# Database Management System

**Database Management**: It is the process of creating, monitoring, administration, and maintenance of the databases and database groups in an organization. It entails managing the speed and efficiency with which a database supplies answers to end user queries.

## What is Database?

Database is a collection of data or information arranged in the computer in a systematical way, so that a computer program can consult it to answer queries.

**Database Management System (DBMS):** Is a set of programs that enables you to store, modify, and extract information from a database, it also provides users with tools to add, delete, access, modify, and analyze data stored in one location.

## Examples of DBMS

- MySQL,
- Microsoft Access,
- Oracle,
- RDBMS,
- dBase,
- FoxPro e.t.c

## Basic terms in DBMS

1. **Character**: is the most basic element of data that can be observed and manipulated. A character is a single symbol such as a digit, letter, or other special character (e.g., $, #, and?)
2. **Table:** A **table** is a collection of related data arranged in rows and columns.

| Student_ID | Name | Class |
|---|---|---|
| 001 | John | SS1 |
| 002 | Mary | SS2 |

3. **Field**: it contains an item of data; that is, a character, or a group of related text characters such as “John Smith” makes up a name in a field.

4. **Records**: this is a set of attributes for one stance of the things, for which the table is storing data. E.g. **Name**: Messi
5. **Database File**: this is the collection of related record about a subject. A collection of data or information that has a name called file name e.g. data files, program files
6. **Key**: in order to track and analyze data effectively each record requires a unique identifier or what is called a key. It's a unique identifier of a particular record among records
7. **Foreign Key:** A **foreign key** is a field that links one table to another table. It helps create relationships between tables.
8. **Query:** A **query** is a request used to retrieve or manipulate data from a database.
   Example: Display all students in SS2.

**9. Form:** A **form** is used to enter, edit, or view data easily in a database.

**10. Report:** A **report** is a formatted presentation of database information, usually for printing or summary purposes.

**11. SQL (Structured Query Language):** SQL is the standard language used to communicate with databases.

Examples of SQL commands:

- SELECT
- INSERT
- UPDATE
- DELETE

**12. Data: Data** are raw facts and figures that can be processed into meaningful information. **Example:** 75, 80, 90

**13. Information:** is processed data that is meaningful and useful.
Example: "John scored 90 in Mathematics."

**14. Relationship:** A **relationship** shows how tables are connected in a database.
Example: Students table linked to Results table using Student_ID.

**15. Schema:** A **schema** is the overall design or structure of a database.
It defines:

- Tables
- Fields
- Relationships
- Constraints

**16. Data Redundancy:** means unnecessary duplication of data. A DBMS helps reduce redundancy.

**17. Backup :** A **backup** is a copy of database data stored separately to prevent data loss.

**18. Security:** Database security protects data from unauthorized access, theft, or damage.

**19. Normalization:** is the process of organizing data to reduce redundancy and improve efficiency.

**20. Entity:** An **entity** is a real-world object or item about which data is stored. Examples:

- Student
- Teacher
- Product

**USES OF MS ACCESS AND SPREADSHEET DATABASE**

1. **Microsoft Access:** is a database software package. A database is an organized collection of records. Telephone and address books are examples of paper databases. With Access you can create a computerized database. For example, you can use Access to organize the students who attend a school, the courses they take, and the instructors who teach them.

   **Uses of Microsoft Access**

   Microsoft Access is a database management software used to store, organize, manage, and retrieve large amounts of data efficiently.

   **1. Record Keeping**

   - Used for storing records such as:
   - Student records
   - Employee records

- Patient records
- Customer information

**2. Data Storage:** Helps organizations store large amounts of data safely in tables.

**3. Data Retrieval:** Allows users to quickly search and retrieve information using queries. **Example:** Finding all students in SS3.

**4. Report Generation**

- Used to create reports for:
- Examination results
- Sales summaries
- Attendance reports
- Financial statements

**5. Form Creation**

Provides forms for easy data entry and editing.

**6. Inventory Management**

- Used in shops and businesses to track:
- Goods in stock
- Products sold
- Remaining inventory

**7. Payroll Management:** Helps organizations manage staff salaries and payment records.

**8. Library Management:** Used to keep records of: Books, Borrowers, Returned books

**9. School Administration**

- Schools use it to manage:
- Admission records
- Fees payment
- Examination scores
- Attendance

**10. Customer Relationship Management:** Businesses use it to maintain customer details and transaction history.

**Uses of Spreadsheet Database**

2. Spreadsheet software such as Microsoft Excel is used to organize data in rows and columns and perform calculations.

**1. Performing Calculations**

Used for: Addition, Subtraction, Multiplication, Division, Statistical calculations

**2. Budget Preparation:** Helps individuals and organizations prepare budgets and monitor expenses.

**3. Data Analysis:** Used to analyze data using formulas, charts, and graphs.

**4. Record Keeping**

Stores records such as: Sales records, Attendance records, Financial records

**5. Preparation of Payroll:** Used to calculate workers' salaries, bonuses, and deductions.

**6. Creating Charts and Graphs**

- Used to present information visually through:
- Pie charts
- Bar charts
- Line graphs

**7. Inventory Control:** Helps businesses monitor stock and sales.

**8. Result Computation**

- Schools use spreadsheets to calculate:
- Students' scores
- Grades
- Positions

**9. Forecasting and Planning:** Used for predicting future sales, expenses, or profits.

**10. Data Sorting and Filtering:** Allows users to arrange and search data easily.

**Differences Between MS Access and Spreadsheet Database**

| Microsoft Access | Spreadsheet Database |
|---|---|
| Used mainly for database management | Used mainly for calculations and analysis |
| Stores large related data efficiently | Best for smaller datasets |
| Uses tables, queries, forms, and reports | Uses worksheets and formulas |
| Better for multiple users | Better for individual use |
| Supports relationships between tables | Limited relationship support |