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CST-203

ADVANCED DIPLOMA IN INFORMATION TECHNOLOGY (ADIT) / BACHELOR IN INFORMATION TECHNOLOGY (BIT)

00125

Term-End Examination

December, 2010

CST-203 : RELATIONAL DATABASE MANAGEMENT SYSTEMS

Time : 2 hours *Maximum Marks : 50*

Note : *There are **two** sections in this paper. **Section-A** consists of objective type questions and short answer type questions. All questions in **Section-A** are **compulsory**. **Section-A** carries **26** marks. **Section-B** consists of three questions. Attempt **any two** questions from **Section-B**. **Section-B** carries **24** marks.*

SECTION - A

1. There are 10 objective type questions. There are four choices for each question. Select the best choice. If you feel that none of the given choices is correct, then mark '0' as your answer. Each question carries 1 mark :

(a) A 17-tuple is : **1**

(i) A table with 17 tuples

(ii) A table with at least 17 tuples

(iii) A table where the tuples have 17 attributes

(iv) A table with at most 17 tuples

(b) A relational schema can omit. 1

(i) Name of the relation

(ii) Attributes of the relation

(iii) Domain of each attribute

(iv) None of the above

(c) In a relation, NULL values are not allowed in : 1

(i) any attribute

(ii) any component of a composite primary key

(iii) any non-key attribute

(iv) any component of a secondary key

(d) Which of the following makes for a different relation from the current one ? 1

(i) same tuples in a different order

(ii) same attributes in a different order

(iii) one extra attribute

(iv) any of the above

(e) Which of the following is true for a sub-query ? 1

(i) it can be placed in a HAVING clause of the main query

(ii) it can have an ORDER BY clause

(iii) it executes after the main query

(iv) it must use the same tables as the main query

(f) In SQL, the operator "11" represents 1

(i) Concatenation

(ii) Logical OR

(iii) Logical exclusive OR

(iv) Parallelism

(g) The reliability of a network in a star topology mostly depends on : 1

(i) Every site

(ii) Every link

(iii) Central site

(iv) All the above

(h) Which of the following is not a database model ? 1

(i) Relational

(ii) Object oriented

(iii) Network

(iv) Hierarchical

(i) A simple attribute cannot be : 1

(i) multi-valued

(ii) stored

(iii) derived

(iv) composite

(j) A database integrity violation will not happen in case of : 1

(i) Unauthorised, malicious, incorrect alteration

(ii) Unauthorised, correct alteration

(iii) Unauthorised, inadvertently incorrect alteration

(iv) None of the above

2. (a) What is meant by Write Ahead Protocol ? 2

(b) Write the SQL command to create a sequence called "linear". It should end at 15,000, beginning at 1000 and increment in steps of 10. 2

(c) Write down any three components of a database manager and describe their functions briefly. 3

3. Distinguish between the following with an example of each as appropriate :

(a) Undo and Redo operations for database recovery 3

(b) Natural join and outer join 3

(c) Intersection and difference of two tables 3

SECTION - B

There are three questions in this section. Attempt any two. This section carries 24 marks. Please give to the point answers.

4. (a) Consider a Hospital Management System that has data on 8

* Patients - Name, date of birth, sex, address, phone numbers, unique id.
* Doctors - Name, age, sex, qualifications, specialisations, fees.
* Diagnostic tests - Lab in which conducted, cost, time taken, equipment needed
* Laboratories - Pathologist/Radiologist in charge, tests conducted, equipment available.
* OPD - Timings / days, departments, doctors on duty
* Wards - Beds, type of rooms, conditions admitted, charges, doctors available.

Identify the functional dependencies, candidate keys and integrity constraints for this database. Design normalised relations for this system. Make and state any reasonable assumptions if needed.

(b) Explain briefly any 4 disadvantages of a hashing file organisation. 4

5. (a) In a mobile telephony application, each number has one SIM card allotted to a subscriber. Each phone has a unique IMEI number. Each SIM card is associated with a particular telephone number from a given data and time until terminated. Calls are made between two or more telephone numbers between a start and end time. Other services include SMS, data transfer to a website and MMS. Each of these is billed at a different rate. A subscriber receives a monthly bill based on his usage and other fixed charges. 9

Draw an ERD for this system. Mention clearly the entities and relationships with reasons. Make and state assumptions, if required.

(b) A relation stores the name and phone number of each phone subscriber. A person may have any number of phones. Write the SQL query that displays the name and number of phones for each subscriber who has more than one phone. 3

6. (a) Write down the 4 states of an RDBMS transaction. 2

(b) In an entity relationship diagram, E1 and E2 are two strong entity types with a 1 : n relationship. Show with an example how will you construct an RDBMS that models this relationship ? 4

(c) A relation TAX is ordered on the attribute PAN. The relation has 1,000,000 records of 600 bytes each. The size of each disk block is 32 k. If the file is not indexed, how many disk block accesses would be needed on the average to locate a particular record from TAX ? 6