REWIND CLASS
ON
INTRODUCTION TO DATABASE
MANAGEMENT SYSTEM AND SQL
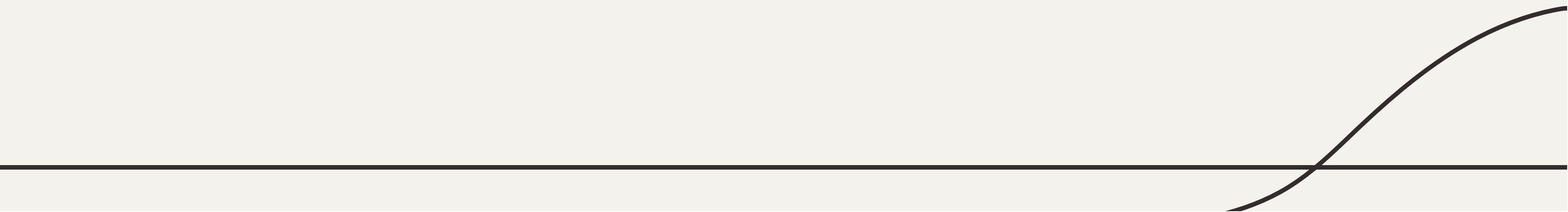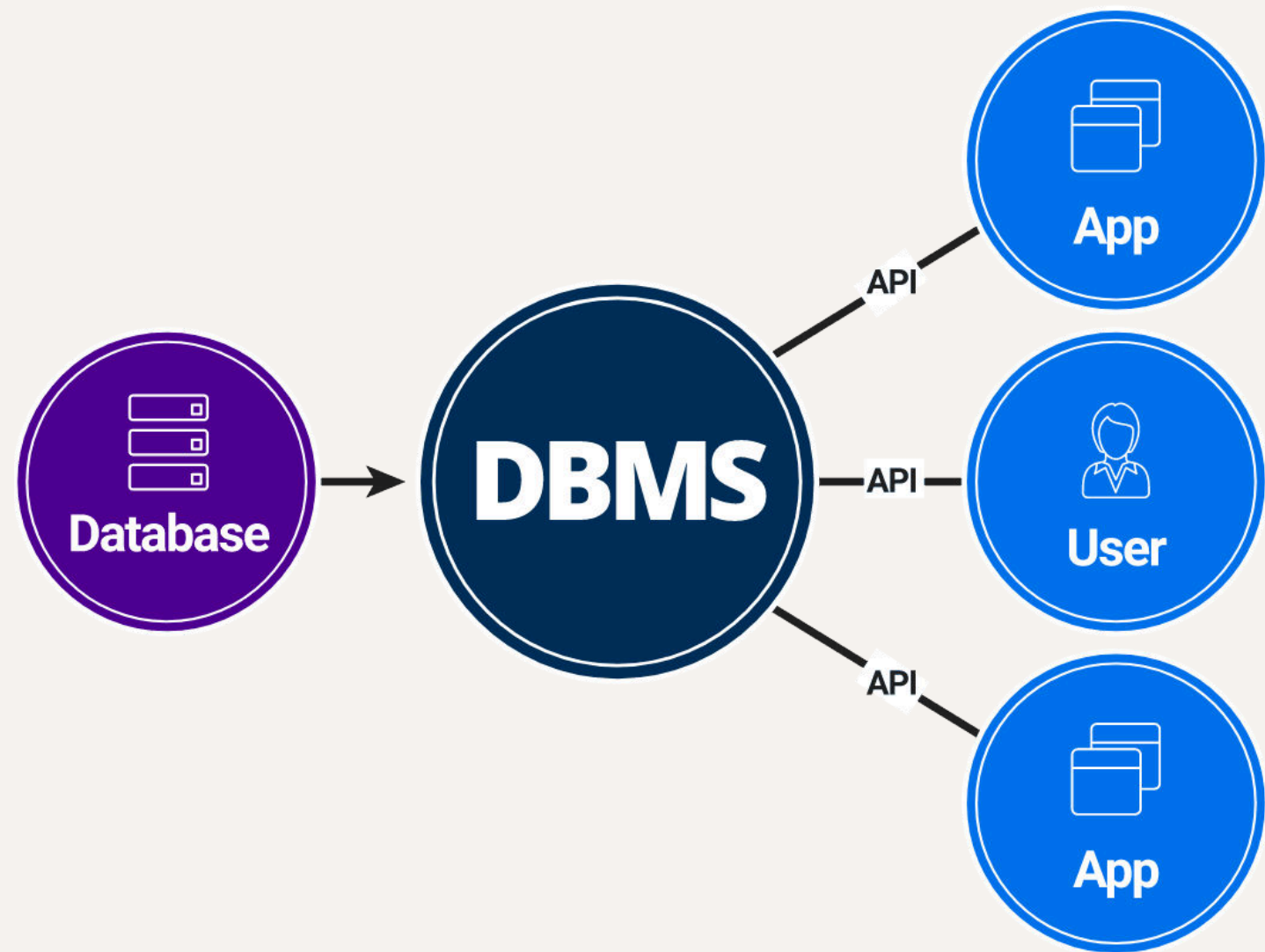(STUCTURED QUERY LANGUAGE)

PRESENTED BY :

MITHUN K -CSA2257

KAUSSAR A - CSA2248

TOPICS COVERED:

Fundamentals of Database Management: From DBMS and SQL , Joins, Aggregation Functions, Transaction States, and Entity Relationship Diagrams

Introduction to Database Management system

A Database Management System (DBMS) is a software system that is designed to manage and organize data in a structured manner. It allows users to create, modify, and query a database, as well as manage the security and access controls for that database.

Understanding DBMS

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                    ┌──────────────┐
                    │   Database   │
                    │  Languages   │
                    └──────┬───────┘
          ┌────────────┬───┴────────┬────────────┐
          ▼            ▼            ▼            ▼
   ┌────────────┐┌────────────┐┌───────────┐┌────────────┐
   │Data        ││Data        ││Data       ││Transaction │
   │Definition  ││Manipulaton ││Control    ││Control     │
   │Languages   ││Languages   ││Languages  ││Languages   │
   │(DDL)       ││(DML)       ││(DCL)      ││(TCL)       │
   └─────┬──────┘└─────┬──────┘└─────┬─────┘└─────┬──────┘
         ▼             ▼             ▼            ▼
   ┌──────────┐  ┌──────────┐  ┌─────────┐  ┌──────────┐
   │ CREATE   │  │ INSERT   │  │ GRANT   │  │ COMMIT   │
   │          │  │          │  │         │  │          │
   │ ALTER    │  │ UPDATE   │  │ REVOKE  │  │ ROLLBACK │
   │          │  │          │  └─────────┘  │          │
   │ DROP     │  │ DELETE   │               │ SAVEPOINT│
   │          │  │          │               │          │
   │ TRUNCATE │  │ MERGE    │               │AUTOCOMMIT│
   │          │  │          │               └──────────┘
   │ COMMENT  │  │ CALL     │
   │          │  │          │
   │ RENAME   │  │ EXPLAIN  │
   └──────────┘  │ PLAN     │
                 │          │
                 │ SELECT   │
                 │ (DQL)    │
                 └──────────┘
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Database languages, commonly referred to as query languages, are a type of programming language that programmers useto define and access data. Within the database management system(DBMS), these languages enable users to perform tasks such as: Restricting data access. Defining and modifying data.
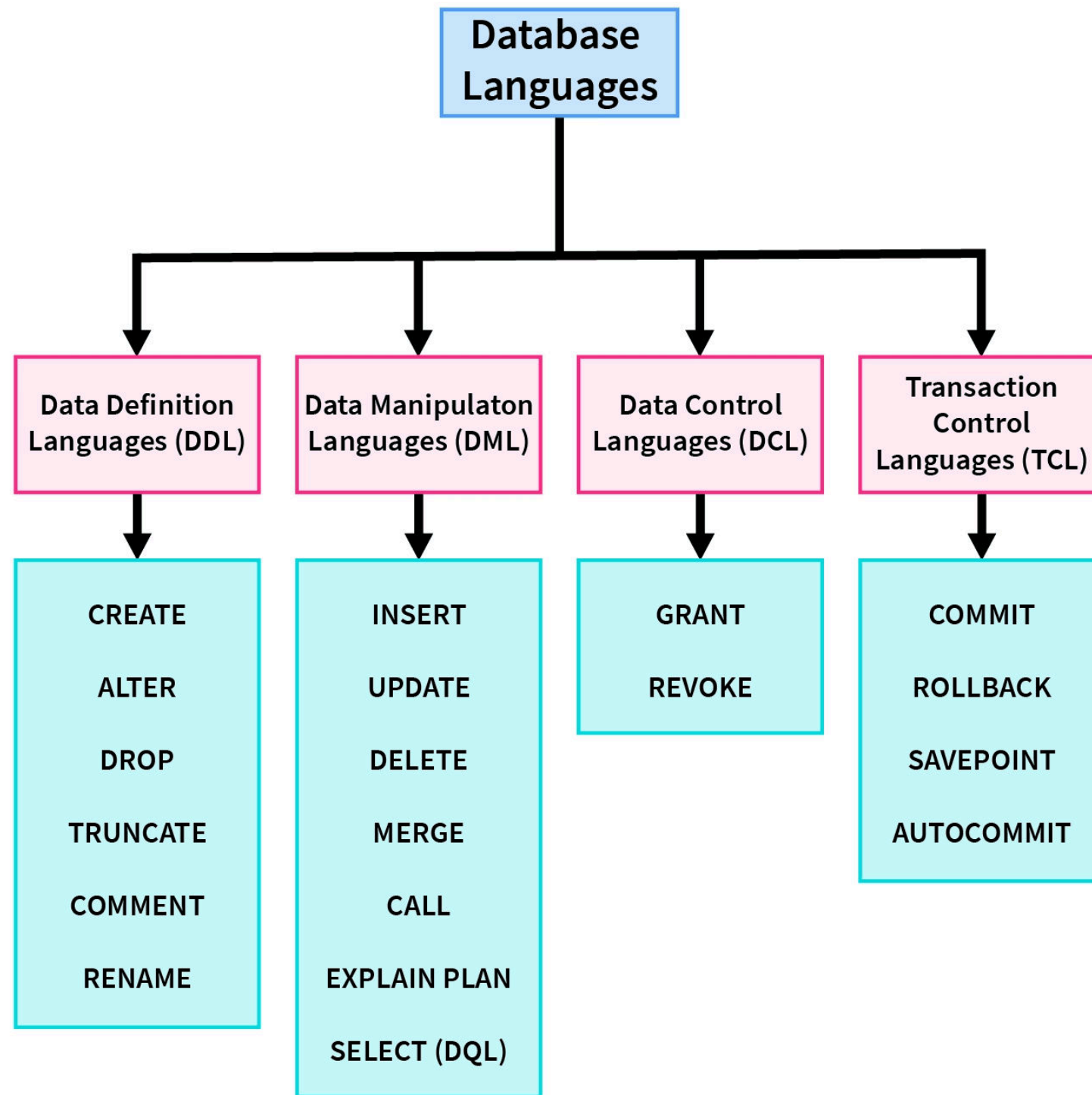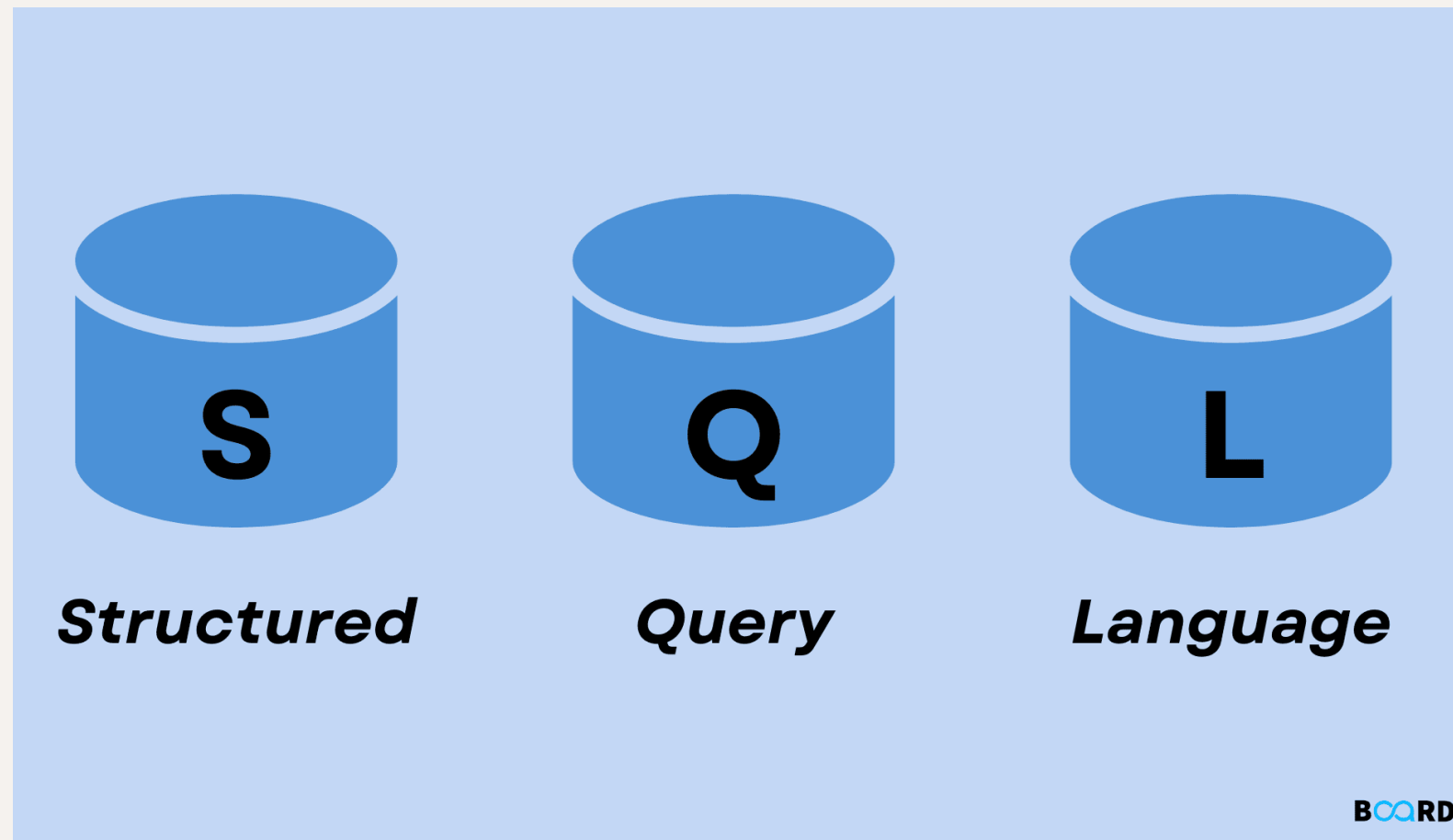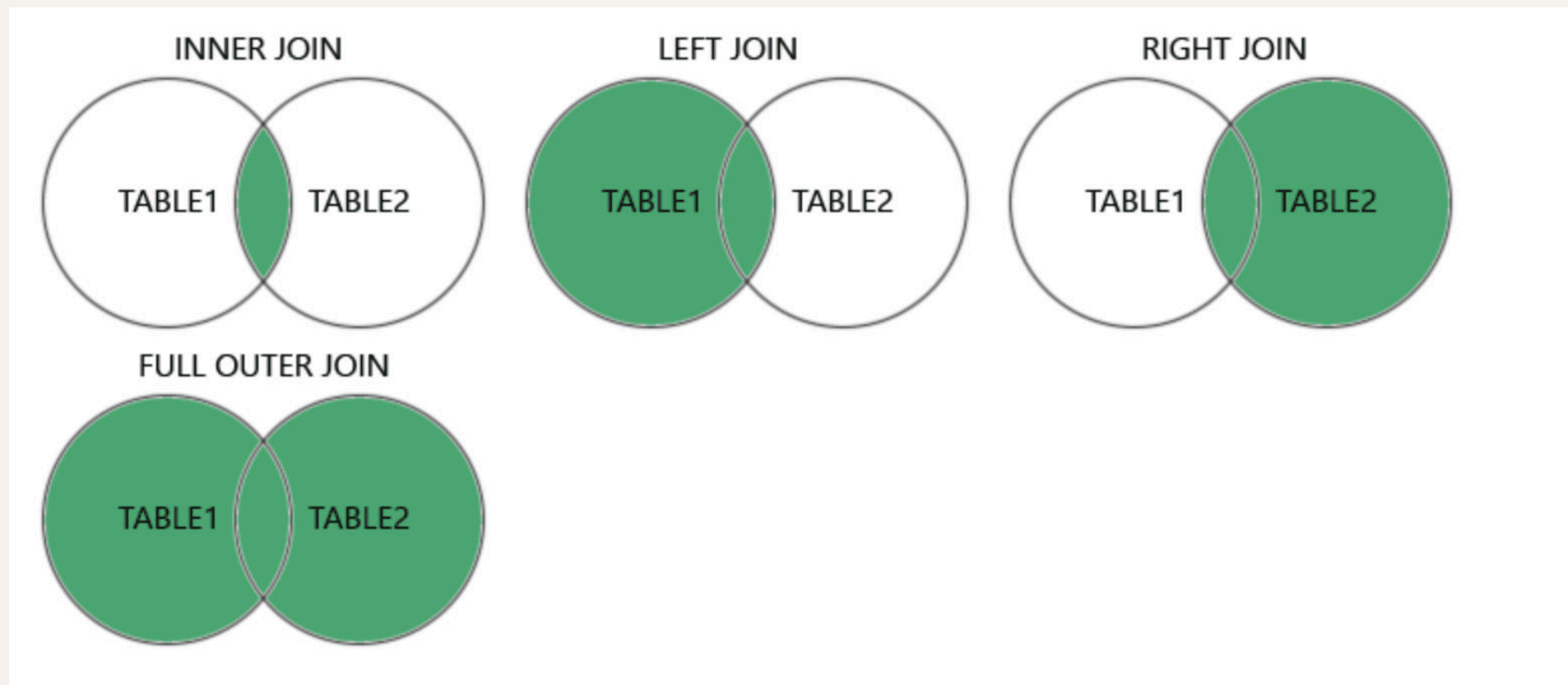
Structured Query Language (SQL)

SQL stands for Structured Query LanguageSQL lets you access and manipulate databasesSQL became a standard of the American National Standards Institute (ANSI) in 1986, and of the International Organization for Standardization (ISO) in 1987

S Structured **Q** Query **L** Language

BOORD

Database Joins

Joins are a fundamental SQL operation that allow you to combine data from multiple tables based on related columns. We will explore different types of joins, including **inner**, **outer**, **left**, and **right** joins.

INNER JOIN · TABLE1 TABLE2

LEFT JOIN · TABLE1 TABLE2

RIGHT JOIN · TABLE1 TABLE2

FULL OUTER JOIN · TABLE1 TABLE2

Types of joins

(INNER) JOIN: Returns records that have matching values in both tablesLEFT (OUTER) JOIN: Returns all records from the left table, and the matched records from the right table
RIGHT (OUTER) JOIN: Returns all records from the right table, and the matched records from the left table
FULL (OUTER) JOIN: Returns all records when there is a match in either left or right table

Aggregation Functions in SQL

.COUNT counts how many rows are in a
particular column
.SUM adds together all the values in a
particular column
.MIN and MAX return the lowest and
highest values in a particular column,
respectively
.AVG calculates the average of a group of
selected values.
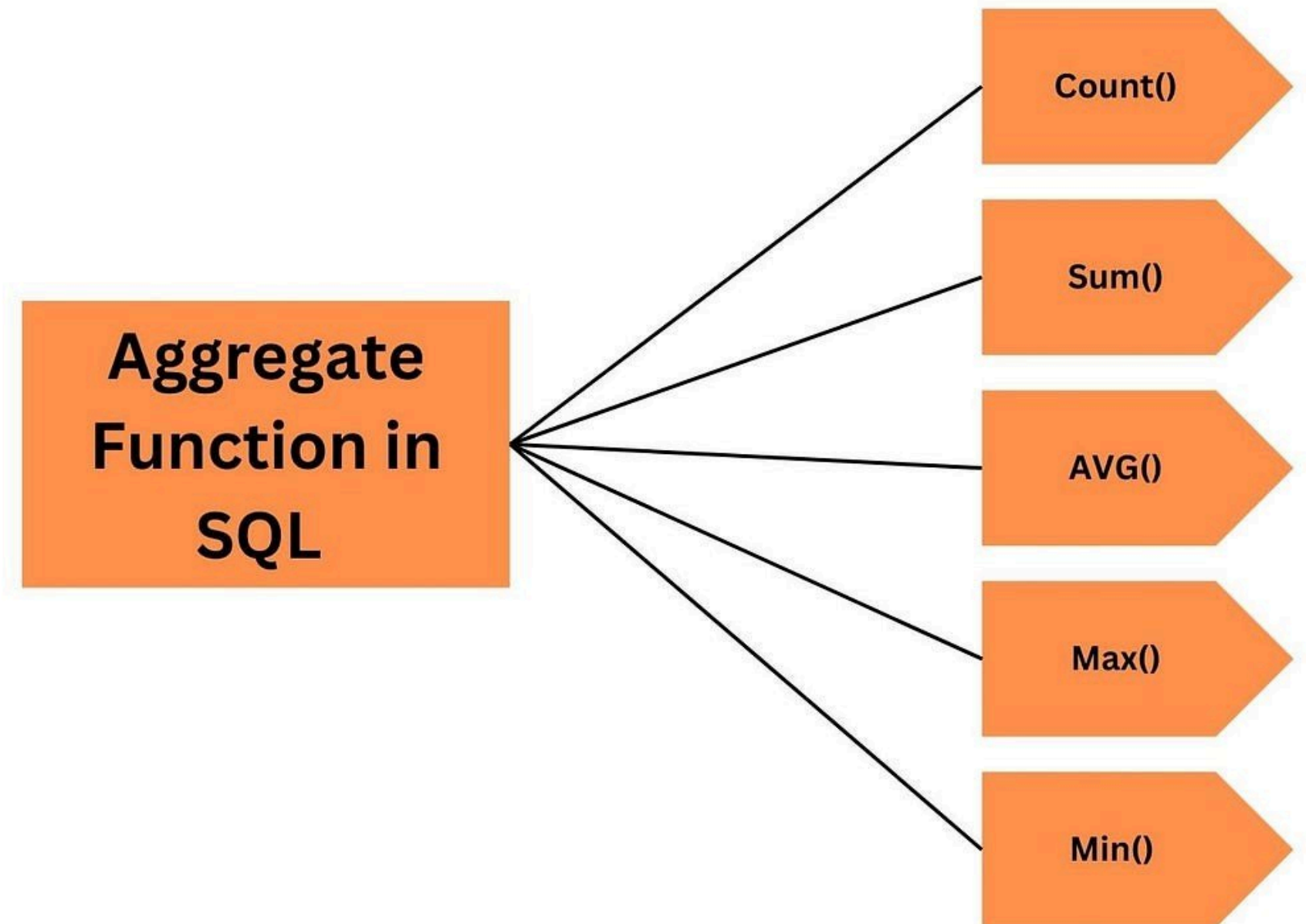
Data Models

Data Model is the modeling of the data description, data semantics, and consistency constraints of the data. It provides the conceptual tools for describing the design of a database at each level of data abstraction. Therefore, there are following four data models used for understanding the structure of the database
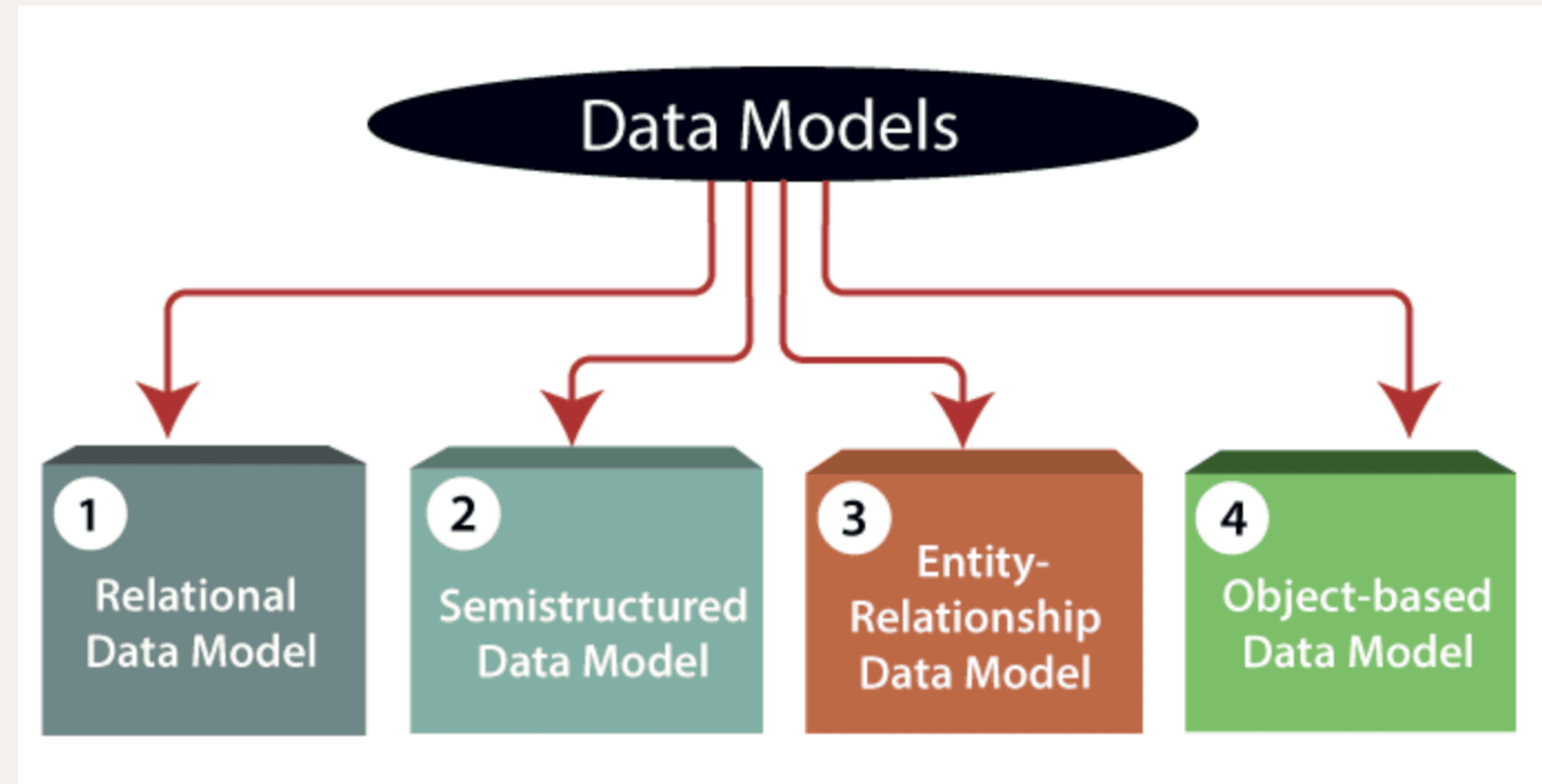
ER diagrams are used to represent the E-R model in a database, which makes them easy to convert into relations (tables).ER diagrams provide the purpose of real-world modeling of objects which makes them intently useful.ER diagrams require no technical knowledge and no hardware support.These diagrams are very easy to understand and easy to create even for a naive user. It gives a standard solution for visualizing the data logically.
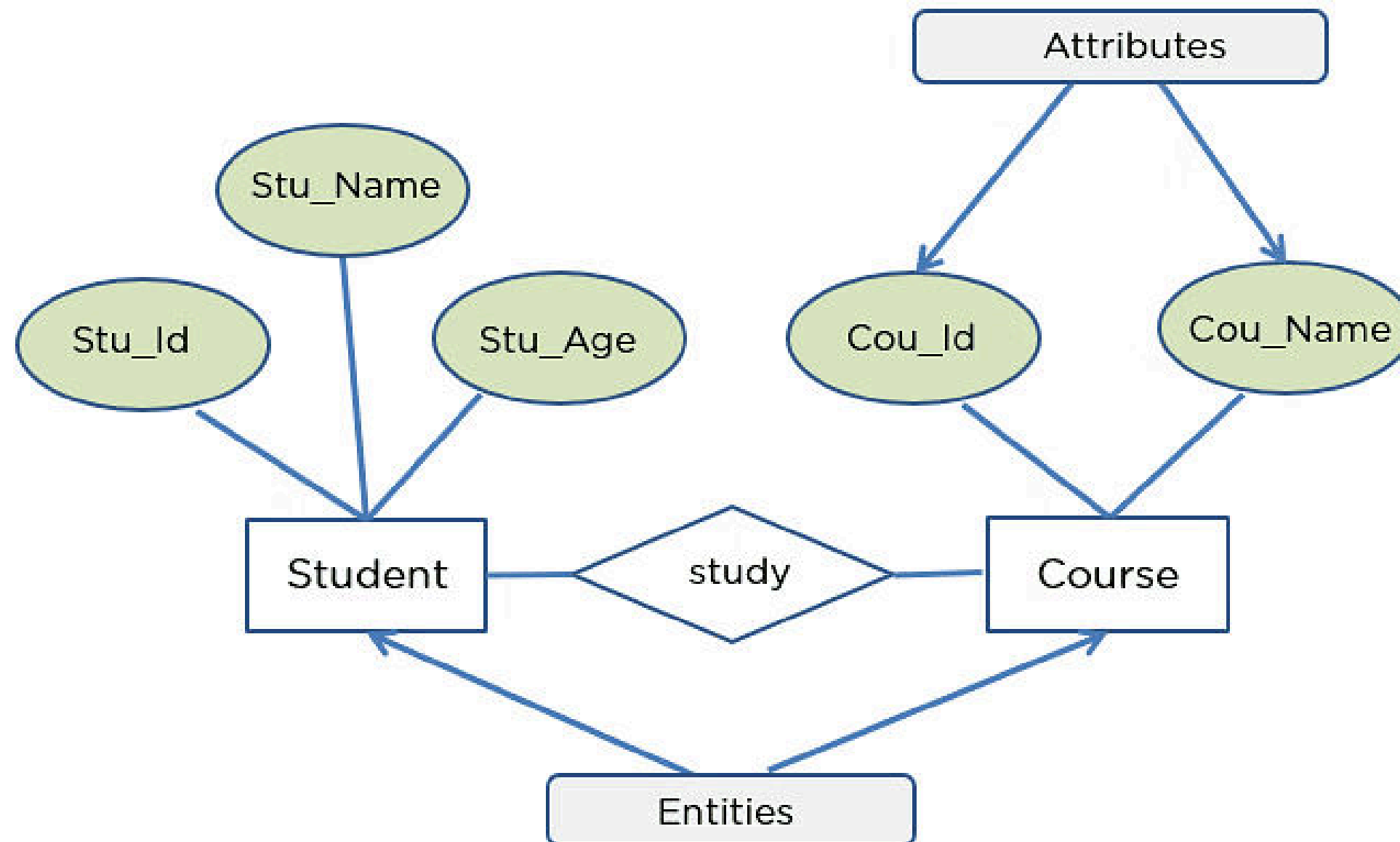
Securing your database is essential to protect sensitive information. We will discuss **access control**, **user authentication**, **encryption**, and other security best practices to safeguard your data.
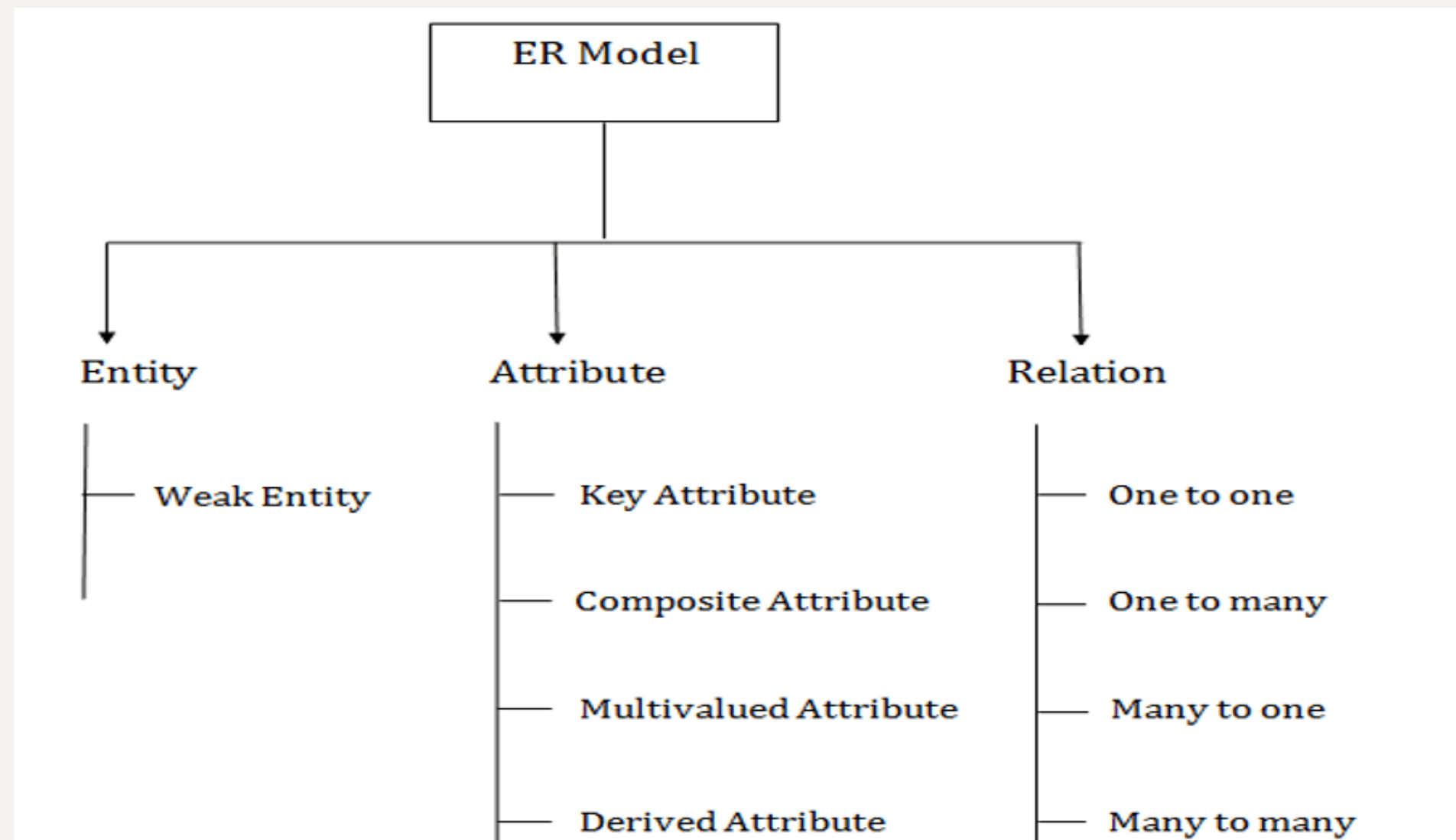
Normalization is the process of organizing the data in the database.Normalization is used to minimize the redundancy from a relation or set of relations. It is also used to eliminate undesirable characteristics like Insertion, Update, and Deletion Anomalies.Normalization divides the larger table into smaller and links them using relationships.The normal form is used to reduce redundancy from the database table.

Transactions Stages

These are the states which tell about the current state of the Transaction and also tell how we will further do the processing in the transactions. These states govern the rules which decide the fate of the transaction whether it will commit or abort.

.Active State

.Partially Committed State

.Committed State.Failed State

.Aborted State

.Terminated State.
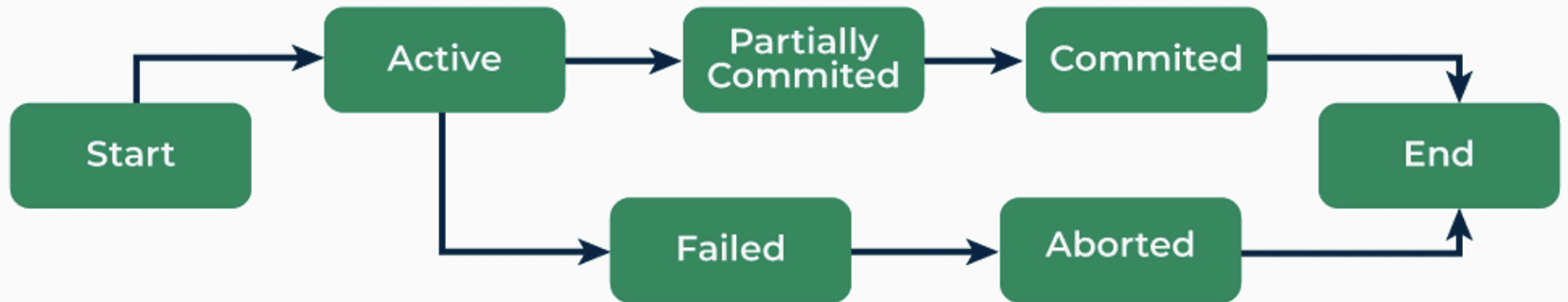
Triggers

A trigger is a stored procedure in a database that automatically invokes whenever a special event in the database occurs. For example, a trigger can be invoked when a row is inserted into a specified table or when specific table columns are updated. In simple words, a trigger is a collection ofSQLstatements with particular names that are stored in system memory.

- **Types of Triggers in SQL:**
  - AFTER INSERT Trigger
    - This trigger is invoked after the insertion of data in the table.
  - AFTER UPDATE Trigger
    - This trigger is invoked in SQL after the modification of the data in the table.
  - AFTER DELETE Trigger
    - This trigger is invoked after deleting the data from the table.
  - BEFORE INSERT Trigger
    - This trigger is invoked before the inserting the record in the table.
  - BEFORE UPDATE Trigger
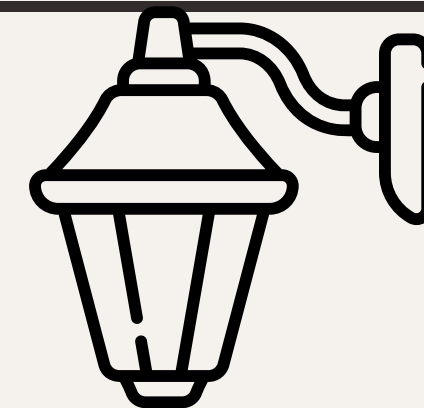   - This trigger is invoked before the updating the record in the table.
  - BEFORE DELETE Trigger
    - This trigger is invoked before deleting the record from the table.

SQL Set Operation

The SQL Union operation is used to combine the result of two or more SQL SELECT queries.In the union operation, all the number of datatype and columns must be same in both the tables on which UNION operation is being applied.The union operation eliminates the duplicate rows from its resultset.

THANK YOU

presented by:

Mithun K - CSA2257
Kaussar A - CSA2248