What is Data & Database management system?

Data: In general, data is any set of characters that is gathered and translated for some purpose, usually analysis. It can be any character, including text and numbers, pictures, sound, or video. If data is not put into context, it doesn't do anything to a human or compute.
For example your name, age, height, weight, etc are some data related to you.
A picture, image, file, pdf etc can also be considered data.

Database:

Database is a systematic collection of data. Databases support storage and manipulation of data. Databases make data management easy.
OR
A database is a collection of information that is organized so that it can be easily accessed, managed and updated
Data is organized into rows, columns and tables, and it is indexed to make it easier to find relevant information. Data gets updated, expanded and deleted as new information is added. Databases process workloads to create and update themselves, querying the data they contain and running applications against it.

What is DBMS & RDBMS?

Difference between DBMS & RDBMS

NO.	DBMS	RDBMS
1	DBMS applications store data as a file	RDBMS application store data in a tabular form.
2	In DBMS, data is a general store in either a hierarchical from or a navigation form.	In RDBMS, the tables have an identifier called primary key and the data values are stored in the form of tables.
3	Normalization is not present in DBMS	Normalization is present in RDBMS.
4	DBMS does not apply any security with regards to data manipulation.	RDBMS defines the integrity constraint for the purpose of ACID (Atomicity, Consistency, Isolation, and Durability) property.
5	DBMS use file system to store data, so there will be no relation between the tables.	In RDBMS data values are stored in the form of tables, so a relationship between these data values will be stored in the form table as well.
6	DBMS has provide some uniform methods to access the store information.	RDBMS system supports a tabular structure of the data and a relationship between them to access the stored information.
7	DBMS does not support distributed database.	RDBMS supports distributed database.
8	DBMS is meant to be for small organization and deal with small data. It support single user.	RDBMS is designed to handle large amount of data. It supports multiple users.
9	Examples of DBMS are file systems, xml etc.	Example of RDBMS are mysql, postgre, sql server, oracle etc….

Key

A key is a single or combination of multiple fields in a table. Its is used to fetch or retrieve records/data-rows from data table according to the condition/requirement. Keys are also used to create relationship among different database tables or views.

Types of SQL Keys

Primary Key, Foreign Key, Unique Key, Super Key, Candidate Key, Alternate Key.

1. **Super Key**

Super key is a set of one or more than one keys that can be used to identify a record uniquely in a table.

Example: Primary key, Unique key, Alternate key are subset of Super Keys.

Example:

1. Roll+Name+DOB+Course+Ph+Eamil+Address is a super key
2. Roll is a super key

2. **Candidate Key**

A Candidate Key is a set of one or more fields/columns that can identify a record uniquely in a table. There can be multiple Candidate Keys in one table. Each Candidate Key can work as Primary Key.

Example: In below diagram ID, RollNo and EnrollNo are Candidate Keys since all these three fields can be work as Primary Key.

Example:

1. Roll+Phno+Email is a candidate key
2. Roll is a candidate key

3. **Primary Key**

Primary key is a set of one or more fields/columns of a table that uniquely identify a record in database table. It cannot accept null, duplicate values. Only one Candidate Key can be Primary Key.

4. **Alternate key**

An Alternate key is a key that can be work as a primary key. Basically it is a candidate key that currently is not primary key.

Example:

1. Phone number & Email is an alternate key.

5. Composite/Compound Key

Composite Key is a combination of more than one fields/columns of a table. It can be a Candidate key, Primary key.

Example:

1. Name+DOB+address

6. Unique Key

Unique key is a set of one or more fields/columns of a table that uniquely identify a record in database table. It is like Primary key but it can accept only one null value and it cannot have duplicate values.

Example:

1. Phone No

7. Foreign Key

Foreign Key is a field in database table that is Primary key in another table. It can accept multiple null, duplicate values.

Roll no	Name	DOB	Course	Ph no.	Email	Address
1	Prashant	20-1-1990	MCA	235633	pr@gmail.com	Delhi
2	Vipul	10-6-1989	MCA	45663	vi@gmail.com	East Delhi
3	Nalin	07-07-1990	MBA	96544	na@gmail.com	North Delhi
4	Prashant	20-12-1990	MCA	63578	p@gmail.com	South Delhi

Example : We can have a DeptID column in the Employee table which is pointing to DeptID column in a department table where it a primary key


ID RollNo Name EnrollNo Address DeptID
1 1 60391401 Avin AX101 Delhi 1
2 2 60391402 Amit AX102 Noida 1
3 3 60391403 Mohan AX103 Ghaziabad 2
4 4 60391404 Pavan AX104 Ghaziabad 2
5 5 60391405 Deepak AX105 Delhi 3
6 6 60391406 Jitendra AX106 Delhi 3
DeptID Name Address
1 1 IT Delhi
2 2 Mechanical Delhi
3 3 Electrical Delhi
FK_Relationship
Possible Candidate Keys
Foreign Key
Primary Key
Primary Key
Alternate Keys
Unique Key
Super Key
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