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Question Paper Code : 91347

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Fourth Semester

Computer Science and Engineering

CS 2255/CS 46/CS 1254/080250009/10144 CS 406 – DATABASE MANAGEMENT SYSTEMS

(Common to Information Technology)

(Regulation 2008/2010)

(Common to PTCS 2255/10144 CS 406 – Database Management Systems for B.E. (Part-Time) Third Semester – Computer Science and Engineering, Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is physical, logical and view level data abstraction?
2. What do you mean by simple and composite attribute?
3. Explain the use of Assignment operator in relational algebra with an example.
4. What is the use of unique statement?
5. Define trivial functional dependency.
6. What is meant by referential integrity?
7. What is a cascading update?
8. What are the disadvantages of not controlling concurrency?
9. What is a heap file? How pages are organized in a heap file?
10. What is a catalog?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Why would you choose a database system instead of simply storing data in operating system files? When would it make sense not to use a database system?
- (ii) Explain the difference between logical and physical data independence. (8 + 8)

Or

- (b) Notown Records has decided to store information about musicians who perform on its albums (as well as other company data) in a database. The company has wisely chosen to hire you as a database designer.

Each musician that records at Notown has an SSN, a name, an address, and a phone number. Poorly paid musicians often share the same address, and no address has more than one phone.

Each instrument used in songs recorded at Notown has a unique identification number, a name (e.g., guitar, synthesizer, flute) and a musical key (e.g., C, B-flat, E-flat).

Each album recorded on the Notown label has a unique identification number, a title, a copyright date, a format (e.g., CD or MC), and an album identifier.

Each song recorded at Notown has a title and an author.

Each musician may play several instruments, and a given instrument may be played by several musicians.

Each album has a number of songs on it, but no song may appear on more than one album.

Each song is performed by one or more musicians and a musician may perform a number of songs.

Each album has exactly one musician who acts as its producer. A musician may produce several albums, of Course.

Design a conceptual schema for Notown and draw an ER diagram for your schema. The preceding information describes the situation that the Notown database must model. Be sure to indicate all key and cardinality constraints and any assumptions you make. Identify any constraints you are unable to capture in the ER diagram and briefly explain why you could not express them.

12. (a) 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. Write the following queries in relational algebra and SQL.

- (i) Find the *sids* of suppliers who supply some red or green part.
- (ii) Find the *sids* of suppliers who supply every part.
- (iii) Find the *sids* of suppliers who supply every red part or supply every green part.

Or

- (b) Briefly explain about fundamental, additional operations in SQL with example.

13. (a) (i) What are the three data anomalies that are likely to occur as a result of data redundancy? Can data redundancy be completely eliminated in database approach? Why or why not?
- (ii) Explain the process of normalization from 1NF to BCNF stage with example. (10)

Or

- (b) (i) Define the domain relational calculus. (6)
- (ii) Given $R(A,B,C,D,E)$ with the set of FDs, $F\{AB \rightarrow CD, ABC \rightarrow E, C \rightarrow A\}$.
- (1) Find any two candidate keys of R.
- (2) What is the normal form of R? Justify. (10)
14. (a) (i) Define and differentiate between Deadlock prevention, Deadlock Detection, Deadlock avoidance. (6)
- (ii) Explain different locking mechanism used in lock based concurrency control. (10)

Or

- (b) (i) What are deferred modification and immediate modification technique for recovery? How does recovery takes place in case of a failure in these techniques?
- (ii) Explain time stamp based concurrency control with and without Thomas write rule. Give example. (8 + 8)
15. (a) (i) Explain the difference between Hash indexes and B+-tree indexes. In particular, discuss how equality and range searches work, using an example.
- (ii) Explain the structure of B+ tree. How to process queries in B+ tree? (10)

Or

- (b) What is RAID? Briefly explain different levels of RAID. Discuss the factors to be considered in choosing a RAID level. (16)