A/L ICT

Database Management System

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What is a Database?

A database is a **structured collection of data organized in a way that allows for efficient storage, retrieval, and management**.

It serves as a central repository for information used by software applications.

Types of Databases

- **Relational Databases:** Use tables to store data and define relationships between them.

  Examples: MySQL, PostgreSQL, and Oracle.

- **NoSQL Databases:** Handle unstructured or semi-structured data and can be more flexible.

  Examples: MongoDB and Cassandra.

Database Management System (DBMS)

A DBMS is software that provides an interface for interacting with the database.

It includes tools for

Data definition

Data manipulation

Data control.

Key Concepts of Database Management

Tables: Data is organized into tables, each with rows (records) and columns (attributes).
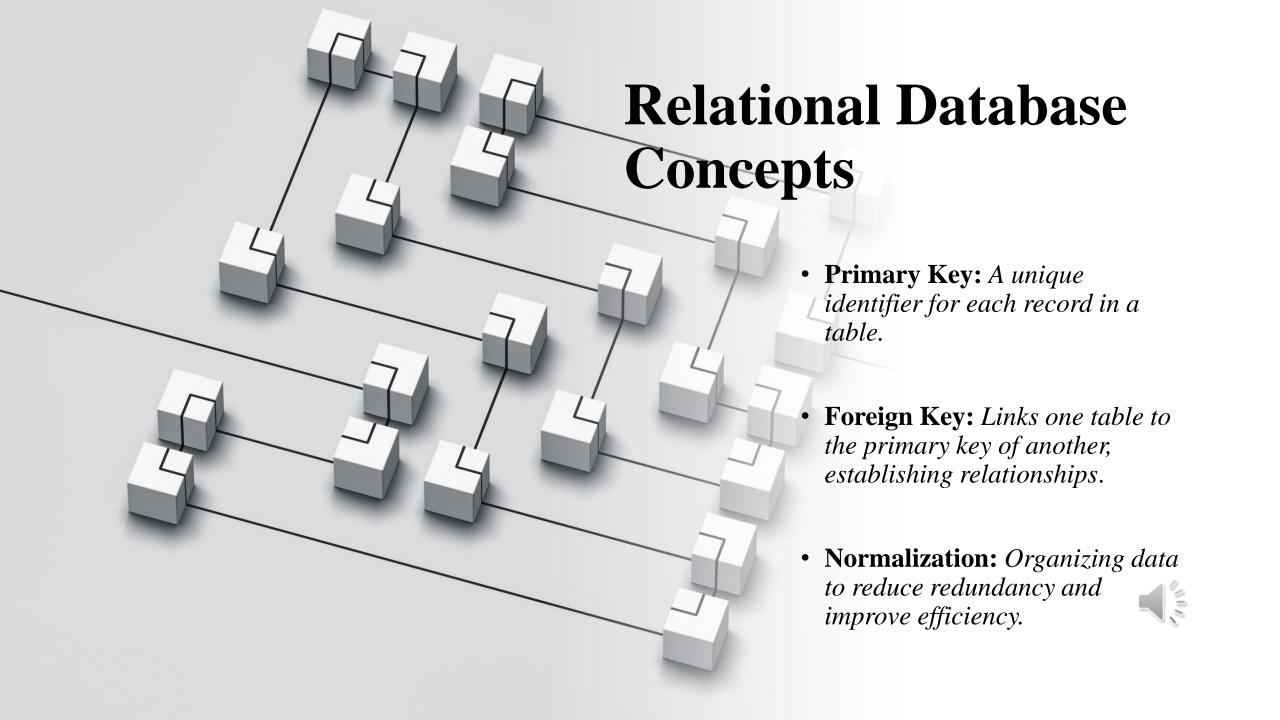
Schema: Describes the structure of the database, including tables, relationships, and constraints.

Queries: Retrieving information from the database using SQL (Structured Query Language)
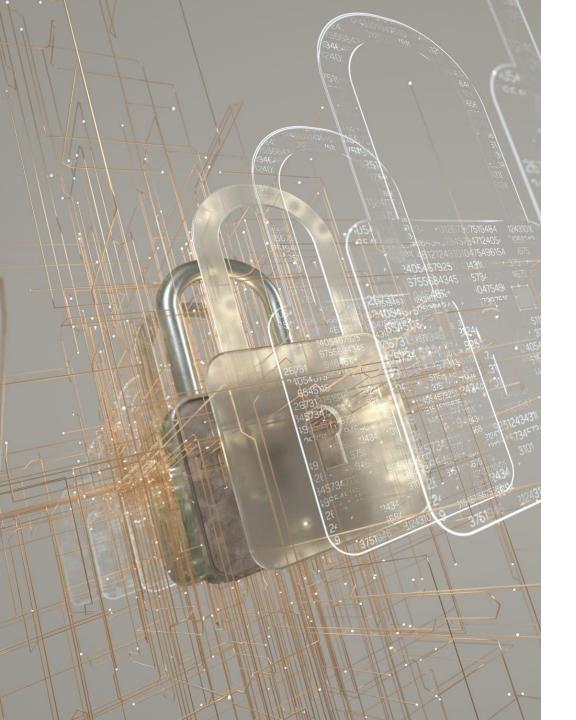
Relational Database Concepts

- **Primary Key:** *A unique identifier for each record in a table.*

- **Foreign Key:** *Links one table to the primary key of another, establishing relationships.*

- **Normalization:** *Organizing data to reduce redundancy and improve efficiency.*

SQL

*SQL (**Structured Query Language**) is a domain-specific programming language used for **managing and manipulating relational databases**.*

*It provides a standardized syntax **for executing queries**, allowing users **to interact with databases to retrieve, insert, update, and delete data** efficiently.*

Structured Query Language

Database Security

Database security involves implementing measures such as **access controls, encryption**, *and* **authentication** *to safeguard sensitive data stored within a database from unauthorized access, ensuring confidentiality and integrity.*

Robust database security practices are essential for **preventing data breaches, protecting against malicious activities, and maintaining the trustworthiness** *of the information stored in the database.*

Popular Database Management Systems

- **MySQL**
- **Microsoft SQL Server**
- **Oracle Database**
- **MongoDB**
- **PostgreSQL**

Covered Points:

- Definition of Database
- Types of Database
- Introduction to DBMS
- Key Concepts in DBMS
- Relational Database Concepts
- Introduction to SQL
- Database Security
- Popular DBMS

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