Course Name: SQL Support Professional Training Program

Course Overview

This course is tailored for aspiring SQL Support Engineers and database administrators, offering comprehensive training on managing, troubleshooting, and optimizing SQL Server environments. It covers foundational topics like writing SQL queries, database management, and backup strategies, alongside advanced concepts such as performance tuning, security best practices, and high availability configurations. Learners will engage in hands-on projects, including a capstone project that simulates real-world SQL support scenarios. By the end of the course, participants will be well-equipped to address SQL-related challenges and excel in database support roles.

Course Type

Intermediate Level.

Course Objectives

1. Develop proficiency in writing, managing, and optimizing SQL queries.

2. Troubleshoot common SQL Server errors and performance issues.

3. Implement robust database security measures and high availability solutions.

4. Perform regular database maintenance and monitoring tasks.

5. Gain hands-on experience in SQL support workflows and real-world problem-solving.

6. Prepare for SQL support roles with resume building, interview preparation, and industry-relevant tools.

What You'll Learn?

- The fundamentals of SQL and relational database management systems (RDBMS).

- Writing and optimizing SQL queries, including advanced techniques for performance tuning.

- Troubleshooting common database errors, connection issues, and slow-running queries.

- Implementing security protocols such as encryption, role-based access, and auditing.

- Configuring high availability and disaster recovery solutions in both on-premise and cloud environments.

- Hands-on experience with real-world SQL support workflows, monitoring tools, and database maintenance strategies.

Duration

Approximately 60–80 hours, including lectures, hands-on labs, and a capstone project.

Requirements

- A computer with SQL Server installed or access to a cloud SQL environment.

- Internet access for accessing cloud-based SQL tools and additional resources.

Pre-requisites

- Basic knowledge of databases and SQL concepts.

- Familiarity with Windows or Linux environments for database installations and configurations.

Target Audience

- Aspiring SQL Support Engineers and Database Administrators.

- IT professionals seeking to enhance their SQL troubleshooting and optimization skills.

- Recent graduates preparing for entry- to mid-level roles in database management.

- Individuals interested in learning SQL and exploring database support as a career path.

Curriculum

Module 1: Introduction to SQL and RDBMS

1.1 Overview of SQL and Relational Databases

- Introduction to SQL and its purpose in relational database management.
- Key components of RDBMS (tables, rows, columns, relationships).
- Overview of SQL Server, MySQL, and other common RDBMS.

1.2 Role of SQL Support

- Understanding the role and responsibilities of an SQL Support Engineer.
- Common challenges faced in SQL Support roles (troubleshooting, query optimization).
- Introduction to support workflows and ticketing systems (e.g., ServiceNow, Jira).

1.3 Setting Up an SQL Server Environment

- Installing and configuring SQL Server.
- Understanding SQL Server Management Studio (SSMS) and command-line tools.
- Connecting to SQL Server instances locally and remotely.

Module 2: Basic SQL Queries and Database Management

2.1 Writing Basic SQL Queries

- SELECT, INSERT, UPDATE, DELETE statements.
- Filtering data using WHERE, GROUP BY, and HAVING clauses.
- Joining tables (INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN).

2.2 Database Objects Management

- Understanding and managing database schemas.
- Creating and modifying tables, indexes, and views.
- Managing relationships: Primary keys, foreign keys, and constraints.

2.3 Backup and Restore Operations

- Performing full, differential, and transaction log backups.

- Restoring databases from backups.

- Ensuring database availability and disaster recovery.

Module 3: Troubleshooting Common SQL Issues

3.1 Identifying and Troubleshooting SQL Server Errors

- Understanding SQL Server error messages and logs.

- Common SQL Server issues (login issues, database connection failures).

- Resolving database connection errors (authentication, permissions, firewall).

3.2 Performance-Related Troubleshooting

- Identifying slow-running queries and deadlocks.

- Using execution plans to diagnose query performance issues.

- Troubleshooting locking and blocking problems.

3.3 Database Corruption and Recovery

- Understanding database corruption and detection techniques.

- Using DBCC commands to check and repair databases.

- Steps for recovering corrupted data and restoring integrity.

Module 4: SQL Server Security

4.1 User Authentication and Access Control

- Managing user accounts and roles in SQL Server.

- Implementing role-based access control (RBAC).

- Using Windows authentication vs. SQL Server authentication.

4.2 Data Encryption and Security Best Practices

- Implementing Transparent Data Encryption (TDE).

- Encrypting sensitive data in databases.

- Securing connections using SSL/TLS for SQL Server.

4.3 Auditing and Monitoring for Security Threats

- Setting up SQL Server Audit to track security events.

- Monitoring database activity and detecting unusual access.

- Best practices for protecting data from breaches and threats.

Module 5: SQL Server Maintenance and Optimization

5.1 Automating Maintenance Tasks

- Setting up maintenance plans for backups, indexing, and cleanup.

- Using SQL Server Agent to schedule jobs.

- Managing automated alerts and notifications.

5.2 Index Management and Optimization

- Understanding clustered vs. non-clustered indexes.

- Creating, maintaining, and rebuilding indexes.

- Optimizing database performance through proper indexing strategies.

5.3 Database Shrinking and File Management

- Managing database size with shrinking.

- Best practices for data file and log file management.

- Handling issues related to disk space and database growth.

Module 6: Monitoring and Performance Tuning

6.1 Monitoring SQL Server Performance

- Using built-in tools like SQL Server Profiler and Activity Monitor.

- Configuring performance counters and setting up monitoring dashboards.

- Monitoring CPU, memory, and disk usage in SQL Server.

6.2 Query Optimization Techniques

- Understanding how SQL Server processes queries.

- Using query hints, indexing, and query refactoring to improve performance.

- Optimizing joins, subqueries, and views for faster execution.

6.3 SQL Server Performance Tuning Tools

- Using Dynamic Management Views (DMVs) for performance analysis.

- Understanding SQL Server Extended Events.

- Using third-party tools (e.g., SolarWinds Database Performance Analyzer, Redgate) for advanced monitoring.

Module 7: High Availability and Disaster Recovery

7.1 High Availability Options in SQL Server

- Overview of SQL Server AlwaysOn Availability Groups.

- Configuring database mirroring and failover clustering.

- Understanding replication and log shipping.

7.2 Disaster Recovery Strategies

- Planning for database failovers and disaster recovery.

- Implementing point-in-time recovery.

- Testing disaster recovery plans and ensuring database availability.

7.3 SQL Server in Cloud Environments

- Deploying SQL Server on cloud platforms (Azure SQL Database, AWS RDS).

- Implementing high availability and disaster recovery in the cloud.

- Understanding cloud database security and backup strategies.

Module 8: Capstone Project and Job Preparation

8.1 Capstone Project: SQL Support Case Study

- Solving a real-world SQL support case involving troubleshooting, optimization, and performance tuning.

- Documenting the issue, steps taken to resolve it, and final solutions.

- Presenting the case study and results to peers for feedback.8.2 Resume Writing and Interview Preparation

- Crafting a resume for SQL Support and Database Administrator roles.

- Preparing for common SQL support interview questions.

- Mock interviews focusing on troubleshooting, performance tuning, and database management scenarios.