

# 1. Introduction to Databases

## 1.1 Basic Concepts of databases

### What is Database?

A database is an organized collection of structured data that is stored electronically and can be accessed, managed, and manipulated efficiently. It serves as a repository for storing and managing data for various applications.

In database, data is organized into tables i.e. relations. Each table consists of rows (records) and columns (attributes) that represent different pieces of information.

### Data:

Data is a collection of facts and figures that can be processed to produce information.

### Database Management System (DBMS)

Database management system is a collection of inter-related data and programs to access those data.

### The challenges for data management:

Traditional file-based data management approaches suffer from several challenges, such as data redundancy, inconsistency and isolation.

Data Redundancy: In file-based systems, data is often duplicated across multiple files or applications. This



duplication. can lead to data inconsistency, as changes made to one copy of the data might not be reflected in other copies

Data Inconsistency: When the same data is stored in different files or formats, it can lead to inconsistencies in the values and meanings of data.

Data isolation: File-based systems are often isolated from each other, making it difficult to share data across different applications or users.

## 1.2 Database Management System Architecture

The DBMS design depends upon its architecture. The basic client/servers architecture is used to deal with a large number of PCs, web servers, database servers and other components that are connected with networks.

The client/server architecture consists of many PCs and a workstation which are connected via the network.

DBMS architecture depends upon how users are connected to the database to get their request done.

### Types of DBMS Architecture

