UPDATED

As per National Education Policy (NEP-2020)

Computer

(An Interactive series on Computer Science)

Authors :

Nisha Madan

K. Srinivasa

8

New Edition

Computer-8

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Authors :
Nisha Madan
K. Srinivasa

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Preface

Computer : Computers is a comprehensive series of eight books designed specifically for the needs and requirements of the students studying in classes 1-8. This series perfectly complies with the NCERT syllabus criteria and the National Curriculum Framework's vision. In keeping with NEP 2020's guidelines, the series adopts an interactive approach to make it possible for the learners to enjoy computers. This book includes enough questions in accordance with the NEP criteria. The fundamental principles of NEP which are recognizing, identifying and fostering the unique capabilities of each student, respect for diversity, and consideration for the local context in all topics, are always kept in mind while framing the book.

The topics are introduced in a way that children experience and learn through exploration.

Child-friendly language and contextual images have been incorporated throughout the series to make the material more understandable for young readers. This allows them to connect what they read and relate it to the views, ideas, and experiences they encounter every day.

Salient Features of the series:

Learning Outcomes : It guides both the teacher and the students towards the correct direction of efficient learning. It establishes the path of learning for efficient and superior learning results.

Warm Up : Children can connect their prior knowledge to the chapter's topic through simple yet engaging activities.

Teacher's note : An outline of guidelines for teachers to follow in the classroom in order to make lessons interactive and discussion-based.

Let me answer : Questions related to the topic which are essential for checking pupil understanding and keeping them engaged with the task at hand.

Do You know : An interesting piece of information related to the topic.

Remember It : Additional information about the topic to encourage children to wonder about various surroundings.

Kids' IQ : These questions have been included to reinforce learners to think,analyse and apply.

Up skill your Intelligence : Ample exercises with a range of questions to support learning.

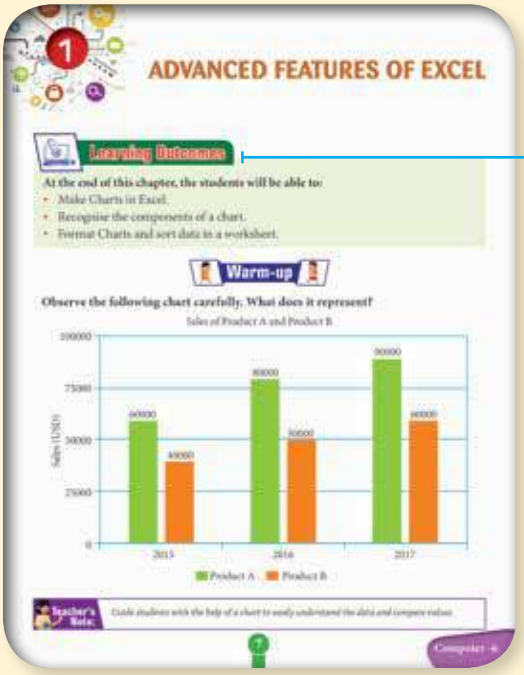
Critical Thinking : Questions which allow the learners to think clearly and rationally.

Team Work : It enables the students to collaborate with others.

The content is structured and well graded. Sincere efforts have been made to prevent any inconsistencies and make this series a perfect complement to the students' education. Any worthwhile recommendations for the improvement of the series are always welcome and greatly appreciated.

Author

FOCUS AREAS



Learning Outcomes

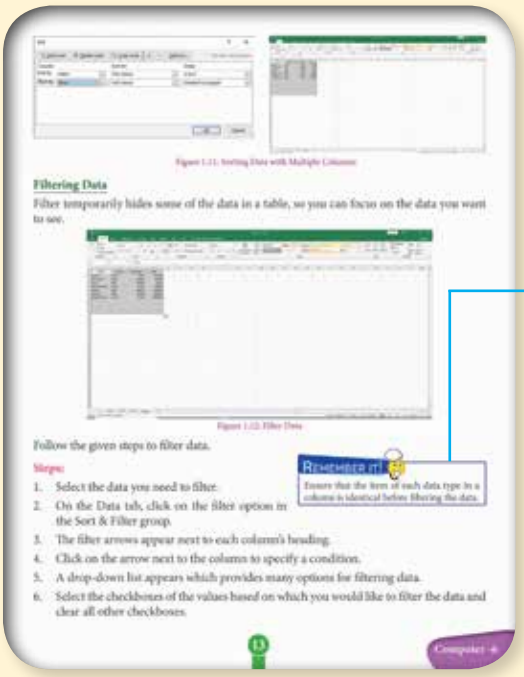
It shows the right path of learning to the teacher as well as students. It establishes the direction of learning for efficient and superior learning results.

Warm-Up

Children can connect their prior knowledge to the chapter's topic through simple yet engaging activities.

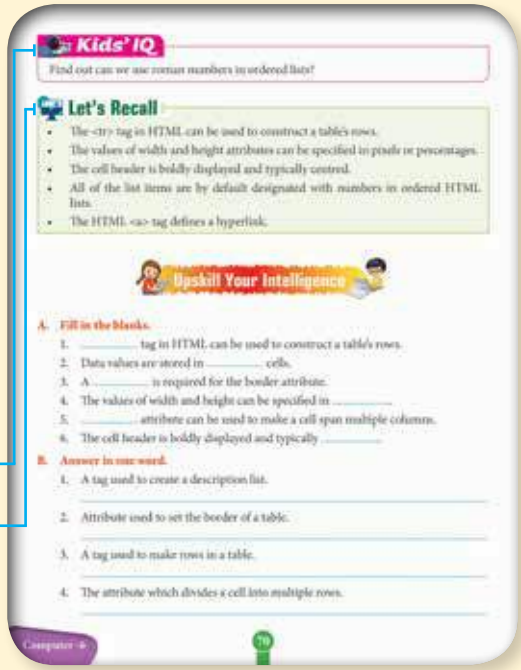
Teacher's Note:

An outline of guidelines for teachers to follow in the classroom in order to make lessons interactive and discussion-based.



Remember It

Additional information about the topic to encourage children to wonder about various surroundings.



Kids' IQ

These questions have been included to reinforce learners to think,analyse and apply.

Let's Recall

It aids in providing a brief summary of the entire chapter.

OF NEP 2020

Do You Know

An interesting piece of information related to the topic.

Critical Thinking

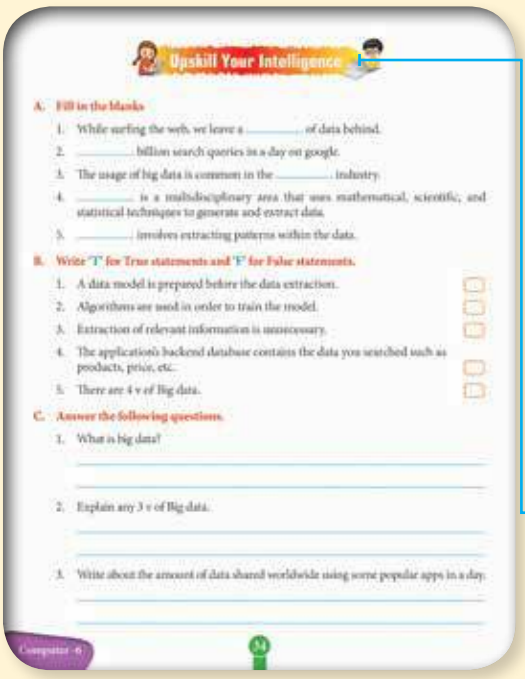
Questions which allow the learners to think clearly and rationally.

Let me Answer

Questions related to the topic which are essential for checking pupil understanding and keeping them engaged with the task at hand.

Team Work

It enables the students to collaborate with others.



Upskill Your Intelligence

Ample exercises with a range of questions to support learning.

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1

COMPUTER NETWORK

Learning Outcomes

At the end of this chapter, the students will be able to:

- Know about computer network
- Learn different types of networks
- Identify the advantages of a computer network

Warm-up

Circle the devices which are connected to Wi-Fi in your house.









Teacher's Note: *Elucidate students that it is impossible to go through a day without the use of communication. Both the sender and receiver require a medium to communicate.*

Hey Friends! Let us learn about computer networks.

We frequently discuss our feelings, opinions, and favourite things with our friends . Similarly, two or more computers must be connected in order to share information. A computer network is made up of two or more computers that are connected to one another through various communication channels. These computers are all linked together in such a way that they can occasionally exchange data and hardware resources.

THE NEED FOR A COMPUTER NETWORK

An organisation can benefit greatly from a computer network in a number of ways. Here are some advantages of a computer network.

Saves Cost

We have learned how all the computers are connected to a single network and can share a variety of hardware resources. There is no requirement to purchase several items as a result of this. For instance, a single modem can be used to link a variety of networked devices to the internet.

Reducing Data Redundancy

Imagine that an organisation has 100 employees, and every single one of them wants to work on the same file. One approach is to keep separate copies of the same file on each computer. Data duplication or redundancy will result from this. The alternative is to connect all of the computers over a network and store a single copy of the file on a main computer, allowing the other networked computers to access the file as needed.

Sharing Resources

Information or data, software applications, and hardware components make up resources. These resources can be shared across computers that are connected through a network.

For instance, a single computer with

Figure 1.1: Sharing Resources

a printer attached may exist in an organisation. All the other computers that are part of the network can use the network services of the same printer.

Security

As more computers communicate information via a network, security becomes increasingly important. This can be done using a variety of methods, including setting up a firewall system and other network protection tools that are available across many platforms. This aids in the fight against phishing and data theft.

TYPES OF NETWORKS

Computer networks can be characterised by their size as well as their purpose. There are different types of computer networks depending upon the number of devices that are connected together.

The size of a network can be expressed by the geographic area they occupy and the number of computers that are part of the network.

Personal Area Network (PAN)

A computer network set up just for an individual inside a compact building is known as a personal area network. This may take place in a small workplace or house. PAN generally covers a range of up to around 10 metres. A PAN would typically consist of one or more computers, phones, including mobile phones, printers, video game consoles, and other personal entertainment devices.

Figure 1.2: PAN

Do You Know?

The main role of PAN is to eliminate cables that connect devices to peripherals.

Local Area Network

The Local Area Network is confined to a limited area, such as a room, an office building, or a school, or a college campus. As the area covered by LAN is limited, the data transmission speed in LAN is very fast

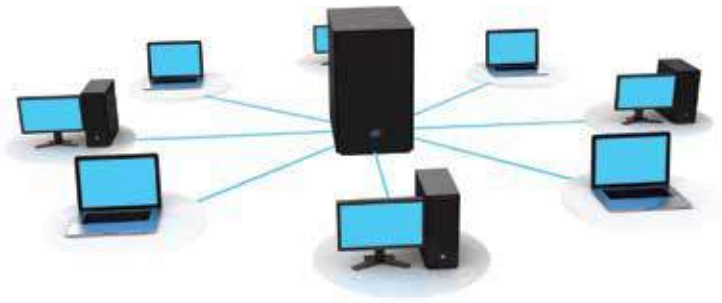

Figure 1.3: LAN

and can be easily maintained. In LAN, wires are used to physically connect the computer terminals. WLAN refers to local area networks where computers communicate wirelessly.

Metropolitan Area Network (MAN)

A metropolitan area network consists of a computer network which covers an entire city, college campus or small region. As compared to LAN, it covers a wider area. A MAN network's computers can be linked together using both wired and wireless communication methods. ATM machines of a specific bank, installed at different locations in a city, are an example of MAN.

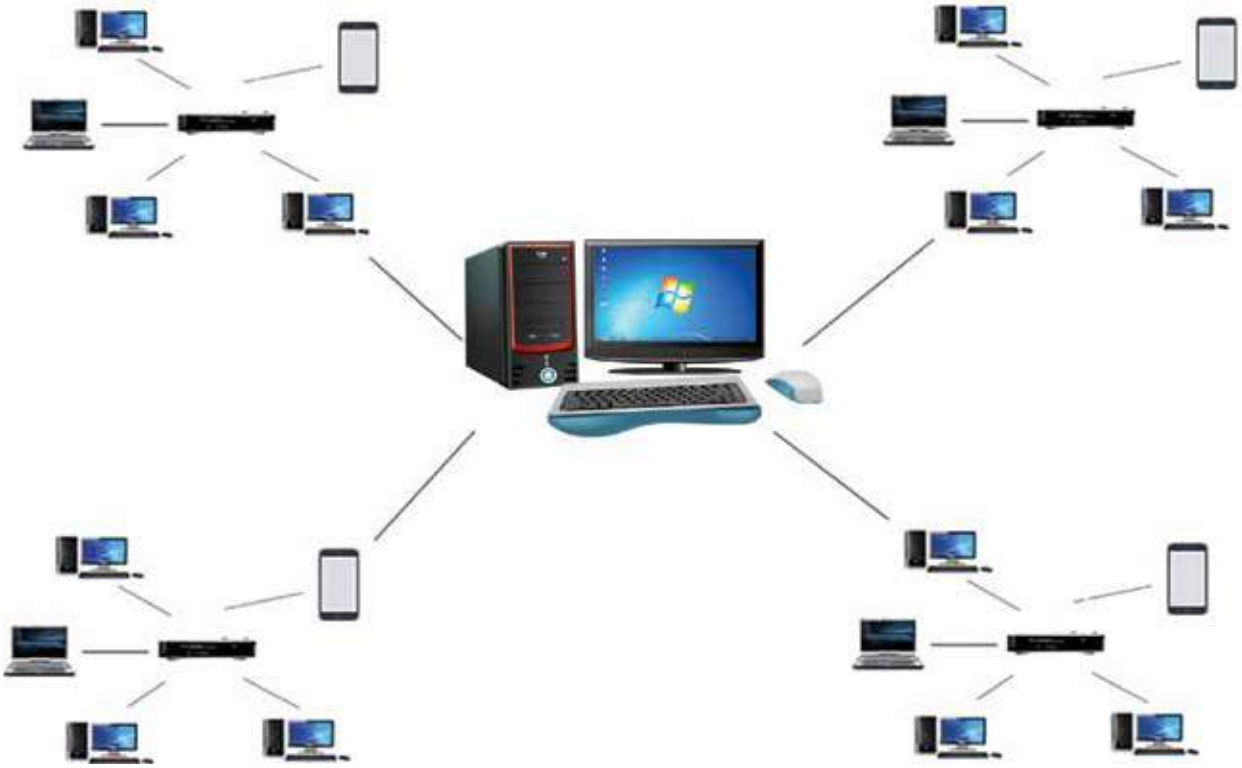

Figure 1.4: MAN

Wide Area Network

A wide area network occupies a very large area, such as an entire country or the entire world. It consists of many smaller networks, such as LANs or MANs. The primary characteristic of WAN is that data transfer requires a public telecommunications medium. A very common example of WAN is the internet, wherein millions of computers are interconnected with each other.

NETWORK TOPOLOGIES

The organisation of diverse network components in a way that makes communication simple is known as network topology. Before you start with the arrangement of network

components, It's crucial to establish the logical topology—also known as the information flow between network components.

Network topologies are categorised into the following basic types:

Point-to-Point

This topology is among the most widely used since it is simple to utilise. Direct communication between two network components, such as PCs, routers, hubs, etc., is established using this method. Both wired and wireless technologies can be used to create a direct link.

Bus Topology

Bus topology, also known as line topology, is a type of network topology in which all devices in the network are connected by one central network cable or coaxial cable. The single cable, where all data is transmitted between devices, is referred to as the bus, backbone, or trunk.

Figure 1.5: Bus Topology

There are two types of bus topologies:

- Linear bus topology. All devices are connected to a single cable with two endpoints.
- Distributed bus topology. All devices are connected to a single cable that branches off into multiple sections, resulting in more than two endpoints.

REMEMBER IT!

A host on a bus network is called a station.

Star Topology

In a star topology, the central hub acts like a server and the connecting nodes act like clients. When the central node receives data from a connecting node, it can pass the data on to other nodes in the network. A star topology is also known as a star network. In this topology,

Let Me Answer

What do you mean by Star Topology?

Figure 1.6: Star Topology

it is easy to add a new device to the network with the help of only one cable. The entire network goes down only if the central computer/hub fails.

Ring Topology

Each computer in a ring topology is connected to the one behind it in such a way that when they are all put together, they resemble a shape of ring. When one node sends a message to the other node, which is not adjacent to it, the data travels through all the intermediate nodes, until it reaches its final destination. The data in this topology has to pass through each connected computer; this makes it slower than the other topologies.

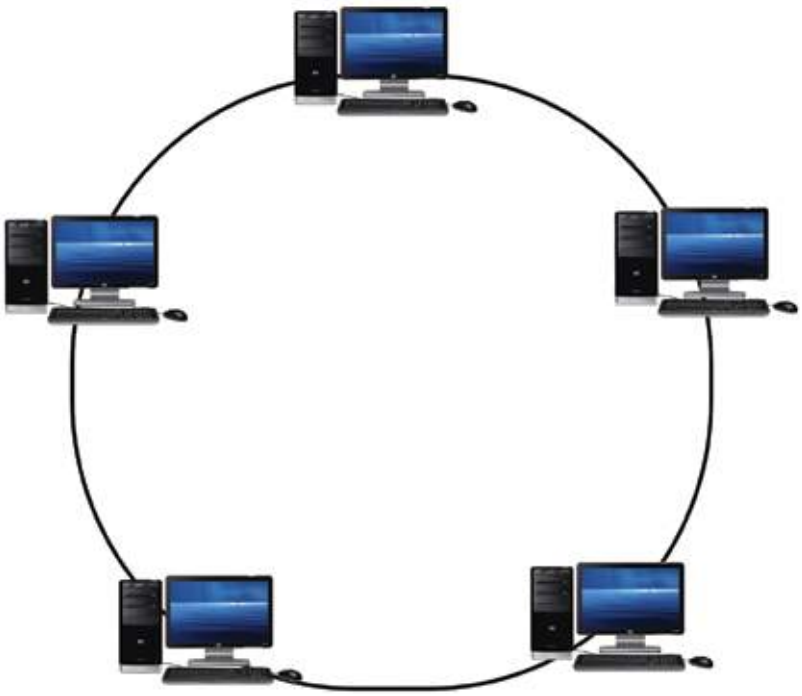

Figure 1.7: Ring Topology

Tree Topology

A tree topology is a sort of structure in which each node is related to the others in a hierarchy. In a topological hierarchy, there are at least three distinct levels. Sometimes it is also called hierarchical topology as in this topology, all elements are arranged like the branches of a tree. In a tree topology, there can only be one connection between any two connected computers. For database-related services or to organise the computers in a large cooperative network, the tree topology is commonly utilised. In this topology, the expansion of

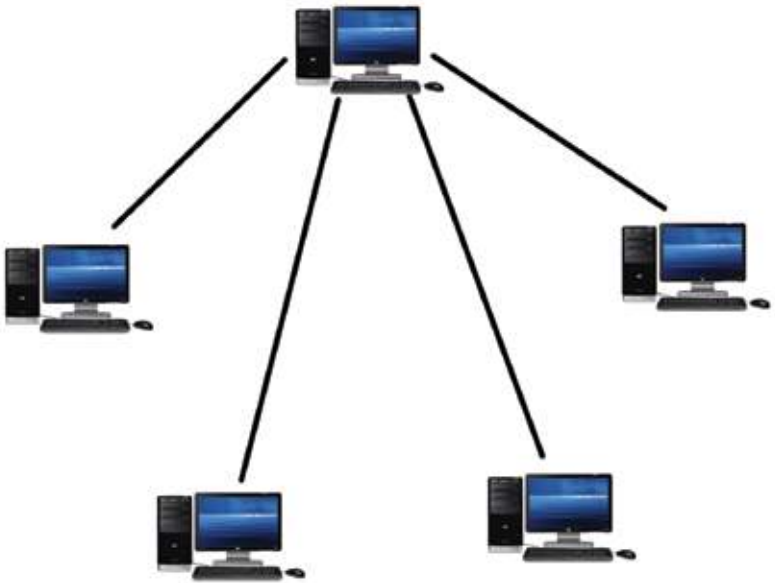

Figure 1.8: Tree Topology

Let Me Answer

How is Tree topology related to a tree?

network is feasible, and an easy task to carry out, but the maintenance of the same is often difficult.

Mesh Topology

Computers are joined randomly in a mesh network structure. Each computer in the network can transmit a signal to the other computers in this sort of topology, and each computer also assists in retransmitting data to other computers in the network. It is a topology commonly used for wireless networks. The cost is too high for maintaining this type of network.

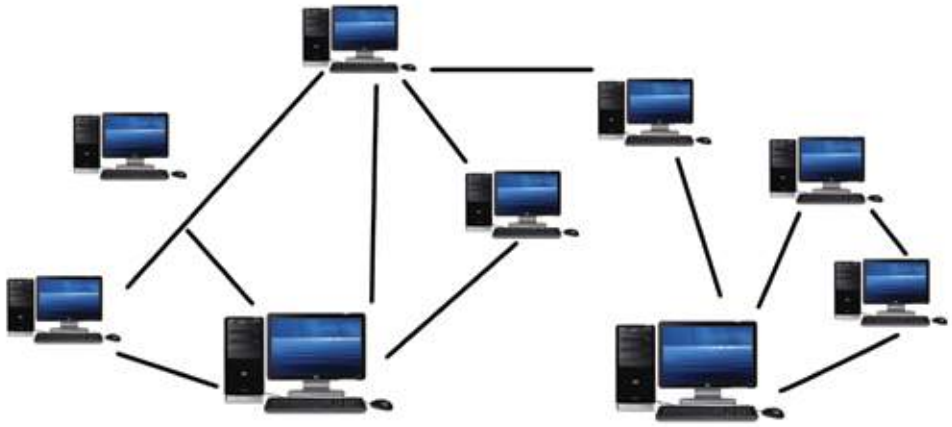

Figure 1.9: Mesh Topology

Peer-to-Peer Network

In the simplest terms, a peer-to-peer network is a network created whenever two or more devices (usually a computer) are connected and share resources available on the web. Each computer can act both as a server and a client as there is no central server in this network.

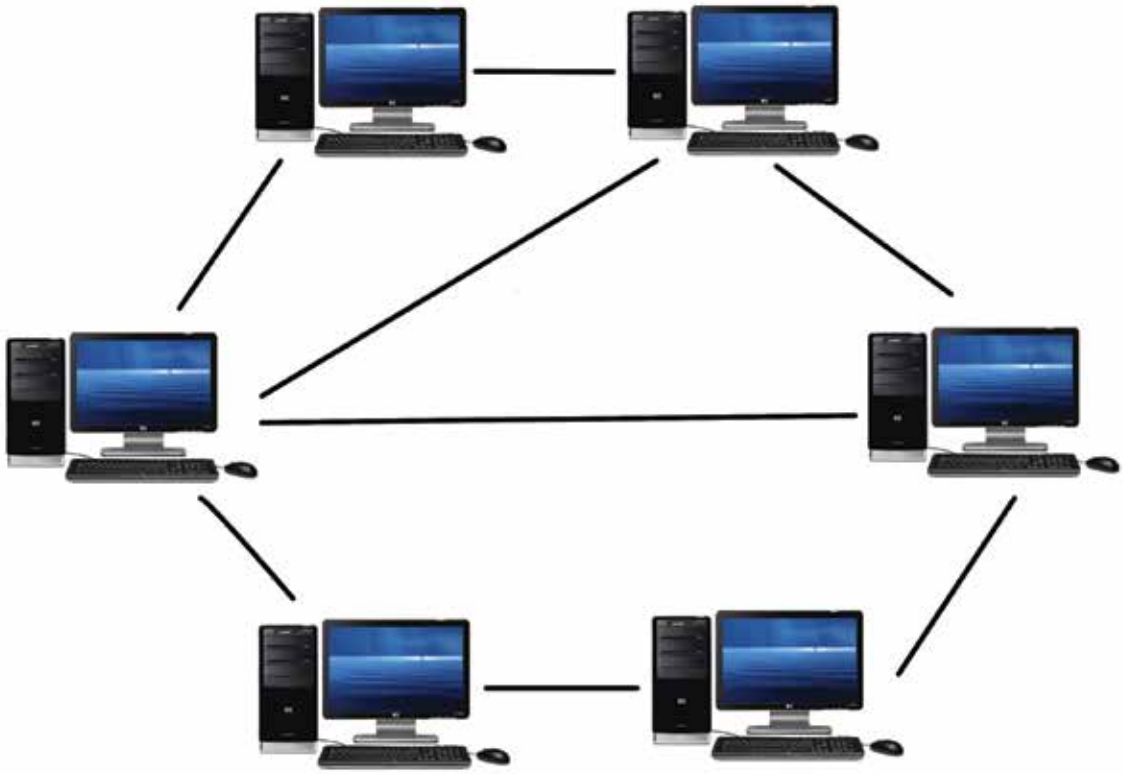

Figure 1.10: Peer-to-Peer Network

Client-Server Network

Several Computers called clients are connected to the main computer called the server in this network. A computer that serves clients and manages access to hardware, software, and other resources is known as a server.The computers that ask the server for services like data retrieval, storage, etc. are known as clients.

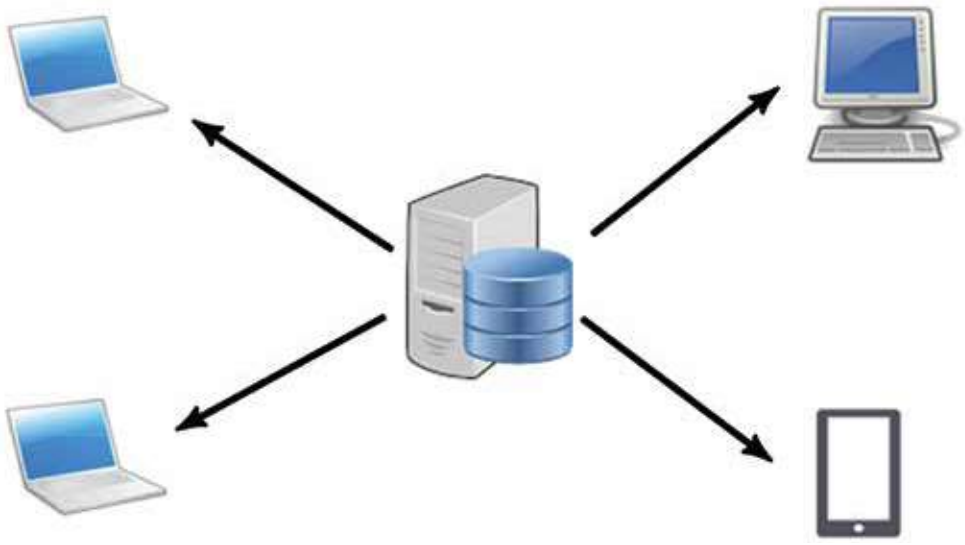

Figure 1.11: Client-Server Architecture

Kids' IQ

Shivani wishes to link the electronic devices of her entire family with each other. Give Shivani and her family a network type that will work for them.

Let's Recall

- An organisation can benefit greatly from a computer network in a number of ways.
- Computer networks can be characterised by their size as well as their purpose.
- A computer network set up just for an individual inside a compact building is known as a personal area network.
- A wide area network occupies a very large area, such as an entire country or the entire world.
- A tree topology is a sort of structure in which each node is related to the others in a hierarchy.
- In Client-Server Network, several Computers called clients are connected to the main computer called the server.

A. Fill in the blanks.

1. A single ..... can be used to link a variety of networked devices to the internet.
2. Information or data, software application, and ..... components make up resources.
3. Setting up firewall system aids in the fight against ..... and .....
4. Computer networks can be characterised by their ..... as well as their .....
5. The size of a network can be expressed by the ..... area they occupy.

B. Write 'T' for True statements and 'F' for False statements.

1. A computer network setup just for an individual inside a compact building is known as wide area network. ☐
2. PAN generally covers a range up to 10 metres. ☐
3. The data transmission speed in LAN is very fast. ☐
4. MAN stands for Metro Area Network. ☐
5. Bus topology is also known as line topology. ☐

C. Answer the following questions.

1. Why is there a need for a computer network?

   .....

   .....

2. Explain any two types of networks.

   .....

   .....

3. What do you mean by network topologies?

   .....

   .....

4. What is Client-server architecture?

   .....

   .....

5. Explain Wide area network. (WAN)

.....

.....

Critical Thinking

Identify the following topologies.

.....

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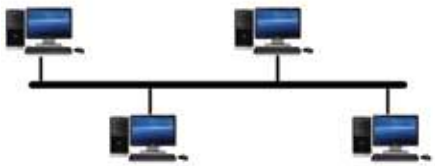

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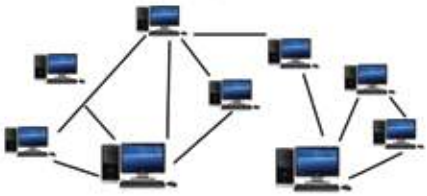

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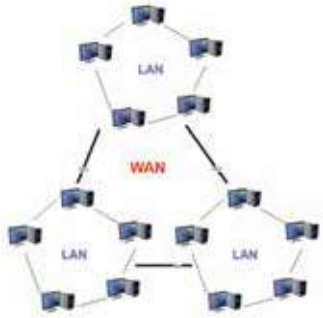
Team Work

Prepare a presentation on types of network.



2

LOG ON TO ACCESS

Learning Outcomes

At the end of this chapter, the students will be able to:

- Comprehend the concept of Database
- Learn the advantages of DataBase Manager
- Know the components of Access
- Create a Database
- Identify views in Access
- Insert/delete field in Datasheet view

Warm-up

Prepare a Telephone directory and address book of your friends.

Name	Phone Number	Address

Teacher's Note: *Guide students that it is very difficult to maintain this data manually when there are hundreds and thousands of records, as the chances of committing errors increase. Telephone directory, a dictionary, list of groceries in a grocery store are the examples of different types of databases.*

Hello Friends! Let's learn how to arrange data in databases.

The use of data is essential in advanced technologies. Today's most well-known apps and websites rely on data. Data is essential for organisations and institutions when creating strategy. Government also depends on data for decision-making and for creating favourable policies for the people of the country. The data needs to be stored in an organised way to allow for easy access and accurate information retrieval. Databases are used to organise the data in this manner.

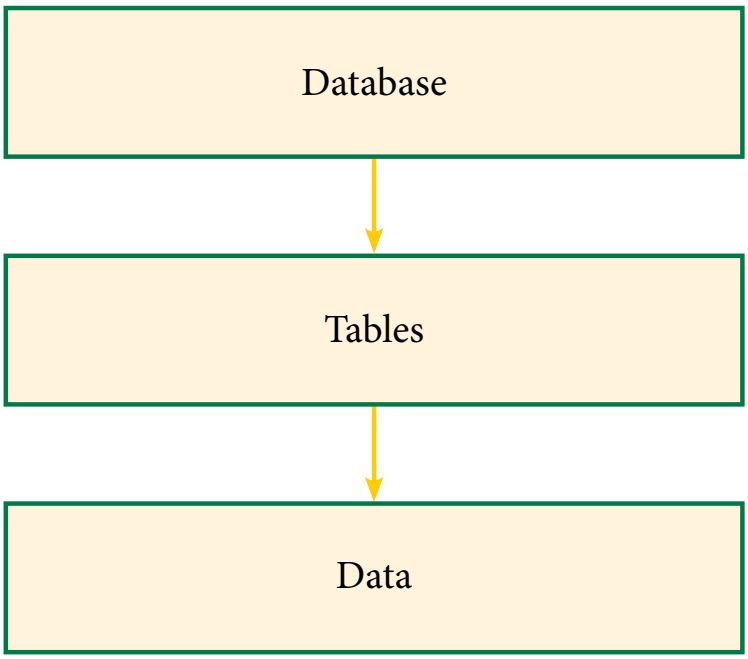
Do You Know?

On November 13, 1992, the first version of MS Access was released by Microsoft.

DATABASES

A structured collection of information about an entity is what is meant by a database. Databases make it simple and efficient for users to add, access, modify, and delete data. A database may sometimes be regarded as a storage location for data. For example, an organisation can create its own database to store the personal records of their employees. The database system uses a hierarchical structure to store the data. A system that supports the organising of data is called Database Management System. (DBMS)

The way data is kept in a database is shown in the following diagram.



ADVANTAGES OF DATABASE MANAGEMENT SYSTEM

Control Of Data Redundancy

A computer's memory is a crucial component. Memory is wasted as a result of redundancy. DBMS offers a number of methods to check for data redundancy.

Application ID	Name	Percentage	School Allotted
23456	Shruti	79%	DPS
23457	Shivani	78%	APS
23456	Shruti	79%	DPS

You can observe that the record of Shruti is entered twice. This may lead to wastage of memory.

Maintaining Data Consistency

Data consistency is the management of data across many database tables, particularly when the data in these tables is related to one another.

Table 1	
Application ID	**Name**
23456	Shruti
23457	Shivani
23456	Shruti

Table 2	
Application ID	**Percentage**
23456	79%
23457	78%
23456	79%

Sharing of data

One computer's data can be shared among numerous users with DBMS.

Data Integrity

Data integrity guarantees that the database only contains relevant information. For Example, an organisation database should have data related to employees and clients.

WHAT IS MICROSOFT ACCESS?

Microsoft Access is the most popular and powerful RDBMS (Relational Database Management System) that serves an integral part of the Microsoft Office Suite Application. It has a graphical user interface. It is employed to effectively organise and manage massive amounts of data. It organises data in the form of tables. Data duplication can be avoided with a relational database. Access also allows you to add, update, delete, and view data using forms. Further, it helps to find and retrieve the data in a desired way by using queries, and print the data in a specific layout by using reports.

Components of Microsoft Access 2016

Let's familiarise ourselves with the various parts of the Microsoft Access window.

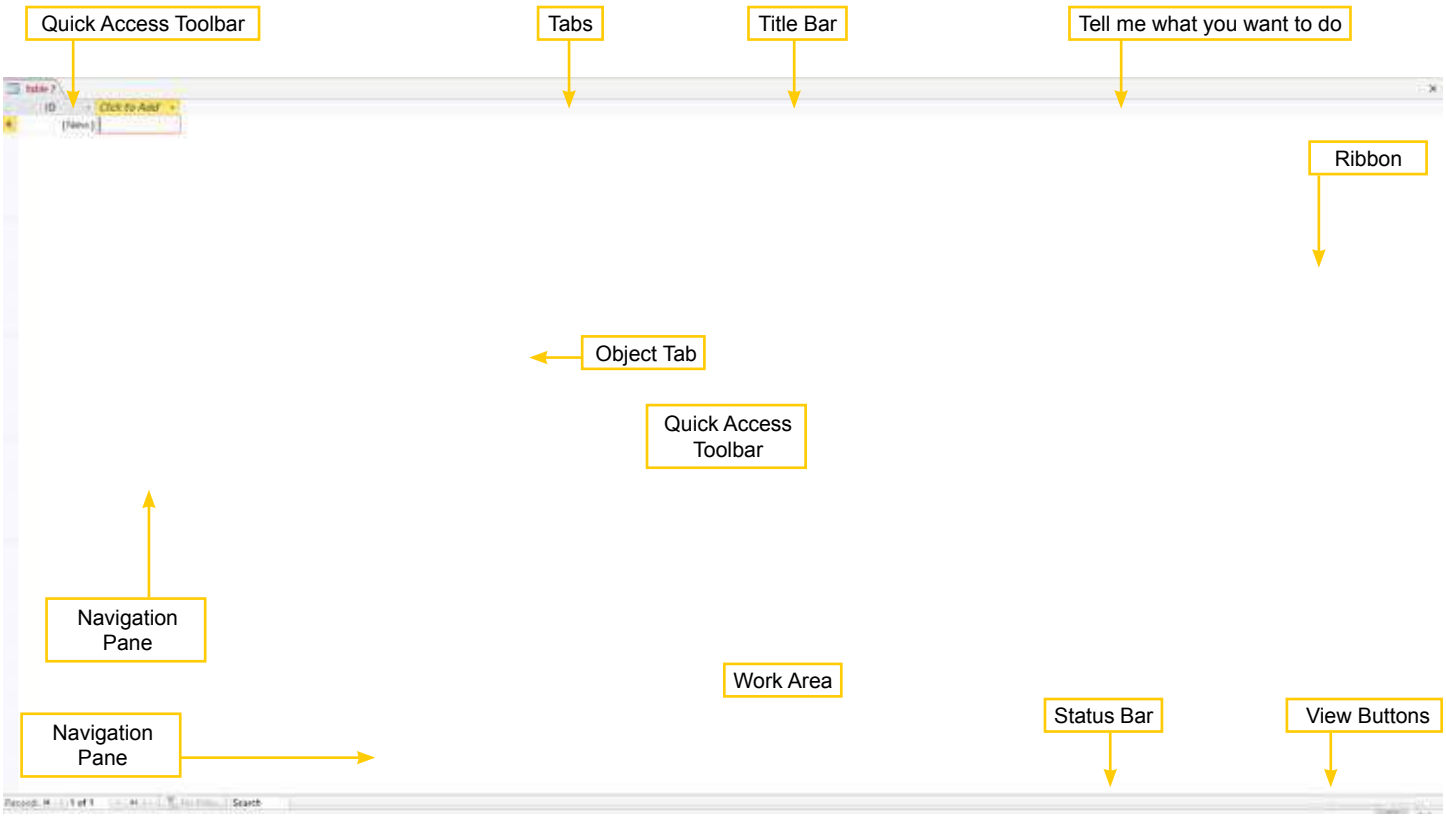


Figure 2.1: Components of Microsoft Access 2016

Title Bar

The name of the current database is displayed on it, which is at the top of the window.

Quick Access Toolbar

This toolbar can be found in the Access window's upper left corner. It has the command buttons that are used the most. It comes with three buttons by default: Save, Undo, and Redo.

Ribbon

It has numerous tabs, each of which has a number of 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's a brand-new tool that you may use to find quick information on subjects you're interested in or commands you wish to utilise in your document.

Navigation Pane

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

Record Navigation Buttons

As the name suggests, it helps in navigating through the records. The navigation button displays the current record number in an object.

Object Tabs

The object tabs resemble the tabs found in web browsers. It displays the elements you've opened in tabbed form. The contents of the components in the Work area are displayed when you click on any tab.

Status Bar

This resembles the buttons we use in PowerPoint to select from the different views. 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, Design view, PivotTable view and PivotChart View,

Let Me Answer

Can you tell which software is similar to Access 2016?

CREATING A DATABASE

Using a template or starting from a blank database are the two approaches to create a database in Microsoft Access. An access template helps in creating a complete data application which is ready to use. It contains four main objects like tables, queries, forms, reports,etc that you need to perform a specific task.

Creating a Blank Database

Follow the given steps to create a database from scratch.

Steps:

1. Click on the Blank database option.

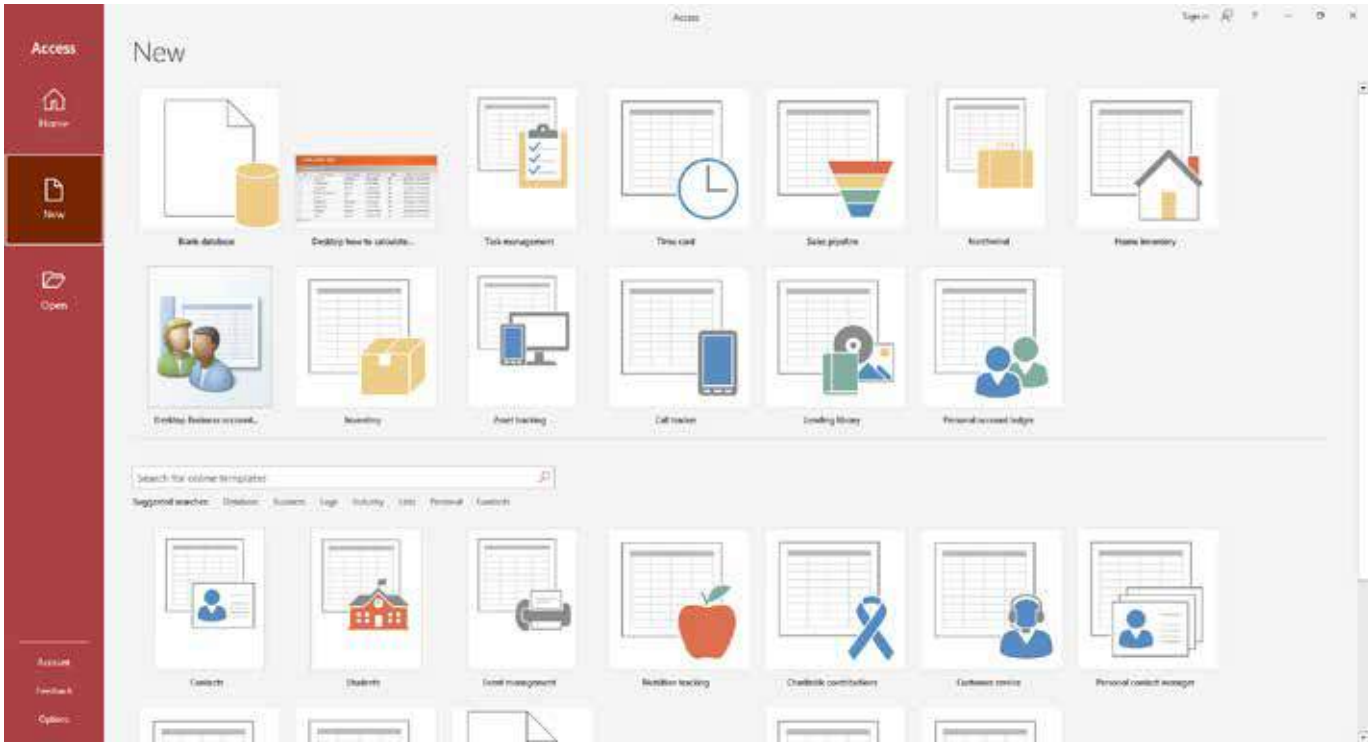


Figure 2.2: Blank Database

2. Click on the Blank database option.

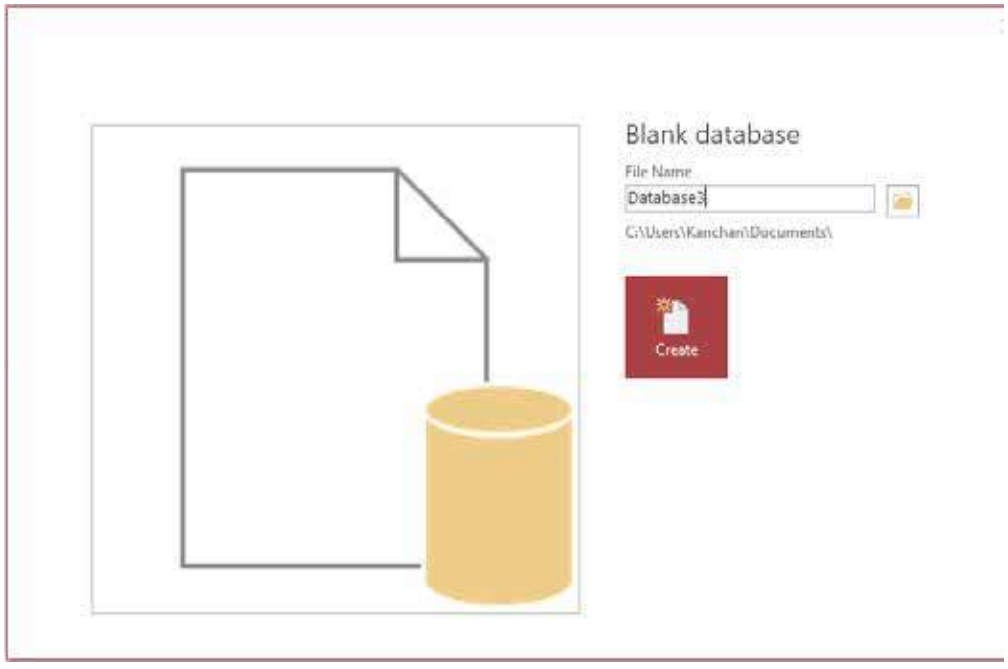


Figure 2.3: Blank Desktop Database

3. Click on the Blank database option.

Creating a Table In Design View

The Design view window's structure can be seen in the following image.

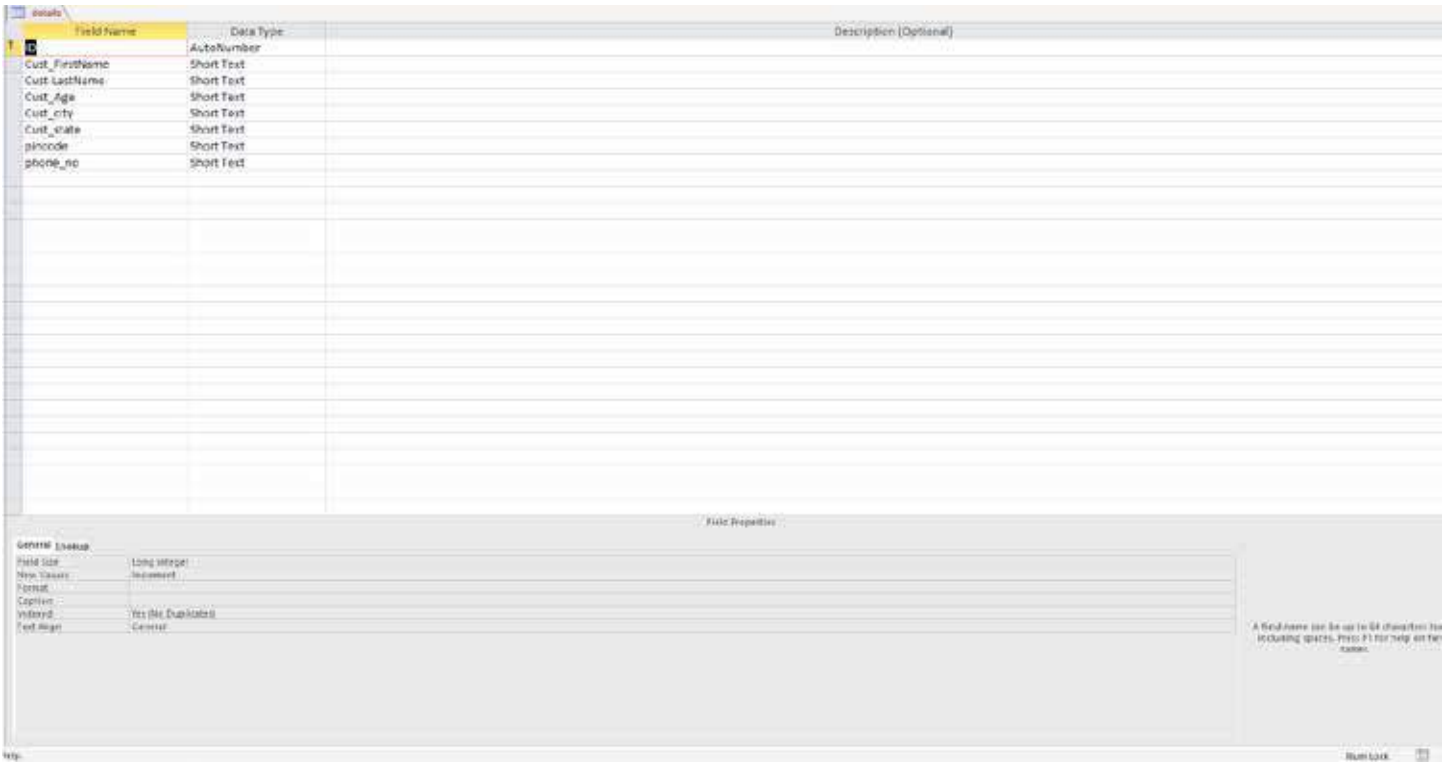


Figure 2.4: Creating Table in Design View

Steps:

1. In the Field name, add a column name for the table.
2. Select an appropriate data type for the field from the Data Type drop-down list.
3. Add the text in the description to enter a few more details about the field.
4. Save the table by clicking on the Save option in the File tab.

REMEMBER IT!

Access 2016 offers ready templates for regular users to create and publish data.

Creating Table with Datasheet View

Click the Create tab and choose the table button from the Tables group to create a table in the Datasheet view. This will create a new blank table. The table will open in the Datasheet view.

Steps:

1. Click on the "Click to Add" label. Observe that the icon in the row selector changes to a pencil. This means that changes were made to the record but they weren't saved. The asterisk (*) sign moves to the next row.
2. Enter the data.
3. Press the tab key after each entry
4. Click on the Save icon present on the Quick Access toolbar to save the table.

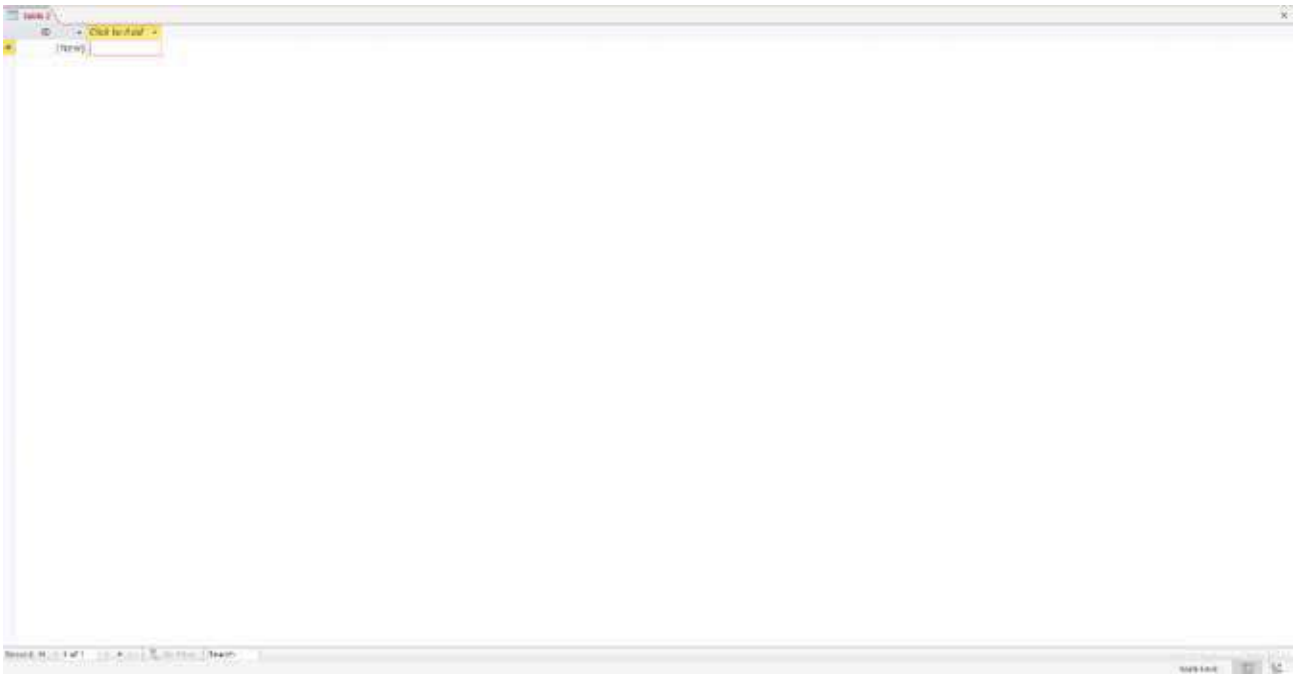


Figure 2.5: Creating Table with Design View

Data Types In Access

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. 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 is stores numeric information that we can use for calculations. The maximum size of a number field can be 16 bytes. It can store both integer values as well as decimal values.
Date/Time	It stores date and time values. The maximum size used by this data type is 8 bytes.
Currency	This data type is used to store financial data up to 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-bytes.
Yes/No	It is used at places where the field can have only one possible value. It can either be True/False, Yes/No.
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 upto 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	The data type allows you to attach images, spreadsheet files, documents, charts, and other types of supported files to the records in your database.
Calculated	This data type is used mostly in case of queries, forms, and tables that generate data from calculations performed on fields of a table.
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.

FIELD PROPERTIES

A field property applies to a particular field in a table and defines the characteristics of that field. The field properties are used to define how a field can behave when data is added to the field.

The following table shows a list of properties used in Access:

Field Property	Description
Field Size	This property is used to specify the maximum size a Field can hold.
Format	This property specifies the format of data a Field can hold. For example, there can be different formats for date and time.
Input Mask	It specifies the pattern for the data to be entered in a field. For example, you can choose the input mask for a password field as *.
Caption	The Caption property specifies a column heading for a field. It is shown whenever a Field is displayed in Datasheet View. It can hold up to 2,046 characters.
Default Value	The Default Value Property to specify a value that is automatically entered in a field when a new record is created. For example, Delhi can be a default value for the city field.
Validation Rule	This sets a rule for a range of values that can be entered into a field. For example, marks>50; the marks field will only accept values greater than 50.

Validation Text	
Required	You can use this property to specify if a value is required in a field. It accepts two values, Yes and No. Yes, it means a value needs to enter, and No means it can be left blank.

PRIMARY KEY

Primary key is a standard feature of every database management system which is used to identify each record of a table uniquely. The field which is designated as the Primary key of a table neither can have duplicate data nor it can be left blank while entering the data.

Let Me Answer

Can we leave the primary key blank?

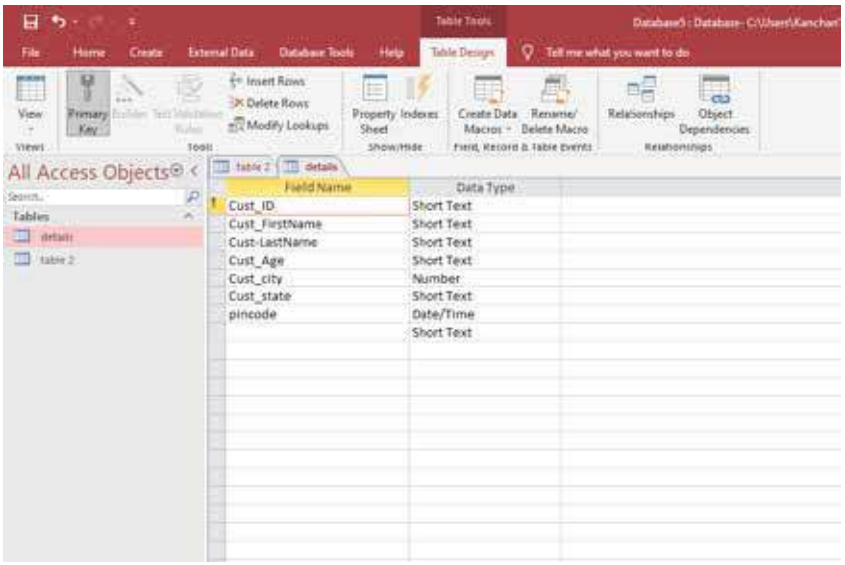


Figure 2.6: Primary Key

Follow the given steps to set the Primary Key.

Steps:

1. In the design view, click on the field you wish to set as the primary key.
2. The selected field will be highlighted.
3. On the toolbar, click on the Primary Key.
4. Save the table.

Kids' IQ

Shobhit has been given an assignment to add a new table in the existing database. Which option should he use to complete the task?

Let's Recall

- Microsoft Access is the most popular and powerful RDBMS (Relational Database Management System) that serves an integral part of the Microsoft Office Suite Application.
- Data duplication can be avoided with a relational database.
- 'Tell me What You Want To Do' is a brand-new tool that you may use to find quick information on subjects.
- The object tabs resemble the tabs found in web browsers.
- A field property applies to a particular field in a table and defines the characteristics of that field.

A. Fill in the blanks.

1. The use of data is essential in ..... technologies.
2. Governments depend on data for ..... and for creating favourable policies for the people of the country.
3. ..... are used to organise the data in an organised way.
4. A database can sometimes be regarded as a ..... for data.
5. DBMS offer a number of methods to check for data redundancy.

B. Write 'T' for True statements and 'F' for False statements.

1. A system that supports the organising of data is called Data Base Management system. ☐
2. A computer's memory is not necessarily important. ☐
3. One computer's data can be shared among numerous users with DBMS. ☐
4. Data integrity guarantees that the database only contains irrelevant information. ☐
5. Microsoft access is the most popular and powerful RDBMS. ☐

C. Answer the following questions.

1. What is Microsoft access?

.....

.....

2. Describe the components of Microsoft Access 2016.

.....

.....

3. Write the steps to create a blank database.

.....

.....

4. How can we create a Table in Design view?

.....

.....

5. What do you mean by the Primary key?

.....

.....

Critical Thinking

Find out five components of Microsoft Access.

W	S	U	T	A	T	S	A	T	Y
D	F	G	H	J	C	K	L	O	P
X	T	I	T	L	E	B	A	R	N
A	W	E	R	E	J	T	B	Z	J
A	R	I	B	S	B	D	T	X	M
G	R	I	B	B	O	N	C	C	K
N	A	V	I	G	A	T	I	O	N

Team Work

Team up with your lab partner and create the following table in a database named My grades.

Grades			
❖ English	❖ Hindi	❖ Maths	❖ Social Science
❖ Business	❖ Maths	❖ Science	

3

WORKING WITH QUERIES, FORMS AND REPORTS

Learning Outcomes

At the end of this chapter, the students will be able to:

- Learn the importance of Queries, forms and Reports in Access 2016.
- Create forms, queries and reports in Access 2016.

Warm-up

Fill the following Application form.

Customer Application Form

Name of Company

Full Postal Address *

Street Address

City | Region

Postal / Zip Code | Country

Details of Applicant

Previous Full Postal Address

Street Address

City | Region

Postal / Zip Code | Country

Teacher's Note: *Apprise students that forms help an individual or organisation to get detailed information about a person, event, or an object.*

Hello Friends! Let us learn to create Forms, Queries and Reports.

A form is a device for gathering data in a sequential style. Frequently, whoever creates the form has all the necessary fields for required data.

Forms actually make the process of entering data a lot convenient and simple. Forms make sure the proper data is entered into the table in the proper format.

We should be aware that the form is related to the table. This implies that the values entered into a form are kept in a table. Let's learn to create forms in Access.The presence of an operational database and a table is one of the requirements for building a form in Access. If a database or table is not present, we can first construct one. Once our database and tables are available, you can create a form by following the instructions below.

Let Me Answer

Have you ever filled in any form?

Steps:

1. From the Navigation Pane, choose the table.

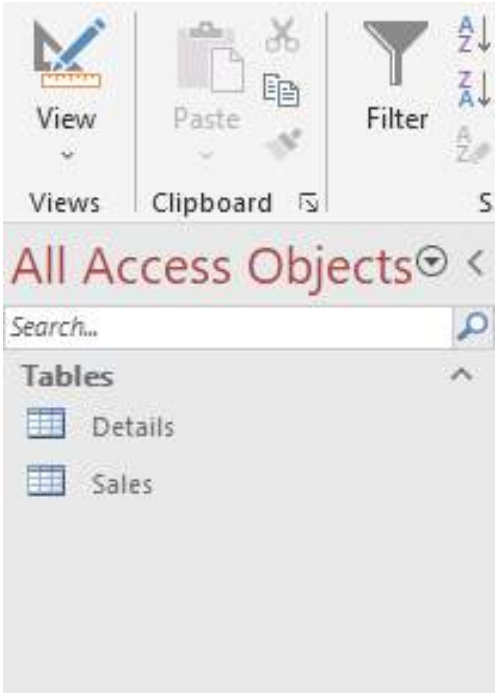


Figure 3.1: Navigation Pane

2. Click the Form button in the Forms group after selecting the Create tab from the ribbon.

3. A new form has been created; notice how the ribbon's options have changed and how the Design tab is now active.

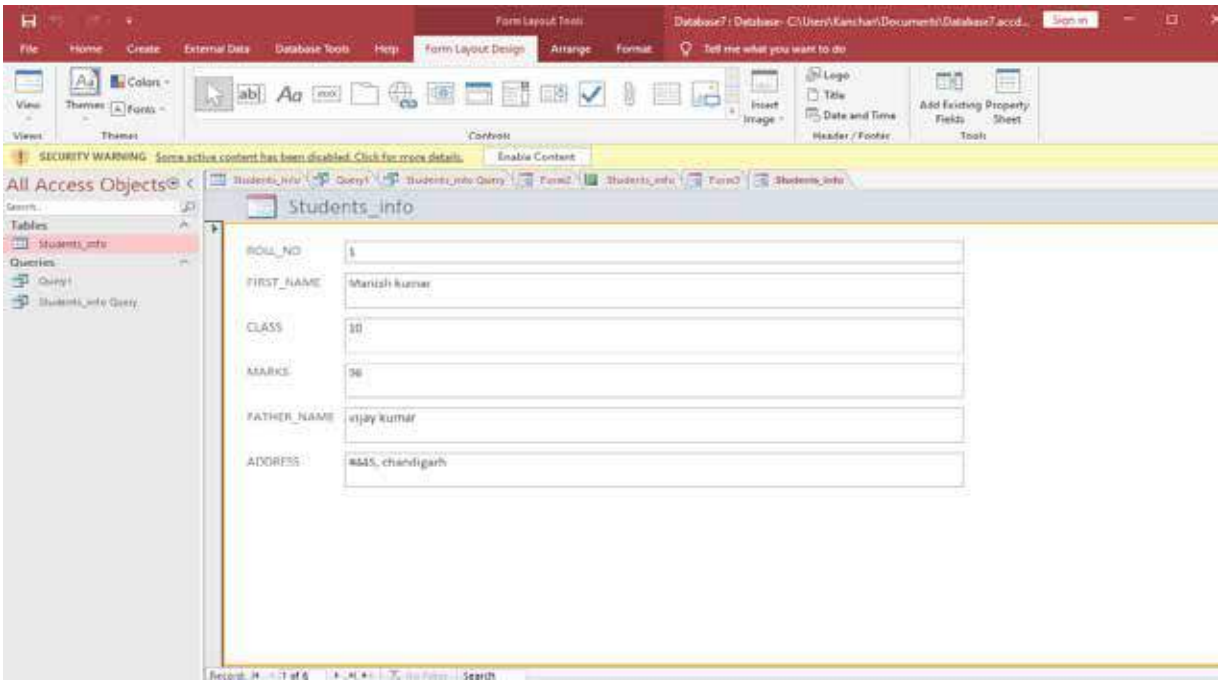


Figure 3.2: Design Tab

4. Click the Home tab and then the view button displayed in the Views group to input or edit records in the form. Go to the drop-down menu and choose Form View.

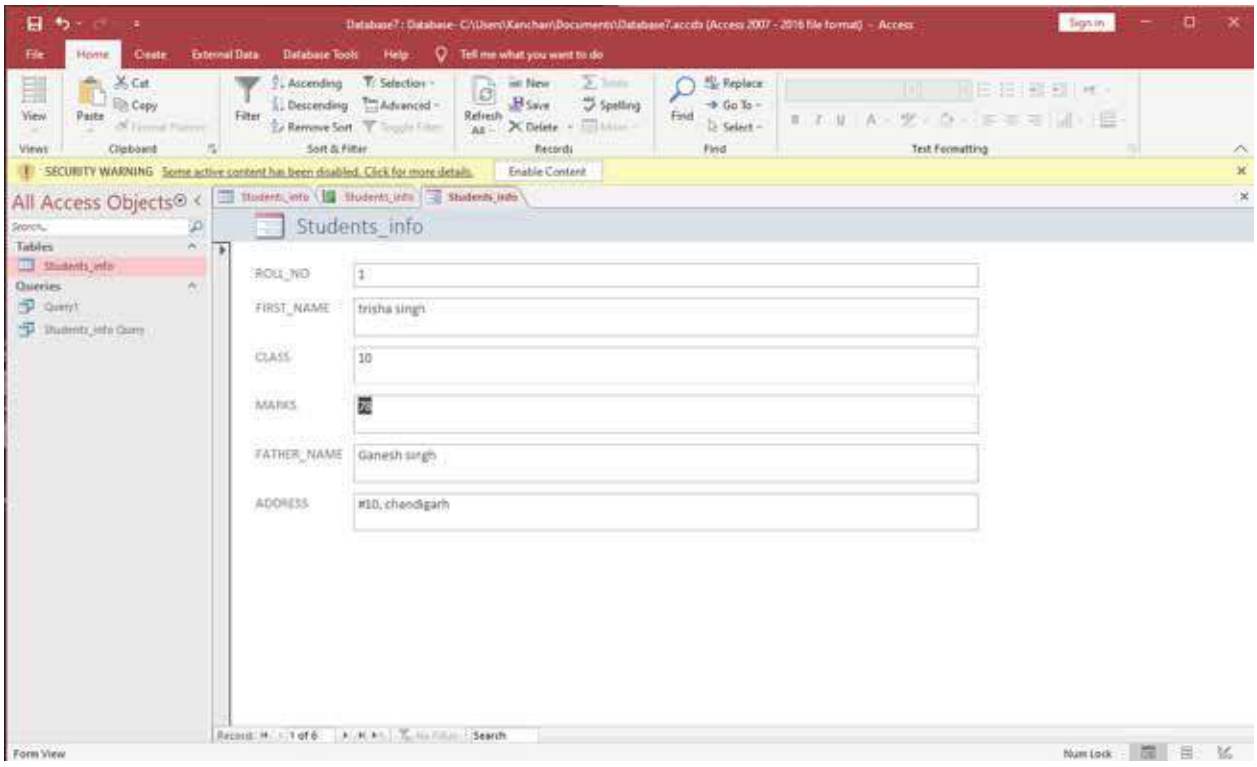
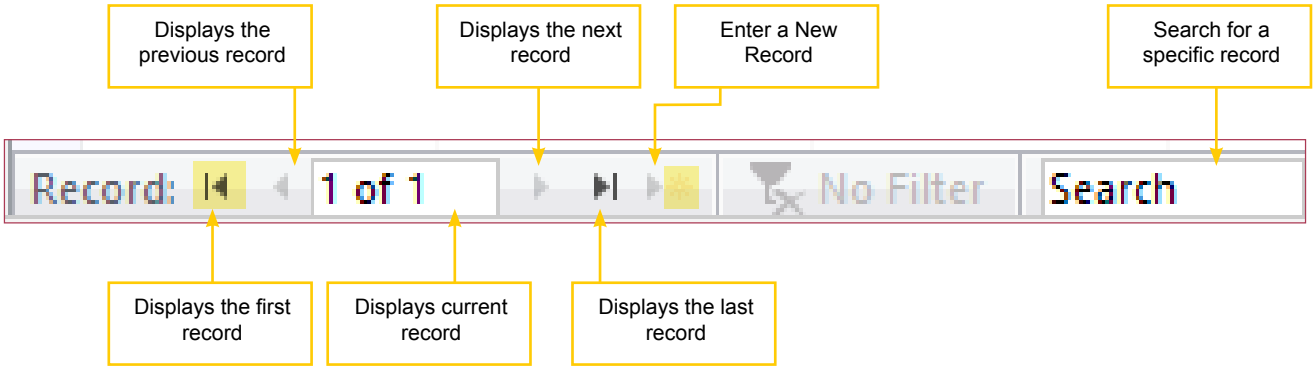


Figure 3.3: Form View

Update the value, then press the Enter key to modify it. Open the form table using the Navigation pane and look for any changes to see whether the value has changed.

RECORD NAVIGATION BAR

A form's record navigation bar is a crucial component. It facilitates the form's navigation and value modification. Let's quickly comprehend how this bar functions.



FORMATTING A FORM

Changing Themes and Fonts of a Form

Follow the given steps to change the theme of a form.

Steps:

1. In the Navigation pane, click the name of the form. Launch the Layout View and open the form.
2. Click on the button in the Themes group. We can choose the theme we want from the drop-down list. By selecting the Colours and Fonts button found in the Themes group, we can also alter the theme's colours and font.

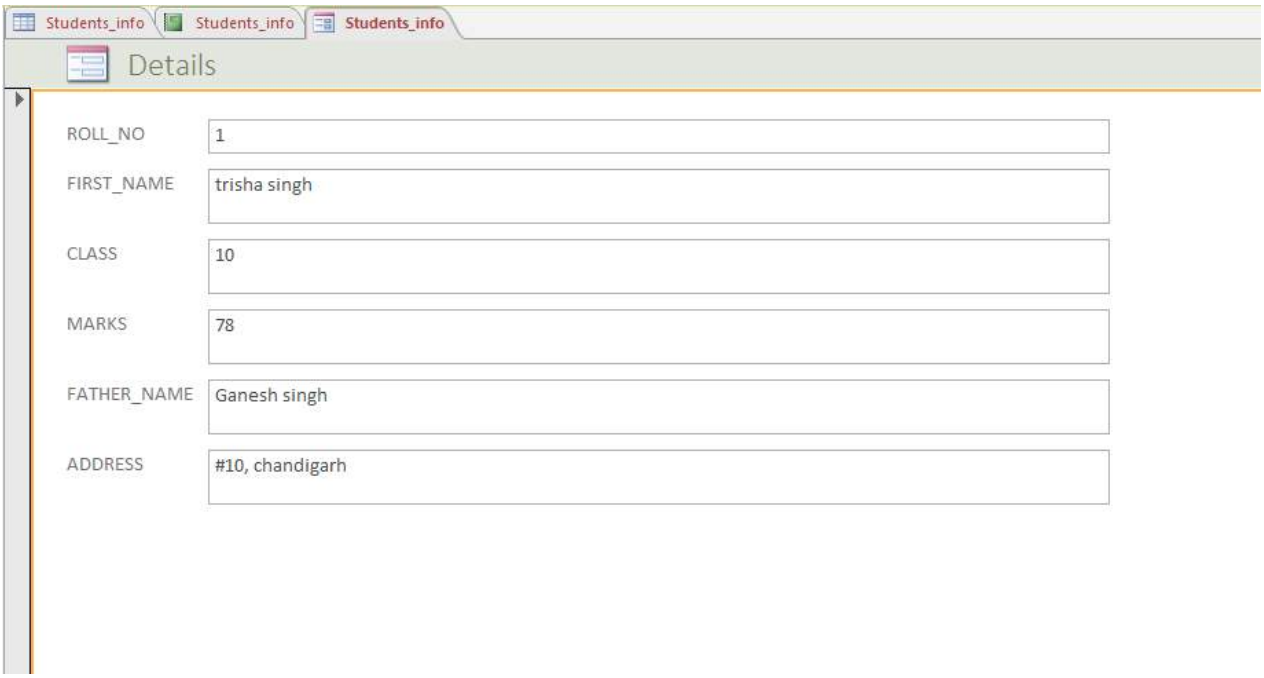
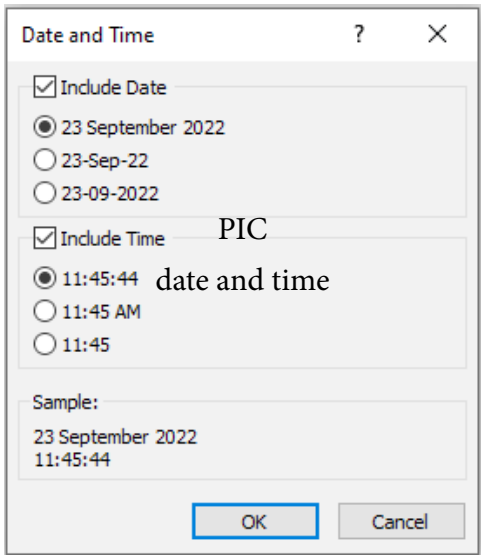


Figure 3.4: Applying Themes and Fonts

Inserting Date and Time to a Form

Follow the given steps to insert Date/Time to the Form.



Steps:

1. In the Layout view, open the form.
2. Select the Date and Time option in the Header/Footer group.
3. Choose the preferred date and time format from the Date and Time dialogue box.
4. Click on the OK button to insert date and time.

Arranging the Order of the Fields in the Form

Click the Arrange tab in the MS Access ribbon to reorder the text fields of the form.

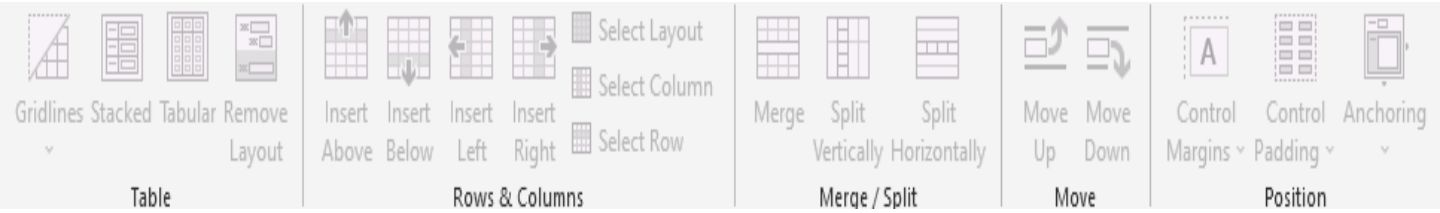


Figure 3.5: Arrange Tab

To reorder the text fields in a form, use the set of options found under the Arrange tab.

Adding Background Image to a Form

Follow the given steps to add a background image to a Form.

Steps:

1. In the layout view, open the form.
2. Select the Background Image option by clicking the Format Tab.
3. Select Browse. The dialogue window for inserting a picture will display.

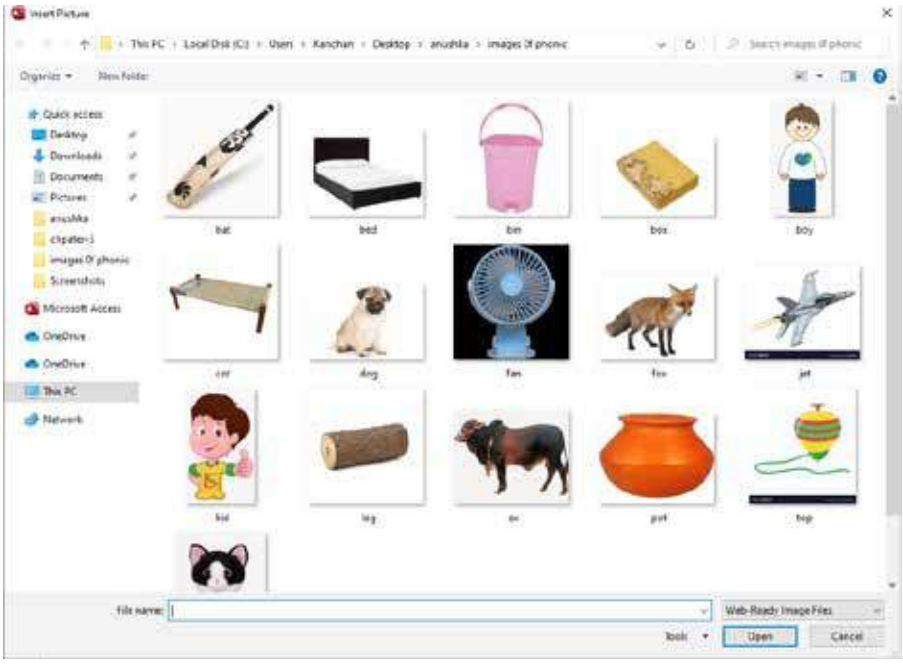


Figure 3.6: Inserting Picture

Do You Know?

Anchoring is a cool feature which gives your form a professional look.

4. Click the open button after choosing the image you wish to use as a background image.

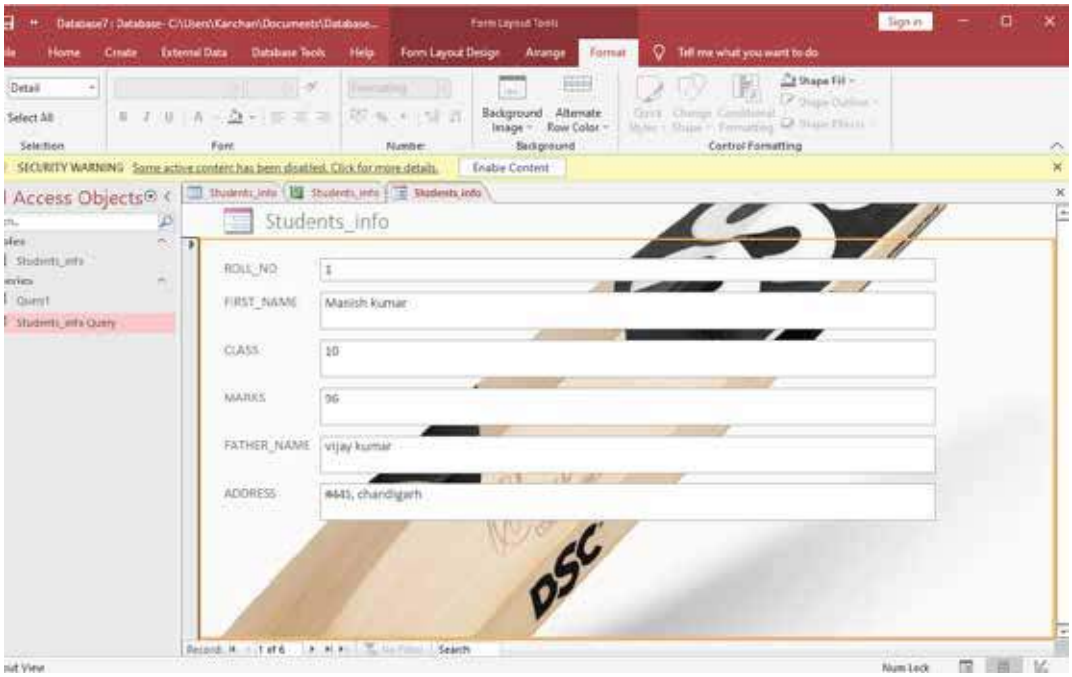


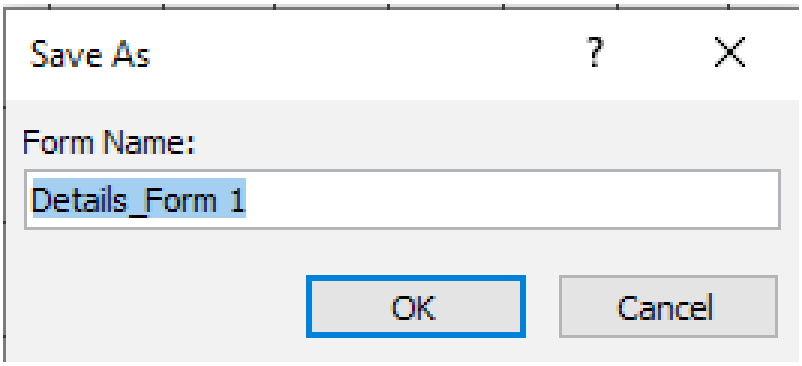
Figure 3.7: Form Background Image

SAVING A FORM

Follow the given steps to save a form.

Steps:

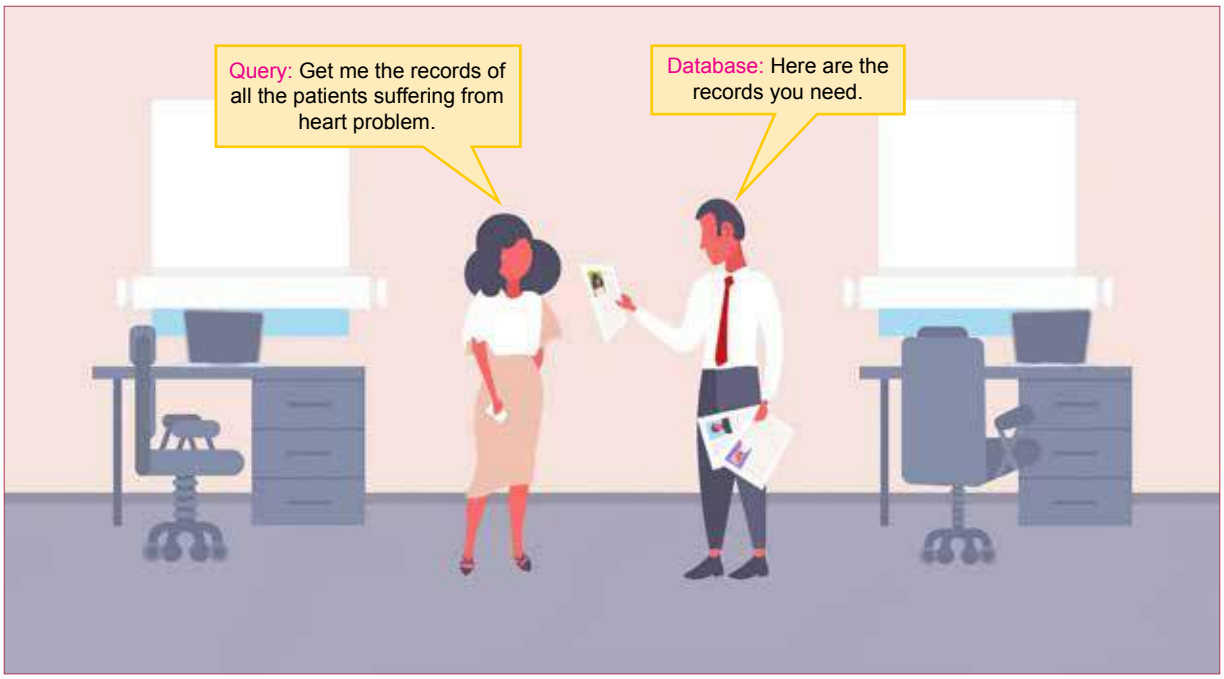
1. Click on the Save Button in the Quick Access Toolbar to save a form.
2. In the Save As dialogue box, type the name in the Form Name text field and click on OK.



QUERY IN ACCESS 2016

In simple terms, a query is a simple question that you ask to find 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.

Queries are made on tables and the results are displayed in the forms of a table,which are composed of rows and columns and include the data that satisfy the criteria.In other words, a query is like a question you ask from a database, and the database in reply returns the required records you have requested.



In Access, a query can be created in two different ways.

1. Using Query Design
2. Using Query Wizard

Let Me Answer

Does a sudden question appear on your screen when you enter a website, sometimes?

You can have more control over a query with the design view. You can build a query from scratch with it.

REMEMBER IT!

A query gives the user a custom view of the data.

Steps

1. On the ribbon, select the Create tab. Then, in the Queries group, click the Query Design button.
2. The dialogue box for the show table will appear. Choose a table from the list of tables for your query. Depending on our needs, we can choose a single table or a number of tables.

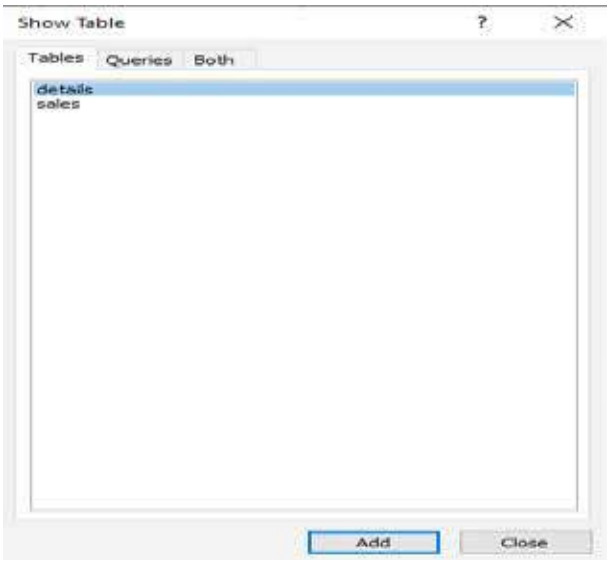


Figure 3.8: Show Tables

3. Click the Add button after choosing a query table from the Show Table dialogue box. You'll see the screen given below.

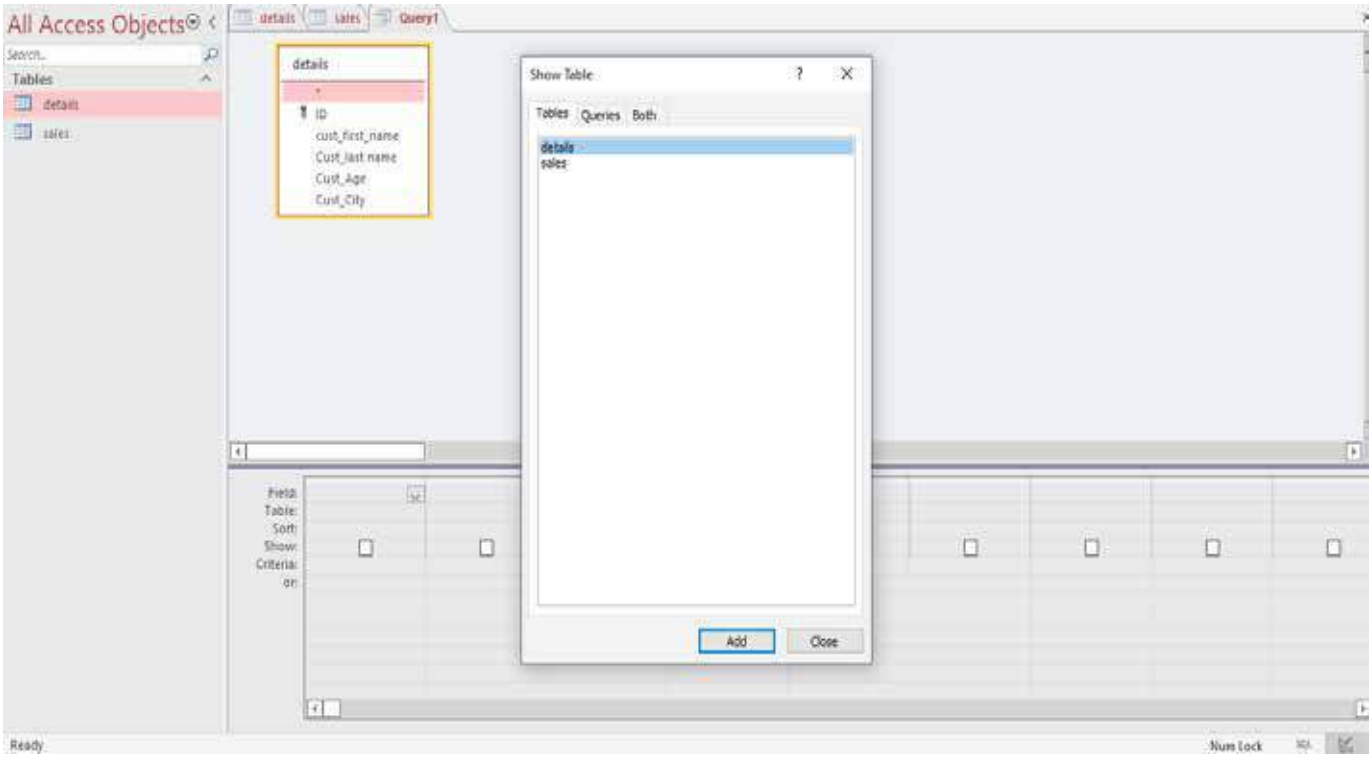


Figure 3.9: Query Design Window

4. See how the Object Relationship Pane displays the fields from the selected tables.

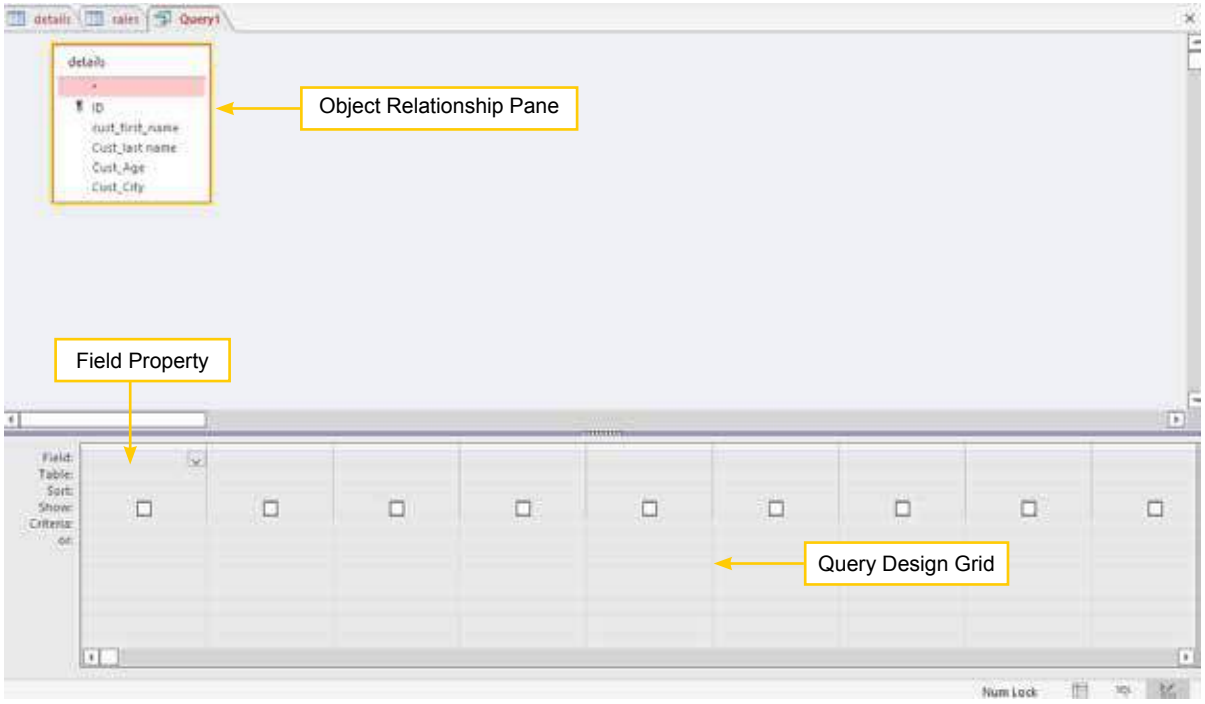


Figure 3.10: Query Design Window

5. A query is made up of one or more table fields. Drag and drop the fields to the field property to add them to the query in the Query Design Grid as shown below.

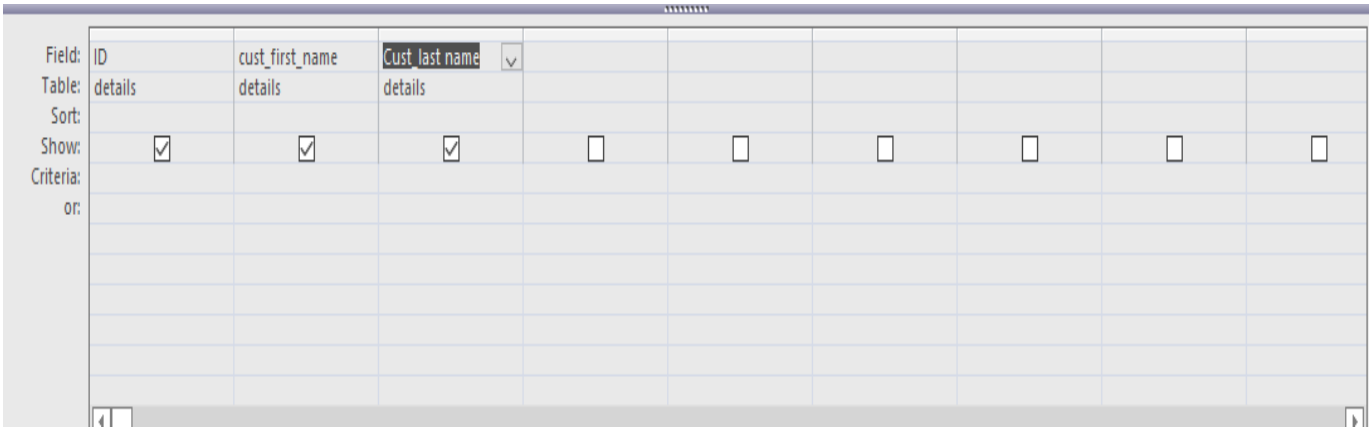


Figure 3.11: Query Design Grid

6. When your query is ready, click the Run button in the Results group on the Design tab to see the query's results. The query's outcome will be displayed in the output window, as seen below.

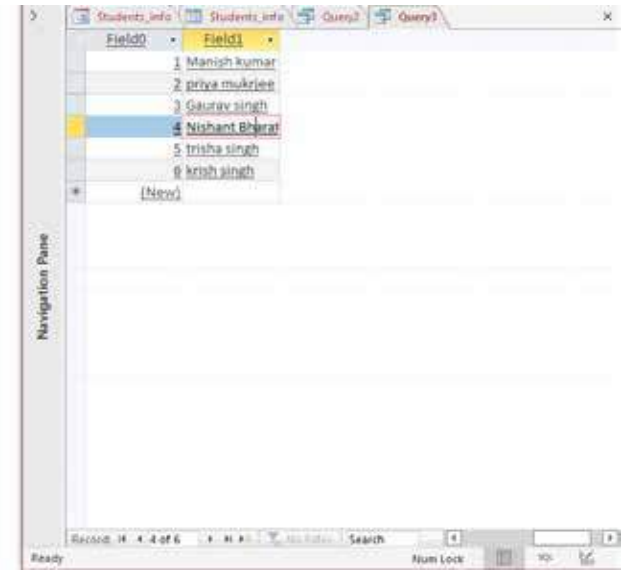


Figure 3.12: Query Result

CREATING QUERY WITH QUERY WIZARD

A small built-in application called Wizard asks users questions and then displays a result based on their inputs.

Steps:

1. Select the "create" tab. In the queries group, click the Query wizard button.

Figure 3.13: Create Tab

2. The New Query dialogue box appears. By default, the Simple Query Wizard option is chosen. Click OK to continue.

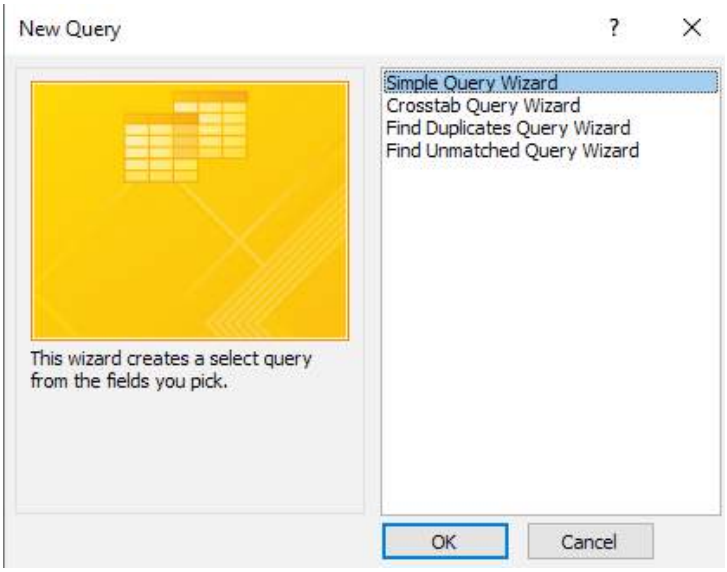


Figure 3.14: New Query

3. As illustrated below, the wizard will now ask us to choose the query table and the fields inside it that we want to include in the query.

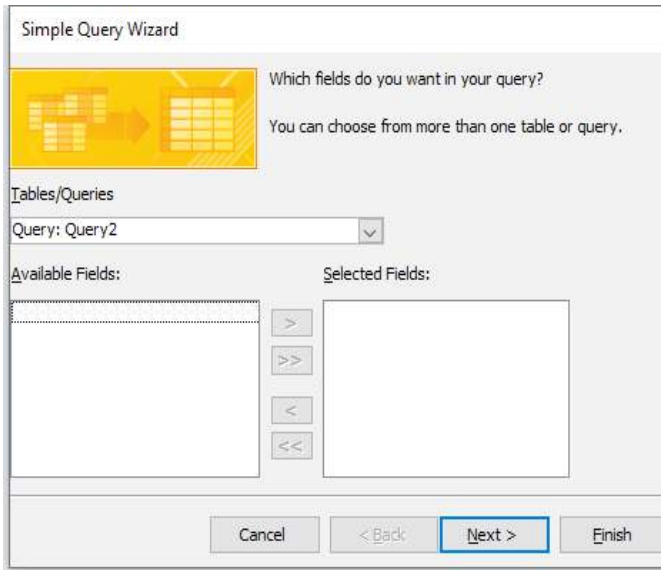


Figure 3.15: Selecting Fields

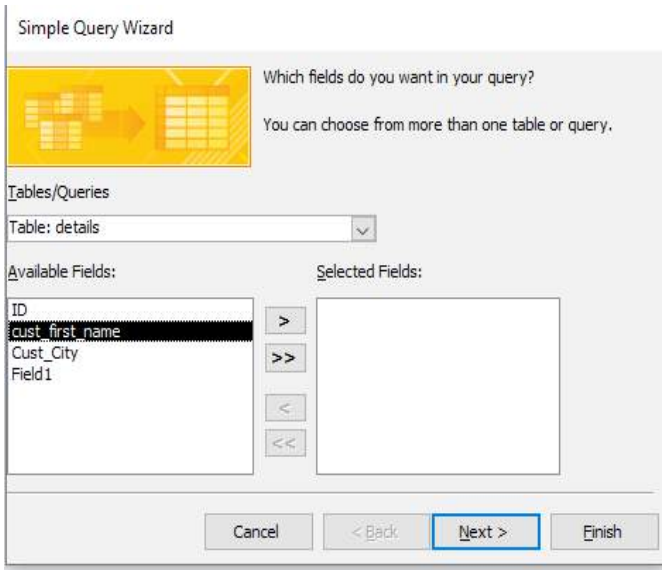


Figure 3.16: Adding Fields

4. We will be asked to enter the query title in this final step. Additionally, we have the choice of the following two possibilities.
   - Open the query to view information.
   - Modify the query design.
   - Open the query to view the result of the query.
   - Select the second option if you wish to modify the query.
5. Click the finish button after selecting the first choice.

REPORTS IN ACCESS 2016

For viewing or printing, a report is a useful tool for organising and summarising data. A report can be created exactly the same as we have created the form. The only modification is that you now click on Report in the Reports group after choosing the Create Tab.

Let's learn to create reports in Access.

Steps:

1. After selecting the Create tab on the ribbon, go to the Reports group and select the Report button.
2. The Report Layout window displays a new report; notice how the ribbon's options have changed and how the four new tabs Design, Arrange, Format, and Page Setup have been added to the ribbon.

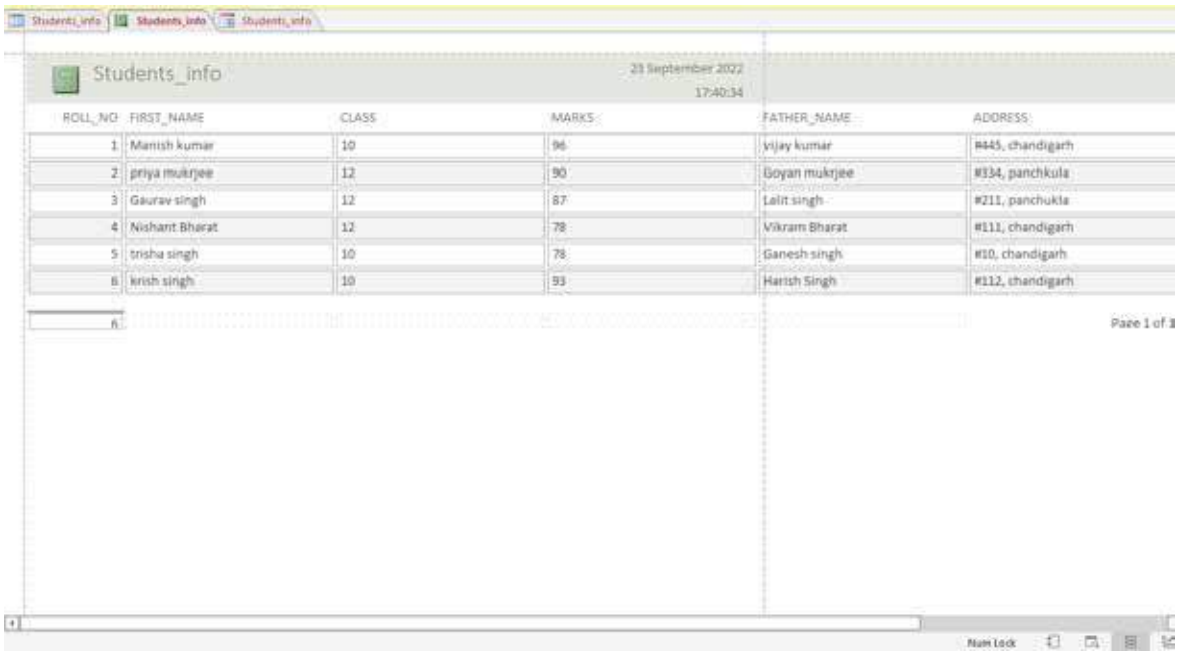


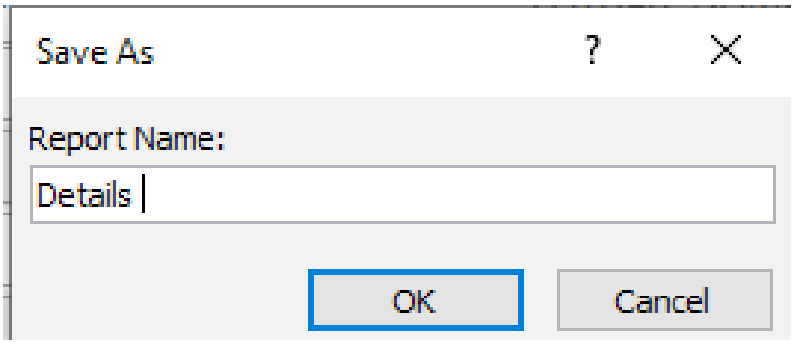
Figure 3.17: Report Layout Window

SAVING A REPORT

Follow the given steps to save a Report.

Steps:

1. Click on the Save button in the Quick Access toolbar to save a report.
2. Type the desired form name in the Save As dialogue box in the Report Name text field and click on Ok.



Kids' IQ

Fifty records have been added to a database that Sanisha established of her classmates. She must display the statistics for the kids who received less than a 35% grade, per the teacher's request. Give her some advice on how to apply this standard.

Let's Recall

- A form is a device for gathering data in a sequential style.
- The presence of an operational database and a table is one of the requirements for building a form in Access.
- A query is a simple question that you ask to find specific information from the database.
- A small built-in application called Wizard asks users questions and then displays a result based on their inputs.
- A report is a useful tool for organising and summarising data which can be created exactly the same as we have created the form.

A. Fill in the blanks

1. A form is a device for gathering data in a ..... style.
2. The ..... is related to the table.
3. The presence of an ..... database and a table is one of the requirements for building a form in Access.
4. Choose the table from ..... pane.
5. ..... facilitates the form's navigation and value modifications.

B. Write 'T' for True statements and 'F' for False statements.

1. The Arrange tab reorders the text fields of the form. ☐
2. Save button is present on the File tab. ☐
3. A query is a simple question that you ask to find specific information from a database. ☐

4. Queries are made on documents. ☐

5. A report is a useful tool for organising and summarising data. ☐

C. Answer the following questions.

1. What is a form?

.....

.....

2. In what way can you format a form?

.....

.....

3. Write the steps to create a form.

.....

.....

4. How can we create a query using the query wizard?

.....

.....

5. What do you mean by reports in Access 2016?

.....

.....

Critical Thinking

Amazon has a huge database of employees and clients. The company wants to maintain the privacy of each employee and client. They have given the instructions to computer operators to update each record, one at a time.

Which database object should it use to perform this task?

Team Work

Conduct a group discussion on the following topic:

Creating Query using The Query Wizard v/s Creating Query using The Query Design.

4

CLOUD COMPUTING

Learning Outcomes

At the end of this chapter, the students will be able to:

- Learn the pros and cons of Cloud Computing.
- Know about different types of clouds.
- Understand different types of services a cloud can offer.

Warm-up

Observe the following picture and write five things that come to your mind.

1. .....
2. .....
3. .....
4. .....
5. .....

Teacher's Note: *Ask students how these clouds are somehow useful to us, how they help us. Also introduce them with the term 'Cloud Computing'.*

Hello Friends! Let's learn about Cloud Computing.

Cloud computing is a service that requires a subscription and includes a number of services. These services are used by individuals and organisations. Because all the processes take place in the internet world, it is known as cloud computing.

Today, cloud computing is attracting a lot of interest from consumers, including everyone from individuals at home to the government. One approach to understanding cloud computing is to think about how we use our email account.We launch a web browser and sign into our email account to view our email when we need to. Our email accounts aren't kept in the computer's memory, but we can access them from anyplace with an internet connection. Our emails are kept in a server computer that is physically situated far away. Our email account can be accessed via email server through internet connectivity.

Do You Know?

By 2023, researchers predict that more than 40 zettabytes of data will be stored on the cloud.

The functioning of an email service is comparable to cloud computing. If we use a cloud service, we can access a variety of user-available services like storage, processing, and security services in addition to accessing our email.

ADVANTAGES OF USING CLOUD SERVICES

You can become an expert in machine learning if you comprehend other concepts that are related to it. The various fields that have contributed to machine learning are briefly listed below.

Freedom of Access

The drawback of the conventional computer system is that we must physically be where our data storage device is in order to access it.Through the internet, we may access data using cloud services from anywhere in the world.

Helpful for Businesses

Small businesses can benefit from cloud services. However, they provide a significant contribution to small businesses by providing them with storage and processing capabilities,

which were previously only accessible to large organisations because of the high cost of infrastructure construction.

Flexible Services

Sometimes, a business or a person may need more or less space depending on their storage space needs. We can also quickly sign up for or discontinue using a cloud service.

Reduction in Cost

If someone wants to launch a new business, they will need to invest a lot of money in new computers, internet access devices, additional storage devices, security measures, and software licences.This would undoubtedly take a large amount of money. By using cloud services that can meet all of our needs for storage, security, and app accessibility, we can reduce this expense. The setup cost will be significantly reduced by using cloud services.

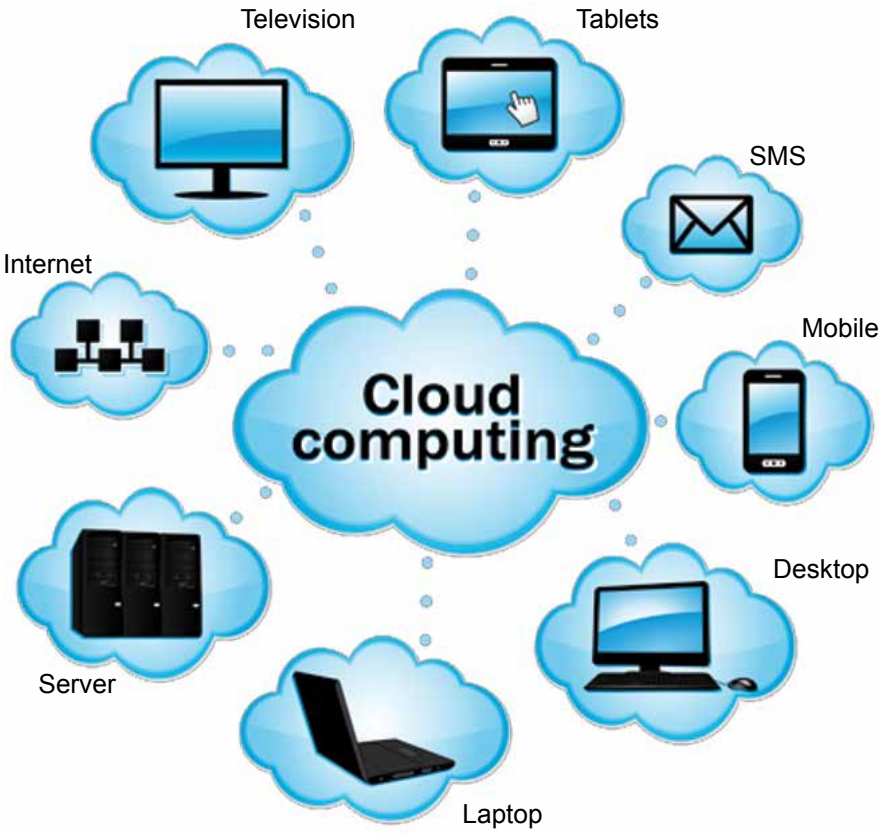


Figure 4.1: Cloud Computing

Cloud Storage

The majority of cloud providers offer storage options. Users love these storage services extremely. Google Drive, Dropbox, One Drive, and other well-known services are very popular. As a result, it is crucial for us to comprehend the security procedures that a cloud service provider has in place and to take our own steps to protect our data.

TYPES OF CLOUD SERVICES

Different types of cloud services are available depending on the needs of the users.

Public Cloud

Anyone with an internet connection and access to the cloud space can use the public cloud. All its users have access to the public cloud. It is accessible to everyone, but the data and applications used by one subscriber are hidden from all the other subscribers.

Private Cloud

A private cloud is created specifically for a given organisation, and only that organisation is permitted to use or access it. Access to data and applications is strictly controlled in private clouds. An example of this may be a school's canteen, which is solely open to its own faculty, students, and staff.

Community Cloud

A community cloud is shared by two or more businesses with similar cloud needs. This kind of solution aids businesses in cutting costs associated with cloud services.

Let Me Answer

Discuss about icloud service provided on Apple phones.

Hybrid Cloud

In core, a hybrid cloud is the merging of at least two clouds, where the clouds are a mix of community, private, and public clouds.

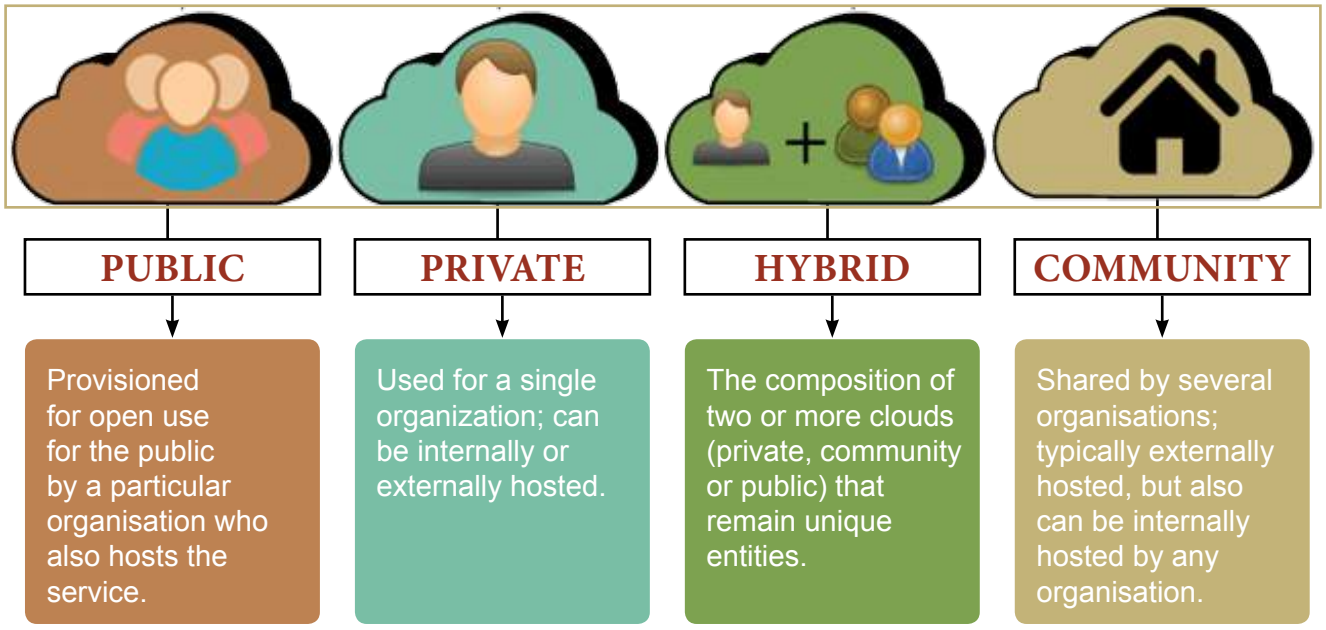


Figure 4.2: Cloud Computing

TYPES OF SERVICES PROVIDED IN CLOUD

Software as a Service

A SaaS cloud service gives subscribers access to different applications (apps). SaaS frees us from downloading and storing an app in our phone, this means you do not need to install the required app on your devices. SaaS makes it easier to have the same software on all the devices at once by accessing it on the cloud.

Platform as a Service

A PaaS system goes a level above the Software as a Service setup. A PaaS provider gives subscribers access to the components required to develop and operate applications over the internet.

Infrastructure as a Service

In an IaaS agreement, the subscriber completely outsources the storage and resources, such as hardware and software, that they need.

All this simply means that we can choose a specific cloud service based on our requirement.

CLOUD SECURITY

We all recognise the need of protecting our data from unauthorised users. By incorporating system security in the form of a user ID, password, or pin, we may protect the data on our computer. However, if we are using the internet to store our data on a cloud service, it may also free up more space for other users to access our data.

Figure 4.3: Cloud Security

However, we will have to willingly lose direct control of our data in order to benefit from the cloud. On the contrary, keep in mind that most cloud service providers have a great deal of knowledge on how to keep our data safe. In order to secure their computers and networks, service providers have access to more tools and knowledge than the average user.

The following considerations should be made by a user before choosing which cloud services to use.

- What kind of encryption does the provider use?
- What methods of protection do they have in place for the actual hardware that our data will be stored on?
- Do they have duplicates of our data on hand?

- Do they have firewalls set up?
- What safeguards are in place to prevent a user's information from being shared with other users if they have a community cloud?

DISADVANTAGE OF CLOUD COMPUTING

- We have little to no understanding of where our data is stored, and we have limited control over who has access to our information.
- Our data is frequently accessed by hackers without our permission.

SOME POPULAR CLOUD SERVICES

Dropbox

One of the best cloud services for sharing files is Dropbox. It offers its customers SaaS-based services. Many people take advantage of its limited free storage options, but it also provides paid services to both individuals and organisations under various plans.

REMEMBER IT!

1.2 billions files are saved on Dropbox every day.

Google GSuite

The most widely used email application in the Google Play Store is Gmail, a free online email service. Google Calendar, Google Drive, Google +, Hangouts, Docs, Sheets, Forms, Slides, Sites, Keep, and Jamboard are all part of Gmail's email service. It also provides cloud-based storage services to the users.

Let Me Answer

Do you have a gmail account?
Google drive.

Adobe Creative Cloud

Creative professions like artists, filmmakers, designers, and other creative professionals can access cloud-based services from Adobe Creative Cloud. InDesign, XD, Premiere Pro, Dreamweaver, etc. are a few of the most well-known apps.

Kids' IQ

What kind of cloud service should your school or institution choose, and why, it is required to do so?

Let's Recall

- Cloud computing is a service that requires a subscription and includes a number of services.
- If we use a cloud service, we can access a variety of user-available services like storage, processing, and security services in addition to accessing our email.
- One of the best cloud services for sharing files is Dropbox.
- Creative professions like artists, filmmakers, designers, and other creative professionals can access cloud-based services from Adobe Creative Cloud.
- A private cloud is created specifically for a given organisation, and only that organisation is permitted to use or access it.

A. Fill in the blanks.

1. Cloud computing is a service that requires a .....
2. The functioning of an ..... service is comparable to cloud computing.
3. ..... businesses can benefit from cloud services.
4. The majority of cloud providers offer ..... options.
5. A ..... is created specifically for a given organisation, and only that organisation is permitted to use or access it.

B. Write 'T' for True statements and 'F' for False statements.

1. One of the best cloud services for sharing files is Dropbox. ☐
2. The most widely used email application in the Google Play Store is Yahoo. ☐
3. A hybrid cloud is the merging of at least two clouds, where the clouds are a mix of community, private, and public clouds. ☐
4. Access to data and applications is uncontrolled in private clouds. ☐
5. A community cloud is shared by two or more businesses with similar cloud needs. ☐

C. Answer the following questions.

1. What is cloud computing?

.....

.....

2. What are the types of cloud services?

.....

.....

3. Write two disadvantages of cloud computing.

.....

.....

4. What considerations are to be made before choosing cloud service?

.....

.....

5. Write about any two cloud services.

.....

.....

Critical Thinking

Samaira prefers to use a cloud-based service that will provide her access to various Office-based programmes rather than installing Microsoft Office on her laptop.

Name the service you think Samaira should use.

Team Work

Together with your pals, make a video outlining the benefits and drawbacks of cloud computing. Use your teacher's assistance to show the video to each of your classmates.

5

INTRODUCTION TO ARDUINO

Learning Outcomes

At the end of this chapter, the students will be able to:

- Learn about Arduino.
- Know various parts of the Arduino board.
- Write code in Arduino IDE.

Warm-up

Look at the following picture carefully. Identify and write about the functions.

1.  .....
.....

2.  .....
.....

3.  .....
.....

4.  .....
.....

5.  .....
.....

Teacher's Note: *Guide students that as our sense organs are capable of performing multiple tasks, a microcontroller is a small computer chip mounted on a single integrated circuit that is capable of performing multiple operations like input, processing and output.*

Hello Friends! Let's Know about Arduino

ARDUINO

Arduino is a tiny computer chip installed on a single integrated circuit, it is a reasonably priced microcontroller. It has a processor, memory, and programmable input/output peripherals. It is capable of performing multiple operations like input, processing and output.

Do You Know?

Arduino was initially intended to serve as a teaching tool that would introduce students to the world of electronics.

Let Me Answer

How can a robot sense its environment?

The majority of the computers we are acquainted with accept human input via a keyboard and mouse. The many sensors that are attached to an Arduino allow it to sense light, sound, vibrations, temperature, and other things as well as receive input from the user. These measurements can subsequently be transformed into digital signals by the microcontroller.

Humans use their senses to perceive their surroundings. Similar to this, if we combine several sensors with a microcontroller, these sensors can scan the area around us and relay inputs to the memory for processing. The result can then be seen on the screen.

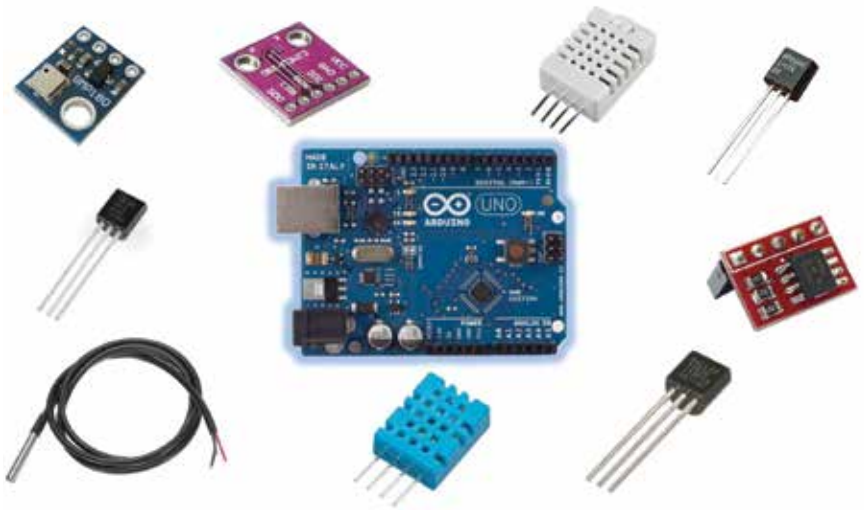


Figure 5.1: Arduino and its Sensors

PARTS OF AN ARDUINO

1. Built-In LED

Whether your Arduino is delivering or receiving data is indicated by the LEDs labelled TX and RX.

2. On Indicator LED

When the LED is turned on, this shows that it is receiving electricity.

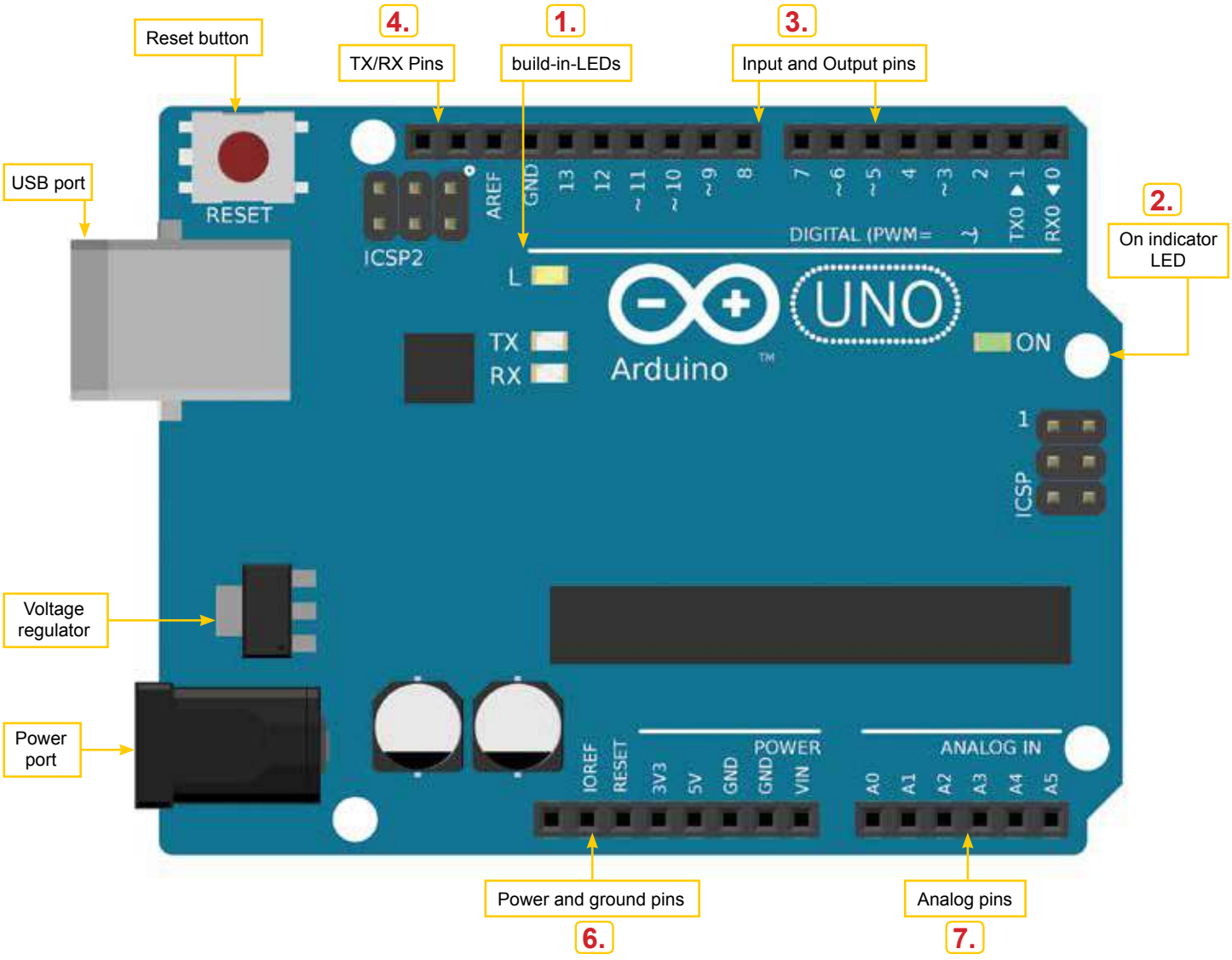


Figure 5.2: Parts of an Ardunio Board

3. Digital I/O Pins

The holes on this side of the board are called the digital input/ output pins. They are either used to sense the outside world (input) or control lights, sounds or motors. (output)

4. TX/RX Pins

Special pins with the labels TX and RX are PIN 1 and Pin 13. You should always leave these pins empty. Anything wired into Pin 0 prevents your software from loading any changes you make.

5. ATmega328P, Black Chip

An ATmega328P is the black chip in the centre of the circuit board. This is the brain of the Arduino. It interprets the programming code that you submit to your Arduino as well as the inputs and outputs.

6. Power and Ground Pins

Here are the power-related pins. These pins can be used to connect the Arduino to the breadboard circuit's power supply. These pins capture a range of values of sensor readings.

7. Analog Pins

Instead of providing a simple on/off signal, these pins take sensor measurements throughout a range of values.

CONNECTING YOUR COMPUTER TO ARDUINO BOARD

Following steps indicate how we can connect the Arduino to the computer.

Selecting Right Components

An Arduino, a computer, and a USB A-B cable are required.

Plug-in USB Cable

Start by inserting the USB cable into a computer's USB port as demonstrated below. Connect the USB cord to the Arduino's USB port.

Figure 5.4: Arduino USB Port

See the Arduino's top view of the USB port with the USB A-B cable

Figure 5.5: USB Port Top View

ARDUINO IDE

With all the features one would require, the Arduino team has created an IDE for use with their devices.

It includes a tool called a code editor that can be used to write any kind of code.With the aid of a message box that displays code faults and a console that provides further information about the nature of these mistakes, the code can be tested in the IDE and utilised to address any emergent problems. It has buttons for checking the code, saving it, uploading it to Arduino, and other functions.

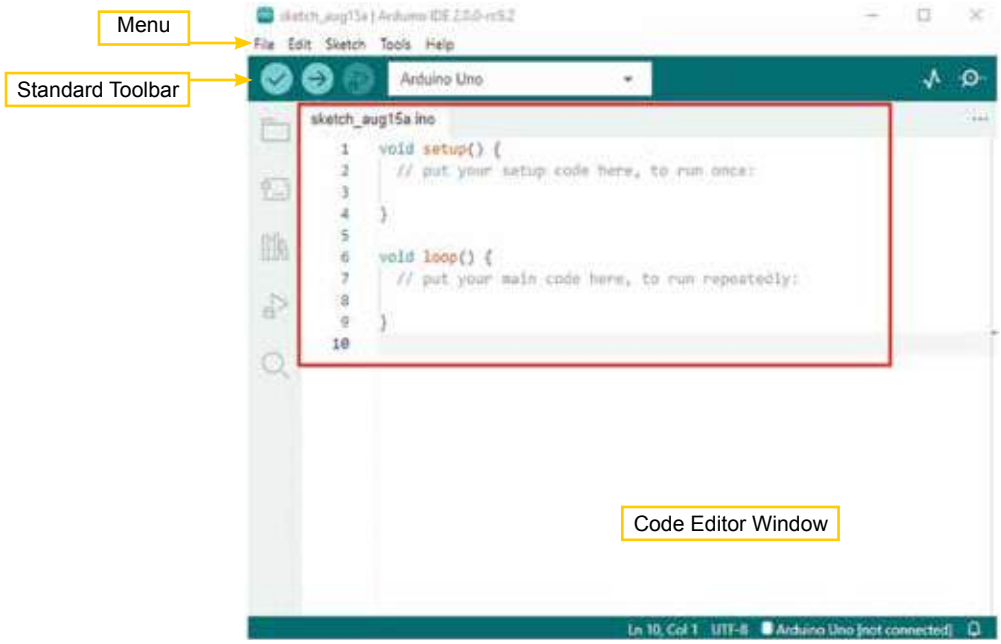


Figure 5.6: Arduino IDE

REMEMBER IT!

In 2014, more than 240 user groups, Makerspaces, hackerspaces, fab labs, schools, studios and educators throughout Europe, North and South America, Asia, Africa and Australia came together to celebrate the inaugural Arduino Day.

WRITING YOUR FIRST PROGRAM

Now let's use the Arduino IDE to write some code. Code for Arduino can be written in a variety of languages, including Java, C++, and Python. Since we know Python, we will write our code in Python.

To connect Python and Arduino, follow the instructions.

Steps:

1. Open Arduino IDE.
2. Click on File> Examples>Firmata> StandardFirmata

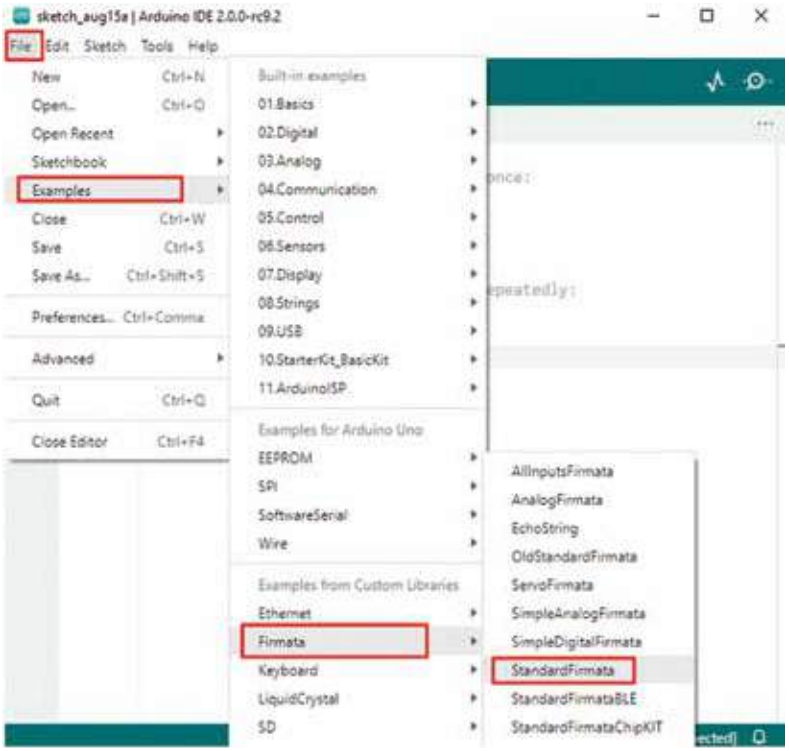


Figure 5.7: Selecting StandardFirmata Library

3. To load the Firmata support files to the Arduino Board, click the tick button now.
4. The pyFirmata library needs to be downloaded to Python . This makes it easier for us to write code in python for Arduino.

5. Enter “Command prompt” in the search box, then select “Run as administrator.”

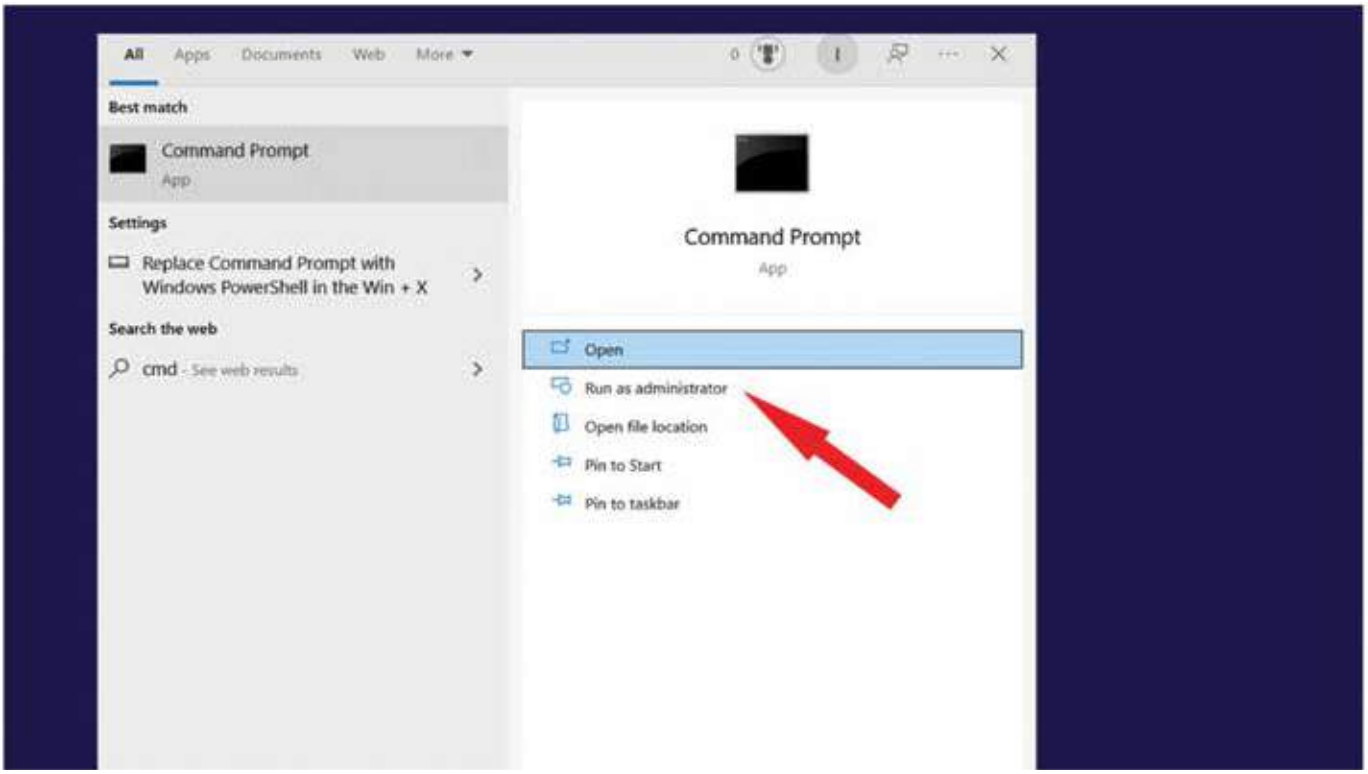


Figure 5.8: Opening Command Prompt

6. In the Command prompt window, type the command pip install pyfirmata and press the Enter Key. The downloading process will begin after this.

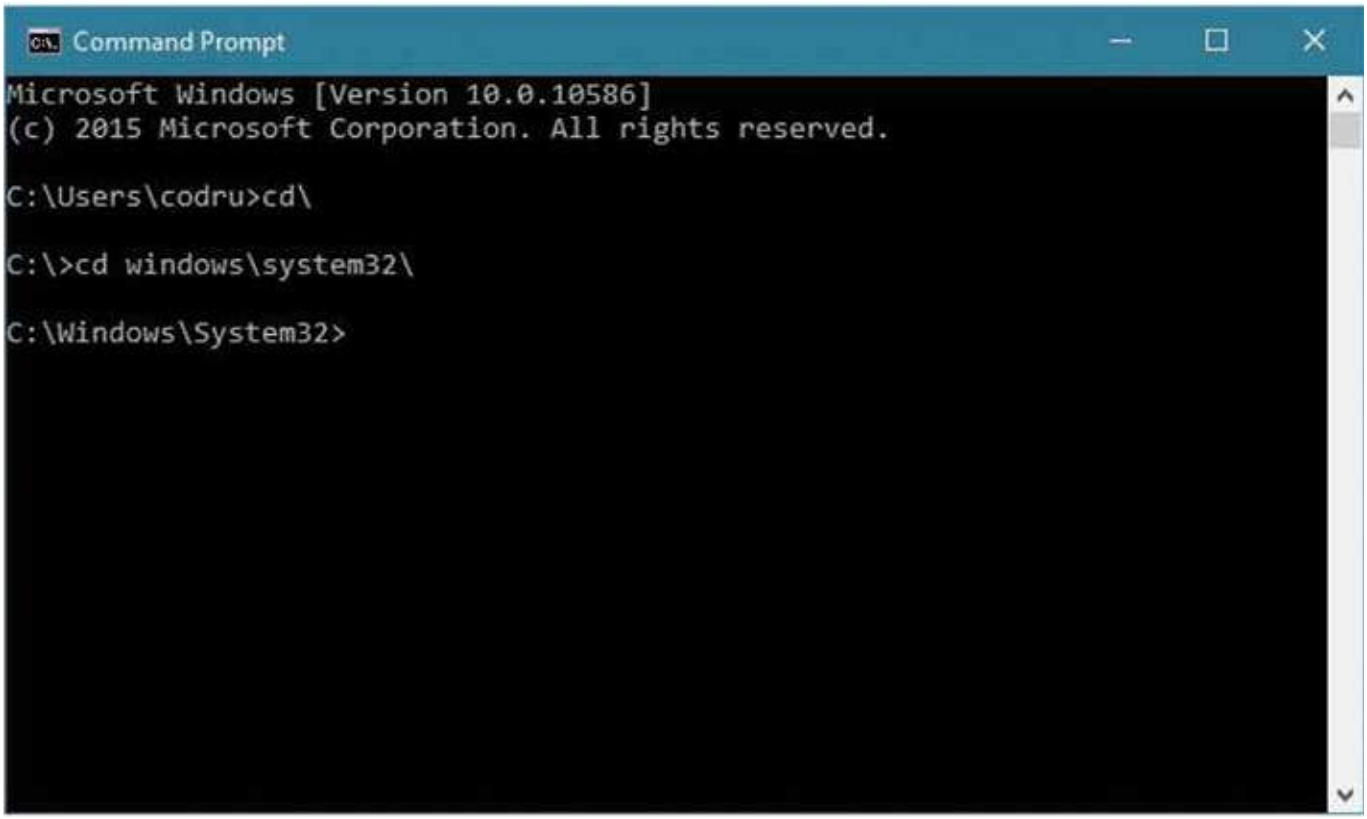


Figure 5.9: Installing Pyfirmata

7. Now open the Python IDE and write the code given below.

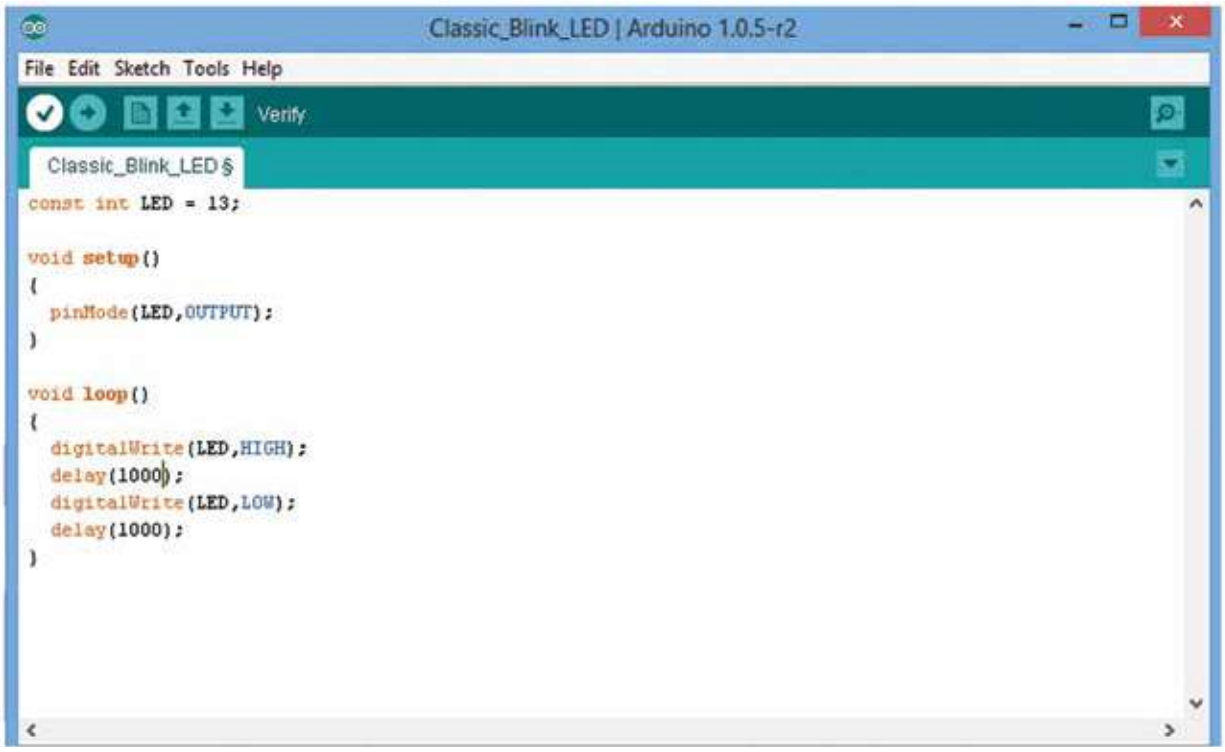


Figure 5.10: LED Code

8. After pressing F5 to run the code, you should observe the LED on pin 13 begin to blink.

Kids' IQ

Search about a microcontroller chip. Talk about it in the class.

Let's Recall

- Arduino is a tiny computer chip installed on a single integrated circuit.
- It is capable of performing multiple operations like input, processing and output.
- The many sensors that are attached to an Arduino allow it to sense light, sound, vibrations, temperature, and other things as well as receive input from the user.
- Microtellers can then convert these measurements into digital signals.
- Different languages can be used for writing code for Arduino like Java, C, C++, and Python.

A. Fill in the blanks.

1. Arduino is a tiny computer chip installed on a single .....
2. The many sensors that are attached to an Arduino allow it to sense and receive ..... from the user.
3. If we combine several sensors with a ....., these sensors can scan the area around us.
4. Microtellers can convert measurements into ..... signals.
5. Arduino includes a tool called a ..... that can be used to write any kind of code.

B. Write 'T' for True statements and 'F' for False statements.

1. The black chip in the middle of the board is an ATmega328P. ☐
2. Pyfirmata is required to establish communication between Python and Arduino. ☐
3. Analog Pins take sensor measurements throughout a range of values. ☐
4. You cannot write code in the Arduino IDE. ☐
5. Arduino IDE has an in-built code editor. ☐

C. Answer the following questions.

1. What is a microcontroller?

   .....

   .....

2. Briefly explain any two parts of Arduino.

   .....

   .....

3. What are Analog Pins?

   .....

   .....

4. What is the importance of IDE?

   .....

   .....

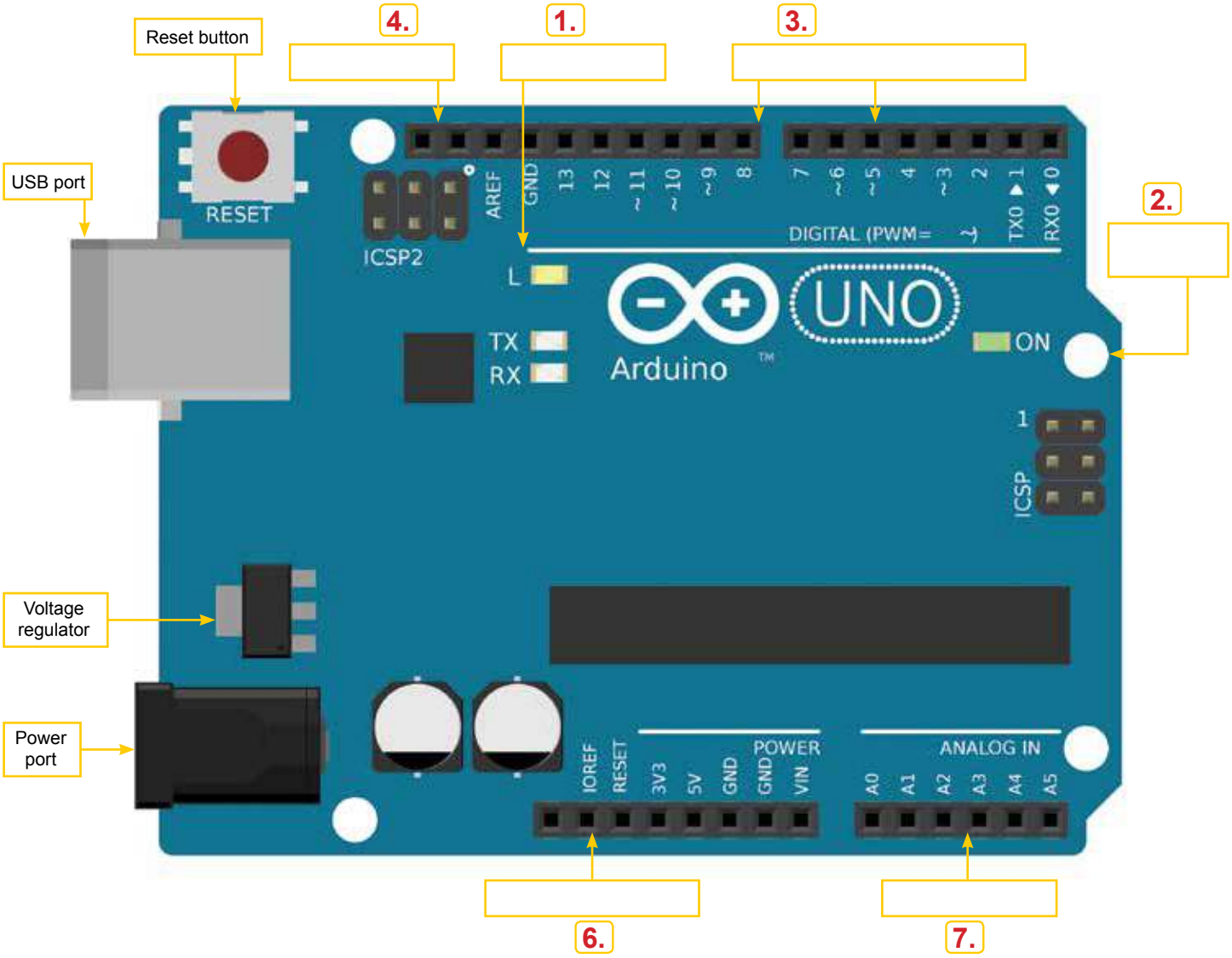
5. Differentiate between an Arduino and a normal computer.

.....

.....

Critical Thinking

Label the Arduino board shown below.



Team Work

Team up with your partner and create a program in python that will blink LED 8 and 9.

6 LOOPING STATEMENTS IN PYTHON

Learning Outcomes

At the end of this chapter, the students will be able to:

- Comprehend Looping statements in Python.
- Traverse elements using loops.
- Know the working of the range function.
- Know the operations of for and while loops.

Warm-up

Play the game.

Start here!	I have 25	I have 38	I have 18
I need 5 × 5	I need 26 + 12	I need 6 × 3	I need 44 + 11
I have 55	I have 28	I have 65	I have 36
I need 7 × 4	I need 41 + 24	I need 9 × 4	I need 32 + 12

Teacher's Note: *Guide students about the loop game. Introduce them with the loop statements in Python, what if something has to be printed 100 times. You need to type 100 times which seems time-consuming. So, this is where the loops play a very important role.*

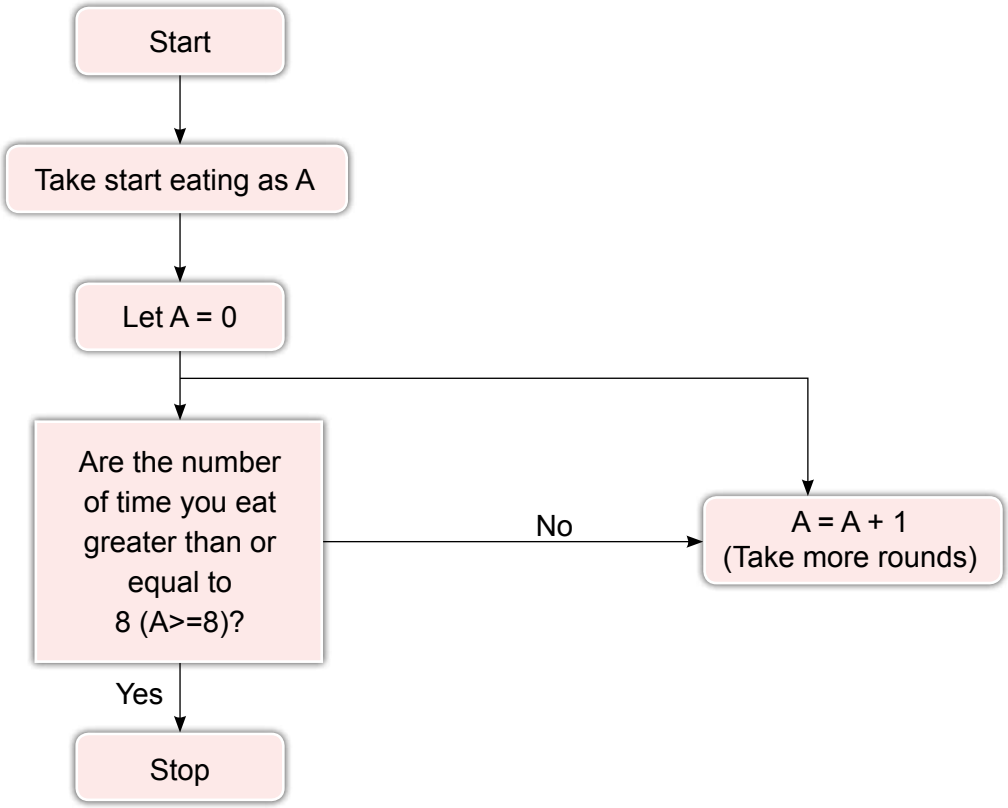
Hello Friends! Let's learn about the looping statement in Python.

The idea of a loop enables us to execute programme instructions repeatedly without having to repeatedly write the same ones.The successful execution of loop depends on the condition. As long as the condition returns True, the statements continue to run.The loop ends automatically when the condition returns False.

For Example, Mother gives you a bowl of rice. You won't eat it up at once. You start with the first spoon, then second and so on. In this manner, you finish your rice after several tablespoons of eating. (let's say eight)

Let's examine the programming-based loop example.

Let the control variable be A. In this example, we have taken the initial value of A as 0. When you eat the first spoon, the value of A becomes 1, after the second spoon, its value becomes A = A + 1 i.e., 1 + 1 = 2 and so on. The value increases every time the process repeats. After being increased, the control variable C will be evaluated to the maximum number of repetitions, which is 8 rounds.



It will keep going till the value of A equals 8. This indicates that the loop will repeat itself eight times before coming to an end.

Do You Know?

The use of loops in programming has the benefit of reducing both the number of instructions and the amount of memory required.

Python uses loops to iterate through sequence elements. Two different types of loops are available in Python for use in looping operations.

- For loop
- While loop

FOR LOOP

The for loop is used to repeatedly iterate over a sequence's values. These values can be either string, list or tuple values.

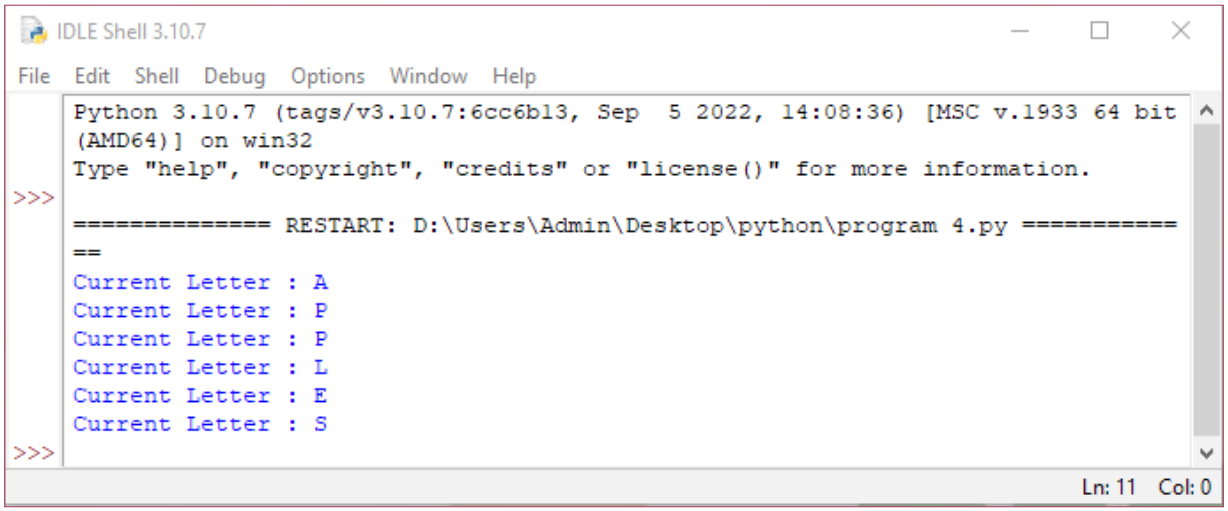
The control variable determines whether each value in the sequence has been traversed or not with each iteration.Traversal is the process of accessing elements in a sequence one at a time.The for loop's body is no longer performed once all the values in the sequence have been traversed; instead, control is passed to the statements that come next.The for loop statement is used when you know the number of iterations beforehand.

Let me answer: How would you define a loop?

The 'for loop' is also called a counting loop.

Program: Printing the characters of a string.

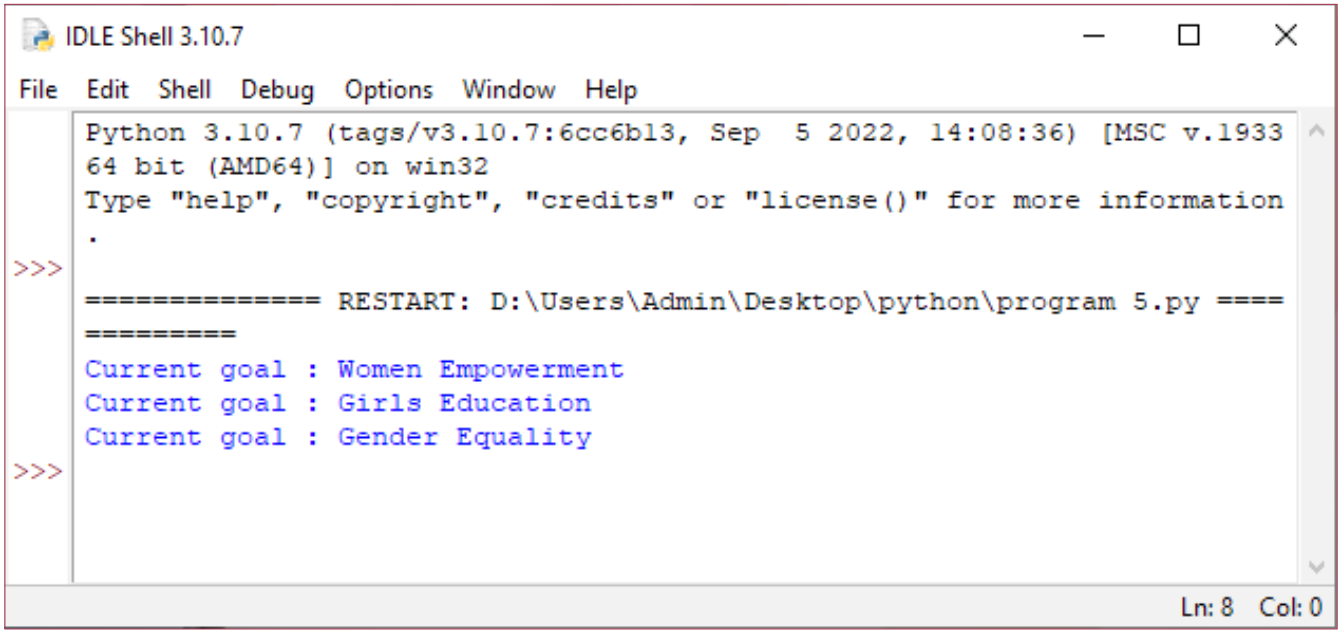
```
For letter in 'APPLES':
Print ('Current Letter' : letter)
```



Output

Program: Printing the items of a list.

```
SDGS = (' Women Empowerment' , 'Girl's Education', 'Gender Equality')
for goal in SDGs:
print ('Current goal:', goal)
```



Output

LOOP CONTROL STATEMENTS

There are three loop control statements in Python. These are used to alter how the loop typically operates.

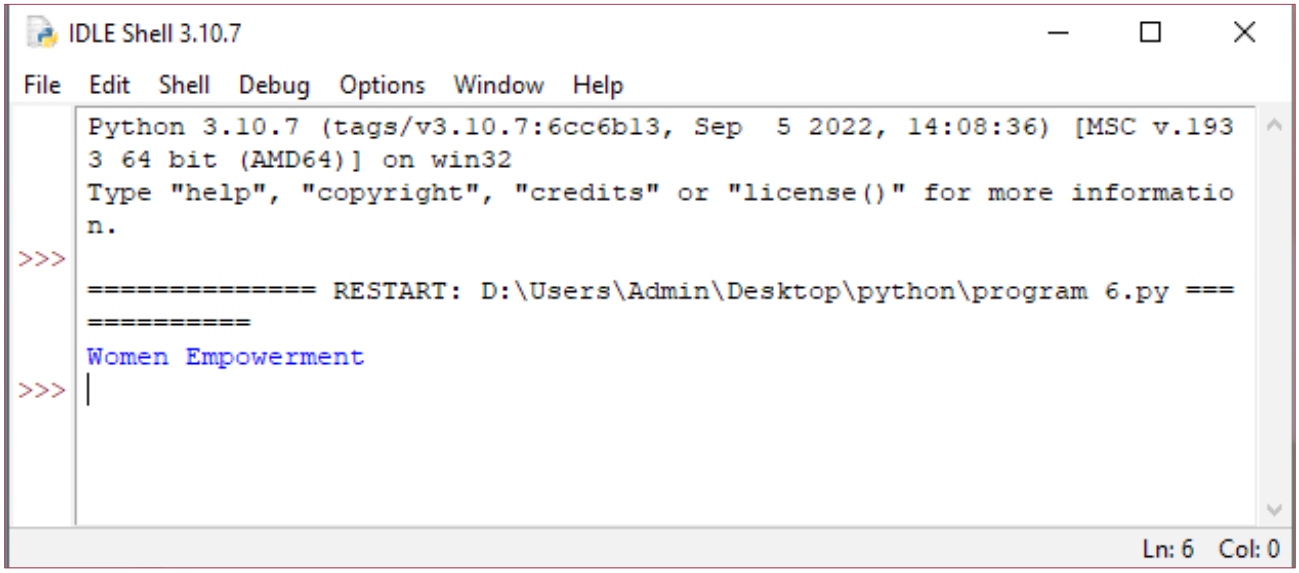
Break Statements

The break statement ends the loop statement and shifts control to the statement that comes right after the loop.

Program: Using break statement

```
SDGS = (' Women Empowerment' , 'Girl's Education', 'Gender Equality')
for goal in SDGs:
If goal ==' Women Empowerment'
print (goal)
break
```

This will print only 'Women Empowerment' and stop the execution of the loop although more items are present in the list.



Output

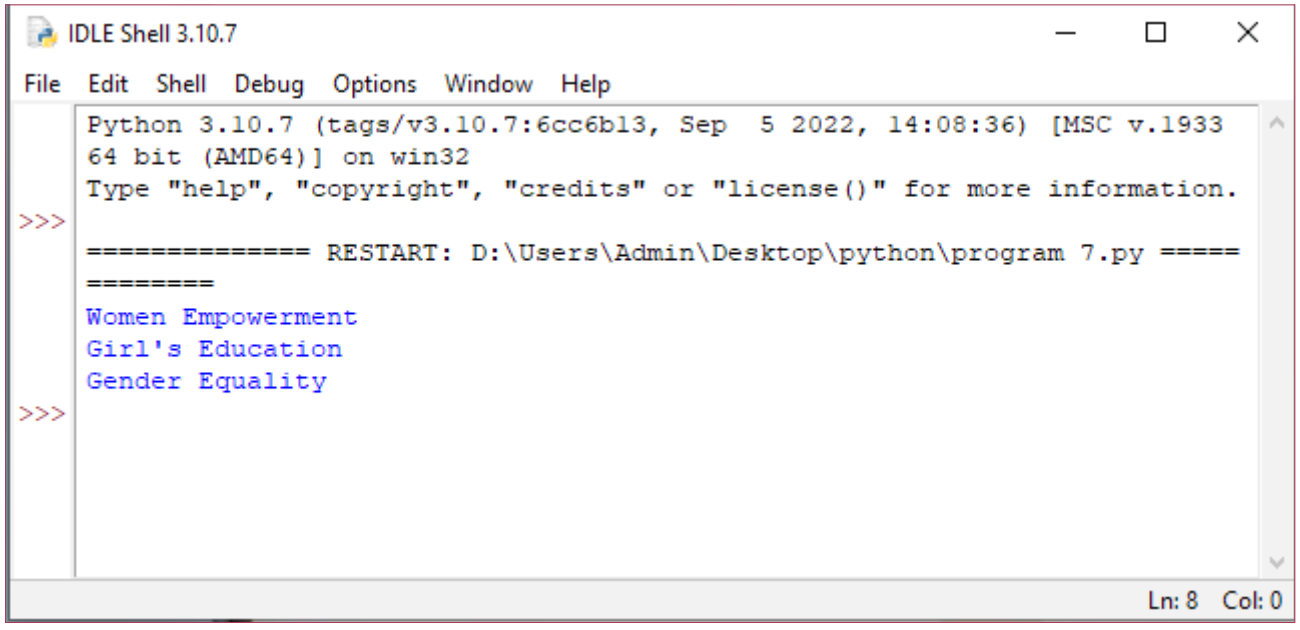
Continue Statement

This command causes the loop to skip the remaining portions of its body and to retest its condition right away before updating the loop variable.

Program: Using continue statement to not print 'Women Empowerment'

```
SDGS = (' Women Empowerment' , 'Girl's Education', 'Gender Equality')
for goal in SDGs:
If goal =='Women Empowerment'
        continue
print (goal)
```

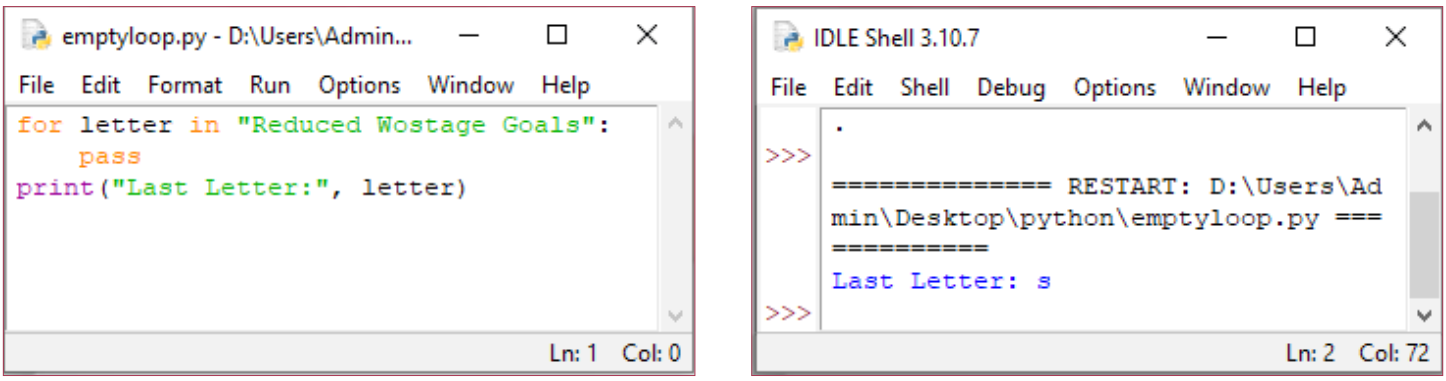
This will print the other items of the list except 'Women Empowerment'.



Output

Pass statements

Pass statements are used to create empty loops.



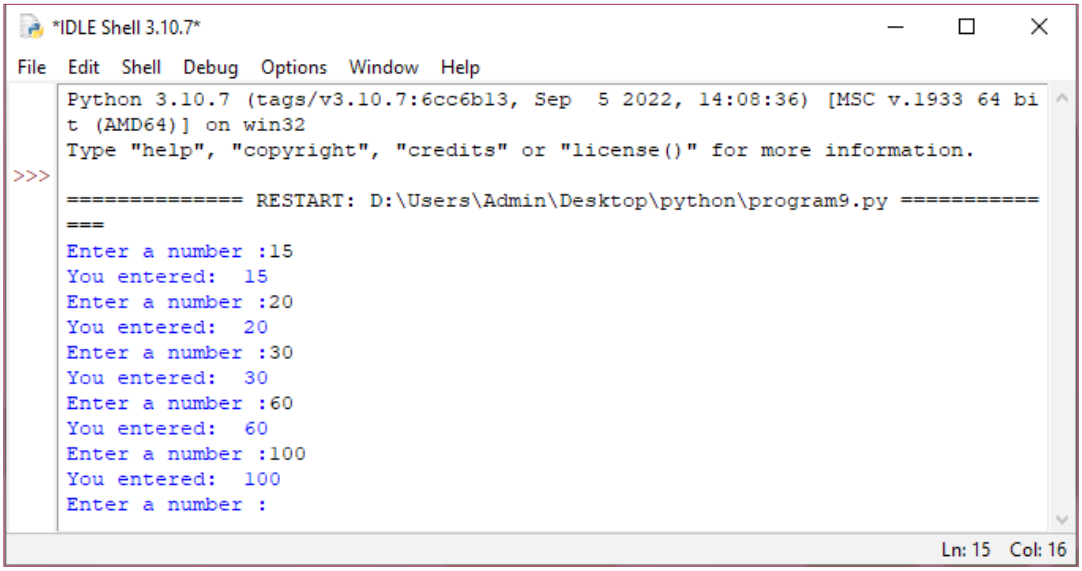
Empty loop

INFINITE LOOP

If a condition never evaluates to FALSE, a loop becomes infinite. It occurs because the loop either lacks a terminating condition or has a requirement that can never be satisfied. As a result, a never-ending cycle is created. It is known as an infinite loop.

Program: Write a program to display an endless loop.

```
var= 1
While var == 1:
        num = int(input("Enter a number :"))
        print ("You entered: ", num)
```



Output

WHILE LOOP

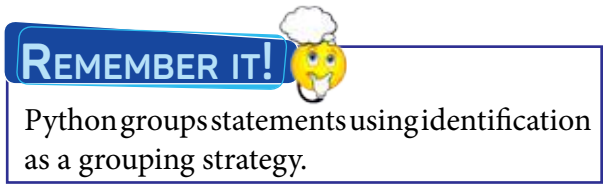
In the while loop, if the specified condition is true, a series of statements will be carried out . Prior to starting the body of the loop, the condition is tested. One statement or a group of

statements could be found in the loop body. The statement that comes straight after the loop receives control when the condition is changed to false. It's referred to as a conditional loop.

Syntax:

while expression:

statement(s)



The body of the loop is skipped and the statement that comes after it is performed if the condition is first found to be false.

Program: Write a program to print all the numbers up to the number entered by the user.

```
n = int(input  ('Enter a number:'))
while (n > 0):
print (n)
n = n - 1
```

The user is prompted to input a number in this section. The condition is checked first, then the number is entered. Since 4 was entered , the condition is true, and so 4 is printed according to the first statement inside the loop body.

The value of n is then decreased by 1, making it 3 (i.e. 4-1). The operation is repeated after returning to the loop's first statement to check the condition. As a result, the loop runs four times until the value of n equals 0, at which point the condition will be considered false. After the while loop, control will move to the statement.

Kids' IQ

Write a program to print the odd numbers between 1 and 30.

Let's Recall

- The idea of a loop enables us to execute programme instructions repeatedly without having to repeatedly write the same ones.
- The 'for loop' is also called a counting loop.
- The break statement ends the loop statement and shifts control to the statement that comes right after the loop.
- In the while loop, if the specified condition is true, a series of statements will be carried out .
- If a condition never evaluates to FALSE, a loop becomes infinite.

A. Fill in the blanks.

1. The successful execution of the loop depends on the .....
2. There are ..... loop control statements in Python.
3. ..... is the process of accessing elements in a sequence one at a time.
4. If a condition never evaluates to FALSE, a loop becomes .....
5. ..... command causes the loop to skip the remaining portions of its body and to retest its condition right away before updating the loop variable.

B. Answer in one word.

1. A loop that tests the condition before executing the loop body.

   .....

2. It is also called a conditional loop.

   .....

3. Accessing the elements of the loop one by one.

   .....

4. It is also called a counting loop.

   .....

5. This statement ends the loop statement and shifts control to the statement that comes right after the loop.

   .....

C. Answer the following questions.

1. What are loops? Give real life examples.

   .....

   .....

2. What is an infinite loop?

.....

.....

3. State the difference between for loop and while loop.

.....

.....

4. Write a program to print all the numbers up to the number entered by the user.

.....

.....

5. What do you mean by continue statement?

.....

.....

Critical Thinking

Is an infinite loop useful? Think and write.

.....

.....

.....

.....

.....

Team Work

Team up with your partner and write a program to find if the given number entered by the user is even or odd.

7

ROBOTICS

Learning Outcomes

At the end of this chapter, the students will be able to:

- Know about Robotics.
- Learn the composition of Robots.
- Recognise the characteristics of a Robot.
- Understand the types of Robots.
- Comprehend the uses of Robots.

Warm-up

Think about the following questions and write the answers.

Q1. What is your plan for the coming weekend?

.....

.....

.....

Q2. What did you do when you woke up today?

.....

.....

.....

Q3. What will you play after going home?

.....

.....

.....

Teacher's Note: *Apprise students that to answer the above question, they had to think a bit. In the same way, when a machine thinks and decides independently it makes it artificially intelligent.*

Hello Friends! *You all know about Artificial Intelligence. Let's learn about one of the latest technologies of AI i.e. Robotics.*

ROBOTICS

The study of building effective and intelligent robots is the focus of the artificial intelligence field of robotics.

Robots are artificial agents that behave in the real world. They can carry out the tasks that a person gives them. Robots are equipped with sensors that can recognise and pick up on physical information from the outside world, such as heat, light, temperature, pressure, sound, bumps, and movement. To demonstrate intelligence, they have several sensors, a large amount of memory, and powerful Processor cores. Additionally, they have the capacity to grow from their mistakes and mould themselves to the new surroundings. Electrical engineering, mechanical engineering, and computer science are combined in robotics to design, build, and use robots.

Figure 7.1: A Robot

Let Me Answer

Have you ever seen a Robot?

COMPOSITION OF ROBOTS

Robotics uses computer science, mechanical engineering, and electrical engineering to build, develop, and use robots.

- Robots' mechanical designs develop shapes or their forms to do a specific task.
- Electrical components power and regulate the machinery of robots.
- Robots operate under the control of some sort of computer software that dictates what, when, and how they perform things.

Robots are developed with:

- Actuator used in Robots convert energy into movement.

Do You Know?

The term 'robot' comes from the Czech word 'Robota', that means 'Drudgery' or 'hard work' and 'forced lab

- Electric motors are required for rotational movement.
- Batteries, solar power, hydraulic or pneumatic power sources.
- Muscle wires contract by 5 % when electric current is passed through them.
- Sensors provide knowledge of real time information on the task environment.

Figure 7.2: Actuator

Figure 7.3: Pneumatic Air Muscles

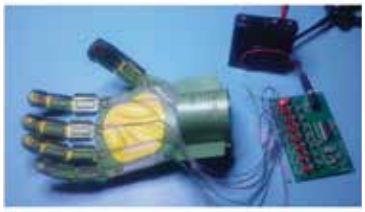


Figure 7.4: Muscle Wires

FEATURES OF A ROBOT

REMEMBER IT!

George Devol developed the first digitally operated Robot.

Robots resemble humans in terms of their physical composition. They are held together by a structure, and they can move due to mechanical components. A robot is capable of doing actions and movement.

- A robot absorbs information about its surroundings and makes use of that data to carry out tasks as directed.
- It functions according to the programs installed in it and the programs can be changed accordingly.
- Robots have sensors which enable them to see even in dark as well as detect the small movements which a normal person is not able to do.

TYPES OF ROBOTS

Aerospace:

This is a broad category. It includes all sorts of flying robots the SmartBird robotic seagull and the Raven surveillance drone, for example—but also robots that can operate in space, such as Mars rovers and NASA's Robonaut, the humanoid that flew to the International Space Station and is now back on Earth.

Figure 7.5: SmartBird

Figure 7.6: Raven

Consumer Robots

These robots are available for purchase and are kept as toys. They also carry out other jobs and errands for people. Aibo the robotic dog and Roomba the vacuum machine are two examples.

Figure 7.7: Aibo

Figure 7.8: Roomba

Disaster Response Tools

Robots used in disaster response do hazardous or dangerous duties, such as looking for survivors after a tragedy. Consider the Packbot, a mobile robot used for hazardous material disposal and other risky duties. It can drive through mud, climb stairs, and function in all weather.

Figure 7.9: Packboat

Industrial Robots

Industrial: The traditional industrial robot consists of a manipulator arm designed to perform repetitive tasks. An example is the Unimate, the grandfather of all factory robots. This category includes also systems like Amazon's warehouse robots and collaborative factory robots that can operate alongside human workers.

Figure 7.10: Unimate

Medical Robots

Systems like the da Vinci surgical robot, bionic prosthesis, and robotic exoskeletons are examples of medical and health-care robots.

Figure 7.11: da Vinci

APPLICATIONS OF ROBOTICS

- Conservation: fighting forest fires.
- Manufacturing: working in factories, finding and carrying items in warehouses.
- Companionship: providing company to elderly individuals.
- Healthcare: assisting in surgical procedures.
- Delivery: completing food delivery and last-mile fulfilment.
- Household: vacuuming and mowing the grass.
- Rescue: undertaking search-and-rescue missions after natural disasters.
- Military Operations: detecting landmines in war zones.

Kids' IQ

Do you think Robots can replace Humans?

Let's Recall

- Robots are artificial agents that behave in the real world.
- Robotics is a domain in artificial intelligence which deals with the study of creating intelligent and efficient robots.
- Robots resemble humans in terms of their physical composition.
- Robots are developed with batteries, Actuator, Muscle wires and sensors.
- Robots used in disaster response do hazardous or dangerous duties, such as looking for survivors after a tragedy.

Upskill Your Intelligence

A. Fill in the blanks.

1. The study of building effective and intelligent robots is the focus of the ..... field of robotics.
2. ..... is an example of Medical robots.
3. ..... are installed in the body of the robots to work like the five senses of a human being.
4. Robots used in disaster response do ..... or ..... duties.
5. ..... is a domain of artificial intelligence that deals with the study of creating intelligent and efficient robots.

B. Write 'T' for True statements and 'F' for False statements.

1. Robots cannot perform the tasks given by a human.
2. Aibo is a consumer robot.

3. Raven is an example of Disaster response robots.
4. Robots look like human beings.
5. A robot does not have the ability to sense his environment.

C. Answer the following questions.

1. What is a Robot?

.....

.....

2. Write the features of the Robots.

.....

.....

3. Describe the types of robots.

.....

.....

4. What are the applications of Robotics?

.....

.....

5. Give two uses of a robot.

.....

.....

Critical Thinking

Identify the following Robots and their types.

....

Team Work

Team up with your partner. Make a working Robot using cardboard, thermocol or plastic bottle.

8

CYBER ETHICS

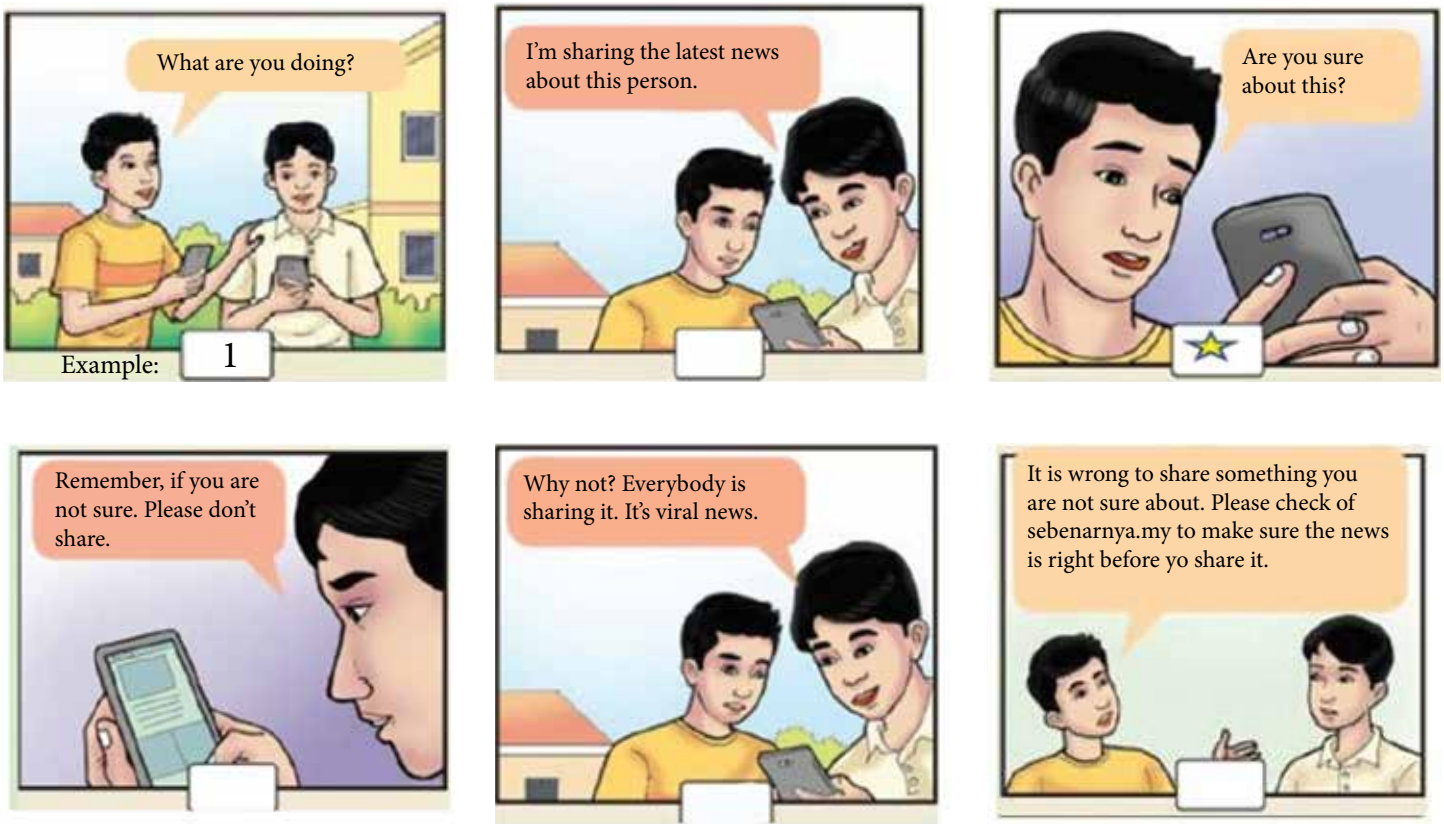
Learning Outcomes

At the end of this chapter, the students will be able to:

- Comprehend the concept of cyber security and ethics.
- Recognise the several kinds of risks related to the internet.
- Know about piracy and its types.

Warm-up

Observe the following picture and continue the conversation.



Teacher's Note: *Guide students that everything they see on the internet is not true, you have to be very careful while sharing the video with others.*

Hello Friends! *Let us learn some Cyber Ethics and ways to protect ourselves, online.*

When computers were first used, there weren't any guidelines or requirements on how to use them. This led to various issues. But when their use spread in every aspect of our lives, it became essential to establish some guidelines. At the national and international levels, many of these regulations have been codified as laws.

The ethical use of computing resources is ensured by computer ethics. It outlines techniques for avoiding breaking trademark and copyright laws. Furthermore, it addresses the unauthorised dissemination of digital content.We must follow all the standards which have been set for the appropriate use of the internet. It should not be used for wrong and illegal purposes.

AVAILABLE RISKS ON THE INTERNET

We must educate ourselves on the risks associated with using the internet as responsible users.

Loss of confidentiality of Information

Hackers are those who take advantage of a computer network or system's flaws. They are able to breach a computer's poor security. Hackers take advantage of computer systems to steal important data. They steal this material to strike revenge on others, gain fame, or for financial gain. Hackers have cost organisations all over the world significant financial losses.

Fake information

It is quite challenging to verify the accuracy of the information because there is so much of it available online. On social networking platforms, many internet users create fake accounts. They think they can disseminate rumours in this way and get away with it. Rumours have frequently ignited riots and hatred in the past. These rumours are disseminated via various social media apps. Make sure to check the information from reliable online sources or question individuals you trust before you believe any kind of information.

Let Me Answer

Have you ever come across any fake information?

Computer Virus

Many professional organisations use the internet to do their business online in the twenty-first century. Companies and governmental organisations both save their important information online. In order to disrupt this knowledge, individuals who want to steal or destroy it construct a lethal virus. One of the most popular methods used by these individuals to propagate the infection is the internet.

CYBER CRIME

Cyber Crime is any crime that is committed using the computer and the internet where the computer may be the target, tool, both. They involve criminal activities such as theft, fraud, forgery and defamation. Cyber crimes are addressed by the Information Technology Act, 2000. Cyber policies take care of cyber crimes.

Cyber Stalking

Stalking is the recurrent practice of unwanted monitoring or harassment with the intent to manipulate or influence the victim. Online and offline stalking both are against the law.

Let Me Answer

What can be the ill-effects of cyberbullying?

Cyberbullying

The act of harassing a person through electronic media is known as cyberbullying. In this case, the attacker uses intimidating messages to attempt to corner the victim.

Identity Theft

It is a type of cybercrime when the culprit creates a false identity in order to obtain financial benefits like credit cards and loans, among other things. They borrow money from a financial institution, fail to repay it, and inflict significant financial losses on the institution in the name of another person. For example, fraudsters can copy adhar card information or bank credentials and get the loan cleared in our name.

Spamming

You must have noticed when looking through

REMEMBER IT!

There is a hacker attack every 39 seconds

your mailbox that there are numerous emails from unidentified email addresses. Who is the sender of these emails and how did they get our email addresses? The majority of contemporary browsers come with an internal application that can recognise these emails and put them in a different folder. Spam is the term for these unwelcome emails. They are generally sent in large numbers for commercial advertising. Spamming involves sending the same messages to email users all over the world in millions. Since spam may be used to spread malware such as trojan horses, viruses, worms, spyware, and coordinated targeted phishing attempts, it poses a major security risk.

Do You Know?

Spam accounts for 14.5 billion messages globally per day. In other words, spam makes up 45% of all emails.

CYBER SECURITY

Any computer that is connected to the internet is exposed to a wide variety of technological dangers. We cannot ignore the reality that we constantly feel scared by the idea that a computer genius may utilise dubious methods to learn crucial information about your financial situation, interfere with it, or otherwise misuse it.This is where cyber security steps in. Because it tries to protect sensitive data, computer security is crucial. It tries to protect the confidentiality, integrity, and accessibility of important data kept on computers.

USING PASSWORDS

It's crucial to use passwords properly since they serve as your first line of security against hackers and imposters.

Follow some of the tips given below.

- Never disclose your password to a third party.
- Never use the same password across all the accounts.
- Make passwords that are simple to remember yet difficult to decode.
- The password must include at least 12 characters, including capital letters, digits, and symbols.
- Make sure your devices have anti-malware software and are secure.
- Use a fingerprint or "password" on your phone as well.

SAFELY ACCESSING WEBSITES

Our lives have been completely transformed by the internet, which now allows us to read the news, watch movies, conduct research, plan our vacations, buy and sell, and perform a variety of other daily tasks. However, it comes with a lot of risks that could arise from viewing a malicious website or unintentionally disclosing sensitive information. Malware, which includes both spyware and viruses, may be involved.

Some points to keep in mind while accessing a website:

- When using the websites, use common sense.
- Verify the website's address, contact information, and email address to ensure its legitimacy.
- The URL of the website might look authentic. Keep an eye out for slight spelling variations.
- Use the most recent versions of your browser and antivirus software.
- Always keep in mind to log out of the website after finishing your transaction.

Kids' IQ

Which things will you keep in mind while creating a password?

Let's Recall

- The ethical use of computing resources is ensured by computer ethics.
- Hackers are those who take advantage of a computer network or system's flaws.
- Cyber Crime is any crime that is committed using the computer and the internet.
- Stalking is the recurrent practice of unwanted monitoring or harassment with the intent to manipulate or influence the victim.
- Any computer that is connected to the internet is exposed to a wide variety of technological dangers.
- Never use the same password across all the accounts.

A. Fill in the blanks.

1. The ethical use of computing resources is ensured by .....
2. Cyber ethic addresses the ..... dissemination of digital content.
3. ..... are those who take advantage of a computer network or system's flaws.
4. Companies and governmental organisations both save their ..... information online.
5. Identity theft is a type of cybercrime when the culprit creates a ..... identity.

B. Write 'T' for True statements and 'F' for False statements.

1. Cybercrime is an act of crime in which a computer system is used to commit an offence. ☐
2. The Internet leads to the exchange of mobiles. ☐
3. Hackers steal crucial information from a computer system. ☐
4. Blocking someone who is stalking you on the web is a crime. ☐
5. In spamming, millions of the messages are sent to different email users. ☐

C. Answer the following questions.

1. What is Cyberstalking?

.....

.....

2. What do you mean by identity theft?

.....

.....

3. Define spamming.

.....

.....

4. What things to be kept in mind while accessing websites?

.....

.....

5. What is Cyber security?

.....

.....

Critical Thinking

Your friend's fake id has been created with his profile picture and details and the person is asking for money from his friends.

As a friend, what steps would you take in this case?

Team Work

Make a poster in MS word on 'Cyber Security'.

9

INTRODUCTION TO APP DEVELOPMENT

Learning Outcomes

At the end of this chapter, the students will be able to:

- Know different types of apps.
- Create apps based on the client's requirements.
- Develop an app using a thunkable app.

Warm-up

Identify the logos of various apps given below and write their name.

.....

.....

.....

.....

Teacher's Note: *Guide students that they use various apps on a daily basis but have they ever thought about how these applications are developed.*

Hello Friends! *Let us learn about the development of apps.*

The most common utility item today is the mobile phone. Everyone these days has access to a cell phone.

People are using several brands of mobile phones . These mobile phones are little more than miniature handheld computers; they are equipped with memory, storage, and processors, as well as a keyboard, touchscreen, and output screen. Similar to how a computer has many software applications installed in it, a mobile phone also has many applications placed inside its memory. These apps do feature a distinctive User experience that has been masterfully created by professionals.

Running many apps loaded on a computing device depends heavily on the operating system. Due to the fact that a mobile phone serves as a computing device, every mobile phone has an operating system as well. Apps are made to function on the various operating systems that they employ.While iPhone apps may be used on iPhones that run iOS, Android apps are designed to work on phones and tablets that run the Android OS. Most of these apps can be downloaded easily from the Google play store on Android phone or through the App store on iOS.

Let Me Answer

Which app do you use often?

TYPES OF MOBILE APPS

There are three main types of mobile apps, just as there are various operating systems for mobile phones. Let's learn about these three categories of mobile phone apps.

Native Apps

A native is a person who is connected to a place by birth or who was born there. Native apps are created expressly for an operating system on a mobile device. As a result, you can create iOS apps for mobile devices running the iOS operating system and Android apps for devices running the Android operating system. Native apps are created with consideration for the hardware requirements of a mobile device, which have different hardware requirements than desktop computers. Numerous coding languages are used to create native apps.

Figure 9.1: Pros and Cons of Native apps

Advantages

1. Native UI.
2. It can access the features of a device.
3. It is faster and gives better performance.

Disadvantages

1. It is expensive to maintain.
2. Updates need to be downloaded.
3. Take up much space in the device.

Web Apps

Apps that can be used with a web browser are referred to as web apps. You don't need to download these apps to your phone. Even when we select the install option, all that happens is that we download a bookmark. The URL link will enable easy browser access to the online application.

Figure 9.2: Pros and Cons of Web apps

Advantages

1. It can be used on all devices since it's web-based.
2. It is easy to maintain.
3. It doesn't occupy space in the device.

Disadvantages

1. It always needs an active internet .
2. It is totally dependent on the web browser.
3. It may not always integrate with device hardware.

Hybrid Apps

Web apps and native apps are combined to create hybrid apps. These apps can be loaded on a device much like native apps and have a user interface similar to a web app. Apps that are hybrids can be acquired from the iOS or Play stores. Hybrid apps have an app icon, display responsive design, and assure fast performance. Although they look native, they are essentially web apps that are made to work offline.

Figure 9.3: Pros and Cons of Hybrid apps

Advantages

1. It is quicker and cheaper to make.
2. Loads fast.
3. Requires less code to maintain.

Disadvantages

1. It has less power than native apps.
2. Some features might not work on devices.
3. Since each element has to be downloaded, it is slower.

CHOOSING THE RIGHT APP FOR DEVELOPMENT

1. Development Time

Web apps are the greatest option if you want to make an app that shouldn't take too long to design and your users are okay with using a browser.

2. Limited Resources

If you have a limited budget, go with a web app instead of a native app. You can convert your application to the Native version after it gains user engagement.

3. Performance

Development of a Native app is the best option if app performance is your top priority. Native apps are effective in terms of performance and stability and may be readily customised.

Let Me Answer

Have you ever noticed the name of the app developed while using any app?

DEVELOPING YOUR FIRST APP

In the process of developing an app, each of the app's component parts is first created, and then the entire app is put together. Here, we will learn to create different components of an app.

Let's start by using the web application 'Thunkable' to build a basic user experience for an app.

THUNKABLE APP

Thunkable is a web-based application that was first made available by Google and has an integrated development environment. Anyone with basic computing skills can develop Native apps that are based on Android and iOS . It has a GUI based interface which is very similar to Scratch. It offers the feature of drag and drop, by which we can easily create an app without writing any code.

Starting Thunkable app

Follow the given steps to start the Thunkable app.

Steps:

1. In your browser, type the following URL.

www.thunkable.com

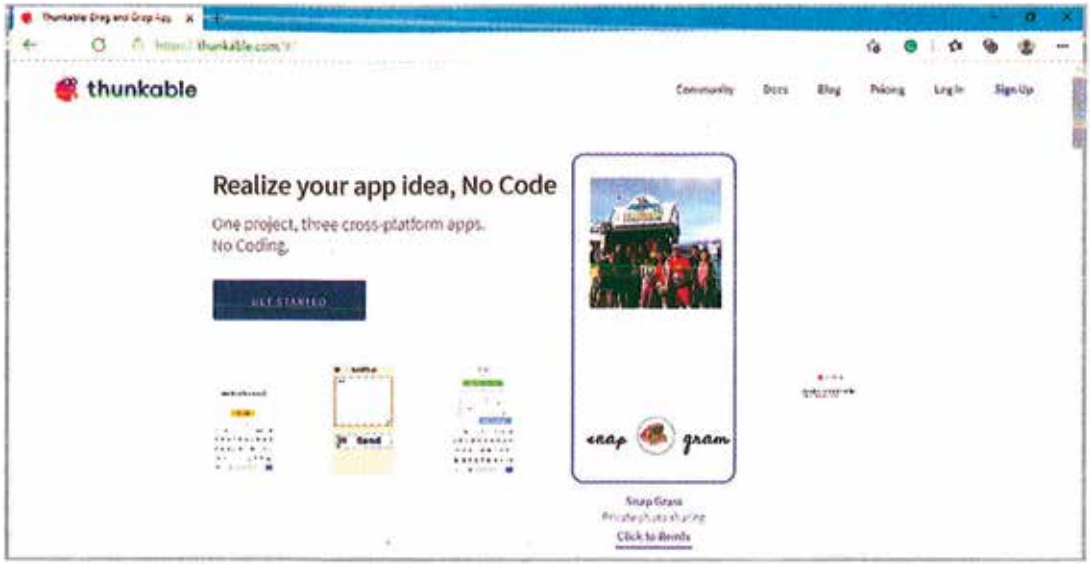


Figure 9.4: Thunkable App Interface

2. To begin, select the start button. You'll see the screen given below.

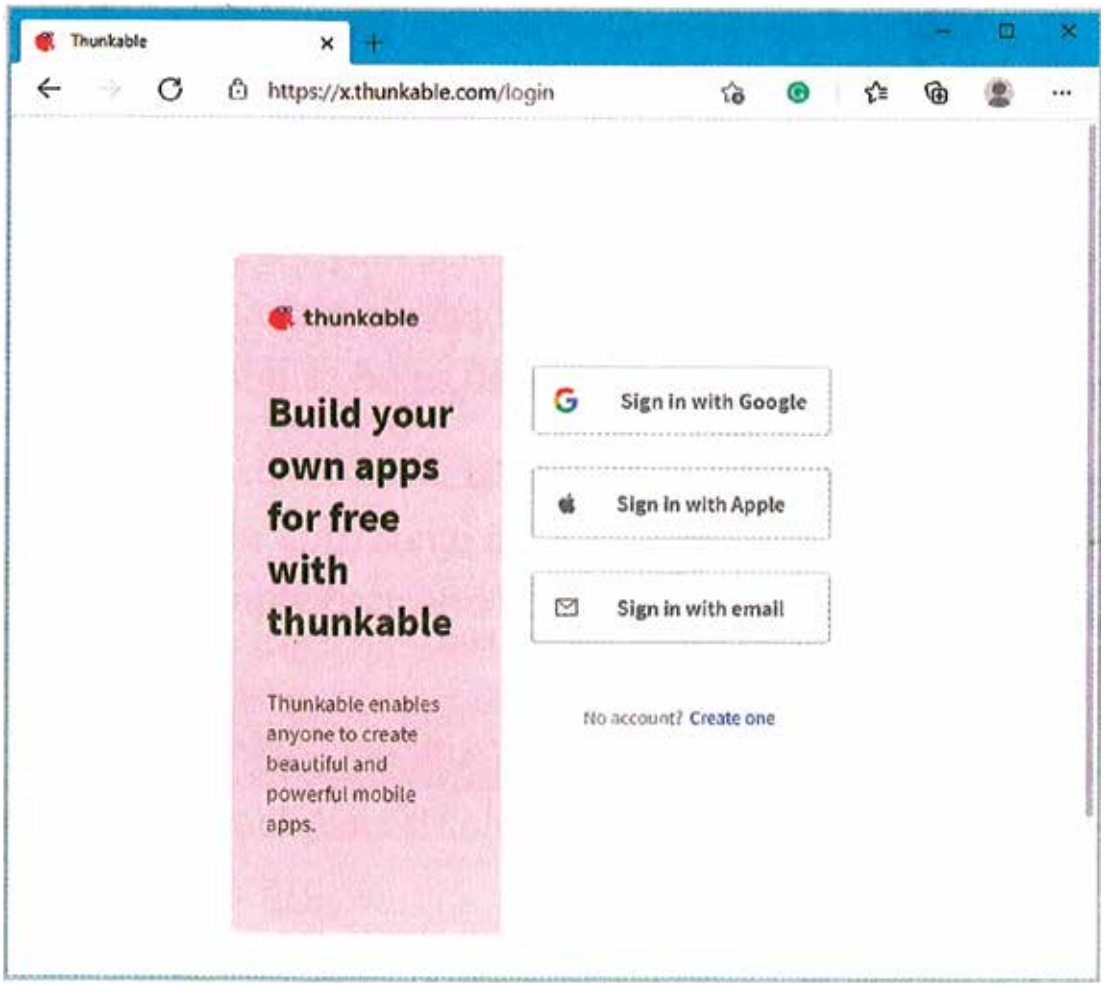


Figure 9.5: Sign in

3. Use your Google account to log in to the Thunkable application. The following page will appear after you check in to the app with your Google account.

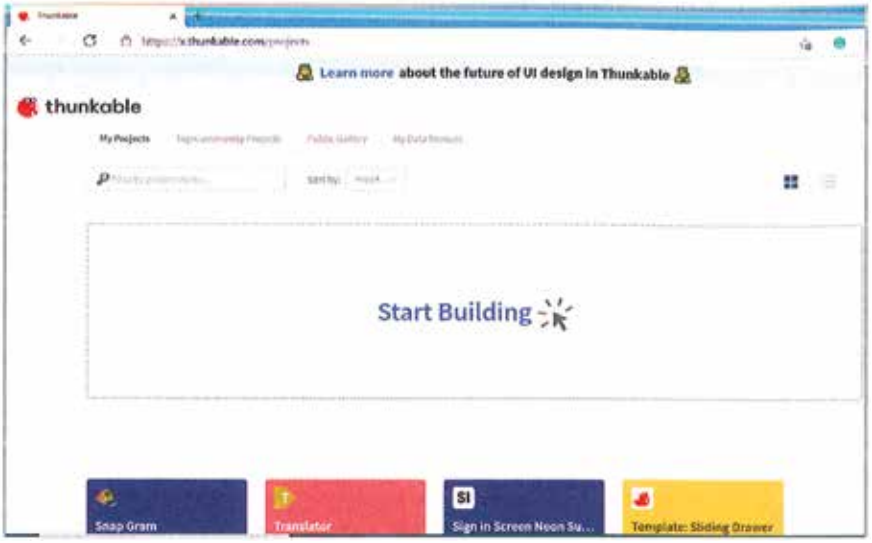


Figure 9.6: Start Building your App

4. Select "Start Building" option. It will then display the Create New Project dialogue box, as seen below. Add the required information and click on Create button.

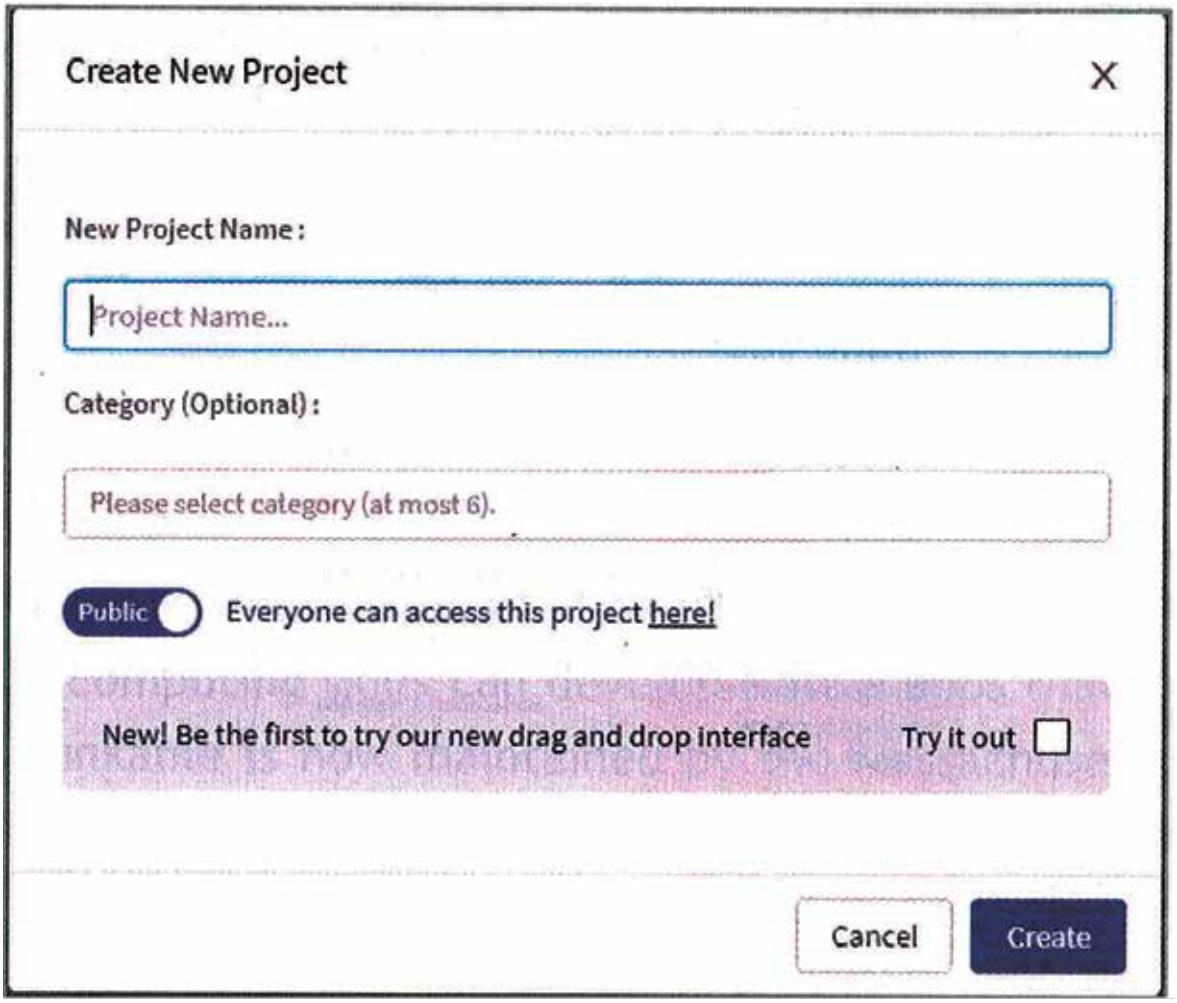


Figure 9.7: Creating a New Project

5. A webpage with a different toolbar and a demo screen will be shown as below.

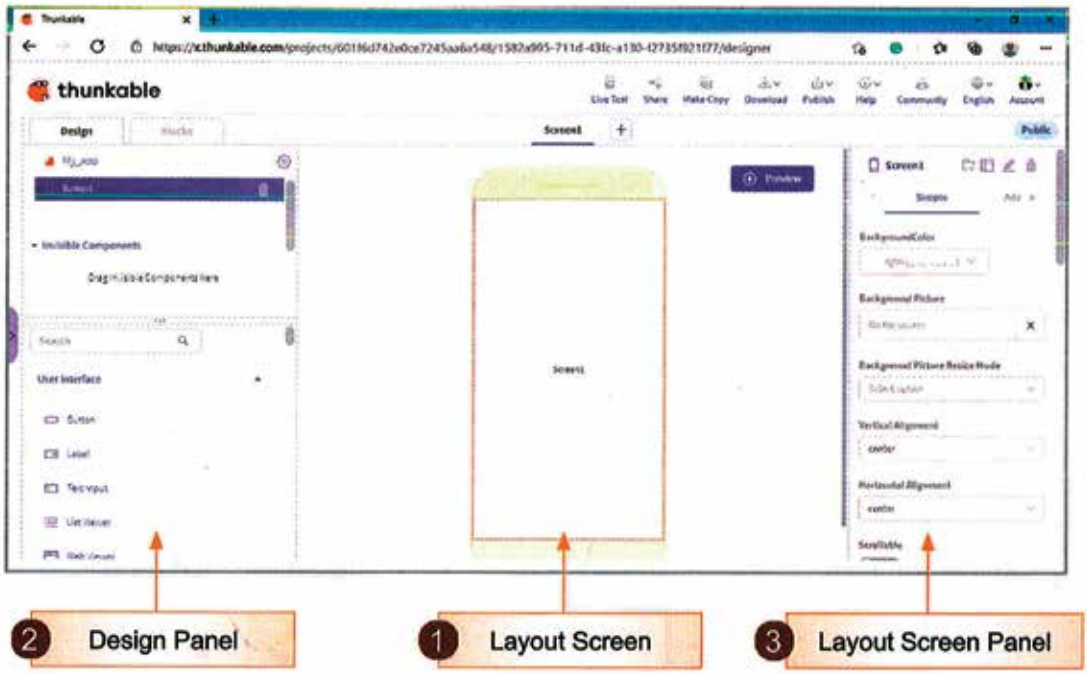


Figure 9.8: Thunkable App Development Interface

CREATING THE FIRST APP WITH THUNKABLE

Follow the given steps to create your first app.

Steps:

1. Scroll down to the Image tool in the design section.

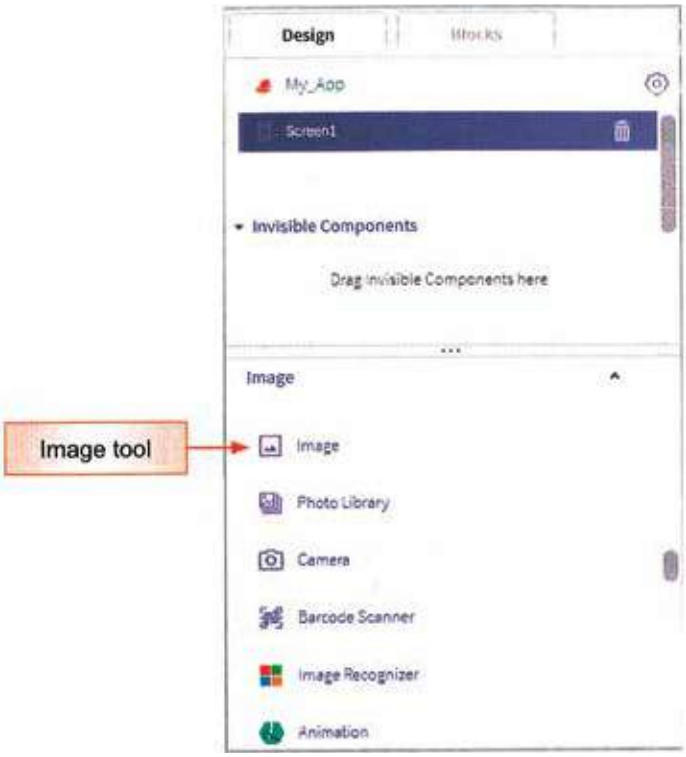


Figure 9.9: Using the Image Tool

2. Place the picture tool in the Layout Screen by dragging and dropping it there. The layout screen will look similar to the illustration below.

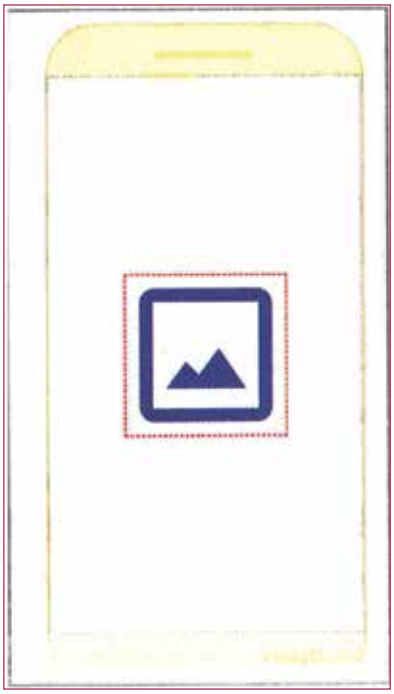


Figure 9.10: Inserting Image

3. Choose a picture from the Image panel on the right side of the screen. Utilise the Upload files option to upload an image from your PC.
4. As soon as the picture has been added to the layout screen, you can drag and drop it to reposition it.

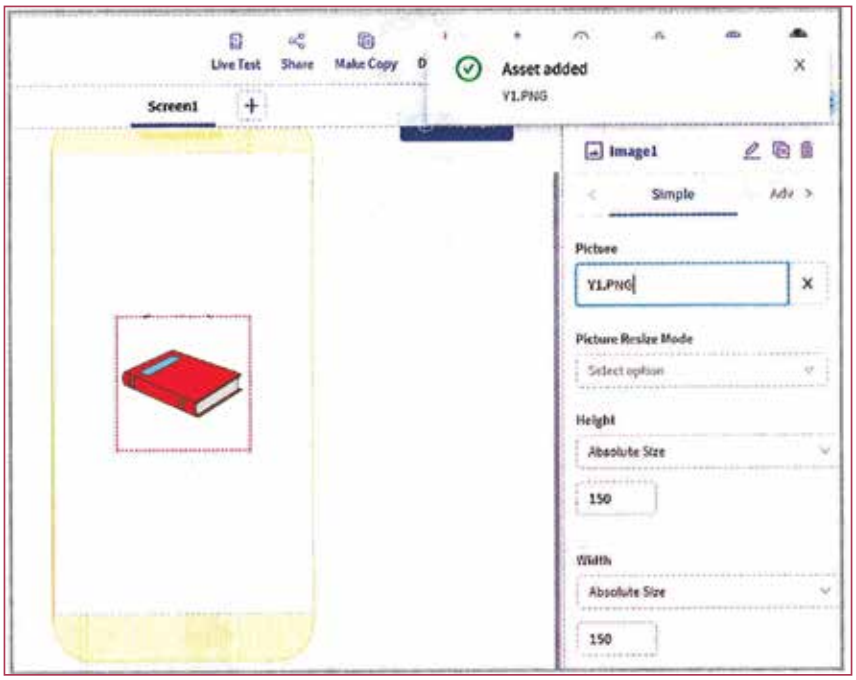


Figure 9.11: Positioning Image

5. Scroll down and choose the Label tool in the Design section. Drag it down and drop it next to the picture.

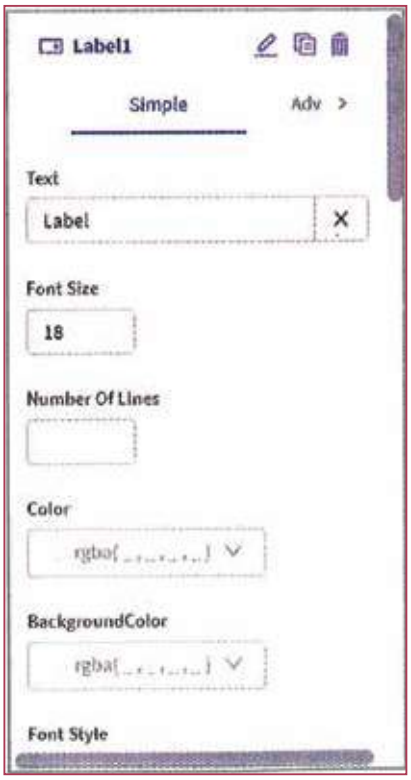


Figure 9.12: Inserting Label

6. From the label1 panel shown on the right hand side of the browser screen,click on the Text option and add text of your choice in the textbox. You can also change the colour and size of the text using the options given in the Label panel.

7. Scroll down and choose the button tool in the Design section. Drag it down and drop it just below the label.
8. From the button panel, click on the text option and add text of your choice in the textbox. Various options visible in the Button panel allow you to alter the Button text's style and appearance.

Our app's user interface is now complete. The app interface, which consists of an image, a label, and a button, can be seen in the figure.

Figure 9.13: App Interface

Kids' IQ

Sandeep wants to build a mobile application, but he is aware of his limited resources and is unsure of the type of app he should build. Help Sandeep choose the app he should build while considering his constraints.

Let's Recall

- The most common utility item today is the mobile phone.
- Most of the apps can be downloaded easily from the Google play store on Android phone or through the App store on iOS.
- Native apps are created expressly for an operating system on a mobile device.
- Apps that can be used with a web browser are referred to as web apps.
- Hybrid apps can be loaded on a device much like native apps and have a user interface similar to a web app.

A. Fill in the blanks.

1. Every mobile phone has an ..... system.
2. A ..... is a person who is connected to a place by birth or who was born there.
3. The image tool is present in the ..... panel.
4. An ..... helps the user to interact with an app.
5. ..... app which saves development time.

B. Write 'T' for True statements and 'F' for False statements.

1. Native apps can be downloaded only from the iOS store. ☐
2. A web app doesn't need to be downloaded. ☐
3. Operating systems play a crucial role in running the different apps installed on a computing device. ☐
4. Hybrid apps are a combination of both web apps and native apps. ☐
5. A mobile phone can run without an operating system. ☐

C. Answer the following questions.

1. State the difference between Native and Web apps.

.....

.....

2. Write the reasons you'll consider for selecting one type of app and not another.

.....

.....

3. What is a Thunkable app?

.....

.....

4. Write the steps to create an app using Thunkable.

.....

.....

5. What are Hybrid apps?

.....

.....

Critical Thinking

Rahul wants to create an app for his business. He doesn't know much about creating apps, just he is well versed with computing skills.

Suggest to him the platform he should use to create an app. Further, write the steps to open it.

Team Work

Team up with your lab partner and create an app on thunkable that enables the students to learn the basic english grammar. Your app should include all the eight parts of speech.

10

SOUND EDITING WITH AUDACITY

Learning Outcomes

At the end of this chapter, the students will be able to:

- Comprehend the significance of Audacity
- Install Audacity
- Know the user interface of Audacity
- Import audio files in Audacity
- Apply sound effects

Warm-up

Identify the logo of the following apps.

.....

.....

.....

.....

Teacher's Note: *Assist students in finding the name of the above apps. Also, guide them about the Sound apps which enhance the scene making it real, interesting and thrilling.*

Hello Friends! *We will learn about one of the most popular sound editing apps called Audacity.*

AUDACITY

Installing Audacity on numerous operating systems like Windows, Mac OS, and Linux enables you to edit and record audio. Audacity was released on May 28, 2000, and since then its popularity is on the rise.

Let Me Answer

What is the literal meaning of Audacity?

FEATURES OF AUDACITY

1. **Free:** Since Audacity is an open-source programme, it can be downloaded for free. It is simple to obtain from the internet.
2. **Cross-platform support:** Audacity includes this feature, allowing you to install it on devices running Windows, Linux, or Mac OS operating systems.
3. **Multi-Track Audio Mixing:** You can quickly and easily trim a section from one audio track and combine it with another using Audacity. Powerful audio tracks can be made by combining many audio recordings.
4. **Navigation Control and Zoom:** Audacity has a user-friendly design; for instance, when using painting software, you can utilise the zoom tool to improve your vision if you wish to add colour to an area that is not immediately visible to you. Similar to this, in Audacity, you can utilise the zoom tool to enhance a specific area of the track and modify it using the numerous audio-enhancing effects that are offered by Audacity.
5. **Speed Adjustments (Tempo):** With a simple mouse click in Audacity, you may quickly increase or decrease a track's speed.

Do You Know?

To make a scene more thrilling and interesting, a sound editor is used to create symphony and desired effect.

INSTALLING AUDACITY

As we all know, Audacity is a free open-source programme. The most recent version of Audacity is readily available online.

Let Me Answer

What do understand by sound?

Follow the given steps to install Audacity.

Steps:

1. Open the browser application on your computer and type the URL displayed below in the address field to download Audacity.

   www.audacityteam.org

2. Once you press enter, the following page will appear:

Figure 10.1: Audacity Home Page

3. Click on the download button and select the Windows option.

Figure 10.2: Audacity Windows Download

4. Open the Audacity installer on your PC by going to the downloads folder. Selecting your preferred language will set off the installation process. After choosing your desired language, press the OK button.

Figure 10.3: Selecting Setup Language

5. The welcome screen for the setup process will appear; select Next to continue.

Figure 10.4: Setup Welcome Screen

6. After reading the licence agreement, press the Next button.

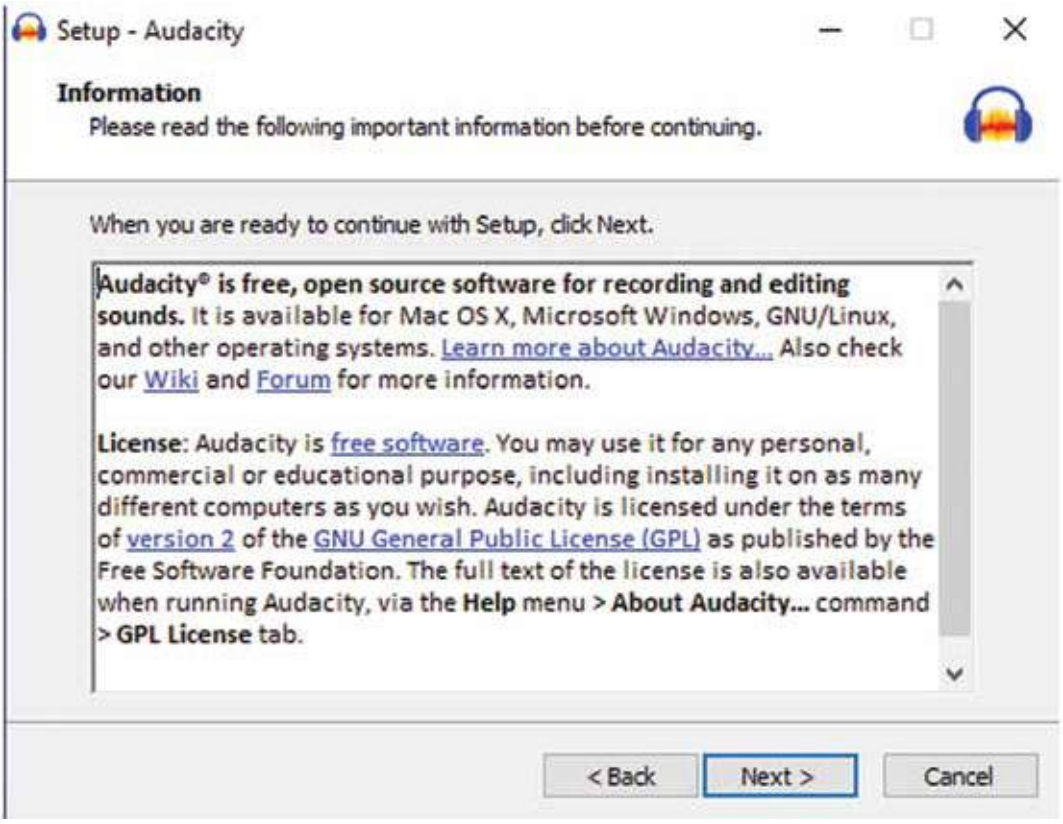


Figure 10.5: Licence Information

7. Set the installation path at this time. To modify the installation directory, simply retype the path or press the Browse option.

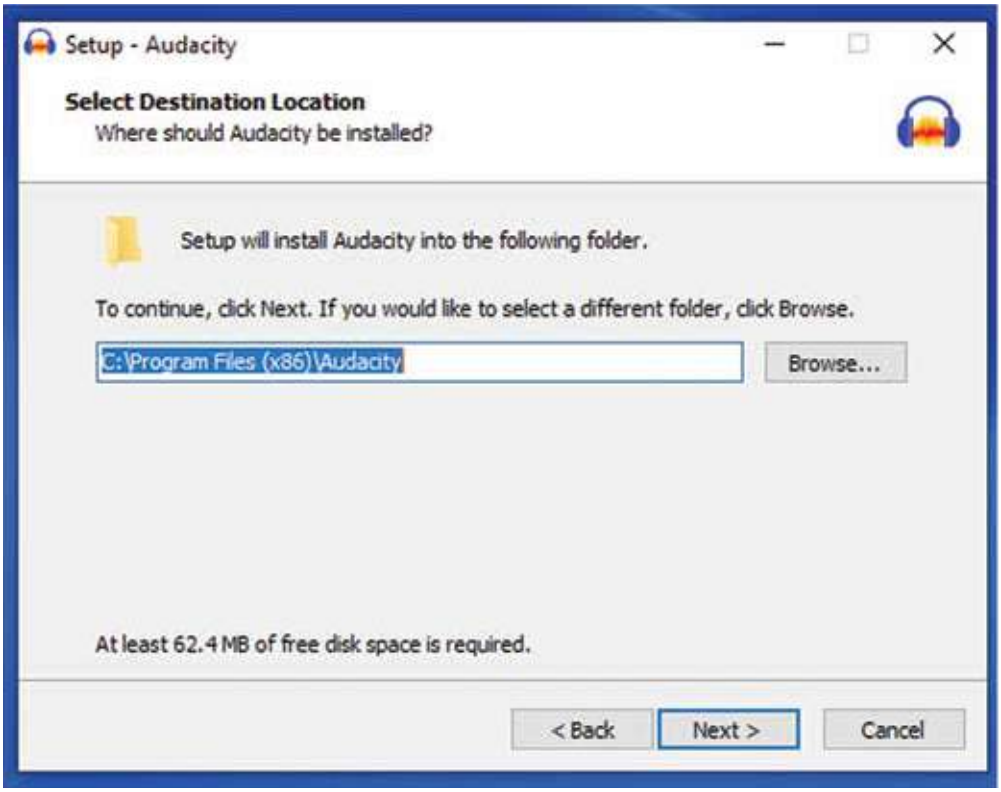


Figure 10.6: Selecting Installation Destination

Click the Next button if you are satisfied with the preset installation path.

8. The following step is to help you to enter your specific installation options, such as how you want Audacity to look on your computer once it has been installed.

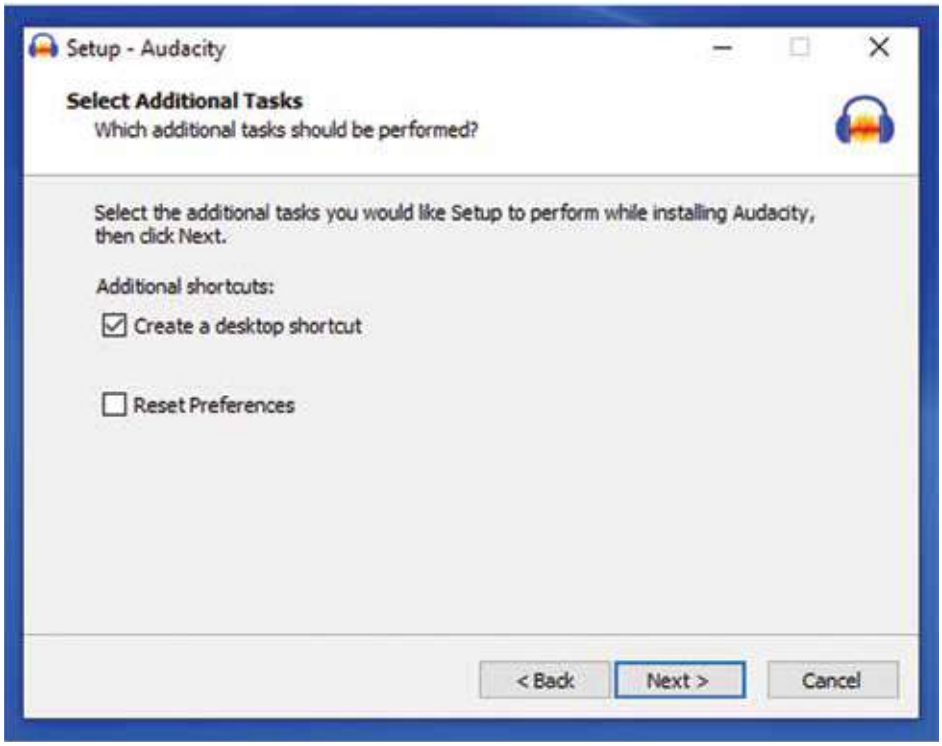


Figure 10.7: Additional Shortcut

Click the Next button after making your selection for the preference.

9. Audacity is now prepared for installation; at this point, you can decide whether to stick with the preset options for the installation or alter them. To alter the preferences or to continue, click the back button or the Install button, respectively.

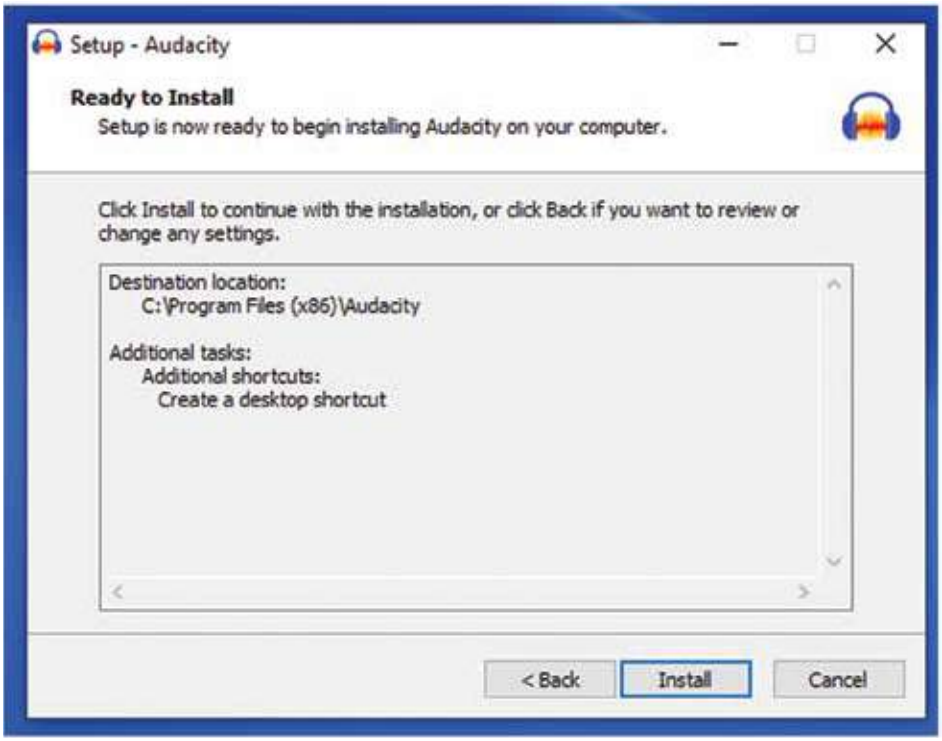


Figure 10.8: Ready to Install

10. On your computer, the setup will extract and install the necessary files.

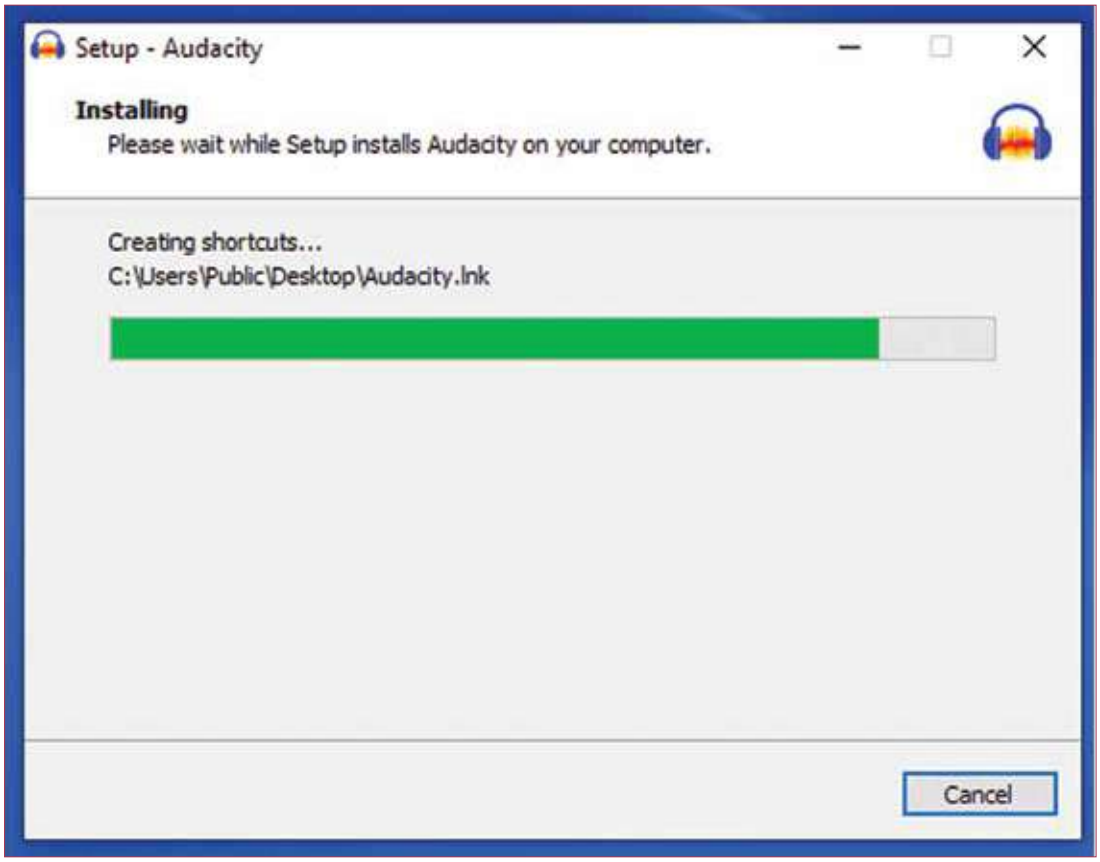


Figure 10.9: Extracting Files

11. To complete the installation, click the Finish button.

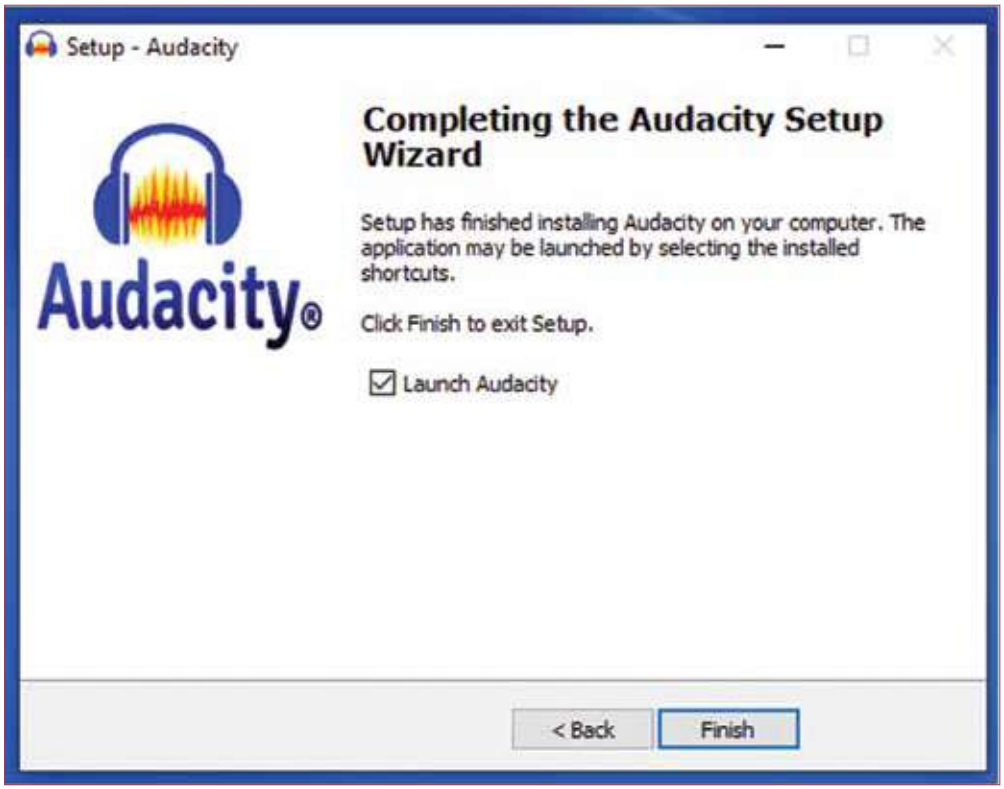


Figure 10.10: Completing Audacity Setup

The Welcome screen will appear as shown below.

Figure 10.11: Audacity Welcome Screen

AUDACITY INTERFACE

Audacity features a user-friendly interface that is essentially the same across all operating systems.

REMEMBER IT!

Audacity was started by Dominic Mazzoni and Roger Dannenberg in the fall of 1999 at Carnegie Mellon University.

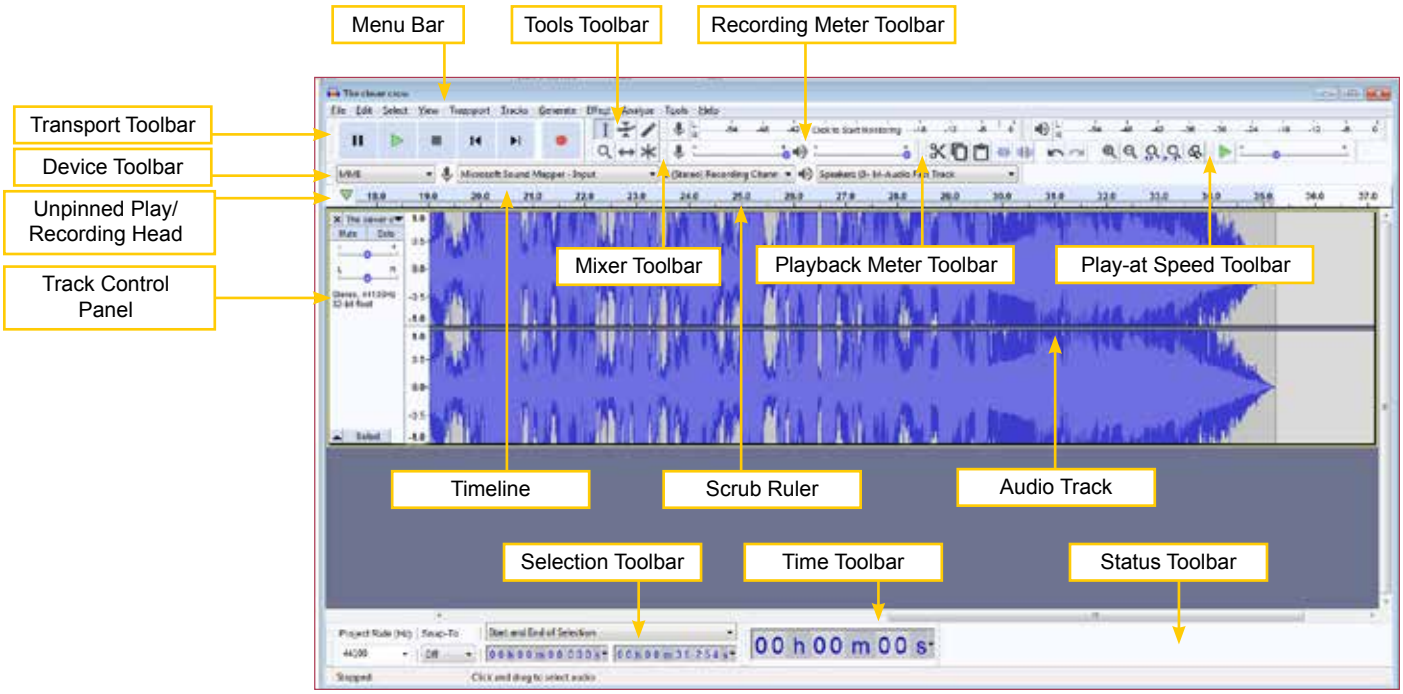


Figure 10.12: Audacity Interface

RECORD AUDIO USING AUDACITY

We are all aware that in order to capture audio, a working microphone must be connected to, or at the very least built into, the computer.

Follow the given steps to install audio in audacity.

Steps:

1. Choose a recording device for audio from the device toolbar.

Figure 10.13: Selecting the Audio Recording Device

2. Check the recording level on the monitoring metre to make sure Audacity and the microphone are working together. The intensity of the signal will be stated.

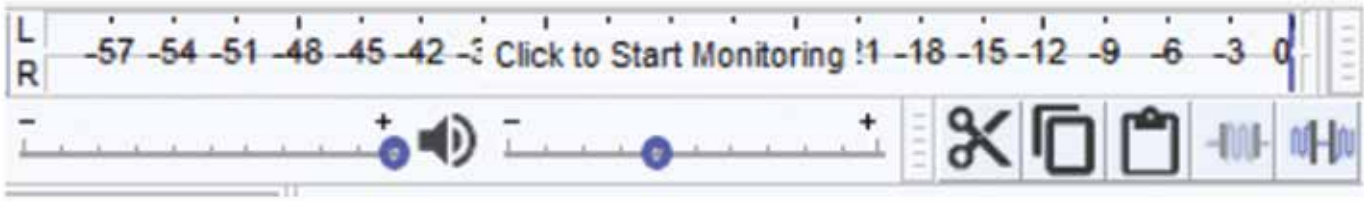
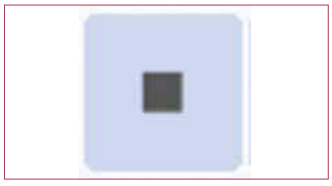


Figure 10.14: Monitoring Meter

3. When everything is prepared to record audio, click the red button on Audacity's main toolbar. The recording will begin after this.

4. Press the stop button to stop the recording.



5. When you touch the stop button, Audacity will show you the recording.

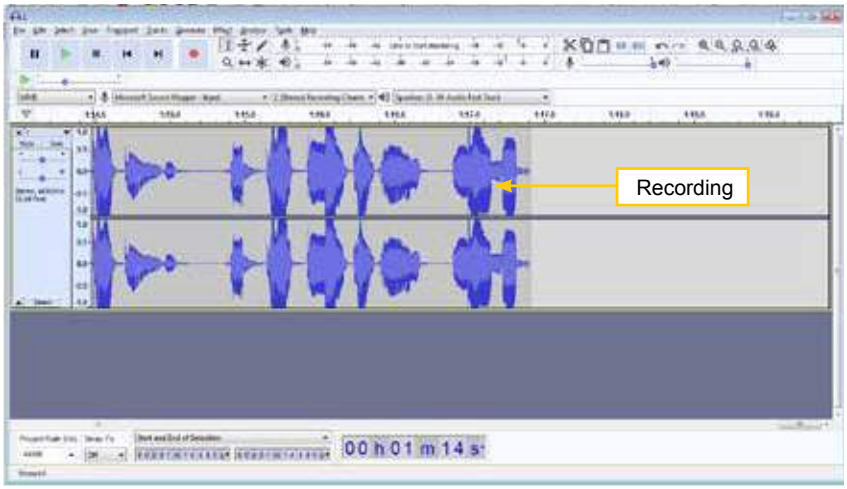


Figure 10.15: Audio Recording

You can hear the most recent audio recording by clicking the play button.

SAVING AUDIO RECORDING

You can save your recording as a Project or Export it to the most popular audio formats using Audacity's many different saving options.

Follow the given steps to save the recording.

Steps:

1. Select Export from the menu options after clicking the File menu, and then choose the required option from the list of supported audio formats.

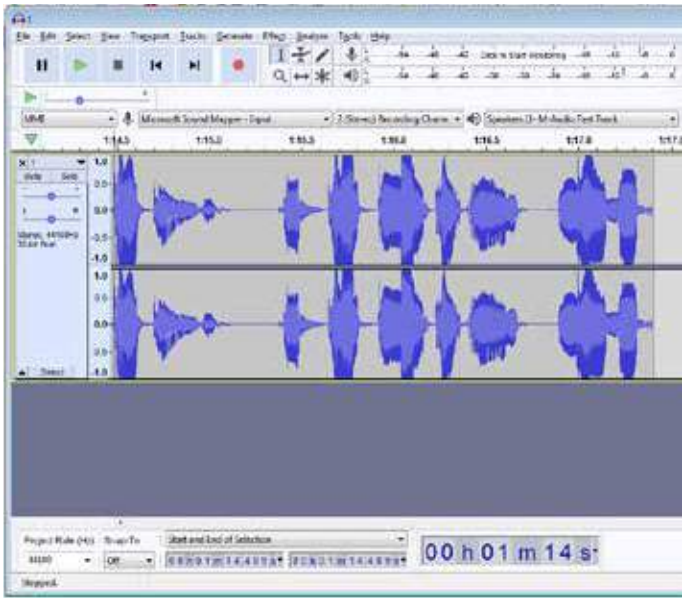


Figure 10.16: Saving Audio Recording

2. It will show the Export Audio dialogue box. Click the Save button after entering the file name in the File name textbox.
3. The Edit Meta tags dialogue box will be displayed. Add additional information about the track in various fields and click on the OK button.

RECORD AUDIO USING AUDACITY

You can add a track from your computer's hard drive and modify it thereafter adding it to Audacity. However, you must import the track first before you can begin modifying it.

Follow the given steps to import a track from your computer's hard drive.

Steps:

1. Select Import from the menu selections by clicking on the File menu, and then choose the Audio option.

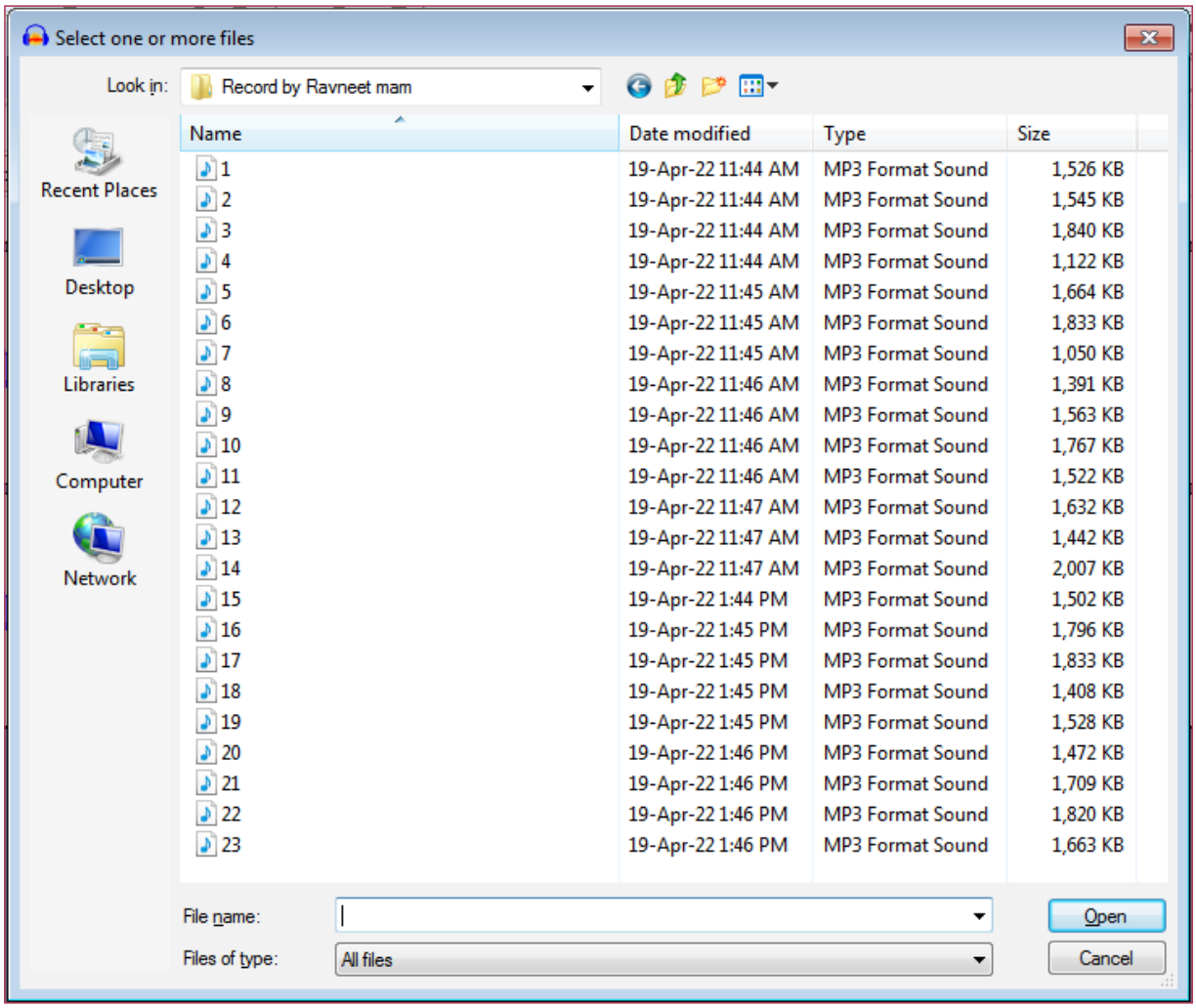


Figure 10.17: Select one or more files

2. Find the track you want to import in the select one or more files dialogue box. When the desired track has been chosen, select Open to bring it into Audacity.

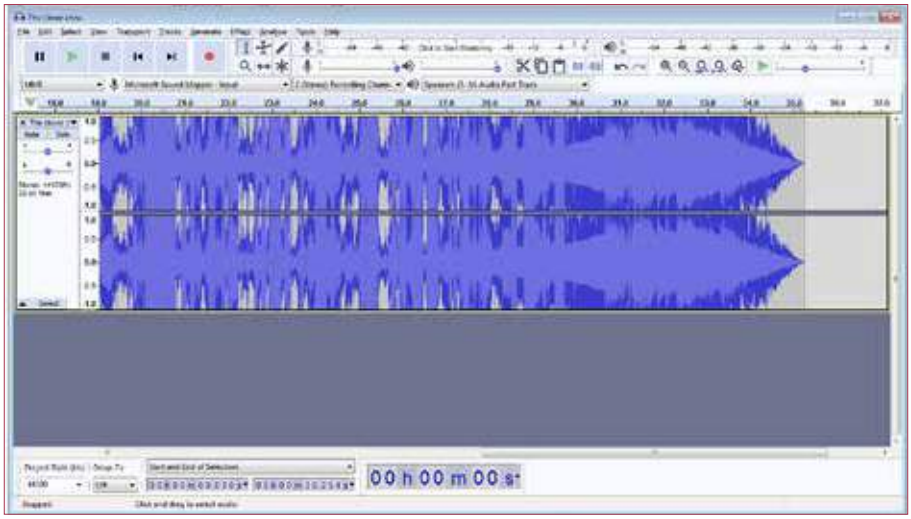


Figure 10.18: Import Track

WORKING WITH MULTIPLE TRACKS

Multiple tracks may be necessary to work with while doing sound editing. Let's say we want to edit the sound for a scene from a movie where characters are conversing while crossing a busy street. We are aware that this scene will include character talk in addition to the regular street noises that one hears when walking. We might like to add some background music to increase the scene's impact. Working with numerous tracks at once is necessary for all of this.

The act of combining numerous Audacity tracks that are playing simultaneously into a single track is known as mixing. When playing or exporting, Audacity automatically combines tracks, but it can also manually combine a number of tracks into one within the project.

Follow the given steps to work with multiple tracks.

Steps:

1. From the file menu, use Import option and import two different tracks that you wish.

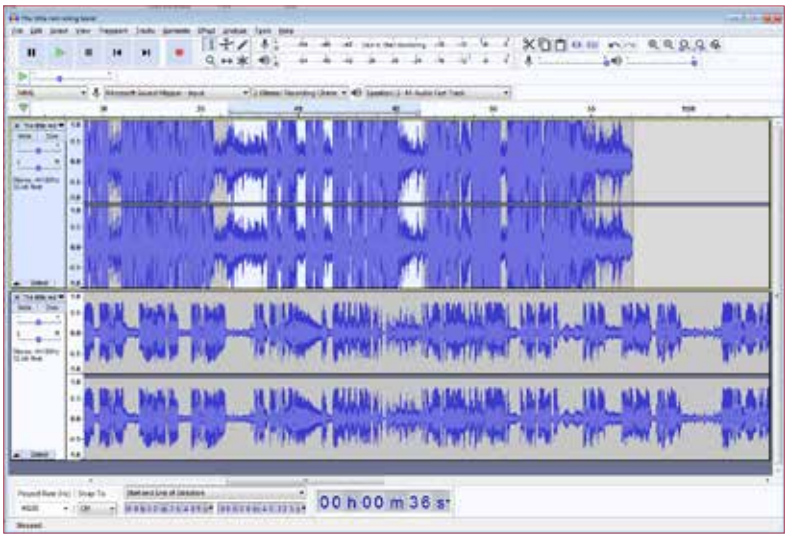


Figure 10.19: Multiple Tracks

2. Use the I selection tool from the Tools toolbar and select the portion you want to delete from the first track.

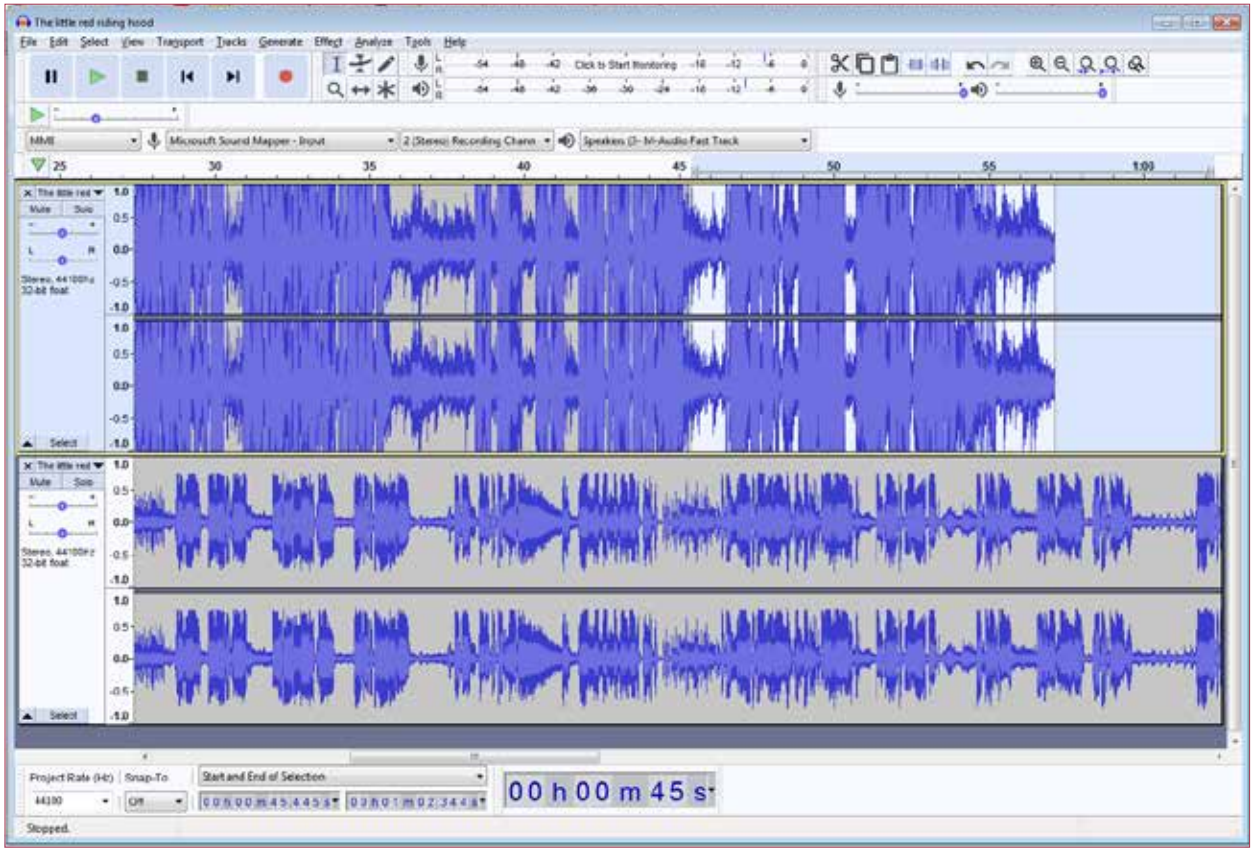


Figure 10.20: Working of Selection Tool

3. You will see that the selected portion is now highlighted with a different colour. To delete the selected portion, click on the delete key. Observe that the selected portion has been removed from the track.

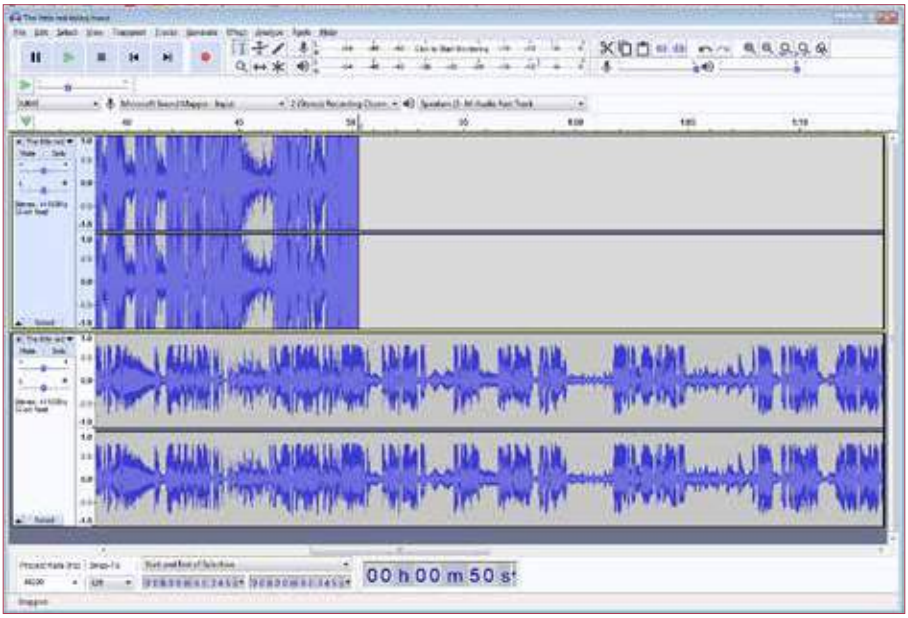


Figure 10.21: Deleting Track Portion

4. Repeat step3 to delete the selected portion in the selected track.

5. You will notice that the timeline of Track Audacity will look the same as the picture given below after deleting the selected portions.

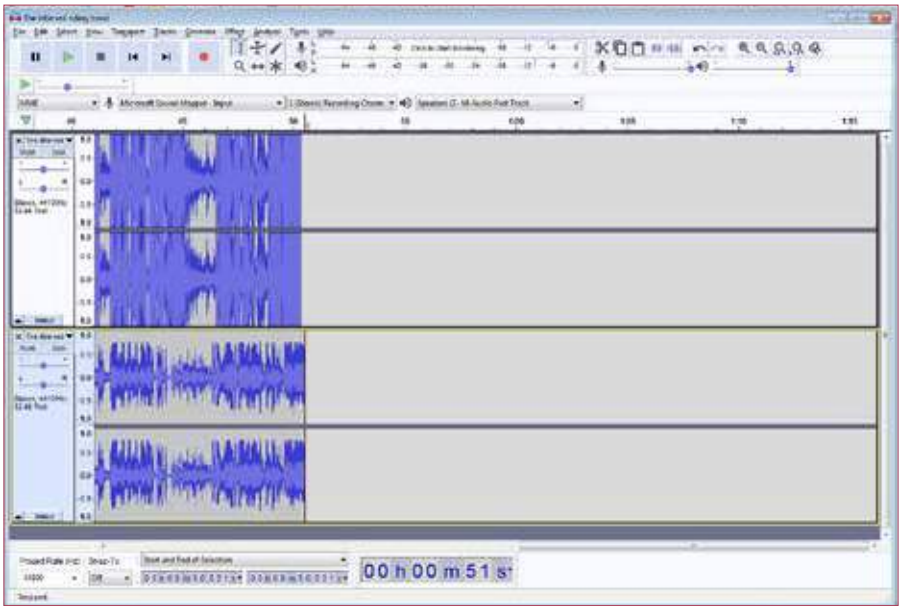


Figure 10.22: Tracks Audacity Timeline

6. Let's select the Timeshift tool and place the remaining part just after track one.

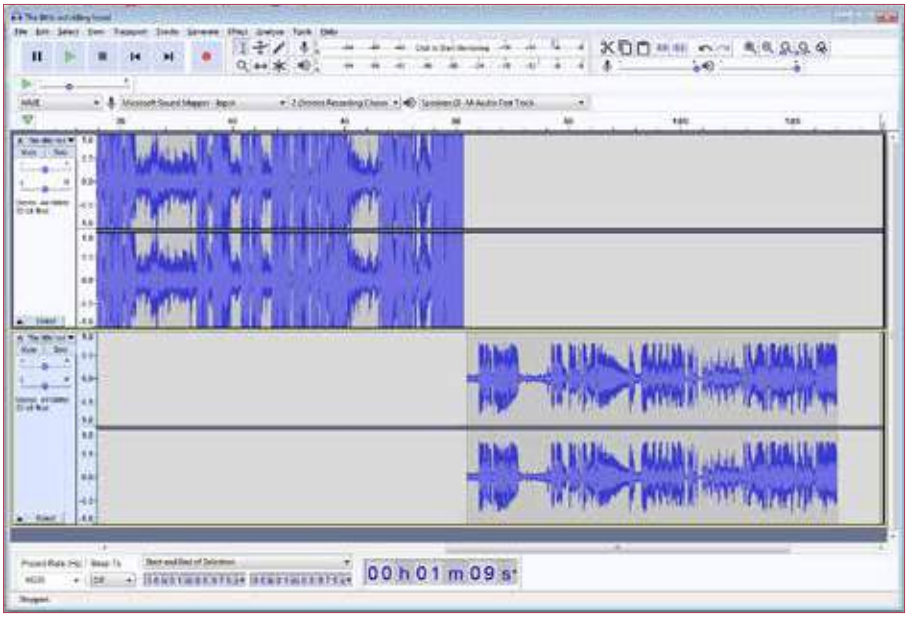


Figure 10.23: Working of Time Shift Tool

Press the Play button to listen to the track.

APPLYING EFFECTS

There are numerous effects available in the majority of photo editing and presentation tools, including PowerPoint software, that may be used to improve the appearance and functioning of various items. For instance, we can easily apply various animation or transition effects to various objects like text and photos in PowerPoint. Similar to this, we can also use Audacity's

many audio effects to enhance the sound quality of an entire track or just a selected section of it.

We'll quickly go through how to add some audio effects to a track today.

Steps:

1. Utilizing Audacity Timeline's import function, add a track.
2. Choose the section of the track where the effect should be applied using the Selection Tool from the Tools Toolbar. Press the Ctrl-A key combination to add effect to the entire track.

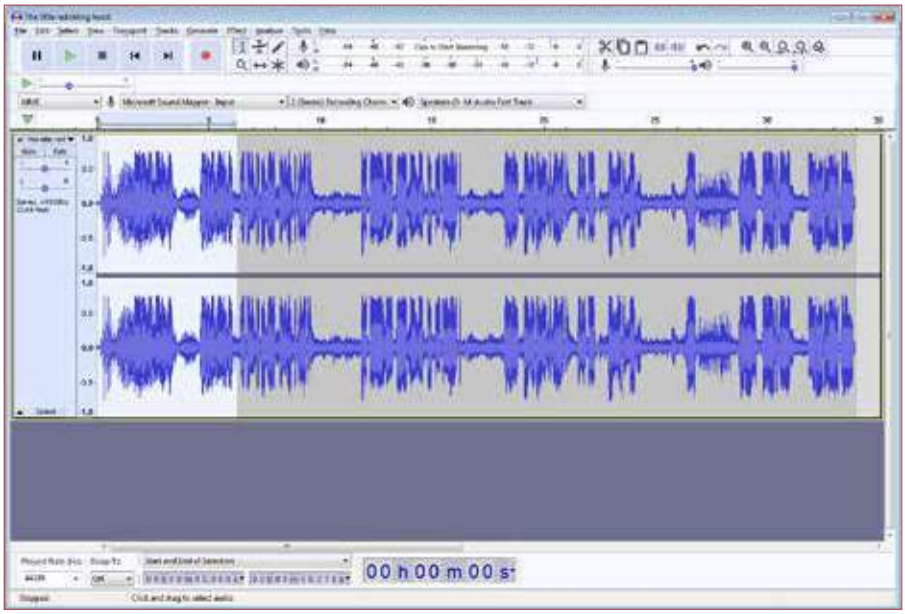


Figure 10.24: Applying Effects

3. Now select the Echo menu option by clicking on the effect menu. The chosen section of the track will immediately receive the Echo effect.

Using the instructions above, you can apply a variety of different effects to your audio file.

Kids' IQ

Karan is working on two tracks; he wants to add the remaining track from track 1 to another track in the timeline after deleting a piece of track 1. Provide Karan with the tools he needs to complete this task.

Let's Recall

- Audacity was released on May 28, 2000 and enables you to edit and record audios.
- Audacity is a free open-source programme.
- You can quickly and easily trim a section from one audio track and combine it with another using Audacity.
- The act of combining numerous Audacity tracks that are playing simultaneously into a single track is known as mixing.
- Audacity was started by Dominic Mazzoni and Roger Dannenberg.

A. Fill in the blanks.

1. Audacity was released on May .....
2. Audacity has a ..... design.
3. In Audacity, you can utilise the ..... tool to enhance a specific area of the track.
4. The act of ..... numerous Audacity tracks that are playing simultaneously into a single track is known as mixing.
5. ..... option is used to add a track to the Audacity timeline.

B. Write 'T' for True statements and 'F' for False statements.

1. Audacity is a Paid software. ☐
2. Audacity is a cross-platform app. ☐
3. It allows edit of only one track at a time. ☐
4. Play button is pressed to play the track. ☐
5. You can't delete the portion of the track once it's saved. ☐

C. Answer the following questions.

1. What is Audacity?

.....

.....

2. How can we install Audacity on our computers?

.....

.....

3. How Audacity is a Cross-platform app?

.....

.....

4. Write the steps to import audios to Audacity.

.....

.....

5. How can we apply effects to the audio using Audacity?

.....

.....

Critical Thinking

Using several Audacity sound effects, Kanku has produced a new track and altered its audio. She wants to save this track in MP3 format on her pen drive. Aid Kanku in saving the MP3 version of the track.

Team Work

Team up with your partner and record an audio of your favourite song using Audacity and apply effects to it. Once done, play it in the class.

Model Test Paper

A. Tick (✓) the correct option.

1. In battle zones, military operations entail ..... .
   (a) landmine detection ☐ (b) theif detection ☐
   (c) cyberbully detection ☐ (d) attack detection ☐
2. We can run computer instructions repeatedly using the .....without having to keep writing the same ones.
   (a) concept of a loop ☐ (b) concept of copy ☐
   (c) concept of detection ☐ (d) concept of a protection ☐
3. The subscriber totally outsources the ..... and ..... they require, such as hardware and software, under an IaaS arrangement.
   (a) storage and resources ☐ (b) guide and guidelines ☐
   (c) data and data science ☐ (d) technology and law ☐
4. Most ……providers give storage options. These storage services are immensely popular among users.
   (a) data services ☐ (b) cloud service ☐
   (c) information services ☐ (d) Electronic computers ☐

B. Fill in the blanks with correct words.

1. The size of a network can be expressed by the ..... area they occupy.
2. Setting up a firewall system aids in the fight against ..... and ..... .
3. Computer networks can be characterized by their ..... as well as their ..... .
4. The majority of cloud providers offer ..... options.
5. A ..... is created specifically for a given organization, and only that organization is permitted to use or access it.

C. Write 'T' for True statements and 'F' for False statements.

1. This command causes the loop to skip the remaining portions of its body and to retest its condition right away before updating the loop variable. ☐
2. Traversal is the process of accessing elements in a sequence one at a time. ☐
3. Companionship: providing company to elderly individuals. ☐
4. Robots are artificial agents that do not behave in the real world. ☐

D. Answer the following in one word.

1. What is cloud computing?
2. What is a microcontroller?
3. Write about any two cloud services.
4. How can we create a query using the query wizard?
5. What considerations are to be made before choosing cloud service?

Model Test Paper

A. Tick (✓) the correct option.

1. The many sensors that are attached to an ……..allow it to sense and receive.
   (a) Arduino ☐ (b) Srirduino ☐ (c) Arvindo ☐ (d) Beprindro ☐
2. Arduino is an open-source hardware and software company, project, and user community that designs and manufactures …….
   (a) single-board microcontrollers ☐ (b) double-board microcontrollers ☐
   (c) Macro controllers ☐ (d) Mixed controllers ☐
3. A query is a simple question that you ask to find specific information from the……....
   (a) database ☐ (b) data security ☐ (c) data collection ☐ (d) data form ☐
4. A …….service gives subscribers access to different applications (apps).
   (a) SaaS cloud ☐ (b) Saving cloud ☐
   (c) PaaS cloud ☐ (d) Google Drive ☐

B. Fill in the blanks with correct words.

1. The goal of the ..... field of robotics is to investigate how to create efficient and intelligent robots, which have ..... implanted in their bodies to function similarly to a human's five senses.
2. People that exploit security holes in a computer network or system are known as ..... .
3. The ..... of digital content is addressed by cyber ethics.
4. Identity theft is a type of cybercrime in which the culprit creates a ..... identity.

C. Write 'T' for True statements and 'F' for False statements.

1. All of this simply means that we have the option to select a certain cloud service based on our needs. ☐
2. The term "cloud computing" refers to a range of services that are available via subscription. ☐
3. A tiny computer chip called Arduino is mounted on a double-integrated circuit. ☐
4. Code for Arduino can be written in a variety of languages, including Java, C, C++, and Python. ☐

D. Answer the following questions.

1. Identify two drawbacks of cloud computing.
2. What is Cloud computing?
3. What function does IDE serve?
4. What should be considered when viewing websites?