

**TRAINING TRAINS**

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IT Services and IT Consultancy \ Internship-Inplant Training \ Software Training Institute

உங்கள் கடை மற்றும் வியாபாரத்திற்கு ஏற்ற **Website & Andriod App** மற்றும் **Software** மிகச்சிறந்த முறையில் செய்து கொடுக்கப்படும்.

Expertise : **AI, Machine Learning & Data Science \ Cybersecurity & Ethical Hacking**
IoT, Blockchain & Cloud Computing \ Full Stack Web & Mobile Development
Digital Marketing & SEO

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SQL – 100+ Lab Exercises (Basic, Intermediate, Advanced)

□ Basic Level (30+ Exercises)

Objective: Build a solid foundation in SQL syntax, querying, and database fundamentals.

Fundamental Concepts

- Introduction to databases and relational model.
- Basic SELECT queries with WHERE clauses.
- Filtering data using comparison and logical operators.
- Sorting data with ORDER BY.
- Using DISTINCT to remove duplicates.

Data Retrieval & Functions

- Using aggregate functions: COUNT, SUM, AVG, MIN, MAX.
- Grouping data with GROUP BY.
- Filtering grouped data with HAVING.
- Working with NULL values and IS NULL checks.
- Using string functions (UPPER, LOWER, CONCAT).

Basic Joins and Subqueries

- INNER JOIN basics to combine tables.
- LEFT JOIN and RIGHT JOIN usage.
- Writing simple subqueries in SELECT and WHERE.
- Understanding aliases for readability.
- Using LIMIT/OFFSET for pagination.

□ Intermediate Level (40+ Exercises)

Objective: Enhance skills in complex querying, database design, and transaction management.



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Advanced Joins and Set Operations

- FULL OUTER JOIN and CROSS JOIN.
- Using UNION, INTERSECT, and EXCEPT.
- Self-joins and recursive queries.
- Nested subqueries with correlated subqueries.

Data Modification and Transactions

- INSERT, UPDATE, DELETE statements.
- Using transactions and understanding ACID properties.
- Implementing COMMIT and ROLLBACK.
- Locking mechanisms and concurrency control.

Database Design & Integrity

- Creating tables with constraints (PRIMARY KEY, FOREIGN KEY).
- Implementing UNIQUE, CHECK, and NOT NULL constraints.
- Normalization concepts and applying 1NF, 2NF, 3NF.
- Creating and using indexes for performance.
- Designing ER diagrams.

Stored Procedures & Functions

- Writing stored procedures and user-defined functions.
- Using variables, control flow, and error handling.
- Triggers for automated responses to data changes.

☐ Advanced Level (40+ Exercises)

Objective: Master performance optimization, complex analytics, and advanced SQL features.

Performance Tuning & Optimization

- Analyzing query execution plans.
- Index optimization strategies.
- Partitioning tables and data sharding.
- Optimizing joins and subqueries.
- Using materialized views.



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Advanced Analytical Queries

- Window functions (ROW_NUMBER, RANK, LEAD, LAG).
- Complex CTEs (Common Table Expressions) and recursive queries.
- Pivot and unpivot data.
- JSON and XML data querying within SQL.
- Full-text search capabilities.

Security & Administration

- Managing user roles and permissions.
- Auditing and compliance queries.
- Backup and recovery strategies.
- Replication and failover setups.
- Managing large-scale distributed databases.

Capstone Projects

- Design and implement a normalized database schema for an enterprise app.
- Write complex reports combining multiple data sources.
- Build a data warehouse star schema and query it.
- Implement stored procedures for business logic automation.
- Optimize and tune queries for a high-traffic application.

□ Popular SQL Platforms Covered

- MySQL, PostgreSQL, Microsoft SQL Server, Oracle SQL, SQLite