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Question Paper Code : 75540

5 Year M.Sc. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Third Semester

Computer Technology

XCS 235/10677 SW 305 — DATABASE MANAGEMENT SYSTEM

(Common to 5 year M.Sc. Information Technology/M.Sc. Software Engineering)

(Regulation 2003/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between hierarchical and network model.
2. What is meant by program data independence?
3. What is RAID technology?
4. What do you mean by blocking factor of a file?
5. Define 2NF.
6. Distinguish between primary key, candidate key and super key.
7. Define Functional Dependency.
8. How does SQL allow implementation of general integrity constraint?
9. What is query execution plan?
10. List the desirable properties of Transactions.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe three schema architecture and its two levels of independence. (4)
- (ii) Draw ER diagram to depict the information about university. (12)
- (1) Professor have an SSN, a name, an age, a rank and research speciality.
 - (2) Projects have a project number, a sponsor name, a starting date, an ending date and a budget.
 - (3) Graduate students have an SSN, name, age and a degree program (Eg MS or PhD).
 - (4) Each project is managed by one professor (known as project's principal investigator).
 - (5) Each project is worked on by one or more professors (known as co-investigators).
 - (6) Professors can manage and work on multiple projects.
 - (7) Each project is worked on by one or more graduate students (known as project's research assistants).
 - (8) When graduate students work on a project, a professor must supervise their work on the project. Graduate students can work on multiple projects, in which case they will have a potentially different supervisor for each one.
 - (9) Departments have a department number, dept name.
 - (10) Departments have a professor who runs dept.
 - (11) Professors work in one or more departments and for each department they work in a time percentage is associated with their job.
 - (12) Graduate students have one major dept in which they are working on their degree.
 - (13) Each graduate student has another more senior graduate student, who advises him or her to take.

Draw ER diagram that captures the information about university.

Or

- (b) (i) Compare File system with Data Base Management System. (6)
- (ii) Discuss the constraints and characteristics of generalization and specialization in Enhanced ER model. (10)

12. (a) (i) Explain the features of hashing file organization techniques with necessary sketches. (8)
- (ii) Explain internal hashing method, its major issue and solutions for handling the issue. (8)

Or

- (b) (i) Discuss on importance of multilevel indexes. (8)
- (ii) Write a note indexes on multiple keys. (8)

13. (a) Consider the following six relations for an order-processing database application in a company.

CUSTOMER(Cust#, Cname, City)

ORDER(Order#, Odate, Cust#, Ord_Amt)

ORDER_ITEM(Order#, Item#, Qty)

ITEM(Item#, Unit_price)

SHIPMENT(Order#, Warehouse#, Ship_date)

WAREHOUSE(Warehouse#, City)

Specify the following queries in relational algebra on the database schema.

- (i) List the Order# and Ship_date for all orders shipped from Warehouse number 'W2'. (3)
- (ii) List the Warehouse information from which the customer named 'Jose Lopez' was supplied his orders. Produce a listing: Order#, Warehouse#. (3)
- (iii) Produce a listing CUSTNAME, Number-Of-Orders, Ave-Order-Amt, where the middle column is the total number of orders by the customer and the last column is the average order amount for that customer. (3)
- (iv) List the orders that were not shipped within 30 days of ordering. (3)
- (v) List the Order# for orders that were shipped from all warehouses that the company has in New York. (4)

Or

- (b) Define 2NF, 3NF and BCNF and explain them with suitable examples. (16)

14. (a) (i) Discuss general transformation rules for relational algebra operation. (8)
- (ii) Explain the three important issues that arise when concurrent transactions are not handled in a controlled manner. (8)

Or

- (b) (i) Explain with an example cost-based query optimization. (8)
- (ii) Write a note on multiple relation queries and join ordering. (8)

15. (a) Discuss the following :
- (i) Shadow Paging Technique. (8)
- (ii) Log Based Recovery Technique. (8)

Or

- (b) (i) Write a note on database security issues. (10)
- (ii) What is multiple granularity locking? Under what circumstances is it used? (6)