

# **MYSQL ROADMAP(BASIC- ADVANCED)**

---

## **BEGINNER LEVEL**

### **1. Introduction to MySQL & Databases**

- What is MySQL?
- Features of MySQL
- RDBMS vs NoSQL
- Database concepts: tables, rows, columns
- Relational database structure
- Client-server architecture

### **2. Installing and Setting up MySQL**

- Download and install MySQL
- Using MySQL Command Line Client
- Introduction to MySQL Workbench
- MySQL CLI vs GUI tools (like MySQL Workbench, phpMyAdmin)
- Connecting to a MySQL server
- Basic SQL Syntax: Statements, clauses, keywords, case-sensitivity

### **3. Database Operations**

- Creating databases

- Selecting a database
- Viewing databases
- Dropping databases

#### **4. Table Operations**

- Creating tables
- Viewing table structures
- Modifying table structure (ALTER)
- Dropping tables

#### **5. Data Types in MySQL**

- Numeric data types (INT, DECIMAL, FLOAT, etc.)
- String data types (CHAR, VARCHAR, TEXT, etc.)
- Date and time data types (DATE, TIME, DATETIME, TIMESTAMP)
- Boolean data type

#### **6. Constraints**

- NOT NULL
- DEFAULT
- UNIQUE
- PRIMARY KEY
- FOREIGN KEY
- CHECK (MySQL 8+)

#### **7. Basic CRUD Operations**

- INSERT
  - SELECT
  - UPDATE
  - DELETE
- 

## □ INTERMEDIATE LEVEL

### 8. Filtering Data

- WHERE clause
- Logical operators (AND, OR, NOT)
- Comparison operators (=, >, <, <=, >=, <>)
- IN, BETWEEN, LIKE, IS NULL

### 9. Sorting and Limiting Results

- ORDER BY
- ASC and DESC
- LIMIT and OFFSET

### 10. SQL Functions

- String functions (CONCAT, LENGTH, LOWER, UPPER, TRIM, SUBSTRING)
- Numeric functions (ROUND, CEIL, FLOOR, ABS, MOD)
- Date functions (NOW, CURDATE, DATEDIFF, DATE\_ADD, DATE\_SUB)

- Conversion functions (CAST, CONVERT)

## **11. Aliases**

- Column aliasing
- Table aliasing

## **12. Aggregate Functions**

- COUNT
- SUM
- AVG
- MIN
- MAX

## **13. GROUP BY and HAVING**

- Grouping data
- Filtering grouped data using HAVING

## **14. JOINS**

- INNER JOIN
- LEFT JOIN
- RIGHT JOIN
- FULL OUTER JOIN (via UNION)
- CROSS JOIN
- Self JOIN

## **15. Subqueries**

- Subqueries in SELECT

- Subqueries in WHERE
- Subqueries in FROM
- Correlated subqueries

## **16. Set Operations**

- UNION
- UNION ALL
- INTERSECT (MySQL 8.0+ via workaround)
- EXCEPT (MySQL 8.0+ via workaround)

## **17. Data Import and Export**

- Importing data from CSV (LOAD DATA INFILE)
- Exporting data to files
- Using MySQL Workbench import/export wizards

---

## **◆ ADVANCED LEVEL**

## **18. Views**

- Creating views
- Updating views
- Dropping views
- Read-only views vs updatable views

## **19. Indexes**

- Purpose of indexing
- Creating indexes

- Unique indexes
- Composite indexes
- Full-text indexes
- Dropping indexes
- Indexes and performance

## **20. Stored Procedures**

- Defining stored procedures
- Parameters (IN, OUT, INOUT)
- Calling procedures
- Using control structures (IF, CASE, WHILE, LOOP)

## **21. Stored Functions**

- Creating functions
- RETURN clause
- Function vs procedure differences

## **22. Triggers**

- Creating triggers
- BEFORE and AFTER triggers
- Trigger events (INSERT, UPDATE, DELETE)
- Managing triggers

## **23. Transactions**

- START TRANSACTION
- COMMIT

- ROLLBACK
- SAVEPOINT and ROLLBACK TO
- Isolation levels
- ACID properties

## **24. Error Handling**

- DECLARE HANDLER
- Error codes and messages

## **25. User Management and Security**

- Creating and deleting users
- Granting privileges
- Revoking privileges
- Roles (MySQL 8+)
- Password management
- FLUSH PRIVILEGES

## **26. Backup and Restore**

- Using mysqldump
- Restoring from SQL dumps
- Backup options in MySQL Workbench

## **27. Performance Optimization**

- Query optimization
- Using EXPLAIN and ANALYZE
- Optimizing indexes

- Query cache
- Slow query logs

## **28. Database Design and Modeling**

- Entity Relationship Diagrams (ERD)
- Normalization: 1NF, 2NF, 3NF, BCNF
- Denormalization concepts
- Schema design best practices

## **29. Partitioning (Advanced)**

- Range, List, Hash, Key partitioning
- Subpartitioning
- Managing partitions

## **30. Replication and High Availability (Advanced)**

- Master-slave replication
- Master-master replication
- GTID-based replication
- MySQL Cluster basics

## **31. JSON Data (MySQL 5.7+)**

- JSON data type
- JSON functions (JSON\_EXTRACT, JSON\_ARRAY, etc.)
- Working with JSON columns

## **32. Common Table Expressions (CTEs)**



- WITH clause
- Recursive CTEs

### **33. Window Functions (MySQL 8.0+)**

- RANK, DENSE\_RANK, ROW\_NUMBER
  - LEAD, LAG
  - NTILE
  - OVER and PARTITION BY
-