

SQL – Introduction to Keys (Understanding Notes)

1. What is a Database?

A database is a shared collection of logically related data designed to meet organizational information needs. It stores customer details, inventory data, employee records, sales figures, and more.

2. Uses of Databases

- Data Storage – Organized storage of large volumes of data.
- Data Analysis – Helps in trend analysis and decision making.
- Record Keeping – Maintains transaction and operational records.
- Web Applications – Stores user data and application content.

3. CRUD Operations

Create – Add new records.

Read – Retrieve data.

Update – Modify existing records.

Delete – Remove records.

4. Properties of Database

- Integrity – Accuracy and consistency of data.
- Security – Protection from unauthorized access.
- Availability – Accessible when needed.
- Concurrency – Handles multiple users simultaneously.
- App Independence – Data independent from applications.

5. SQL vs NoSQL

SQL – Relational, table-based, structured queries.

NoSQL – Non-relational, flexible schema, document/key-value/graph models.

6. DBMS

Database Management System software manages, retrieves, manipulates, and secures database data.

7. Schema

Logical structure of a database defining tables, columns, relationships, indexes, and constraints.

8. Types of Keys

Super Key – One or more attributes that uniquely identify a record.

Candidate Key – Minimal super key without redundancy.

Primary Key – Selected candidate key; cannot be NULL.

Alternate Key – Candidate keys not selected as primary.

Composite Key – Combination of multiple columns as key.

Foreign Key – Links one table to another (references primary key).

9. Cardinality of Relationships

One-to-One

One-to-Many

Many-to-One

Many-to-Many

Conclusion

Keys are essential for maintaining data integrity and establishing relationships between tables. Understanding keys and cardinality helps design robust and efficient database systems.