Test-1 Review
C442
Database Systems

Part - 1
What is a database?
Persistent vs. non persistent data.
What is a DBMS?
Why use a database?
  Redundancy, shareability, inconsistency, standards, integrity, data independence
Advantages of databases over traditional file systems.
When not to use a DBMS?
Database Models (relational, hierarchical, network and object oriented)

Part - 2
Data Models (set of concepts used to describe the structure of a database)
  1) high level or conceptual (entities, relationships, attributes) ER
  2) Representational or Implementation data model (relational hierarchical, network, OO)
  3) Low level or physical (record format, access mechanism)

Database Schema (structure or intension of the database)
Database State (occurrences, instances or the extension of the database)

DBMS architecture (ANSI/SPARC model)
  1) External view (individual user or programmer's view)
  2) Conceptual view (representation of the entire database as known to user community)
  3) Internal view (storage view)

Mapping between views
Physical and logical data independence
Data sub-languages (DDL and DML)
Database query facilities (procedural and non-procedural)
  1) Form based (QBE)
  2) Menu based
  3) Natural language
  4) Query language (SQL, QUEL)

Part - 3
ER Modeling (a conceptual design tool for database design)
  1) Entities
  2) Relationships
  3) Attributes

Be prepared to produce an ER based on a description of an organization.
Types of attributes (simple, composite, single and multi valued, stored, derived and NULL)
When can an attribute have a null value?
Keys, composite keys, domains, weak entities, owner or identifying entities
Recursive relationships, degree of a relationship
Cardinality and ordinality.

Part - 6
Relational Data Model and Relational Algebra
Definitions for database, relation, attribute, tuple, domain under the relational model.
Relation Schema (relation name, list of attributes, domain of each attribute)
Degree of a relation (number of attributes in the schema)

Basic properties of relations: (no duplicate tuples, unordered, all attributes are atomic)
Relational model constraints:
  1) Domain constraints (attrs. should be atomic & from their domain)
  2) Key constraints (all tuples of a relation must be distinct.)
  3) Entity integrity constraints (no primary key value can be NULL)
  4) Referential integrity constraints
  5) Semantic integrity constraints

Keys (super keys, candidate key, primary key, foreign key)

Operations on Relations:
  1) Update operations:
     Insert
     Delete
     Modify
  2) Relational Algebra Operators:
     select
     project
     join
     union
     intersection
     difference
     cartesian product
     divide