DBMS Notes:

Data: Raw facts and figures are termed as data.

Information: Processed data which is meaningful and is delivered on time is known as information.

Database: A database is a collection of inter related table data.

DBMS: A database management system is a collection of database along with a set of programs to control and manage the database. The primary goal of the database management system is to provide an environment which is both convenient and efficient for storing and retrieving data from the database. In a database we can define the structure of the data and manipulate the data using some commands. There are two types of languages for such operations. Namely:-

1. Data Definition/Description Language (DDL): Data Definition Language is that language which comprises of commands for defining the different structures in a database. DDL statements are used to create, modify, and remove the database objects such as tables, indexes, and users. Common DDL statements are CREATE, ALTER and DROP.
2. Data Manipulation Language (DML): Data Manipulation Language is that language which enables users to access and manipulate data stored in a table but not the schema or database objects. The primary goal is to provide efficient human interaction with the system. Data manipulation involves structured Query Language (SQL) and often used as synonym for the term DML. DML involves:
    - Retrieval of information from the database. (Generally done using the SELECT statement).
    - Insertion of new information into the database. (Generally done using the INSERT statement).
    - Deletion of information in the database. (Generally done using the DELETE statement).
    - Modification of information in the database. (Generally done using the UPDATE statement).

There are two types of DML. Namely: -

1. Procedural Mode: In procedural mode, the user writes a set of commands or procedure to automize a particular task, store them by a name and then execute the procedure when required.
2. Non Procedural Mode: In non procedural mode, the user only writes DML commands at the command line/prompt and execute them on the table data separately as and when required.

Relational Database Management System: - It is a collection of data items organized as a set of tables. Data can be accessed or reassembled from these tables in different ways without the need to reorganize the database tables. The basic advantage of RDBMS is that it can be easily extended whenever needed.

Some of the examples of RDBMS include Oracle, Fox Pro, My SQL, (Structured Query Language), MS Access etc.

Applications of RDBMS: They are nearly used in all fields like school, colleges, banks, defense, research, railways, airways, roadways, shops, multinational companies (MNC's) business etc.

Advantages of DBMS:-

1. Easy retrieval of data
2. Easy sharing of data
3. Easy manipulation of data
4. High data security
5. Reduction of data redundancy
6. Reduction of data inconsistency

Database Objects: All objects of a database are stored in a single file. These files are managed through the database window. The main objects of a database are: -

1. **Table:** It is a collection of related data held in a structured format about a specific topic. In other words we can say that it is the intersection of rows and columns. A table is a part of database where the actual data of a database is stored.
2. **Form:** A form is the graphical representation of a table. A form resembles fill in the blanks that we would complete by hand. We use a form when we have numerous fields in the table. In this way we can see all the fields in one screen where as if we were in the table view we would have to keep scrolling to get the field we desire.
3. **Report:** A report is an effective way to present our data in a printed form. We have control over the size and appearance of everything on a report. We can display or print the information the way we want to see it.
4. **Query:** A query is a statement which is used to extract information from a database based on certain condition. The output of a query is a record or group of records that fulfill the specified condition. Example:- Get the record of the student with roll no. 21.
5. **Key:** A key is a field, or combination of fields, in a database table used to retrieve and sort rows in the table based on certain requirements. Functions of a key:-
    - Keys are used to identify any row of data in a table. In a real-world application, a table could contain thousands of records. Moreover, the records could be duplicated. Keys ensure that you can uniquely identify a table record despite these challenges.

- Keys are defined to speed up access to data and, in many cases, to create links between different tables.
- Allows us to establish a relationship between tables and identify the relation between them (tables).
- Help us to enforce identity and integrity in the relationship.

There are different types of keys available in a database. Namely:-

1. Super Key: - A super key is a combination of columns that uniquely identifies any row within a relational database management system (RDBMS) table. Super key is a set of one or more keys that is Primary key, Unique key, alternate key are subset of Super Keys.
2. Primary Key: - A primary key is an entity or a filed name which is used to identify any record uniquely in a database. A table may have single or multiple choices for the primary key. There are three rules to set the primary key. Namely:-
   a) Primary key must be filled i.e. it can't be null or empty.
   b) Primary key must have a unique name i.e. it does not accept duplicate values.
   c) Primary key once entered can't be changed.
3. Unique Key: A unique key is a set of one or more than one fields/columns of a table that uniquely identify a record in a database table. You can say that it is little like primary key but it can accept only one null value and it cannot have duplicate values.
4. Candidate Key: - A Candidate Key can be any column or a combination of columns that can qualify as unique key in database.
5. Alternate Key: - All the keys which are candidate keys but not primary key are known as alternate keys.
6. Foreign Key: - A foreign key is a field (or collection of fields) in one table that refers to the primary key in another table.

Manipulation Operations

1. Adding a new row or record.
2. Adding a new column of field.
3. Deleting a row or record.
4. Deleting a column or record.
5. Updating a recording.

Checklist for creating a database: -

1. Purpose of the database
2. User of the database
3. Queries of the database
4. Tables of the database
5. Forms and Reports