

# Title Cheat Sheet

## Relational Databases

- A relation in a database corresponds to a table.
- Rows are called tuples; columns are attributes.
- Primary Key: uniquely identifies a tuple.
- Foreign Key: used to establish a relationship between tables.
- The order of rows is not significant.
- Physical and logical data independence allows schema change without affecting apps.

## Structured Query Language (SQL)

- SQL is used for data querying in relational databases.
- DDL includes CREATE, ALTER, DROP tables.
- DML: SELECT for retrieval, INSERT, UPDATE, DELETE.
- Fundamental in data science for data transformation.
- Basic form: `SELECT columns FROM table WHERE condition;`

## SQLite Database

- SQLite is a lightweight, file-based DB.
- Useful for small apps, testing, embedded systems.
- Non-commercial; supports SQL standard.
- Offers limited concurrency features.
- ACID compliant via rollback journals.

## DB Browser for SQLite

- Tool for managing SQLite DBs without scripting.
- Easily run queries, create/modify tables.
- Import/export data in CSV format.

## Selection and Projection in SQL

- **SELECT** chooses specific columns from a table.
- **WHERE** clause filters rows based on conditions.
- **Projection**: retrieve specific attributes.
- Conditions without WHERE result in full table data.

## Joins in SQL

- Joins combine rows from two or more tables.
- **INNER JOIN**: returns rows with matching keys.
- **LEFT/RIGHT JOIN**: includes all from one table, matches from another.
- **FULL JOIN**: unions all matched and unmatched rows.

## Minimum Spanning Trees (MSTs)

- Prim's algorithm: starts at a node, expands by minimum edge.
- Kruskal's: sorts edges, adds smallest edge not forming cycles.
- MST edge weight sum is minimal.

## Graph Weight Modification and MSTs

- Doubling edge weights scales MST weights.
- Adding a constant does not change MST itself.

## Shortest Path Trees

- Shortest path trees prioritize path cost.
- MST and shortest trees differ in objectives.

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