

Advanced Database Management System

Unit 1: Basic Concepts

Database and Need for DBMS, Characteristics of DBMS, Database Users, 3-tier architecture of DBMS (its advantages over 2-tier), Data Models

Unit 2: Database Design using ER model

Entities, Relationships, Representation of entities, attributes, relationship attributes, relationship set, Generalization, aggregation, Structure of relational Database and different types of keys, Expressing M: N relation

Unit 3: Relational Model Codd's rules, Relational data model & relational algebra, Relational model concept, Relational model constraints, Relational Algebra, Relational calculus,

Unit 4: Introduction to SQL, Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands

Unit 5: Elements of SQL

SQL operators and their procedure, Tables, views and indexes, Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joins, Unions, Intersection, Minus

Unit 6: Relational Database design

Database Design – ER to Relational, Functional dependencies, Normalization, Normal forms based on primary keys (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF), Loss less joins and dependency, preserving decomposition

Unit 7: Transaction Processing Concepts

Introduction to transaction processing; transaction and system concepts; desirable properties of transaction; characteristics schedule based on recoverability; characteristics schedule based on serializability.

Unit 8: Concurrency Control and recovery

Two phase locking techniques for concurrency control; concurrency control based on timestamp ordering; multi-version concurrency control techniques; validation(optimistic) concurrency control techniques; granularity of data items and multi granularity locking, recovery concepts and recovery techniques.

Unit 9: Security and privacy

Database security issues, Discretionary access control based on grant & revoking privilege, Mandatory access control and role based access control for multilevel security, Encryption & public key infrastructures