Ch-10 Relational Database

Database Concepts

Introduction to Database

- A **database** is an **organized collection of data** that can be easily accessed, managed, and updated.
- It allows data to be stored in a structured format using tables.

Need for a Database

Need	Description
Data Storage	Stores large amounts of information in a structured way
Quick Access	Easily retrieve required data using queries
Data Integrity	Ensures accuracy and consistency of data
Data Sharing	Multiple users can access and manipulate data concurrently
Data Security	Access can be controlled using permissions
Data Redundancy Reduction	Avoids duplication by linking related data using keys

Relational Data Model

The **Relational Model** organizes data into **tables (relations)** with **rows (tuples)** and **columns (attributes)**.

Important Terminologies

Term	Description
Relation	A table with rows and columns
Attribute	A column in a table (e.g., Name, Age)
Tuple	A row in a table (e.g., one record of a student)
Domain	Set of valid values for an attribute (e.g., Age domain: 0–100)
Degree	Number of attributes (columns) in a relation
Cardinality	Number of tuples (rows) in a relation

Keys in Relational Model

Candidate Key

- Minimal set of attributes that uniquely identify a row.
- A table can have **more than one** candidate key.

Primary Key

- One of the candidate keys **chosen to uniquely identify** each row.
- Cannot be null or duplicate.

CREATE TABLE Student (RollNo INT PRIMARY KEY, Name VARCHAR(50), Age INT);

Alternate Key

- Candidate keys **not chosen** as the primary key.

Foreign Key

- An attribute that refers to the **primary key** of another table.
- Used to **create relationships** between tables.

CREATE TABLE Marks (RollNo INT, Subject VARCHAR(50), FOREIGN KEY (RollNo) REFERENCES Student(RollNo));