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# B.E / B.Tech (Full Time ) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

### COMPUTER SCIENCE AND ENGINEERING

#### Third Semester

### **CS8303 Database Management Systems**

(Regulation 2012)

Time: 3 Hours

**Answer ALL Questions** 

Max. Marks 100

#### PART-A (10 x 2 = 20 Marks)

- 1. Give the significant differences between a file system and a DBMS.
- 2. Define data model. List the categories of data models.
- 3. Give the significance of integrity constraints in designing a relational database.
- 4. Define join dependencies.
- 5. How can you test the empty relations? Give an example.
- 6. What is static SQL? How does it differ from dynamic SQL?
- 7. List out the ACID properties.
- 8. What are the factors to be considered to determine which transaction will have to roll back to break the deadlock?
- 9. When it is preferable to use a dense index rather than a sparse index?
- 10. Define data mining.

# $Part - B (5 \times 16 = 80 \text{ marks})$

- i. Describe the system structure of a database system with neat block diagram. (12)
   ii. List out the differences between logical data independence and physical data independence. (4)
- 12. a) i. Construct an ER-diagram for keeping track of the exploits of your favorite sports team. You should store the matches played, the scores in each match, the players in each match, and individual player statistics for each match. (8)
  - ii. Consider the relational database:

employee(empname, street, city)

works(empname, companyname, salary)

company(companyname, city)

manages(empname, managername)

Write each of the following queries in Relational Algebra.

- Find the names of all employees who work for City Bank Corporation (1)
- Delete the tuples in the works relation for employees of Union Bank Corporation (2)
- Give all managers in this database a 10 percent salary raise.

(2)

 Assume the companies may be located in several cities. Find all companies located in every city in which State Bank Corporation is located. (3) b) i. Consider the following relation

Car\_sale (car#, salesman, date\_sold, commission, discount\_amount, color, manufacturing location)

Assume that the car may be sold by multiple salesman and hence (car#, salesman) is the primary key. Additional functional dependencies are: date\_sold -> discount\_amount,

salesman-> commission,

discount amount -> commission

car#, salesman ->> color,

car#, salesman ->> manufacturing\_location.

Based on the given primary key, is the relation in 1NF, 2NF, 3NF and BCNF, 4NF? Why and why not? How would you successfully normalize it completely? (10)

ii. Why 3NF is preferable than BCNF? Explain with a suitable example.

13. a) i. Consider the following relations which keep track of airline flight information:

Flights(flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: real)

(6)

Aircraft(aid: integer, aname: string, cruisingrange: integer)

Certified(eid: integer, aid: integer)

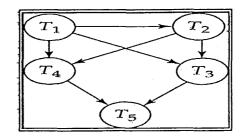
Employees(eid: integer, ename: string, salary: integer)

Note that the Employees relation describes pilots and other kinds of employees as well; every pilot is certified for some aircraft, and only pilots are certified to fly. Write each of the following queries in SQL.

- Find the names of aircraft such that all pilots certified to operate them have salaries more than \$80,000. (2)
- Find the aids of all aircraft that can be used on routes from Los Angeles to Chicago.
   (2)
- Compute the difference between the average salary of a pilot and the average salary of all employees (including pilots).
- Print the names of employees who are certified only on aircrafts with cruising range longer than 1000 miles.
- For each pilot who is certified for more than three aircraft, find the eid and the maximum cruising range of the aircraft for which she or he is certified.(3)
- ii. How is the security enforced in databases?

(OR)

- b) i. Explain the significance of triggers with other integrity constraints supported by SQL. (8)
  - ii. Discuss about views in SQL and the problems that may arise when updating the views with a suitable example. (8)
- 14. a) i. Illustrate the locking protocols for concurrency control. (12)
  - ii. Consider the precedence graph given below. Is the corresponding schedule is conflict serializable? State the reasons. (4)



(OR)

- b) i. Illustrate the two Phase Commit protocol for recovery. (8) ii. Explain the deadlock prevention strategies. (8)
- i. Describe the steps involved in Query processing. (6)
  ii. Let the relations r1(A,B,C) and r2(C,D,E) have the following properties: r1 has 20,000 tuples, r2 has 45,000 tuples, 25 tuples of r1 fit on one block, and 30 tuples of r2 fit on one block. Estimate the number of block accesses required, using each of the following join strategies for r1 ⋈ r2: (10)
  - Nested-loop join
  - Block nested -loop join
  - Merge Join
  - Hash Join

(OR)

b) i. Explain the architecture of a typical data warehouse and describe the various components of data warehouse. (10)
ii. Illustrate the guidelines for tuning the database. (6)