Relational Data Base Management System

Session 1: Introduction

1. Advantages of DBMS approach, Various view of data.
2. Data Independence, Schema and Subschema.
3. Primary concept of data models, Database languages.
4. Transaction Management, Database administrator and users.
5. Data Dictionary, overall system architecture.
6. ER Model: Basic concept, Design issues, mapping constraint, keys, ER diagram, weak and strong entity sets, specialization and generalization, aggregation, inheritance, design of ER scheme, reduction of ER schema to tables.

Session 2: Domains, Relations and Keys

1. Domains, relations, Kind of relations, Relational Database.
2. Various types of keys, candidate, primary, alternate and foreign keys.
3. Relational Algebra & SQL: The structure, relational algebra with extended operations.
4. Modifications of database, idea of relational calculus.
5. Basic structure of SQL, set operations, aggregate functions.
6. Null values, nested sub queries, derived relations, views.
7. Modification of database, join relations, DDL in SQL.

Session 3: Functional Dependencies and Normalization

1. Basic definitions, trivial and non trivial dependencies.
2. Closure set of dependencies and of attributes, irreducible set of dependencies.
3. Introduction to normalization, non loss decomposition.
4. FD diagram: first, second and third, Normal forms, dependency preservation, BCNF, Multivalued dependencies and fourth normal form, Join dependency and fifth normal form.
5. Database Integrity: general idea, Integrity rules, Domain rules, Attribute rules.
6. Transaction, concurrency and Recovery: Basic concept, ACID properties, Transaction states, implementation of atomicity and durability, concurrent executions.

Session 4: Serializability and Distributed Database

1. Basic idea of serializability, concurrency control.
2. Deadlock, failure classification, Storage structure types, Stable storage implementation, data access, recovery and atomicity – log based recovery, deferred Database modification, immediate Database modification, and checkpoint.
3. Distributed Database: Basic idea, Distributed data storage, data replication, data fragmentation and mixed fragmentation.
4. Network and hierarchical models: basic idea, data structure diagrams, DBTG model, implementations, tree structure diagram, implementation techniques, comparison of the three models.

Session 5: Emerging field in DBMS

1. Object- oriented Database: basic idea and the model, object structure, object class, inheritance, multiple inheritance, object identity.
2. Data warehousing: terminology, definition and characteristics.
3. Database on www, multimedia Database – difference with conventional DBMS.
4. Issues, similarity based retrieval, continuous media data, multimedia data formats.
5. Storage structure and file organizations: overview of physical storage media.
6. Magnetic disks performance and optimization.
7. RAID: file organization, organization of records in files, basic concept of indexing, ordered indices, basic idea of B-tree and B+- tree organization