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Total number of printed pages – 3

B. Tech
BECS 2208

Third Semester Back Examination – 2014

DATABASE MANAGEMENT SYSTEM

BRANCH : MECH

QUESTION CODE : L 343

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory and any five from the rest.
The figures in the right-hand margin indicate marks.*



1. Answer the following questions : 2×10
- (a) The external/conceptual mapping defines the correspondence between a particular _____ view and the _____ view.
 - (b) The number of attributes in a relation is called the _____ of the relation and the number of tuples in a relation is called the _____ of the relation.
 - (c) In E-R diagram, _____ is represented by a double lined rectangle where as _____ is represented by a double lined ellipse.
 - (d) _____ is an example of data definition language command or statement and _____ is an example of data manipulation language command or statement.
 - (e) Armstrong's axioms are _____ and _____.
 - (f) Normalization is a process of _____ a set of relations with anomalies to produce smaller and well-structured relations that contain minimum or no _____.
 - (g) In the _____ stage, the query is lexically and syntactically analyzed using parsers to find out any syntax error and in _____ stage, the query is converted into normalized form that can be more easily manipulated.

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- (h) Atomic transaction is a transaction in which either _____ with the transaction are executed to completion or _____ are performed.
- (i) A transaction is a sequence of _____ and _____ actions that are grouped together to form a database access.
- (j) Shadow paging technique maintains two page tables during the life of a transaction namely (a) _____ (b) _____.
2. (a) Discuss the role of a following personnel in the database environment : 5
- (i) Database administrator.
 - (ii) Application developer.
 - (iii) End users.
- (b) Discuss the concept of data independence and explain its importance in a database environment. 5
3. Explain the following with example : 2×5
- (i) Data manipulation language (DML).
 - (ii) Data definition language (DDL).
 - (iii) Transaction control statements (TCS).
 - (iv) Data control language.
 - (v) Data administration statements.
4. (a) Write the procedure to transform an E-R diagram to relations. 5
- (b) Discuss the basic concepts of E-R model with example. 5
5. Consider the following Schema :
- Product (Maker, Model, Type)
- PC (Model, Speed, RAM, HD, CD, Price)
- Laptop (Model, Speed, RAM, HD, Screen-size, Price)
- Printer (Model, Color, Type, Price)

The *Product* relation gives the manufacturer, model number and type (PC, Laptop or printer) of various products. Model numbers are unique over all manufacturers and product types. The value of color in Printer relation is true if the printer produces color output.

Write the following queries either in relational algebra or in SQL : 2.5×4

- (a) Which manufacturers make laptops with a hard disk of at least 40GB ?

- (b) Find the model number and price of all products (of any type) made by the manufacturer DELL.
- (c) Find the model number of all color laser printers.
- (d) Find those manufacturers that sell Laptops, but PC's.
6. (a) Consider the relation $R(A, B, C, D, E, G)$ with a set of functional dependencies $F = \{AB \rightarrow C, AC \rightarrow B, AD \rightarrow E, B \rightarrow D, BC \rightarrow A, E \rightarrow G\}$. Is the decomposition of R into $R_1(A, B)$, $R_2(B, C)$, $R_3(A, B, D, E)$ and $R_4(E, G)$ lossless and/or dependency preserving? 5
- (b) Given a relation $R(A, B, C, D, E)$ with a set of functional dependencies $F = \{A \rightarrow B, BC \rightarrow D, D \rightarrow BC, DE \rightarrow \phi\}$.
Decompose R into a set of 3NF relation schemes that are both lossless and dependency preserving. 5
7. What is concurrency control? What are its objectives? Explain different concurrency control protocols stating the advantages and disadvantages of each. 10
8. Write short notes on any two: 5×2
- (a) Serializability.
- (b) Database recovery.
- (c) Database failures.