# Contents

# 1 COMPUTER NETWORK

## Learning Outcomes

**At the end of this chapter, 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.

## 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, 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.

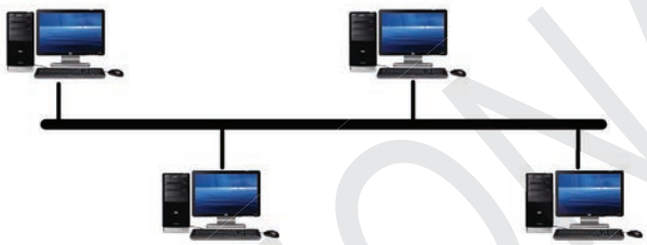


Figure 1.5: Bus Topology

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?*

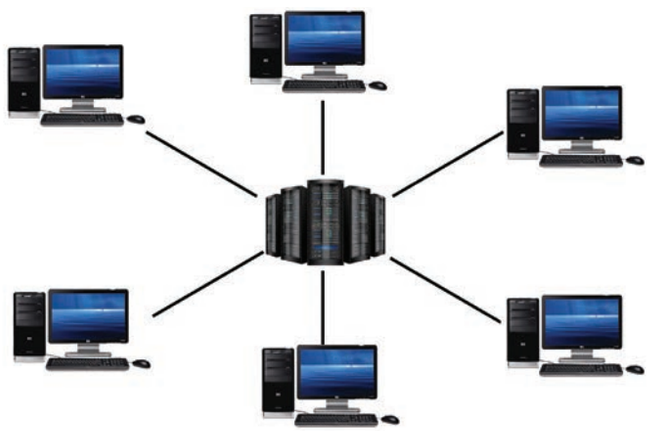


Figure 1.6: Star Topology

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.

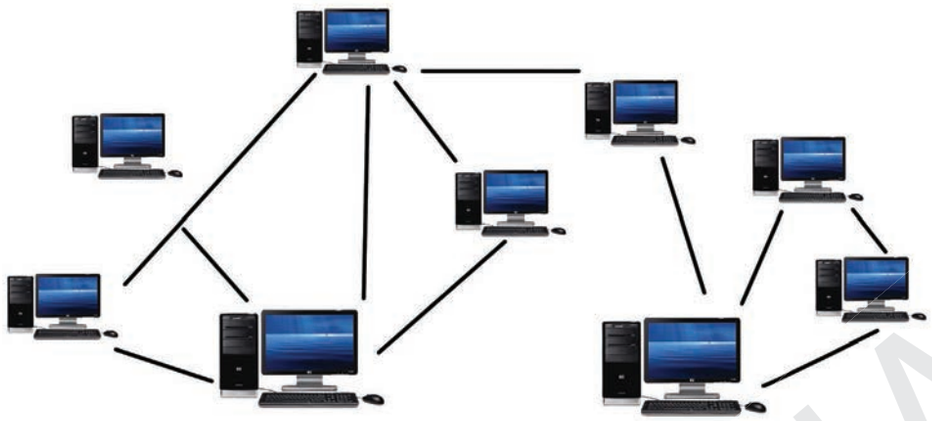


Figure 1.9: Mesh Topology

## 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.

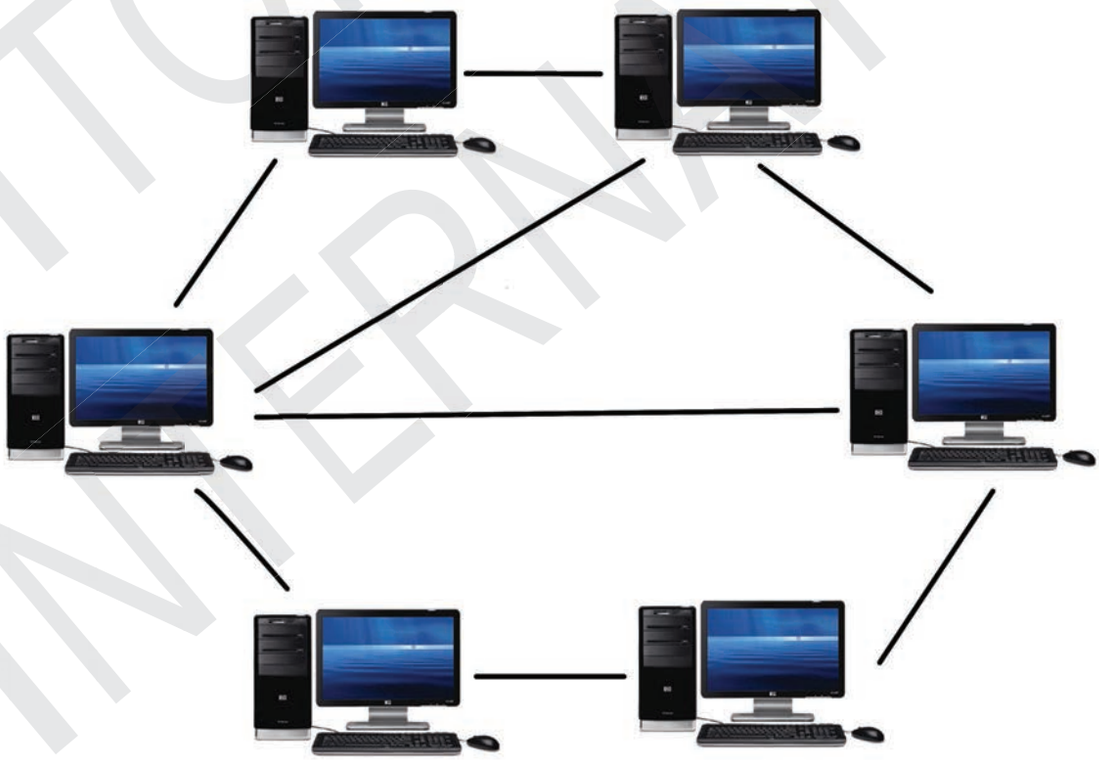


Figure 1.10: Peer-to-Peer Network

## 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.**

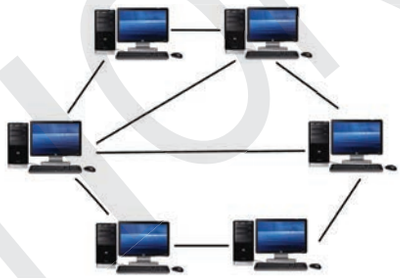
.....

.....

.....

.....

.....



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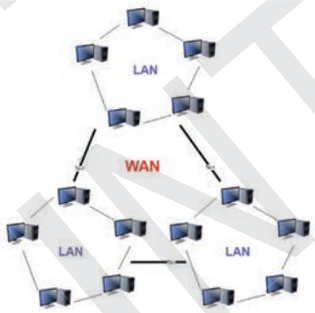
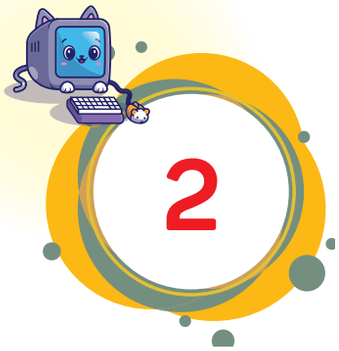
## Team Work

**Prepare a presentation on types of network.**



# 2 LOG ON TO ACCESS

## Learning Outcomes

**At the end of this chapter, 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.

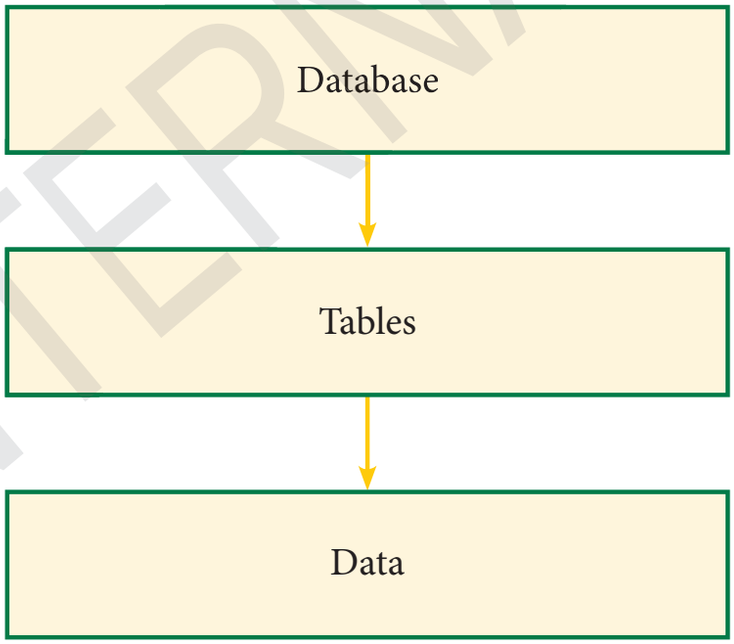
**Do You Know?**

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 Data Base 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.

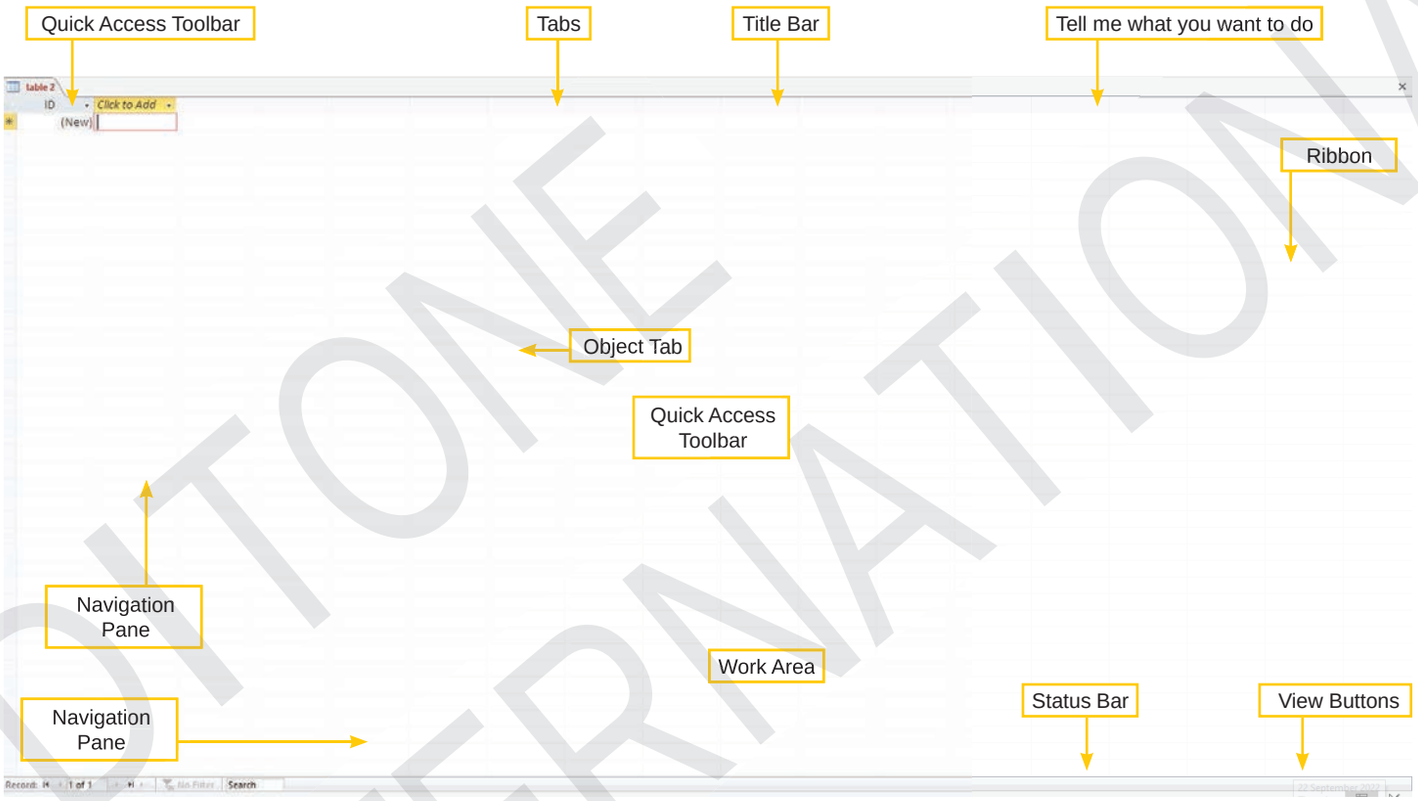



Figure 2.1: Components of Microsoft Access 2016

### 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.

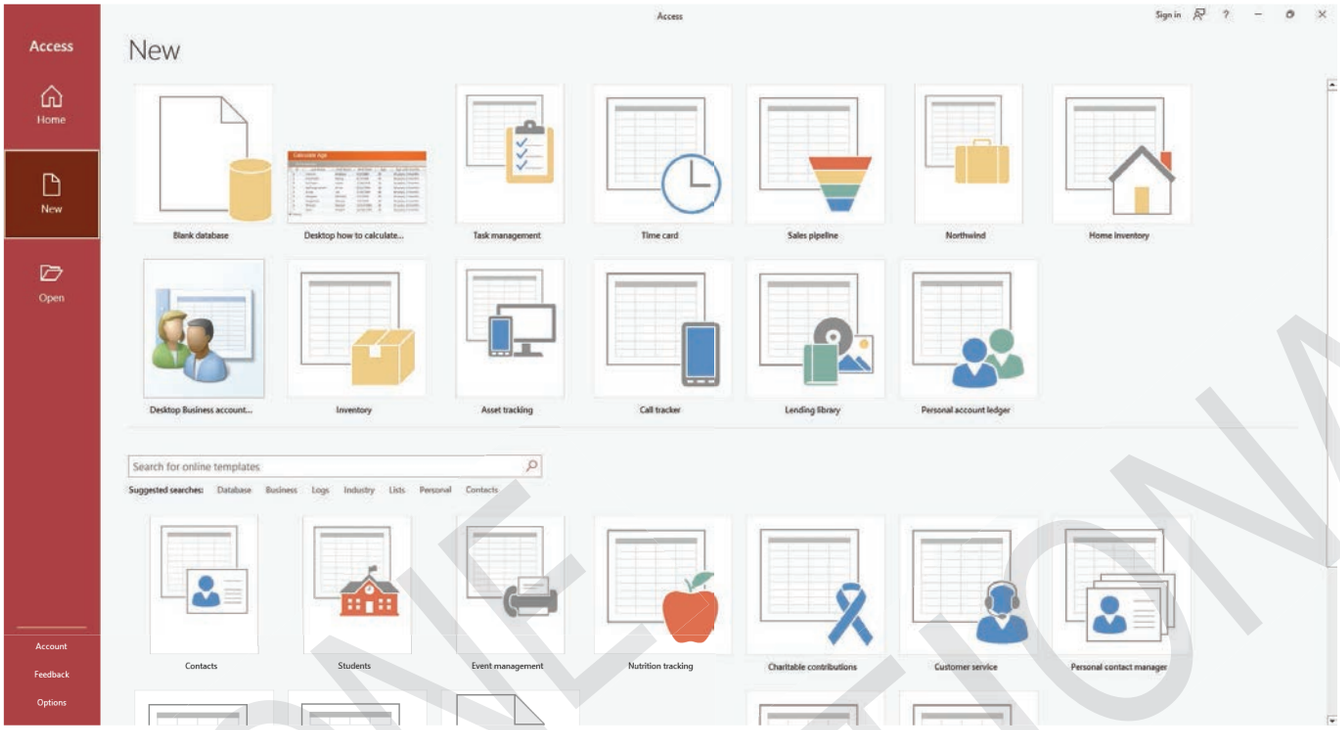



Figure 2.2: Blank Database

2. Write the file name.

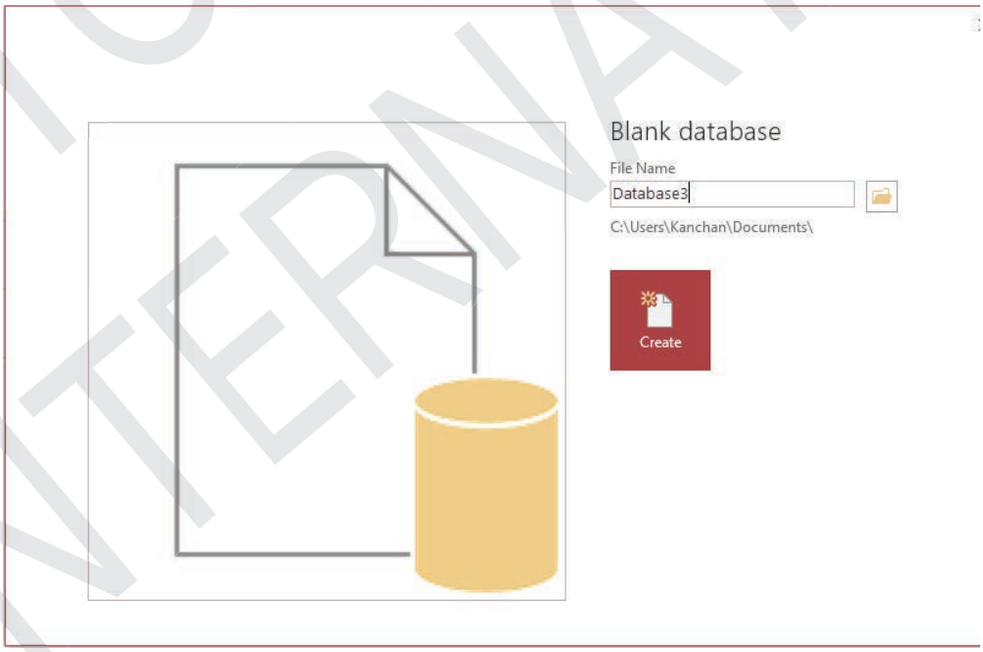



Figure 2.3: Blank Desktop Database

3. Click on the create option to create Data Base.

## Creating a Table In Design View

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

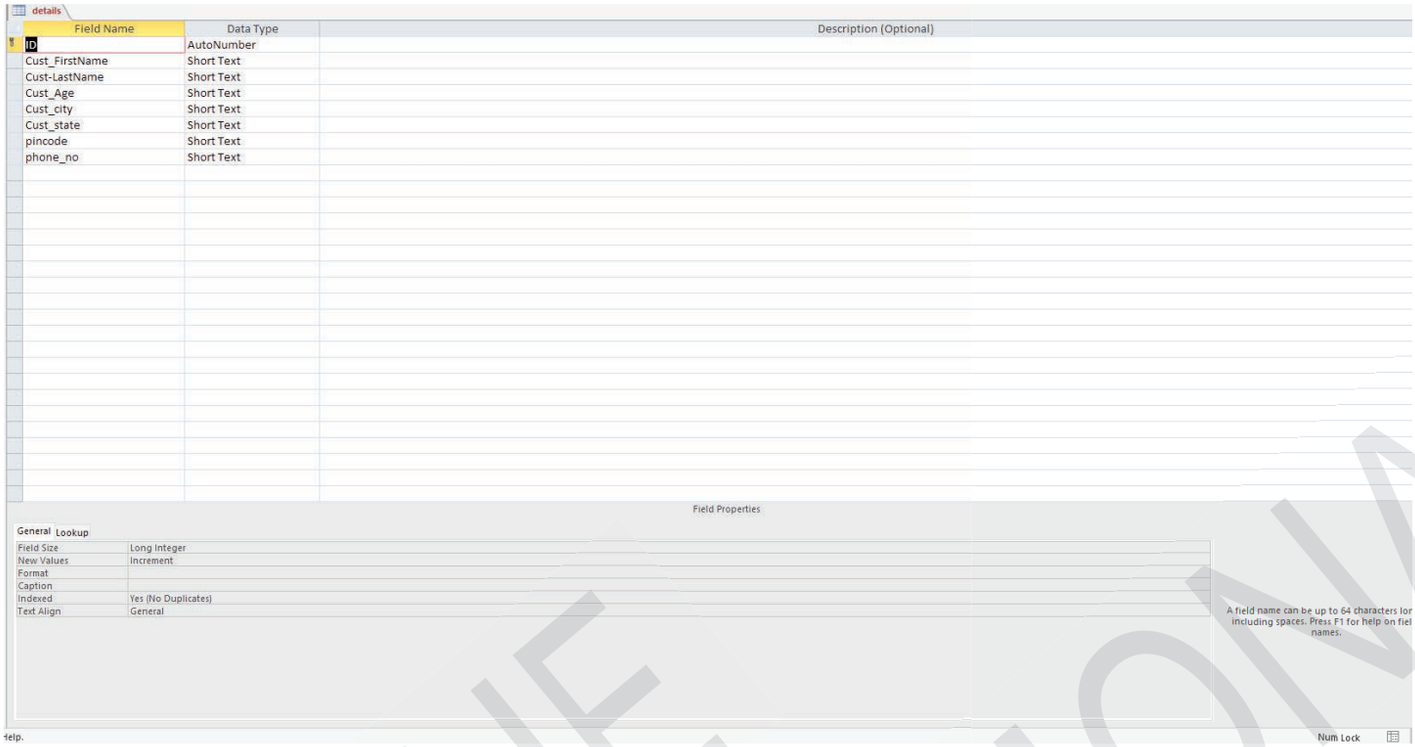



Figure 2.4: Creating Table in Design View

### 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.

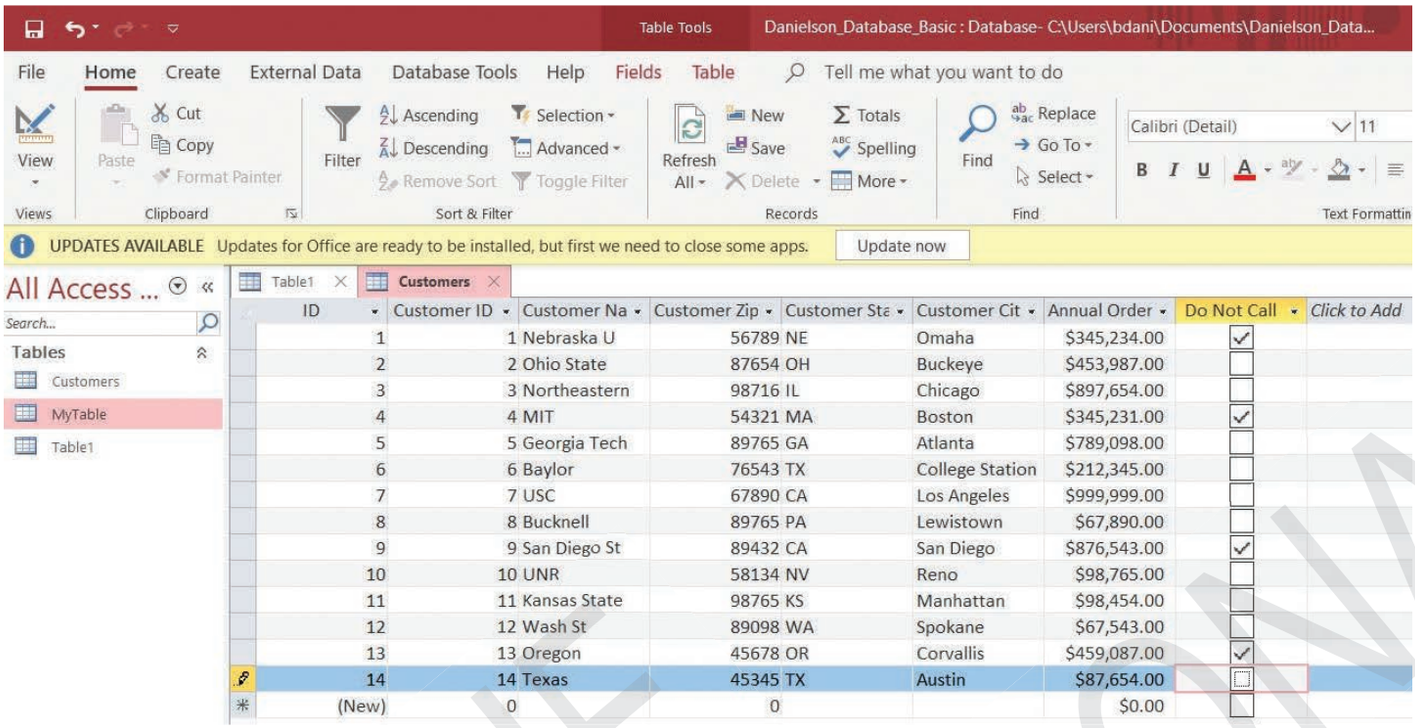



Figure 2.5: Creating Table with Datasheet View

## 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 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. |
| 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?*

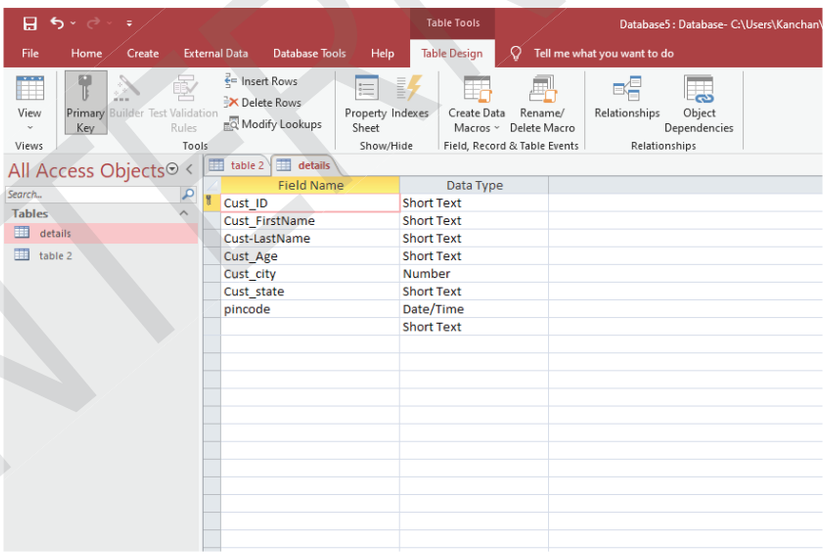



Figure 2.6: Primary Key

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.

## Upskill Your Intelligence

**A. Fill in the blanks.**

1. The use of data is essential in ..... technologies.
2. Government depends 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 ..... 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 in this word grid.**

| 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 |