INFOSOFT IT SOLUTIONS

Training | Projects | Placements

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Database Management & Administration

Introduction to Database Management Systems (DBMS)

- Overview of DBMS: Definition, role, and importance in modern IT
- Types of DBMS: Relational, NoSQL, NewSQL
- Evolution of Database Technologies: From hierarchical to distributed databases

Relational Database Concepts

- Relational Data Model: Tables, rows, columns, keys (primary, foreign)
- Entity-Relationship (ER) Diagrams: Designing relational databases
- Structured Query Language (SQL): Basic and advanced SQL commands

Database Design and Normalization

- Database Design Principles: Conceptual, logical, and physical design phases
- Normalization Techniques: Normal Forms (1NF, 2NF, 3NF) and beyond
- Denormalization: Benefits and trade-offs in database performance

Data Modeling and Schema Design

- Conceptual Data Modeling: Entity types, attributes, relationships
- Logical Data Modeling: Translating conceptual models into logical schemas
- Physical Data Modeling: Implementing logical models in specific DBMS platforms

Database Management Tasks

- Data Definition Language (DDL): Creating, altering, and dropping database objects
- Data Manipulation Language (DML): Inserting, updating, deleting data
- Data Control Language (DCL): Granting and revoking permissions

Transaction Management and Concurrency Control

- ACID Properties of Transactions: Atomicity, Consistency, Isolation, Durability
- Transaction Management: Commit, rollback, savepoints
- Concurrency Control: Locking mechanisms, deadlock prevention

Database Security and Authentication

- Database Security Principles: Confidentiality, integrity, availability (CIA)
- Authentication and Authorization: User roles, privileges, and access controls
- Auditing and Logging: Monitoring database activities and security events

Performance Tuning and Optimization

- Query Optimization Techniques: Indexing, query plans, query rewriting
- Performance Monitoring Tools: Profilers, performance counters

- Database Maintenance: Backup and recovery strategies, data archiving

High Availability and Disaster Recovery

- High Availability Solutions: Clustering, replication, failover
- Disaster Recovery Planning: Backup strategies, point-in-time recovery
- Business Continuity: Ensuring database availability during disruptions

NoSQL and NewSQL Databases

- Overview of NoSQL Databases: Types (document, key-value, column-family, graph)
- Introduction to NewSQL: Characteristics and use cases
- Comparing NoSQL and NewSQL with Traditional RDBMS

Cloud Databases and Database as a Service (DBaaS)

- Cloud Database Services: AWS RDS, Azure SQL Database, Google Cloud SQL
- Benefits and Challenges of Cloud Databases
- Implementing and Managing DBaaS Solutions

Database Migration and Consolidation

- Database Migration Strategies: Lift and shift, online vs. offline migration
- Database Consolidation: Benefits, challenges, and best practices
- Tools and Techniques for Database Migration

Big Data and Distributed Databases

- Introduction to Big Data: Characteristics, challenges, and opportunities
- Distributed Database Architectures: Sharding, replication, consistency models
- Scalable Database Solutions: Hadoop, Apache Cassandra, MongoDB

Emerging Trends in Database Management

- Blockchain and Database Management: Use cases and integration
- AI and Machine Learning in Database Management
- Data Privacy and Compliance: GDPR, CCPA, and database management implications