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17CS53

Fifth Semester B.E. Degree Examination, July/August 2022 Database Management System

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. With a neat block diagram, explain the architecture of a typical DBMS. (08 Marks)
- b. Define the following terms:
 - (i) Data Model
 - (ii) Schema construct
 - (iii) Instance
 - (iv) Canned Transaction
 - (v) Meta Data
 (05 Marks)
- c. Illustrate Data Independence. Explain the types of data independence. (07 Marks)

OR

- 2 a. Explain the different types of end users in DBMS. (04 Marks)
- b. Compare the Specialization and Generalization with an example. (06 Marks)
- c. Define attribute and explain the types of attributes with an example to each. (10 Marks)

Module-2

- 3 a. Explain the steps to convert the basic ER model to relational database scheme with suitable example for each. (10 Marks)
- b. Consider the following schema for a Company database :
 EMPLOYEE (NAME , SSN , ADDRESS , SEX , SALARY, DNO, SUPERSSN, SALARY)
 DEPARTMENT (DNAME , DNO , MGRSSN , MGR_START_DATE)
 PROJECT (PNAME, PNO, PLOCATION, DNO)
 WORKS_ON (SSN, PNO, HOURS)
 DEPENDENT (SSN, DEPENDENT_NAME, SEX, BDATE, RELATIONSHIP)
 Give the relational algebra expression for the following :
 - i) Retrieve the name of the manager who have more than two dependents.
 - ii) Find the name of employees who work on all projects controlled by department 5.
 - iii) Retrieve the names of employees of all employees who do not have dependent.
 - iv) Retrieve the names of employees who gets the second highest salary.
 - v) Retrieve the name of employee who do not have a supervisor. (10 Marks)

OR

- 4 a. Discuss the various set theory operation used in relational algebra with an example. (10 Marks)
- b. Explain the entity integrity and referential integrity constraint. Why each is considered important. Give example. (05 Marks)
- c. Consider the two tables. Apply the LEFT and RIGHT OUTER JOIN operation show the result for $T_1 \bowtie_{(T_1.P=T_2.A)} T_2$ and $T_1 \bowtie_{(T_1.Q=T_2.B)} T_2$.

T ₁		
P	Q	R
10	a	5
15	b	8
25	a	6

T ₂		
A	B	C
10	B	6
25	C	3
10	B	5

(05 Marks)

Module-3

- 5 a. Consider the following schema for a Library Database :
- Book (Book_id , Title, Publisher_Name, Pub_year)
 Book_Authors (Book_id , Author_Name)
 PUBLISHER (Name, Address, Phone)
 Book_COPIES (Book_id , Branch_id , No_of_copies)
 Book_LENDING (Book_id , Branch_id , Card_No , Date_out, Due_Date)
 LIBRARY_BRANCH (Branch_id , Branch_Name, Address)
- Write SQL Queries to :
- Retrieve the details of all books in the library with library_id, title, Name of publisher, author, Number of copies in each branch etc.
 - Get the particulars of borrower who have borrowed more than 3 books, but from Jan 2017 to June 2017.
 - Delete a book in Book table. Update the contents of other tables to reflect this data manipulation operation.
 - Partition the Book table based on year of publication. Demonstrate its working with a simple query.
 - Create a view of all books and its number of copies that are currently available in the library. (10 Marks)
- b. Explain with an example in SQL:
- DROP command
 - DELETE command
 - INSERT command
 - UPDATE command
 - ALTER command (10 Marks)

OR

- 6 a. Define store procedure. Explain the creating and calling of stored procedure with suitable example. (08 Marks)
- b. Briefly explain types of JDBC drivers. (05 Marks)
- c. With the program segment. Explain retrieving of tuples with embedded SQL in C. (07 Marks)

Module-4

- 7 a. Explain the informal design guidelines used as measure to determine the Quality of relation schema design. (08 Marks)
- b. Define Normal Form. Explain 1NF, 2NF and 3NF with suitable example for each. (08 Marks)
- c. State the Armstrong inference rule. (04 Marks)

OR

- 8 a. What is functional dependency? Write an algorithm to find the minimal cover for set of functional dependency. Find canonical cover of F. The FD
 $F = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$ (10 Marks)
- b. Consider $R = (A, B, C, D, E)$ which is decomposed into $R_1 = (A, B, C)$, $R_2 (C, D, E)$ with $FD = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$
 Show that the above decomposition of schema R is not lossless join decomposition. (10 Marks)

Module-5

- 9 a. Why concurrency control is needed demonstrate with example. (10 Marks)
- b. What is a transaction? Discuss the desirable properties of transactions. (05 Marks)
- c. With a neat diagram explain the state transition diagram for a transaction. (05 Marks)

OR

- 10 a. Briefly discuss the two-phase locking technique for concurrency control. (10 Marks)
- b. How to check conflict serializability of a schedule. Explain with an example. (10 Marks)