CERTIFICATE IN MOBILE APPLICATION DEVELOPMENT (CMAD)

Term-End Examination

December, 2024

BCS-092 : INTRODUCTION TO DATABASES

Time : 3 Hours   *Maximum Marks : 75*

*Note : Question No. **1** is compulsory. Attempt any **three** questions from the rest.*

1. (a) What is a database ? Explain the features of relational database with the help of an example.   4

(b) Let R = (a,b,c,d,e,f) be a relation schema with the following dependencies :   4

$$c \rightarrow f, \; e \rightarrow a, \; a \rightarrow b \text{ and } ec \rightarrow d$$

Find out the key for Relation R.

(c) A car insurance company keeps details as per the following schema : 5

PERSON (driver_id, name, address)

CAR (Registration_no, year, model)

ACCIDENT (Report_no, date, location)

ACC_REPORT (driver_id, registration_no, report_no, damage_amount)

Draw an E-R diagram from which the above schema can be derived. Also mention primary keys and cardinality.

(d) Normalize the relation : 10

EMP (emp_name, address, gender, rank, salary) to 3rd NF.

Specify the primary keys is the normalized relations.

Note : (i) An employee can have separate present and permanent address (ii) salary depends only on the rank.

(e) Explain any *four* data types in SQL. 4

(f) Explain the changes required in Waterfall model to accommodate database design. 3

2. (a) Consider the following relation :

EMPLOYEE

FieldName	DataType	Size	Constraint
EMP_No	Var char	6	Start with 'e'
EMP_Name	Var char	30	
Address	Var char	30	
Date_Of_ Birth	Date		
Basic_Salary	Number	6, 2	
Dept_No	Var char	5	dependent on dept_no. of DEPT table.
Designation	Var char	6	Default value is 'mstaff'. Also it can have values 'VP', 'mgr', 'slman' and 'mstaff'.

Write SQL queries :

(i) Create EMPLOYEE table with constraints as mentioned. 6

(ii) List employee number and employee name all the employees who were born in year '1982'. 2

(iii) Determine the total number of employees working in department number 20. 2

(b) Explain the following with the help of examples : 5

(i) Armstrong's inference rules

(ii) Relationship types

3. (a) Distinguish between centralized and distributed databases. 5

(b) Explain the difference between external, internal and conceptual schemas. How are these different schema layers related to data independence ? 10

4. (a) Differentiate between the following : 8

(i) Hierarchical database model and Network database model

(ii) File based system and Database approach

(b) Consider the following database schema : 7

Bank (amount_no, customer_name, date_of_birth_of_customer,

Branch, Branch_Address, Branch_Assets)

List and explain the data anomalies that can occur in the schema given above.

5. Explain the following terms with the help of diagram/examples : 3×5=15

(a) Generalization

(b) Outer-join

(c) LIKE and IN operators

(d) GROUP BY clause

(e) Multivalued and Derived attribute

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