INFOSOFT IT SOLUTIONS

Training | Projects | Placements

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Database Programming

Introduction to Database Programming

- Overview of Database Programming: Role and importance in application development
- Types of Database Systems: Relational, NoSQL, NewSQL
- SQL vs. NoSQL: Comparing SQL and non-relational database paradigms

SQL Fundamentals

- Basic SQL Commands: SELECT, INSERT, UPDATE, DELETE
- Filtering and Sorting Data: WHERE, ORDER BY
- Querying Multiple Tables: Joins (INNER, LEFT, RIGHT, FULL), subqueries

Advanced SQL Concepts

- Aggregation Functions: AVG, SUM, COUNT, MIN, MAX
- Grouping Data: GROUP BY, HAVING
- Set Operations: UNION, INTERSECT, EXCEPT

SQL Functions and Procedures

- Scalar Functions: String functions, date functions, mathematical functions

- Aggregate Functions in Depth: GROUP_CONCAT, LISTAGG, ARRAY_AGG
- Stored Procedures: Creating, calling, and managing stored procedures

Transactions and Concurrency Control

- ACID Properties: Atomicity, Consistency, Isolation, Durability
- Managing Transactions: BEGIN TRANSACTION, COMMIT, ROLLBACK
- Concurrency Issues: Locking, deadlock prevention, isolation levels

Database Security and Authentication in SQL

- User Management: Creating users, granting privileges
- SQL Injection Prevention: Parameterized queries, prepared statements
- Auditing and Logging: Monitoring SQL activities and security events

Indexing and Query Optimization

- Indexing Basics: Types of indexes (B-tree, hash, bitmap)
- Performance Optimization Techniques: EXPLAIN PLAN, query hints
- Tuning SQL Queries: Improving query performance with indexing strategies

Database Triggers and Views

- Database Triggers: BEFORE, AFTER triggers for DML operations
- Creating and Managing Views: Simple views, complex views
- Materialized Views: Benefits and considerations

NoSQL Database Programming

- Introduction to NoSQL Databases: Document-based, key-value, column-family, graph databases

- Querying NoSQL Databases: MongoDB (Mongo Shell), Cassandra (CQL), Redis (Redis CLI)
- Using NoSQL with SQL: Polyglot persistence and hybrid approaches

Object-Relational Mapping (ORM)

- Introduction to ORM: Mapping objects to relational databases
- Using ORMs in Practice: Hibernate (Java), Entity Framework (C#)
- Benefits and Challenges of ORM: Performance considerations, code maintenance

Database Programming for Web Applications

- Connecting to Databases in Web Applications: JDBC (Java), ADO.NET (C#)
- Handling Database Operations: CRUD operations, connection pooling
- Secure Database Access: Best practices for web application security

Database Programming in Cloud Environments

- Cloud Database Services: AWS RDS, Azure SQL Database, Google Cloud SQL
- Deploying Database Applications on Cloud Platforms
- Scalability and Performance Considerations in Cloud Databases

Emerging Trends in Database Programming

- Blockchain and Database Programming: Integration and use cases
- AI and Machine Learning in Database Applications
- Data Privacy and Compliance: GDPR, CCPA, and database programming implications

Database Programming Project

- Real-world Database Programming Project: From design to implementation
- Presentation of Findings: Demonstrating project outcomes
- Peer Review and Feedback: Evaluation and improvement based on feedback