22/11/13.

B.E. / B.Tech. (FULL TIME) DEGREE END SEMESTER EXAMINATIONS NOV/DEC 2013

(Common to CSE/IT Branch)

FIFTH SEMESTER

CS9024- ADVANCED DATABASE TECHNOLOGY

(Regulations 2008)

Time : 3hr Max Mark : 100

Answer ALL questions

Part - A (10 X 2 =20 Marks)

1. Write the distinction between serial schedule and serializable schedule.
2. Consider the following SQL query for our bank database.

   Select *T.branch-name* **from** *branch T, branch S* **where** *T.assets>S.assets* **and** *S.branch-city*="Brooklyn".

   Write an efficient relational-algebra expression that is equivalent to this query.
3. State some relative advantages of centralized and distributed databases.
4. List the drawbacks of pipelined parallelism.
5. What are persistent objects? Why do you need them in database programming language?
6. How does the concept of an object in object-oriented model differ from the concept of an entity in the entity-relationship model?
7. What are star schema and snowflake schema?
8. List the three factors that need to be considered in query optimization for mobile computing that are not considered in traditional query optimizers.
9. Define the parameters *support* and *confidence* of an association rule.
10. State the purpose of nearness queries and Region queries.

Part – B (5 X 16 = 80 Marks)

11. (i) Normalize the following schema, with given constraints, to 3NF and 4NF. (8)

    books(accessionno, isbn, title, author, publisher)

    users(userid, name, deptid, deptname)

    accessionno→isbn

isbn→title

isbn→publisher

isbn→author

userid→name

userid→deptid

deptid→deptname

(ii) Explain the Thomas Write rule time-stamp ordering protocol. (8)

12. A. (i) Describe the Two-Phase commit protocol and explain how it handles transaction failure in a distributed database environment. (10)

(ii) Explain the majority protocol to achieve concurrency control in distributed database. (6)

Or

B. Discuss the various ways by which parallelism can be achieved in relational operations like sort, hash and join operators. (16)

13. A. Design an OO schema for a university database application. First construct an EER schema for the application; then create the corresponding classes in ODL. Specify a number of methods for each class, and then specify 6 queries in OQL for the application. (16)

Or

B. (i) Discuss how persistence is specified in the ODMG Object Model in the C++ binding. (10)

(ii) Explain how Multiversion two phase locking helps in concurrent read and write operation. (6)

14. A. (i) Discuss client server architecture with respect to distributed databases. (8)

(ii) Explain the process of building a decision-tree classifier with illustrations. (8)

Or

B. (i) Discuss in detail the purpose of version-vector scheme in mobile databases. (8)

(ii) Create the XML schema for the following nested-relational schema. (8)

Emp = (ename, ChildrenSet setof(Children), SkillsSet setof(Skills))

Children = (name, Birthday)

Birthday = (day, month, year)

Skills = (type, ExamsSet setof(Exams))

Exams = (year, city)

Write the following queries in XQuery for the XML schema created.

a. Find the names of all employees who have a child who has a birthday in March.

b. Find those employees who took an examination for the skill type "typing" in the city "Dayton".

c. List all skill types in *Emp.*

15. A. Discuss in detail various multimedia data formats, types of continuous-media data, issues in storing multimedia data in a multimedia database. (16)

Or

B. Consider a deductive database with the following rules: (16)

ancestor(X,Y) :- father(X,Y)

ancestor(X,Y) :- father(X,Z), ancestor(Z,Y)

Note that "*father(X,Y)*" means that *Y* is the father of *X*; "ancestor(*X,Y*)" means that *Y* is the ancestor of *X*. Consider the fact base

Father(Harry, Issac), father(Issac, John), father (John, Thomas)

a. Construct a model theoretic interpretation of the above rules using the given facts.

b. Consider that a database contains the above relations *father(X,Y)* , another relation brother(X,Y) and a third relation birth(X,B), where B is the birthdate of person X. State a rule that computes the first cousins (i.e. their fathers must be brothers).

c. Show a complete datalog program with fact-based and rule-based literals that computes the list of pairs of cousins.
