing its driverless cars. While a human took about 2 seconds to react and apply brakes, a computer took only 0.3 seconds to compute and apply brakes in the same scenario.

Neural Networks: Learn and Relearn like a Child

It is like a child who does not know much at birth but once he is exposed to real-life situations, he develops problem-solving skills. For neural networks, data is the only experience. A neural network can also be compared to a race around a circular track with several laps. As a runner passes through the same points repeatedly in the loop, he tries to improve his performance. Each step for a neural network involves a guess, finding error, and upgrade to a better guess. It learns from its own mistakes and tries to attain a better output the next time.



Human beings have a natural tendency to learn from their environment through observations. Past experiences also help us to improve and take better decisions. Neural networks are a set of algorithms that tend to function like the human brain. These are designed to recognise patterns, and then cluster and classify data.

Some examples of Neural Networks classifying data are as follow:

- Detect faces
- Identify people in images
- Recognise facial expressions
- Identify objects in images
- Recognise gestures in a video
- Detect voices
- Identify speakers
- Recognise sentiments in different voices

Some more examples where Neural Networks cluster data are:

- Comparing documents
- Grouping together images or sounds to find similarities
- Detecting unusual behaviour, like frauds

ACTIVITY TIME

Story Time: Imagine that Sanjay lives in a smart home. As he returns home, his car communicates with the garage to open the door. Once inside, the temperature is adjusted to a comfortable level. The lighting is set to a low intensity and colour for relaxation. His pacemaker data indicates it has been a stressful day and instructs the music player to play soft music.... Build a story around this setting. Get Set Go!

GAME TIME : **Quick, Draw !** By Google Creative Lab

It is a game where a neural net tries to guess what you're drawing. You have 20 seconds of time and the computer keeps guessing what you have drawn. It even apologizes for not being able to guess right.

AI Ethics

Nowadays, you keep hearing about cases of data breach from social media platforms, cyberattacks resulting in ransomware, phishing, and malware attacks on the computer system. While using a computer system, AI programs are running in the background, and they know all about you.

You can organise a debate on the topic–Is AI beneficial or harmful for the society?

SWAY

Sway, a part of the Microsoft Office package, is a digital storytelling application. Its colourful and interactive interface is designed for creating and sharing personal stories, interactive reports, presentations, newsletters, and more. In Sway, there is no option for creating content itself, though you can import an existing Word, PowerPoint, or PDF document from which a new Sway story can be created with text and media. Unlike PowerPoint, it is primarily used for presenting ideas on screen rather than to an audience.

FEATURES OF SWAY

ADDING INTERACTIVE CONTENT: You can bring your Sway to life with elements like videos, interactive reports, personal stories, presentations, and more.

READY CONTENT FOR ALL DEVICES: Sway adapts itself to all devices.

SEE SUGGESTED SEARCH RESULTS: Sway suggests searches to help you find relevant images, videos, tweets, and other content that you can drag and drop into your creation.

INBUILT DESIGN ENGINE: Sway's inbuilt design engine provides various choices to customise your content.

EASY TO SHARE: You can also share your Sway with others via a link or through social media, or by embedding it in your websites.

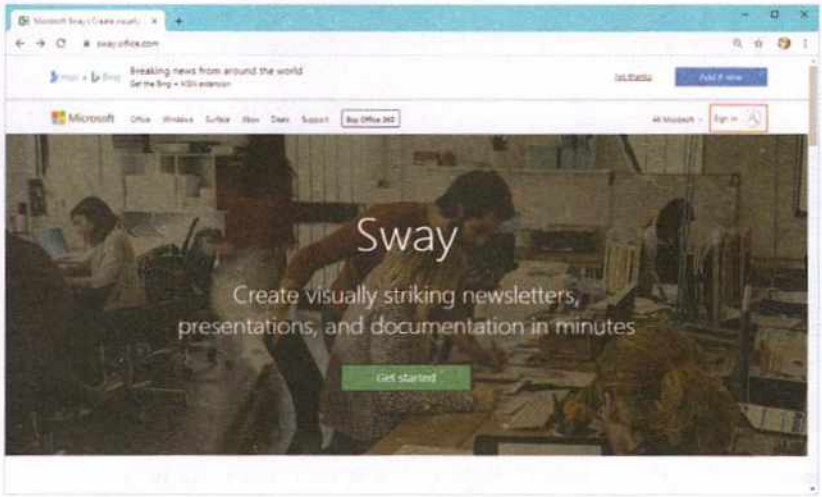
ADDING MEDIA VIA SOCIAL MEDIA ACCOUNTS: In Sway, you can add different media via social media accounts such as inserting photos directly from Face book, inserting tweets from Twitter, and adding videos from YouTube.

USE CREATIVE NAVIGATION STYLES: Sway provides you with multiple options to navigate through your content.

ACCESSING SWAY

To get started with Sway, follow the given steps:

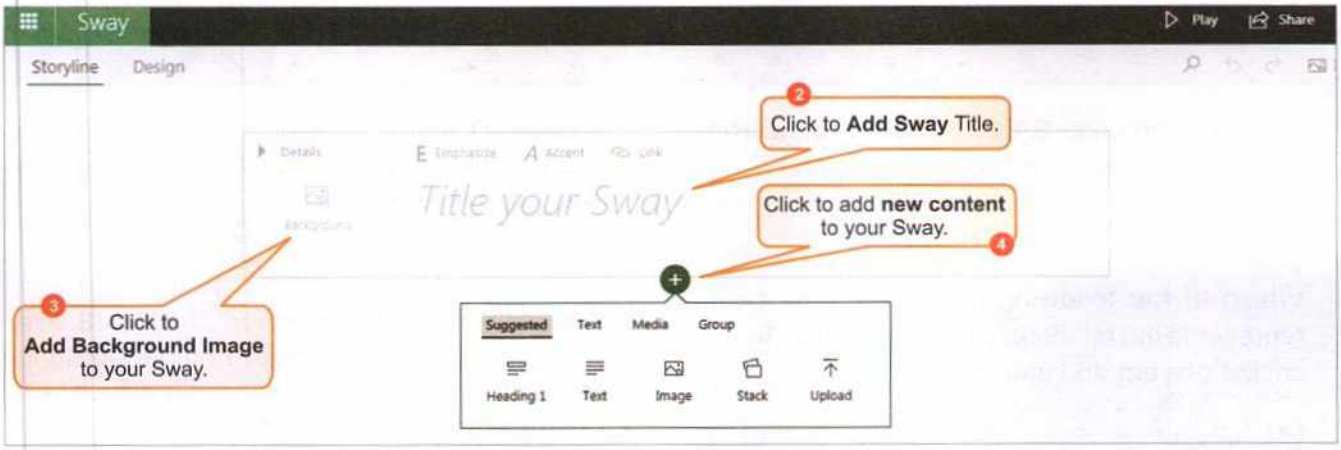
- Visit sway.office.com and then click on the **Sign in** option on the right corner of the top Menu bar.
- A **Sign in** popup window will appear. Sign in using your e-mail address either in **Hotmail** or **Outlook**.



Sway Sign in Window

CREATING A SWAY

1 Create a new Sway by clicking on **Create New** option



2 Click to **Add Sway** Title.

3 Click to **Add Background Image** to your Sway.

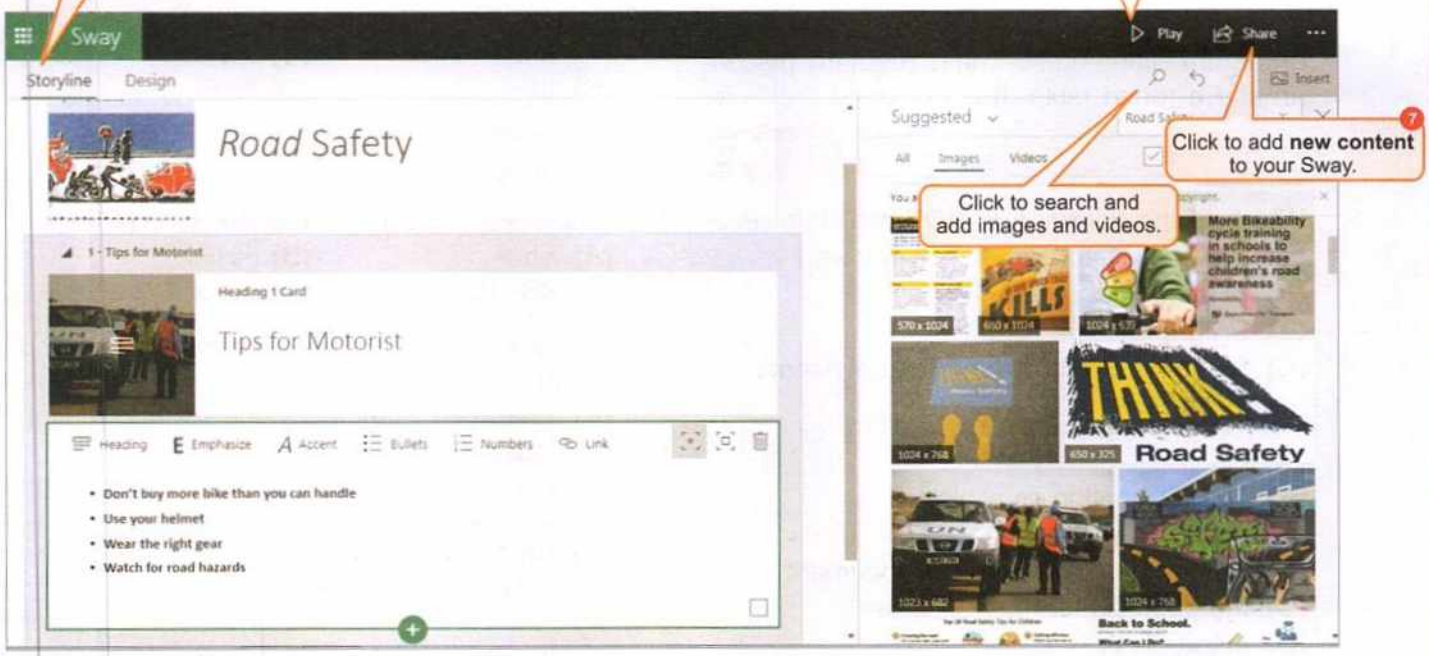
4 Click to add **new content** to your Sway.

5 Click to view and edit your Sway Story line.

6 Click to add **new content** to your Sway.

7 Click to add **new content** to your Sway.

Click to search and add images and videos.



NATIONAL CYBER OLYMPIAD

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Total Questions : 50 | Time : 1 hr.

PATTERN & MARKING SCHEME			
Section	(1) Logical Reasoning	(2) Computers & IT	(3) Achievers Section
No. of Questions	10	35	5
Marks per Ques.	1	1	3

SYLLABUS

Section – 1 : Verbal and Non-Verbal Reasoning.

Section – 2 : Fundamentals of Computers, Internet & Viruses, HTML-[Html, Head, Title, Body (Attributes: Background, Bgcolor, Text, Link, Alink, Vlink), Font (Attributes: Color, Size, Face), Center, BR, HR (Attributes: Size, Width, Align, Noshade, Color), Comment tag(<!-- -->), <H1>..<H6>, <P>, <B>, <I>, <U>, <IMG>, Html Elements: A, UI and OI (Attributes: Type, Start), Li], Flash CS6, MS-Access, Networking, MS-Word (Exploring File tab, Language and Translate options, Tracking features -Comments, Reviewing Pane, Tracking Changes, Comparing, Combining and Protecting documents, Working with References), MS-PowerPoint (Exploring File tab and Slide Show tab, Comparing, Combining and Protecting presentations), MS-Excel(Exploring File tab, Useful Formulas and Functions - IF,Even, Odd, LCM, GCD, Power, Product, Round, Sqrt, Sum, Min, Max, Average, Count, Upper, Lower And Replace, Cell referencing, Using Defined Names group), Memory & Storage Devices, Basics of Cyber Crimes, Cyber Laws, Operating Systems(Introduction, Features, Types-single user and multi-user), Latest Developments in the field of IT.

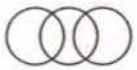
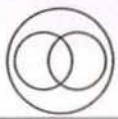
Section – 3 : Higher Order Thinking Questions - Syllabus as per Section – 2.

Questions are based on Windows 7 and MS-Office 2010.

Visit www.sofworld.org for more details.

LOGICAL REASONING

1. If in a certain code SAND is VDQG and BIRD is ELUG, then what is the code for LOVE?
   (A) PRYG (B) ORTG
   (C) NPUH (D) ORYH

2. Which of the following Venn diagrams best represents the relationship among "tennis fans, cricket players and students"?
   (A)  (B) 
   (C)  (D) 

3. A, B, C, D, E and F, not necessarily in that order, are sitting on six chairs regularly placed around a round table. It is observed that A is between D and F, C is opposite to D, D and E are not on neighbouring chairs. The person sitting opposite to B is _____.
   (A) A (B) D
   (C) E (D) F

4. If the digits in the number 25673948 are arranged in ascending order from left to right, what will be the sum of the digits which are fourth from the right and third from the left in the new arrangement?
   (A) 10 (B) 9
   (C) 4 (D) 6

5. Find the missing term in the given series.
   DMP, FLN, HKL, JJJ, __?__
   (A) MII (B) LIH
   (C) III (D) MIF

COMPUTERS AND INFORMATION TECHNOLOGY

6. Which of the following is NOT available as a category in Control Panel of Windows 7?
   (A) System and Security
   (B) Programs
   (C) Bluetooth settings (D) Ease of Access

7. The function of given icon in MS-Word 2010 is _____.
   
   (A) To add caption to a picture or other image
   (B) To insert an index into the document
   (C) Merge document to PDF files
   (D) Insert Flash video

8. Which of the following is CORRECT in HTML?
   (A) <hr> (B) <HR>
   (C) <B> Bold Text </B> (D) All of these

9. Computers use the seven digit code called ASCII. What does ASCII stand for?
   (A) American Standard Code for Information Interchange
   (B) Association of Software Coding and Information Institute
   (C) American Standard Computing and Information Institute
   (D) American Scientists Convention for Information Interchange

10. How many sheets are there in MS-Excel 2010 workbook by default?
(A) 2 (B) 3
(C) 4 (D) 5

11. In Flash CS6,  is called ____ tool.
(A) Fill color (B) Paint bucket
(C) Ink bottle (D) Lasso

12. In MS-PowerPoint 2010, Format Painter is used to _____.
(A) Copy formatting from one place and apply it to another
(B) Reset the position, size and formatting of the slide
(C) Format text to the left
(D) Increase the indent level

13. Which of the following statements is INCORRECT about memory and storage devices?
(A) Cache memory makes memory transfer rates higher and thus raises the speed of the processor.
(B) A storage device is a hardware component that writes data to and reads data from a storage medium.
(C) ROM loses its data when you turn off the computer.
(D) Hard disks can be divided into one or more logical disks called partitions.

ACHIEVERS SECTION

14. Rearrange the steps given below to insert a motion tween in Flash CS6, first and last steps are given for you.
First : Draw a shape at Frame 1
(i) Drag the playhead to a new frame and reposition your object
(ii) Select the shape and convert it to a symbol
(iii) Go to Insert tab → Motion tween
Last: Press Ctrl + Enter ↵ to play the tween.
(A) (ii) → (iii) → (i) (B) (i) → (iii) → (ii)
(C) (iii) → (i) → (ii) (D) (iii) → (ii) → (i)

15. Which of the following statements is CORRECT about 'Sneakernet'?
(A) Transferring computer files between computers by physically moving removable media such as CDs, flash drives.
(B) Unauthorised access of information from a wireless device.
(C) The process of converting data in a form so that an unauthorised person cannot understand it.
(D) A private computer network in which multiple PCs are connected to each other.

16. .... is a device that will only send a message to the device that needs or requests it rather than broadcasting it to all devices.
(A) Router
(B) Hub
(C) Switch
(D) Modem

17. $(2AB)_{16}$ = (.....)$_2$.
(A) 001010101011
(B) 0010101011
(C) 111000110101
(D) 001010101010

ANSWERS

1. (D) 2. (A) 3. (D) 4. (A) 5. (B) 6. (C) 7. (A) 8. (D) 9. (A) 10. (B) 11. (B) 12. (A) 13. (C) 14. (A) 15. (A) 16. (C) 17. (A)