**DBMS and RDBMS**

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* Objective: Study of DBMS and RDBMS.

**DBMS (Database Management System)**

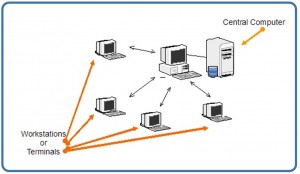
Database management systems can be classified based on various factors such as the number of users, database distribution, and data models. The most popular types of database management system software include relational, distributed, hierarchical, object-oriented, and network.

These systems enable users to define the structure of data, store and retrieve data, ensure data integrity, manage concurrency, and facilitate backup and recovery processes.

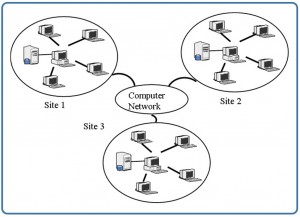
In today's modern information systems, DBMSs are essential for efficient and well-organized data storage and retrieval across a wide range of applications. Additionally, there are four primary distribution systems for database systems, which further aid in categorizing DBMSs. A DBMS is a software application that enables the creation, management, and manipulation of databases.

* Classification of DBMS:

1. **Hierarchical databases:**  Hierarchical databases are structured in a tree-like format, organizing model data through a parent-child relationship in either a top-down or bottom-up approach.
2. **Network Database Management System:** The network database model caters to more intricate relationships by enabling each child to have multiple parents, with entities organized in a graph accessible through various paths.
3. **Centralized DBMS:** A centralized DBMS is a type of database management system where the entire database is stored and managed on a single computer system. In this architecture, all data processing tasks, including data storage, retrieval, and management, are performed on this centralized system.



**4. Distributed Database System:** A distributed database system (DDBMS) is a type of database management system in which the database is spread across multiple interconnected computer systems or nodes. Unlike a centralized DBMS, where all data is stored on a single server, in a distributed system, data is distributed across multiple servers or nodes that are connected via a network.



**5**. **Object-oriented database management systems**: Object-oriented database management systems store data in objects rather than traditional rows and columns, utilizing object-oriented programming principles to define objects with fields, properties, and methods.

**RDBMS**

A relational database management system (RDBMS) is a type of database management system (DBMS) that organizes and manages data in a structured format according to the relational model. Data in an RDBMS is stored in tables with rows and columns, where each row represents a unique record and each column represents a specific attribute of that record. Relationships between tables are established using keys, primarily primary keys and foreign keys.

• Relational Database Management Systems maintain the following characteristics to ensure data integrity:

• Entity Integrity: A database table cannot contain duplicate records.

• Referential Integrity: Only table rows that are not referenced by any other table can be deleted to prevent inconsistent data.

• Individually Specified Integrity: User-defined rules for access and security.

• Domain Integrity: Columns in database tables are constrained within specific structured bounds based on default values, data types, or ranges.

| **DBMS** | **RDBMS** |
| --- | --- |
| Data in DBMS is stored in a file. | While in RDBMS data is stored in tabular form. |
| Data elements need to access individually. | Multiple data elements can be accessed at the same time. |
| There is no relationship between data. | Data is stored in the form of tables therefore are related to each other. |
| Normalization is not present. | Normalization is present. |
| It does not support distributed database. | It supports distributed database. |
| Data is stored in navigational or hierarchical form. | It uses a tabular structure where the headers are the column names, and the rows contain corresponding values. |
| It deals with small quantity of data. | It deals with large amount of data. |
| Data redundancy is common in this model. | Data redundancy is not allowed due to Keys and indexes. |
| It is less secure. | It is more secured. |
| Single user is supported. | Multiple users are supported. |
| Data fetching is slower for the large amount of data. | Data fetching is fast because of relational approach. |
| The data in a DBMS is subject to low security levels with regards to data manipulation. | There exists multiple levels of data security in a RDBMS. |
| Low software and hardware necessities. | Higher software and hardware necessities. |
| Examples:[XML](https://www.geeksforgeeks.org/xml-basics/), Window Registry, Forxpro, dbaseIIIplus etc. | Examples: [MySQL](https://www.geeksforgeeks.org/architecture-of-mysql/), [PostgreSQL](https://www.geeksforgeeks.org/what-is-postgresql-introduction/), [SQL](https://www.geeksforgeeks.org/what-is-sql/) Server, Oracle, Microsoft Access etc. |