

Chapter = 07

Introduction to Database System

1. What is database? Give its some uses.



Database

A database stores data in organized form. A database is composed of tables which contain rows and columns. These rows and columns are called records and fields respectively.

Uses Of Database

- 1) These days, database can be seen in every field of life, for example in industries, health, agriculture, schooling, business and banking.
 - 2) The databases can be developed according to the size of its records for a particular organization.
 - 3) A database is playing a leading role to enhance the efficiency and performance of any organization.
2. What do you know about Database Management System (DBMS). Also give its examples

Database Management System (DBMS)

Databases are usually developed, maintained and controlled by the Database Management System (DBMS). The DBMS essentially serves as an interface between databases and end users or application programs, ensuring that data is consistently organized and remains easily accessible.

Examples

- a) MySql
- b) Oracle
- c) Microsoft SQL Server
- d) MongoDB

3. What are the **Advantages of Database Management System over the Flat File System?**

DBMS	Flat file system
Multiple users can access data simultaneously	only users can access data at a time
Capable of handling huge sets of data	Capable of handling smaller sets of data

Allows non-duplication and integrity	Increase duplication and redundant
Supports online access	Does not Supports online access

4. Mention Characteristics of Database Management System

Characteristics of Database Management System

- Multiple users can access DBMS and can view, add, edit and delete records.
- A DBMS offers tools like Queries, Views and Forms which help users to manipulate data easily and more efficiently.
- A DBMS is more secure and reliable.
- DBMS allows distribution of data in multiple tables by making use of features like keys and relationships between fields of those tables.
- This allows lesser duplication of data and results in lesser redundancy.
- Preparing backups and providing limited permissions to the users are features of DBMS.
- DBMS can handle large and complex data more conveniently. Therefore, it is preferred by the medium and large organizations.

5. What are the basic Components of DBMS?

Table

It is a collection of data elements organized in shape of rows and columns. A contact list may be one of the simplest examples of a table. The marks record prepared by a class teacher is also an example of a table.

Field

It is the smallest component in a database. It is where the actual data is stored during data entry. All data fields in the same table, have unique names. Fields are also called attributes or columns.

Record

A single entry in a table is called a record. Records are also referred as tuples or rows. A record is made up of two or several data items which are also called tuples in a table representing a set of related data

Data Type	Description	Examples
Integer	Holds only whole numbers.	145, -35, 74586
Floating Point	Holds numbers with decimal points.	5.6, 3.14, 554.9
Character	Stores only one character.	A, B, c, d
String	Can store a combination of numbers, letters and special characters.	Pakistan, Computer, @admin
Boolean	Can hold only Boolean values i.e. true or false.	1,0
Date & Time	Stores date and time in specified format.	01-01-2020 11:30

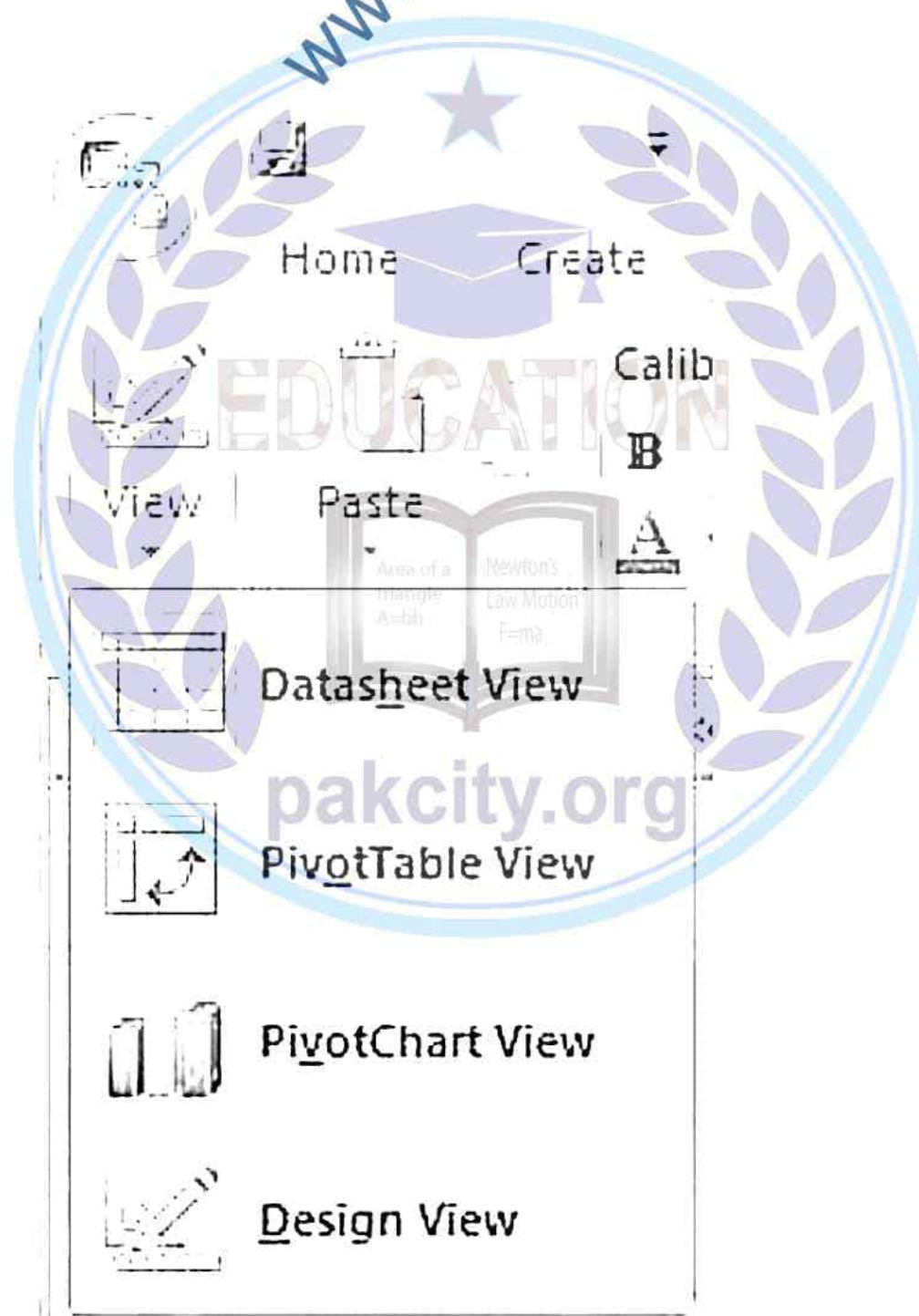
Views



In a database the data is stored in tables. However, we can see that data through views. Views do not store data and just show the information virtually. They have the ability to fetch data from different tables.

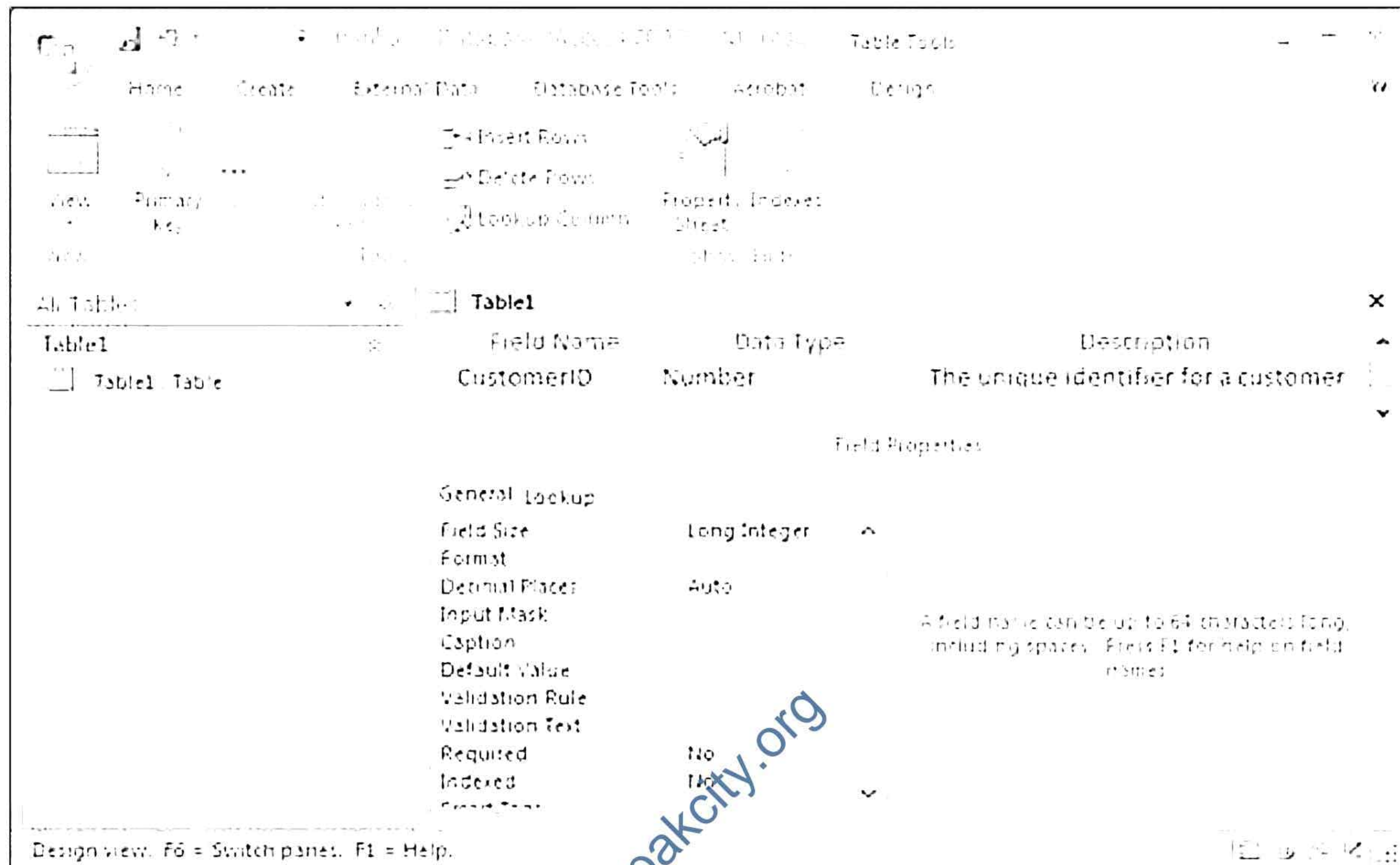
6. Describe the steps for creating a table using a Design View

- 1) To create tables in Access using “Design View,” click on the Create tab and click on the Table icon. Then pull down the View menu and choose Design View.



- 2) A new table then appears in the Table Design View. Note that the default name assigned to the table is Table1.
- 3) Type the name of a field into the “Field Name” column.

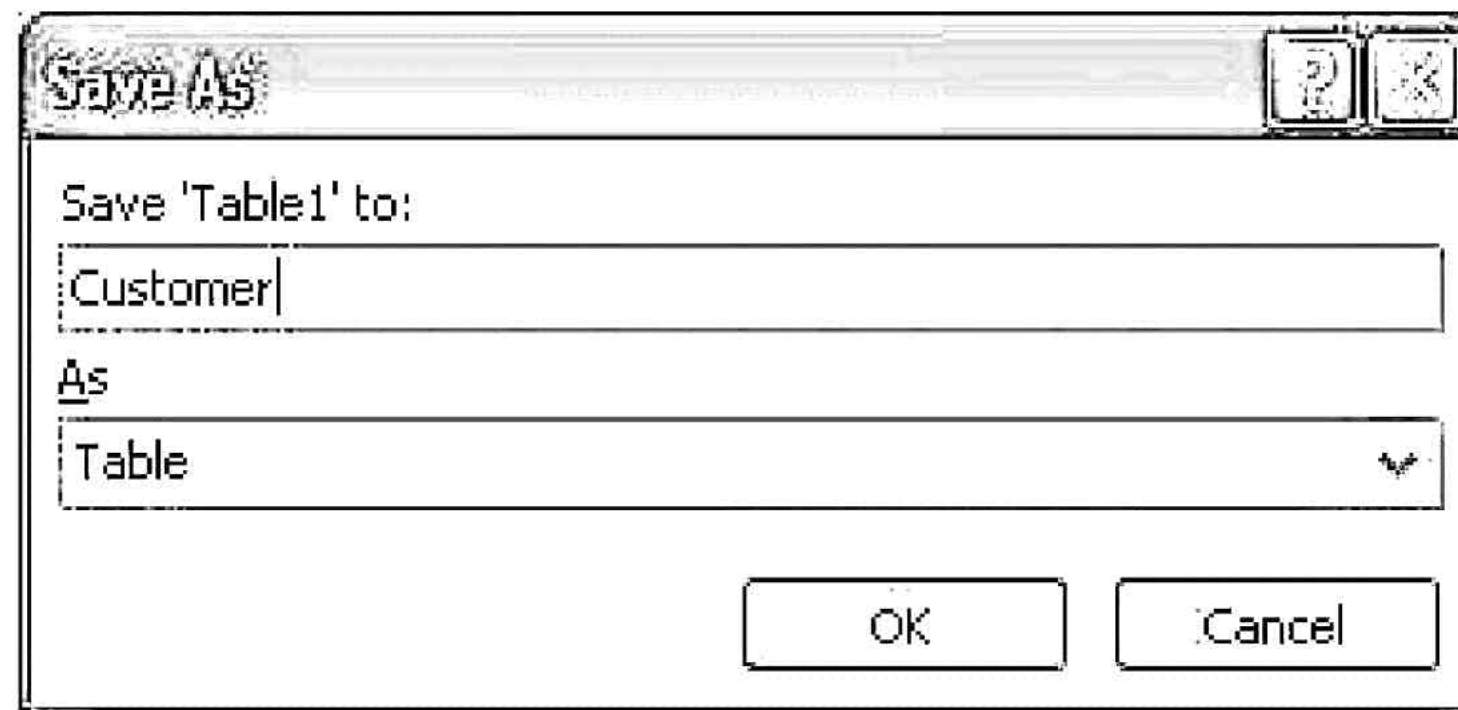
- 4) Then use the drop-down menu in the “Data Type” column to assign the field a data type.
- 5) If desired, type a description of the data stored in this field



- 6) Repeat steps 4 and 5 until you have created all of the necessary table fields. An example of a Table may be customer Table that has following entries.

Field Name	Data Type	Description
Customer ID	Number	The Unique Identifier for a customer
First Name	Text	The First Name of the customer
Last Name	Text	The Last Name of the customer
Address	Text	The Address of the customer

- 7) Click the “Save” button in the Quick Access toolbar.
- 8) Then type a name for the newly created table and click “OK”.



7. Write the Steps for creating a query or view using Design View.

Steps for creating a query or view using Design View



1. To make a query in design view, click on the “Create” tab in the Ribbon and pull down the “Queries” group and click on “Query Design” button.
2. In the “Show Table” dialog box, add the table or tables that you want to add to query design view.
3. Next, add the fields from these tables that you want to view in your query results or view. If you want to add all of the fields of a table into your result set, you can click and drag the first field in the table, shown as an asterisk.
4. Once you have added all the necessary tables and fields to the query or view, click the “Close” button in the “Show Table” dialog box to close it and display the query design view.
5. To run a query and view the result set, you can click the “Run” button in the “Results” group of the “Design” tab in the “Query Tools” contextual tab on the office Ribbon.
6. The result set looks like a table. This result set is a reflection of data from the selected fields of the tables. It is also known as a view.
7. Click the “Save” button in the Quick Access toolbar. Type a name for your view and click “OK” to save the query.

8. What is data modeling? What are its important components?

Data Modeling

Data modeling is a process of developing conceptual representation of data objects and their relations. Data models are used to express how the information will be stored in database. This helps to identify the most important fields and remove the irrelevant data.

(i) Entity

(ii) Relationship

(iii) Referential Keys

9. Describe the components of Data modeling.

Entity

In literal sense, an entity is any individual object which has its own qualities and properties. In database terms, an entity is an independent table and its fields are known as attributes. As an example, a Payroll database will contain an entity named Employees. The Employees entity will contain various attributes like Employee ID, Name, Designation, Salary, etc.

Relationship

When the database structures grew and became more complex, a lot of data started to become redundant which means that data was being unnecessarily duplicated. This created a need to connect data entities instead of repeating same data in multiple tables. This resulted in the creation of relationships and Relational Database Management Systems (RDBMS).

Referential Keys

The relationships are configured by using referential keys on entities. The keys determine a certain set of rules that must be followed by the data stored in a field of an entity. In larger databases, keys are very important to uniquely identify a specific record.

10. Describe the types of relationship.

Three types of relationships can be defined between entities.

(i) One to One Relationship

This type of relationship defines that a record in one entity can be connected to only one record in another entity. This is not a very common type of relationship because the data from related entities can directly be placed in a single entity.

(ii) One to Many Relationship

This type of relationship defines that a record in one entity can be connected to many records in another entity. This is the most common type of relationship used in relational databases

(iii) Many to Many Relationship

In this type of relationship, one or more records of one entity are connected to one or more records of another entity.

11. What are the types of referential Keys

Two types of keys are most commonly used in RDBMSs:

(i) Primary Key

A primary key is used to uniquely identify a record in an entity. When a primary key is applied to any attribute in an entity, it forces the rules of Primary Key onto that attribute.

(ii) Foreign Key

A foreign key is used to define the connection or relation between two entities. The foreign key of one entity is configured to be connected to the primary key of another entity. When a foreign key is applied on an attribute, it enforces that the value for that attribute should match any record in the related entity having a primary key.

12. What are the steps to design ER model

Steps to design ER Model

1. Identify and design the entities based on the requirements of its users.
2. Identify and design the attributes within the required entities.
3. Identify the relationships required between entities.
4. Define Primary Keys in interrelated entities.
5. Design Foreign Key relationships based on requirements and bind them to previously created Primary Keys.
6. Generate an automated Entity Relationship Diagram