

## UNIT-3: RDBMS (RELATIONAL DATABASE MANAGEMENT SYSTEMS)

1	A database is an organized collection of data.
2	A database management system is a software package with computer programs that controls the creation, maintenance, and use of a database. It allows organizations to conveniently develop databases for various applications. A database is an integrated collection of data records, files, and other objects. A DBMS allows different user application programs to concurrently access the same database.
3	Well known DBMSs include Oracle, IBM DB2, Microsoft SQL Server, Microsoft Access, PostgreSQL, MySQL, FoxPro, and SQLite.
4	<b>Data can be organized into two types:</b> <ul style="list-style-type: none"><li>• <b>Flat File:</b> Data is stored in a single table. Usually suitable for less amount of data.</li><li>• <b>Relational:</b> Data is stored in multiple tables and the tables are linked using a common field. Relational is suitable for medium to large amount of data.</li></ul>
5	Database servers are dedicated computers that hold the actual databases and run only the DBMS and related software.
6	<b>Advantages of Database</b> <b>Reduces Data Redundancy</b> → no chance of encountering duplicate data <b>Sharing of Data</b> → the users of the database can share the data among themselves. <b>Data Integrity</b> → Data integrity means that the data is accurate and consistent in the database. <b>Data Security</b> → Only authorised users are allowed to access the database and their identity is authenticated using a username and password. <b>Privacy</b> → The privacy rule in a database states that only the authorized users can access a database according to its privacy constraints. <b>Backup and Recovery</b> → Database Management System automatically takes care of backup and recovery. <b>Data Consistency</b> → Data Consistency means there should be multiple mismatching copies of the same data.
7	<b>Features of Database</b> <ul style="list-style-type: none"><li>➤ A database can have one or many tables.</li><li>➤ Each table in a database contains information about one type of item.</li><li>➤ <b>record uniqueness</b> → Uniqueness helps to avoid accidental duplication of records caused by user or computer error. This unique field is called the <b>Primary Key (PK)</b>. A primary key is a unique value that identifies a row in a table.</li><li>➤ Every database table should have one or more fields designated as key.</li></ul>
8	When primary key constraint is applied on one or more columns then it is known as <b>Composite Primary Key</b> .

9	The foreign key identifies a column or set of columns in one (referencing) table that refers to a column or set of columns in another (referenced) table.						
10	A <i>relational database</i> is a type of database. It uses a structure that allows us to identify and access data <i>in relation</i> to another piece of data in the database. Often, data in a relational database is organized into tables.						
11	<p><b>Fill in the blanks:</b></p> <p>1. A <b><u>Database</u></b> is an organized collection of data.</p> <p>2. A <b><u>Database Management System (DBMS)</u></b> is a software package that can be used for creating and managing databases.</p> <p>3. A <b><u>Relational Database Management System (RDBMS)</u></b> is a database management system that is based on the relational model.</p> <p>4. Three popular DBMS software are <b><u>Open Office Base</u></b>, <b><u>MySQL</u></b>, &amp; <b><u>Microsoft SQL Server</u></b>.</p> <p>5. A <b><u>Primary Key</u></b> is a unique value that identifies a row in a table.</p> <p>6. Composite Key is a combination of <b><u>One or More</u></b> columns.</p> <p><b>Short Answer Questions</b></p> <p>1. What does DBMS stands for? <b>Ans Database Management System</b></p> <p>2. What does RDBMS stands for? <b>Ans Relational Database Management System</b></p> <p>3. How is data organized in a RDBMS? <b>Ans Data in RDBMS is organized in the form of tables</b></p> <p>4. State the relationship and difference between a primary and foreign key? <b>Ans</b></p> <table border="1"> <thead> <tr> <th>Primary Key</th><th>Foreign Key</th></tr> </thead> <tbody> <tr> <td>There can only be 1 primary key in a table</td><td>There can be multiple Foreign Keys in a table</td></tr> <tr> <td>Primary Key field cannot contain duplicate values. All values must be unique</td><td>Foreign Key field can contain duplicate value.</td></tr> </tbody> </table>	Primary Key	Foreign Key	There can only be 1 primary key in a table	There can be multiple Foreign Keys in a table	Primary Key field cannot contain duplicate values. All values must be unique	Foreign Key field can contain duplicate value.
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12	Data in a relational database management system (RDBMS) is organized in the form of tables.						
13	A relational database is a collective set of multiple data sets organized by tables, records and columns. Relational database establish a well-defined relationship between database tables. Tables communicate and share information, which						

	facilitates data searchability, organization and reporting. A Relational database use <b>Structured Query Language (SQL)</b> , which is a standard user application that provides an easy programming interface for database interaction
14	<b>DATABASE OBJECTS</b> <b>Tables:</b> A table is a set of data elements (values) that is organized using a model of vertical columns(which are identified by their name) and horizontal rows. <b>Columns or Fields or Attributes:</b> A column is a set of data values of a particular simple type, one for each row of the table. <b>Rows or Records or Tuples:</b> A row also called a Record or Tuple represents a single, data item in a table.
15	There are different ways to create a table: <b>1. Create table in Design View</b> <b>2. Use Wizard to Create Table</b>
16	By default all the fields will have Text[ <b>VARCHAR</b> ] data type
17	Base automatically adds the column to be set as Primary Key which will help the user to enter the unique values and helps in creating the relationship with the other table to extract the data from multiple tables.
18	<b>Options to set Primary Key</b> You are asked to set a primary key for the table you just created. You can select the appropriate option to set the primary key or leave the table without a primary key. If you click Yes, the application will set the primary key for the first field created automatically.
19	<b>Data Types:</b> Datatypes are used to identify which type of data (value) we are going to store in the database. Fields themselves can be of different types depending on the data they contain. Data types in OpenOffice base are broadly classified into five categories listed below. <ul style="list-style-type: none"> <li>• <b>Numeric Types</b></li> <li>• <b>Alphanumeric Types</b></li> <li>• <b>Binary Types</b></li> <li>• <b>Date time</b></li> <li>• <b>Other Variable types</b></li> </ul> <b>Numeric Types:</b> Numeric data types are used for describing numeric values for the field used in the table of a database. Numeric data types in a database can be used for storing information such as mobile number, roll number, door number, year of school admission, true or false statements, statistical values, etc. The different types of numeric data types available are listed here. Boolean, TinyInt, SmallInt, Integer... <b>Alphanumeric Types:</b> <b>Varchar, char</b>

	<p><b>Binary Types:</b> Binary data types are used for storing data in binary formats. Binary data types in a database can be using for storing photos, music files, etc.</p> <p><b>DATE TIME:</b> Date time data types are used for describing date and time values for the field used in the table of a database.</p>				
20	<p><b>ASSESSMENT</b></p> <p><b>Fill in the blanks:</b></p> <ol style="list-style-type: none"> <li>1. A table is a set of data elements that is organized using a model of vertical <b><u>Columns</u></b> and horizontal <b><u>Rows</u></b>.</li> <li>2. A <b><u>Field or column or attribute</u></b> is a set of data values of a particular type, one for each row of the table.</li> <li>3. A <b><u>Record or Row or Tuple</u></b> represents a single, data item in a table.</li> <li>4. <b><u>Datatype</u></b> are used to identify which type of data we are going to store in the database.</li> <li>5. There are <b><u>two</u></b> ways to create a table.</li> <li>6. Field properties can be set in both the <b><u>Design View</u></b> and <b><u>Wizard</u></b> .</li> </ol> <p><b>Short Answer Questions</b></p> <ol style="list-style-type: none"> <li>1. In how many ways tables can be created in Base? <b>Ans Two ways; Using design view and using wizard</b></li> <li>2. Why are data types used in DBMS /RDBMS? <b>Ans Data types helps maintain data integrity in the table</b></li> <li>3. List datatypes available in Numeric Datatype? <b>Ans Boolean, tinyint, smallint, integer, bigint, numeric, decimal, real, float, double</b></li> <li>4. List datatypes available in Alphanumeric Datatype? <b>Ans Char, Varchar</b></li> <li>5. Define the structure of a table. <b>Ans DDL commands define the structure of a table</b></li> <li>6. Differentiate between Tuples and Attributes of a table. <b>Ans</b></li> </ol> <table border="1"> <tr> <td><b>Tuples</b></td><td><b>Attributes</b></td></tr> <tr> <td><b>Rows or records are known as tuples</b></td><td><b>Column or Fields are known as attributes</b></td></tr> </table>	<b>Tuples</b>	<b>Attributes</b>	<b>Rows or records are known as tuples</b>	<b>Column or Fields are known as attributes</b>
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	<b>Tuples are horizontal</b>	<b>Attributes are vertical</b>
	<p>7. Name different Binary data types.  <b>Ans Binary, VarBinary, LongVarBinary</b></p>	
21	In Base, data is stored in tables which can be inserted, modified and removed using appropriate options.	
22	To insert the data in the table, follow the steps: Select the table > Double click on it.	
23	To edit the data either click on edit icon or double on the data in the cell of a table and modifications can be done.	
24	To remove the data from the table, follow the steps: Select the data > right click on selected data > select the Delete option	
25	<b>To change the field properties table structure in design view has to be changed. To set the field properties, steps will be followed as:</b> <b>Select the table &gt; Right click &gt; Select the option Edit &gt; the table Design View window will open</b>	
26	<b>AutoValue</b> – if set to yes then field will get the auto numeric values. <b>Length</b> – By default length of the field is 10 but the size of the field can be set to maximum length. <b>Default Value</b> – A default value can be set for a field if user don't provide any value while entering the values in the table. <b>Format example</b> – This property helps to set the format of the data entered in the field such as 91-222-333.	
27	Sorting means to arrange the data in either ascending order of descending order.	
28	<p><i>Referential integrity</i> is used to maintain accuracy and consistency of data in a relationship.          In Base, data can be linked between two or more tables with the help of primary key and foreign key constraints.  <b>Referential integrity helps to avoid:</b></p> <ul style="list-style-type: none"> <li>➤ Adding records to a related table if there is no associated record available in the primary key table.</li> <li>➤ Changing values in a primary if any dependent records are present in associated table(s).</li> <li>➤ Deleting records from a primary key table if there are any matching related records available in associated table(s).</li> </ul>	
29	<p>A relationship refers to an association or connection between two or more tables. When you relate two tables, you don't need to enter the same data in separate tables.  <b>Relationships between tables helps to:</b></p> <ul style="list-style-type: none"> <li>➤ Save time as there is no need to enter the same data in separate tables.</li> <li>➤ Reduce data-entry errors.</li> <li>➤ Summarize data from related tables</li> </ul>	

30	You can create a relationship between any two tables by selecting Relationships... option from the Tools menu.
31	<p>There are three types of relationships which can be created in tables:</p> <ol style="list-style-type: none"> <li><b>1. ONE to ONE</b></li> <li><b>2. ONE to MANY OR MANY to ONE</b></li> <li><b>3. MANY to MANY</b></li> </ol> <p><b>One to One Relationship</b> In this relationship, both the tables must have primary key columns.</p> <p><b>One to Many Relationship</b> In this relationship, one of the table must have primary key column.</p> <p><b>Many to Many Relationship</b> In this relationship, no table has the primary key column.</p>
32	<p><b>ASSESSMENT</b></p> <p><b>Fill in the blanks:</b></p> <ol style="list-style-type: none"> <li>1. The types of languages used for creating and manipulating the data in the Database are <u>DDL</u> &amp; <u>DML</u>.</li> <li>2. A <u>DDL (Data Definition Language)</u> is a standard for commands that define the different structures in a database.</li> <li>3. A <u>DML (Data Manipulation Language)</u> is a language that enables users to access and manipulate data in a database.</li> <li>4. A <u>Select Command</u> is a part of DML involving information retrieval only.</li> <li>5. A popular data manipulation language is <u>SQL (Structured Query Language)</u>.</li> <li>6. <u>Tables</u> are the basic building blocks of a database.</li> <li>7. There are <u>three</u> types of Relationships in a table.</li> </ol> <p><b>Short Answer Questions:</b></p> <ol style="list-style-type: none"> <li>1. What is the file extension for databases created using OpenOffice.Org Base? <b>Ans .odb</b></li> <li>2. List any three file formats that can be managed using OpenOffice.Org Base? <b>Ans .odb, .ods, .odp</b></li> <li>3. How many types of relationships can be created in Base? Explain each of the them. <b>Ans. Three types of relationships can be created in Base.</b>  <b>One to One → Both tables must have a Primary Key</b>  <b>One to Many or Many to One → Only one tables needs to have a Primary key</b>  <b>Many to Many → None of the tables needs to have a Primary key</b> </li> </ol>

	<p>4.What do you mean by Sorting? In how many ways it can be done?  <b>Ans Sorting is arranging the records in either ascending or descending order. It can be done in two ways either ascending or descending</b></p> <p>5.Explain Referential Integrity with the help of an example.  <b>Ans Referential integrity is used to maintain the integrity of data based on the primary key of another table.</b>  <b>Example: if there are two tables student with fields schoolno, name, class, section and result with fields resno, schoolno, exam, subject, marks then the field schoolno in result can become a foreign key with relation to the table students schoolno field. Hence the schoolno field in result can contain only those values which exist in the student table</b></p>
33	Query is to collect specific information from the pool of data. A query helps us join information from different tables and filter that information.
34	<b>Filtering</b> means that the query uses criteria you provide to hide some data and present only what you want to see.
35	Some RDBMS provide a graphical means to create queries, but most RDBMS do not do so. That's where you use SQL (pronounced as "sequel") or Structured Query Language.
36	Query languages are computer languages used to make queries into databases and information systems. Queries are commands that are used to define the data structure and also to manipulate the data in the database.
37	A SELECT statement retrieves zero or more rows from one or more database tables or database views. In most applications, SELECT is the most commonly used Data Manipulation Language(DML) command.
38	To retrieve all the columns in a table the syntax is: <b>SELECT * FROM &lt;TABLENAME&gt;;</b>
39	To display the records containing the same type of values " <b>WHERE</b> " clause can be used with the Select SQL Command. To get details about the list of students whose favorite color is blue, you can use: <b>select * from SDetails where Color='Blue';</b>
40	To view records in ascending order of RollNo, from the table the select statement will be: <b>select * from SDetails order by "Rollno" ASC;</b>
41	You can add, modify or delete records using the Insert, Update and Delete commands. To type and execute SQL commands, click on <b>Tools &gt; SQL</b> .
42	Update statement is used for modifying records in a database. The general syntax of the update statement is as follows: <b>UPDATE &lt;table_name&gt;</b> <b>SET &lt;column_name&gt; = value [, column_name = value ...]</b> <b>[WHERE &lt;condition&gt;;]</b>
43	<b>Assessment</b> <b>Fill in the blanks</b>

1. A **Form** helps the user to systematically store information in the database.
2. A **Form** enables users to view, enter, and change data directly in database objects such as tables.
3. **SELECT** statement retrieves zero or more rows from one or more database tables or database views.
4. By default, data is arranged in **Ascending** order using ORDER BY clause.
5. **UPDATE** statement is used for modifying records in a database.
6. **DELETE** statement is used to remove one or more records in a Database.

**Short Answer Questions:**

1. Name DML commands.

**Ans SELECT, INSERT, UPDATE, DELETE**

2. What is the purpose of using queries?

**Ans Queries helps to define the data structure and also to manipulate the data in the database using command.**

3. Which clause of Select statement helps to display specific data?

**Ans WHERE**

4. Differentiate between Where and Orderby clause of SQL statements.

**Ans**

<b>Where</b>	<b>Order By</b>
<b>Where clause is used with SELECT command to filter the records on the basis of some specific condition</b>	<b>Order By clause is used in SELECT to display records arranged in ascending or descending order of any filed.</b>

5. State the purpose of Update Command with the help of an example.

**Ans Update command is used to change the value in a table. For Example if we want to change the marks of a student with rollno 5 then update command will be used.**

- |    |  |
|----|--|
| 44 | A form provides the user a systematic way of storing information into the database. It is an interface in a user specified layout that lets users to view, enter, and change data directly in database objects such as tables. |
| 45 | To create a form, Click on Forms option located under Database section   |
| 46 | A report helps to display the data in a summarized manner. It is used to generate the overall work outcome in a clear format. You can create reports in the database.  |
| 47 | <b>Fill in the blanks:</b>   |



1. To create a form you need to select **Forms** option available under Database section.
2. A **Query** helps to collect specific information from the pool of data in the database.
3. **Reports** is used to display the summary of data.
4. **Forms** are the interfaces with which the user interacts.
5. Data from multiple tables can be stored in **Relational Database**.

**Short Answer Questions:**

1. Why there is a need to create Forms?

**Ans To store or retrieve the data in systematic way**

2. What is the purpose of creating Reports?

**Ans To present the data in a summarized way and helps to take print of it.**

3. What are the prerequisites to create a Form and Reports?

**Ans Tables**

4. Differentiate between Forms and Reports.

**Ans Forms helps to store the data in systematic way, whereas Reports are used to present your data in a summarized way.**

5. Can a form displays data from queries?

**Ans No**

6. In how many ways Forms and Reports can be created in a database?

**Ans Forms can be created in two ways using design view and wizard  
Reports can be created only using wizard**