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F.Y. B.Sc. (Computer Science) EXAMINATION, 2017

CS-102 : File Organization and Fundamentals of Databases

Paper II

(2013 PATTERN)

Time : Three Hours   Maximum Marks : 80

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Figures to the right indicate full marks.

(*iii*) Neat diagrams must be drawn wherever necessary.

(*iv*) Assume suitable data if necessary.

1.   Answer all of the following :   [10×1=10]

(*a*)   What is a physical file ?

(*b*)   State any *two* functions of DBA.

(*c*)   Define Third Normal Form.

(*d*)   Explain the term tuple with example.

(*e*)   What is functional dependency ?

(*f*)   Define strong entity.

(*g*)   What is difference between char and varchar ?

(*h*)   State any *two* advantages of DBMS over file system.

(*i*)   What is Aggregation ?

(*j*)   What are the types of Data Independence ?

P.T.O.

2. Attempt any *four* of the following :   [4×5=20]

   (*a*)   Differentiate between specialization and generalization.

   (*b*)   Write short note on Data Abstraction.

   (*c*)   Explain the following command with example :

       (*i*)   Update

       (*ii*)   Alter.

   (*d*)   Consider the relation :

$$R(A, B, C, D, G, H, I)$$

and the set of FD's defined on R as :

$$F = \{A \to B,\ A \to C,\ CG \to H,\ CG \to I,\ B \to H\}$$

Compute the closure of F i.e. F^+.

   (*e*)   What is Primary Index ? What are different types of ordered index ? Explain in brief.

3. Attempt any *four* of the following :   [4×5=20]

   (*a*)   Explain overall DBMS structure with neat diagram.

   (*b*)   What are the anomalies that might arise if we have redundant data ?

   (*c*)   Discuss various forms of outer join with example.

   (*d*)   What are desirable properties of decomposition ? Explain in brief.

   (*e*)   What are integrity constraints ? How are they classified ?

4. (A) Attempt any *three* of the following : [3×5=15]

(a) Consider the following relations

Country (c_code, name, capital)

Population (p_code, population)

Country and population are related with one to one relationship. Create a relational database in 3NF and solve the following queries in SQL :

(i) Give the name and population of country whose capital is 'Delhi'.

(ii) List the name of all countries whose population is greater than 75,00,000.

(iii) To print countrywise population.

(b) Consider the following relations :

Game (g_no, gname, no_of_player, coach_name, captain)

Player (p_no, pname)

Game and player are related with many to many relationship. Create a relational database in 3NF and solve the following queries in SQL :

(i) Count the total number of players whose coach name is 'Mr. Patil'.

(ii) List the name of player playing Hockey and Tennis.

(iii) Delete all the players playing Basketball.

(*c*) Consider the following relations

Machine (m_no, m_name, m_type, m_cost)

Part (p_no, p_name, description)

Machine and part are related with one to many relationship. Create a relational database in 3NF and solve the following queries in SQL :

(*i*) Increase the cost of machine by 35%.

(*ii*) List all machine whose cost > 25,000.

(*iii*) Display machine name and cost having parts gear box and strearing.

(*d*) Consider the following relations

Company (c_id, c_product, c_name, region, state)

Branches (b_id, b_name, b_product, city)

Company and Branches are related with one to many relationship. Create a relational database in 3NF and solve the following queries in SQL :

(*i*) List all the cities having branch product 'CPU' and 'MOUSE'.

(*ii*) List all the states whose branch product is 'Pen Drive'.

(*iii*) Print citywise branches in descending order.

(B) Attempt any *one* of the following : [1×5=5]

 (*a*) Consider the following relations :

Doctor (doct_no, doct_name, doct_address, doct_city)

Hospital (hosp_no, hosp_name, street, hosp_city)

Doct_Hosp (doct_no, hosp_no, date)

Solve the following queries in relational algebra.

 (*i*) List the names of doctors who live in 'Pune'.

 (*ii*) List all the hospitals visited by 'Dr. Sharma'.

 (*iii*) List all the doctors visited to 'Nobel Hospital' on 02-06-2016.

 (*iv*) List all doctors working in 'Ruby hospital'.

 (*v*) Find all doctors who living and visiting to the hospital from the same city.

 (*b*) Consider the following relations :

Item (i_code, i_name, price)

Order (o_code, date, cust_name)

Item-order (i_code, o_code, quantity)

Solve the following queries in relational algebra.

 (*i*) List all the item name whose price < 3000.

 (*ii*) List all the order before 10th July 2016.

 (*iii*) Find most costly item.

 (*iv*) List all the items along with their prices.

 (*v*) List only those item name whose quantity < 45 ordered by customer Mahesh.

5. (A) Now a days there are many multiplex theaters opened in Nashik city. These multiplex theaters can show 3 to 6 movies at a time. Theaters self decide which movie has to be shown to peoples for longer times. Movie is of two types : Universal and adults. Adult's movie cannot allow to age below 18 persons. Many theaters have AC and doubly digital sound quality system. The ticket of movie is along with taxes or tax-free.

Based on above information :

(*i*) Design an E-R diagram.

(*ii*) Convert the ER diagram into relational database in 3NF. [7]

(B) Differentiate between strong entity and weak entity with suitable example. [3]

Or

Explain division operator with example.