Fifth Semester B.E. Degree Examination, June/July 2019
Database Management Systems

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Discuss the main characteristics of the database approach and how differs from traditional file systems. **(12 Marks)**
   b. Discuss the different types of user-friendly interfaces and the types of users who typically use each. **(08 Marks)**

2 a. With an aid of a neat diagram, describe a simplified database design process. **(08 Marks)**
   b. What is an entity type? What is an entity set? Explain the differences among an entity, an entity type, and an entity set. **(06 Marks)**
   c. When is the concept of a weak entity used in data modeling? Define the terms owner entity type, weak entity type, identifying relationship type and partial key. **(06 Marks)**

3 a. Briefly discuss the different types of update operations on relation. **(10 Marks)**
   b. With an example for each, explain the purpose and notation for the following operations of relational algebra:
   i)   SELECT
   ii) THETA JOIN
   iii) UNION
   iv) CARTESIAN PRODUCT
   v)   DIVISION **(10 Marks)**

4 Consider the following schemes:
   Sailors (Sid : integer, sname : string, rating : integer, age : real)
   Boats (bid : integer, bname : string, color : string)
   Reserves (Sid : integer, bid : integer, day : date)
   Write the following queries in SQL. No duplicate should be printed in any of the answers:
   i)   Find the Sids of sailors who have reserved a red boat. **(02 Marks)**
   ii)   Find the names of sailors who have reserved a red boat. **(02 Marks)**
   iii) Find the colors of boats reserved by Danny. **(02 Marks)**
   iv)   Find the names of sailors who have reserved at least one boat. **(02 Marks)**
   v)   Find the names of sailors who have reserved a red or a green boat. **(03 Marks)**
   vi)   Find the names of sailors who have reserved both a red and a green boat. **(03 Marks)**
   vii) Find the Sids of all sailors who have reserved red boats but not green boats. **(03 Marks)**
   viii) Find all Sids of sailors who have a rating of 10 or reserved boat 104. **(03 Marks)**

PART – B

5 a. With illustrative example for each, discuss the following commands used to modify the database:
   INSERT
   DELETE and
   UPDATE **(10 Marks)**

b. What are the significant issues in database programming? List and explain the three main approaches to database programming. What are the advantages and disadvantages of each approach? **(10 Marks)**

6 a. What do you mean by functional dependency? What are the possible sources of the information that defines the functional dependencies that hold among the attributes of a relation schema? Explain. **(10 Marks)**

b. Discuss the purpose of Boyce-Codd normal form BCNF and describe how BCNF differs from and is stronger than 3NF. Illustrate your answer with an example. **(10 Marks)**

7 a. Write an algorithm to test the non-adaptive join property, and to determine whether functional dependencies are preserved in decomposition. **(10 Marks)**

b. Define Join Dependency (JD) and fifth normal form (5NF). **(05 Marks)**

c. Write short notes on the following:
   i) Template denendencies
   ii) Domain-key normal form. **(05 Marks)**

8 a. What are the ACID properties? Explain. **(06 Marks)**

b. What is a precedence graph or serializability graph? How is it related to conflict serializability? How is it related to two-phase locking? **(06 Marks)**

c. Explain what happens if there are crashes during the undo phase of recovery. What is the role of CLRs? What if there are crashes during the analysis and Redo phases? **(08 Marks)**

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