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10CS54

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

Database Management Systems

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Explain the component modules of DBMS and their interaction, with the help of a diagram. (10 Marks)
- b. Explain the different categories of End Users who access the database. (05 Marks)
- c. Explain the different types of languages and interfaces provided by DBMS. (05 Marks)
- 2 a. Explain the main phases of database process, with the help of diagram. (10 Marks)
- b. Design an E-R diagram for keeping track of information about AIRLINE database taking into account at least FIVE entities. (10 Marks)
- 3 a. Briefly discuss the different types of update operations on relational database. Show an example of violation of the referential integrity in each of the update operation. (10 Marks)
- b. Consider the following two tables R and S, show the results of the following operations?
 - i) $R \bowtie_{R.X = S.A} S$
 - ii) $R \bowtie_{R.Y = S.B} S$
 - iii) $R \bowtie_{R.X=S.A} S$
 - iv) $R \bowtie_{(R.X = S.A \text{ AND } R.Z = S.C)} S$
 - v) $R \cup S$

(Assume R and S are union compatible) (10 Marks)

R		
X	Y	Z
7	a	3
14	b	5
21	a	6

S		
A	B	C
7	b	6
21	c	2
7	b	3

- 4 a. Describe the SIX clauses in the syntax of an SQL retrieval query and give examples for each. (10 Marks)
- b. Consider the following schema for a company database :
 EMPLOYEE(Name, Ssn, Address, Sex, Salary, Super_ssn, Dno)
 DEPT_LOCATIONS(Dnumber, Dlocation)
 DEPARTMENT(Dname, Dnumber, Mgr_ssn, Mgr_start_date)
 PROJECT(Pname, Pnumber, Plocation, Dnum)
 WORKS_ON(Essn, Pno, Hours)
 DEPENDENT(Essn, Dependent_name, Sex, Bdate, Relationship)
 Write the queries in SQL for the following :
 - i) Retrieve the name of each employee who has a dependent with the same name and same sex as the employee
 - ii) List the names of managers who have at least one dependent
 - iii) For each employee, retrieve the employee's name and name of his or her immediate supervisor
 - iv) Show the resulting salaries if every employee working on the 'ProductX' project is given a 15 percent raise
 - v) For each project on which more than two employees work, retrieve the project number, the project name, and the number of employees who work on the project. (10 Marks)

PART – B

- 5 a. Explain the syntax of insert, delete and update statements in SQL and give examples for each. (10 Marks)
- b. How triggers and assertions are defined in SQL? Explain with an example. (10 Marks)
- 6 a. Explain the informal design guidelines for relation schemas. (10 Marks)
- b. What is functional dependency? Write an algorithm to find a minimal cover for a set of functional dependencies? Calculate the minimal cover of $F = \{A \rightarrow BC, B \rightarrow C, AB \rightarrow D\}$? (10 Marks)
- 7 a. Define multivalued dependency. Explain 4NF with an example. (10 Marks)
- b. Let $R = \{Ssn, Ename, Pnumber, Pname, Plocation, hours\}$ and $D = \{R1, R2, R3\}$, where
 $R1 = EMP = \{Ssn, Ename\}$
 $R2 = PROJ = \{Pnumber, Pname, Plocation\}$
 $R3 = WORKS_ON = \{Ssn, Pnumber, hours\}$
 The following functional dependencies hold on relation R.
 $F = \{Ssn \rightarrow Ename; Pnumber \rightarrow \{Pname, Plocation\}; \{Ssn, Pnumber\} \rightarrow hours\}$
 Prove that the above decomposition of relation R has the lossless join property. (10 Marks)
- 8 a. What is meant by the concurrent execution of a database transaction in a multiuser system? Why concurrency control is needed, and give informal examples? (10 Marks)
- b. Briefly discuss the two-phase locking techniques used for concurrency control. (10 Marks)
