

Data Model

A **data model** is a collection of tools that describes how data are represented and accessed.

- Data models define data elements and relationships among data elements.
- A data model determines the structure of data .

The main aim of data models is to support the development of information systems by providing the definition and format of data. If the same data structures are used to store and access data then different applications can share data .

Types of Data Models

1- High-level Conceptual Data Models

This model provides the concepts that are close to user views. The end users can understand them. A typical example is the **entity relationship model**. ER model is a way of graphically representing the logical relationships of entities (or objects) in order to create a database, it consists of main concepts like **entities**, **attributes** and **relationships**.

An **entity** represents a real-world object such as an employee or a project.

An **attributes** represents some properties that describes an entity such as an employee's name or address.

A **relationship** represents an association among two or more entities; for example, an employee works on many projects. A relationship exists between the employee and each project.

2- Record-based Logical Data Models

Record-based logical data models provide concepts users can understand. It represents data by using record structures.

The current DBMS use Record-based Logical Data Models widely.

There are many models:

- The Relational data model
- The Network data model
- The Hierarchical data model
- Object based data model

- ***The Relational data model***

The relational data model is most popular data model in use today. The relational model is a clear and simple model that uses concept of a table or relation rather than a graph or shapes. The information is put into a grid that consists of columns and rows, this is where information can be categorized and sorted.

- ***Hierarchical data model and Network data model***

These are all referred to as traditional models because they preceded the relational model. They are still used in industry mainly on mainframe platforms. However, they are not commonly used due to their complexity.

- ***Object-oriented data model***

OODBMS is represented in the form of objects as used in object-oriented programming. (OODBMS) combine database capabilities with object-oriented programming language capabilities.

Classification of DBMS

Database management systems can be classified based on several criteria:

1- Based on Data Models

- 1- The Relational data model
- 2- The Network data model
- 3- The Hierarchical data model
- 4- Object Based data model

2- Based on number of users

A DBMS can be classification based on the number of users it supports. It can be a single-user or a multiuser database system.

3-Based on Database Distribution

1-Centralized database system, the DBMS and database are stored at a single site, which can support multiple users.

2-Distributed database system, the actual database and the DBMS software are distributed over number of computer sites that are connected by a network.

4- Based on the Purpose

- 1- **General purpose** DBMS can be used for any type of application.
- 2- **Special purpose** is a package developed to suit the needs of a particular user ex. reservation on airlines use this type of packages.