

## Quick Revision Notes

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### ◆ 1. Keys in DBMS

#### ◆ Primary Key

- Uniquely identifies each record in a table.
- Cannot be NULL or duplicated.

#### ◆ Foreign Key

- Points to the primary key in another table.
- Enforces **Referential Integrity**.
- Can be NULL.

#### ◆ Unique Key

- Ensures uniqueness of values.
- **Can have multiple NULLs** (MySQL behavior).

#### ◆ Candidate Key

- All possible keys that could be used as a primary key.

#### ◆ Super Key

- Candidate Key + Extra Attributes.
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### ◆ 2. Entity-Relationship (ER) Model

#### ◆ Entity

- Any real-world object (e.g., Student, Employee).

#### ◆ Weak Entity

- Cannot exist without being related to a strong entity.
- Doesn't require strong entity's ID in its own primary key.

#### ◆ Specialization

- **“IS-A”** relationship. (e.g., Car is a Vehicle).
- Denoted by a **triangle labeled IS A** in ERD.

### ◆ Relationship Cardinality

- **Max Cardinality:** Maximum # of entity instances.
  - Types:
    - One-to-One
    - One-to-Many ☒ (Dept – Employees)
    - Many-to-Many
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### ◆ 3. Normalization

#### ◆ Purpose

- Reduce redundancy.
- Remove anomalies (insert, update, delete).
- Improve schema structure.

#### ◆ Normal Forms

Form	Condition	Removes
1NF	Atomic values only	Repeating groups
2NF	No partial dependency (on part of key)	Partial Dependencies
3NF	No transitive dependency (non-key → non-key)	Transitive Dependencies
BCNF	Every determinant is a candidate key	Remaining anomalies
4NF	No multivalued dependencies (MVDs)	MVDs
DKNF	Domain + Key constraints only	All anomalies

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### ◆ 4. Transactions & Concurrency

#### ◆ ACID Properties

- **Atomicity** → All-or-none
- **Consistency** → DB remains valid
- **Isolation** → Concurrent transactions don't affect each other

- **Durability** → Once committed, changes persist

#### ◆ Transaction States

- **Active** → **Partially Committed** → **Committed** ✓ (success)
- **Active** → **Failed** → **Aborted** ✗ (rollback)

#### ◆ 5. Isolation Levels & Anomalies

Isolation Level	Dirty Read	Non-Repeatable Read	Phantom Read
Read Uncommitted	✓ Allowed	✓ Allowed	✓ Allowed
Read Committed	✗ No	✓ Allowed	✓ Allowed
Repeatable Read	✗ No	✗ No	✓ Allowed
Serializable	✗ No	✗ No	✗ No

- **Repeatable Read** prevents **non-repeatable reads** ✓
- **Serializable** prevents **phantom reads** ✓

#### ◆ 6. SQL Syntax and Clauses

##### ◆ SELECT Queries

sql

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SELECT \* FROM table WHERE condition;

SELECT \* FROM student WHERE name LIKE 'r%';

##### ◆ Subqueries

- Written inside **parentheses**
- Can use **IN**, **EXISTS**, **NOT IN**, etc.

##### ◆ USE Command

- Switches database in MySQL

sql

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USE databasename;

### ◆ **Comparison and Pattern Matching**

sql

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WHERE age > 50 AND age < 80;

WHERE name LIKE 'r%'; -- starts with r

### ◆ **DELETE Statement**

sql

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DELETE FROM studentinfo WHERE name = 'Hari Prasad';

### ◆ **EXISTS**

- Returns TRUE if subquery returns **any row**

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## ◆ **7. SQL Constraints**

### ◆ **PRIMARY KEY**

- Uniquely identifies records

sql

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ALTER TABLE employee ADD CONSTRAINT pk\_empid PRIMARY KEY (empid);

### ◆ **FOREIGN KEY**

- Links to another table's primary key

### ◆ **NOT NULL**

- Column must contain a value

### ◆ **CHECK**

- Enforces domain constraints (e.g., salary > 0)
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## ◆ 8. Set Operators in SQL

Operator	Supported in MySQL	Description
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UNION	✓ Yes	Combines results, removes duplicates
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INTERSECT	✗ No	Not supported in MySQL natively
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MINUS	✗ No	Use JOIN/NOT IN alternatives
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## ◆ 9. Metadata and Data Dictionary

### ◆ Metadata

- Data **about** data.
- Example: Column names, datatypes, table structure.

### ◆ Data Dictionary

- Stores **schema information**, constraints, ownership.
  - ✗ Does **not** store physical info like disk size.
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## ◆ 10. General Concepts

- **Tuple** → Row
  - **Domain** → Set of possible values
  - **Relation** → Table
  - **Schedule** → Sequence of operations from multiple transactions
  - **Modification anomalies:**
    - Insert anomaly
    - Update anomaly
    - Delete anomaly→ Resolved by **Normalization**
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## Must-Know Mnemonics

### ◆ Normal Forms Summary

pgsql

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1NF – Atomic columns

2NF – No partial dependencies

3NF – No transitive dependencies

BCNF – Determinants are candidate keys

4NF – No multivalued dependencies

#### ◆ Transaction States

mathematica

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Active → Committed (Success)

Active → Failed → Aborted (Rollback)

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#### ✔ Quick Tips Before Exam

- **1NF** = Remove repeating groups, keep atomic values
- **2NF** = Only if composite key → check partial dependency
- **3NF** = Remove transitive dependencies
- **BCNF** = Even stricter than 3NF
- **4NF** = Rare, used to remove MVDs
- Use **Foreign Keys** for referential integrity
- **Repeatable Read ≠ Phantom Safe**
- LIKE 'r%' = starts with r
- SQL must have correct syntax → AND, WHERE, etc.