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(Pages : 3)

Name.....

Reg. No.....

FIFTH SEMESTER B.TECH. (ENGINEERING) [14 SCHEME] DEGREE EXAMINATION, NOVEMBER 2016

CS/IT 14 504—DATABASE MANAGEMENT AND SYSTEMS

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

1. Define the concept of aggregation. Give an example of where this concept is useful.
2. Discuss the role of a high level data model in the database design process.
3. Discuss the main characteristics of the database approach and how it differs from traditional file systems.
4. With an example define the term entities, attributes.
5. Consider the universal relation $R = \{A, B, C, D, E, F, G, H, I, J\}$ and the following set of functional dependencies $\{A, B\} \rightarrow \{C\}, \{A\} \rightarrow \{D, E\}, \{B\} \rightarrow \{B\} \rightarrow \{F\}, \{F\} \rightarrow \{G, H\}, \{D\} \rightarrow \{I, J\}$. What is the key of R ?
6. Explain any *two* algorithms to implement SELECT operation with more than one attribute.
7. Distinguish between a "where" clause and a "having" clause ? What is the basic form of a SQL statement to read data out of a table ?
8. Define normalization and De-normalization ? Why sometimes de-normalize is needed ?
9. Write all possible sequences of states of transaction in detail.
10. Can deadlock occur in a serializable schedule ? If yes, explain with example.

(8 × 5 = 40 marks)

Part B

Answer the following.

11. Discuss the responsibilities of DBA.

Or

12. A summary of business rules for the ROBCOR catering service is given that each dinner is based on a single entree, but each entree can be served at many dinners. A guest can attend many dinners, and each dinner can be attended by many guests. Each dinner invitation can be mailed to many guests, and each guest can receive many invitations. Draw an ER diagram and make sure to include all appropriate entities, relationships, connectivity, and cardinalities.

Turn over

13. Consider the following relation :

R (Doctor#, Patient#, Date, Diagnosis, Treat_code, Charge)

In this relation, a tuple describes a visit of a patient to a doctor along with a treatment code and daily charge. Assume that diagnosis is determined (uniquely) for each patient by a doctor. Assume that each treatment code has a fixed charge (regardless of patient). Is this relation in normalized form? Justify your answer and decompose if necessary. Then argue whether further normalization to 3NF is necessary, and if so, perform it.

Or

14. A database schema R = ABCDEF is given, and the following FDs are :

$ABF \rightarrow C$
$CF \rightarrow B$
$CD \rightarrow A$
$BD \rightarrow AE$
$C \rightarrow F$
$B \rightarrow F$

Find a minimal cover of the given set of FDs. Show all steps.

15. Consider a database with the following two Relations

Course (course id, course name, no credit).

Registration (student id, course id, grade).

Note that the underlined attributes are keys of the tables. Write the triggers for imposing the following foreign key constraint speci_ed in the CREATE TABLE statement for registration: FOREIGN KEY (course id) REFERENCES course ON DELETE CASCADE.

Or

16. Consider the following schema :

Suppliers (*sid: integer, sname: string, address:* string)

Parts(*pid:* integer, *pname:* string, *color:* string)

Catalog(*sid:* integer, *pid:* integer, *cost:* real)

The key fields are underlined, and the domain of each field is listed after the field name. Therefore *sid* is the key for Suppliers, *pid* is the key for Parts, and *sid* and *pid* together form the key for Catalog. The Catalog relation lists the prices charged for parts by Suppliers. Answer the following queries using SQL query statement :

1. Find the *sids* of suppliers who supply every red or green part.
2. Find the *sids* of suppliers who supply some red part or are at 221 Packer Street.
3. Find the *sids* of suppliers who supply some red part and some green part.
4. Find the *sids* of suppliers who supply every part.

17. Consider a database with objects X and Y and assume that there are two transactions T1 and T2. Transaction T1 reads objects X and Y and then writes object X. Transaction T2 reads objects X and Y and then writes objects X and Y.

    1. Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a write-read conflict.
    2. Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a read-write conflict.
    3. Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a write-write conflict.

    For each of the three schedules, show that Strict 2PL disallows the schedule.

Or

18. Explain in detail about the principle methods for dealing with the deadlock problem with suitable examples.

(4 × 15 = 60 marks)