CHAPTER 1 — INTRODUCTION TO DATABASE SYSTEMS

1.1 What is a Database?

A database is an organized collection of structured information, or data, typically stored electronically in a computer system. Databases allow users to store, retrieve, update, and manage data efficiently.

1.2 File-Based Systems vs. Database Systems

Before databases, organizations relied on file-based systems which caused redundancy, inconsistency, and difficulty in managing data. Database systems solved these issues by centralizing data management.

1.3 Characteristics of Databases

- Self-describing nature of a database system

- Insulation between programs and data

- Support for multiple views of the data

- Sharing of data and multi-user transaction processing

1.4 DBMS (Database Management System)

A DBMS is software that enables users to define, create, maintain, and control access to the database.

1.5 Advantages of DBMS

- Reduction of data redundancy

- Improved data sharing

- Enhanced security

- Better data integration

- Improved backup and recovery

1.6 Database Users

- End Users

- Application Programmers

- Database Administrators (DBA)

- System Developers

1.7 Types of Databases

- Relational Databases

- NoSQL Databases

- Object-Oriented Databases

- Distributed Databases

- Cloud Databases

1.8 Summary

Databases form the backbone of modern applications across industries, enabling structured storage and quick access to large volumes of data.