DBMS GATE Questions

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## GATE

## Year 2010

## Q.1)

A relational schema for a train reservation database is given below. Passenger (pid, pname, age) Reservation (pid, class, tid)

**Table: Passenger**

pid pname age

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0 Sachin 65

1 Rahul 66

2 Sourav 67

3 Anil 69

**Table : Reservation**

pid class tid

---------------

0 AC 8200

1 AC 8201

2 SC 8201

5 AC 8203

1 SC 8204

3 AC 8202

What pids are returned by the following SQL query for the above instance of the tables?

SLECT pid

FROM Reservation ,

WHERE class ‘AC’ AND

EXISTS (SELECT \*

FROM Passenger

WHERE age > 65 AND

Passenger. pid = Reservation.pid)

|  |  |
| --- | --- |
| A | 1, 0 |
| B | 1, 2 |
| C | 1, 3 |
| D | 1, 5 |

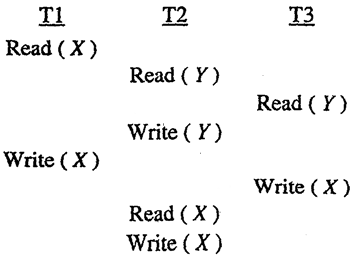
Solution :

->Option C

When a subquery uses values from outer query, the subquery is called correlated subquery. The correlated subquery is evaluated once for each row processed by the outer query.

The outer query selects 4 entries (with pids as 0, 1, 5, 3) from Reservation table. Out of these selected entries, the subquery returns Non-Null values only for 1 and 3

## Q.2)

Consider the following schedule for transactions T1, T2 and T3: [](http://www.geeksforgeeks.org/wp-content/uploads/gq/2013/12/GATE2010DBMS1.png) Which one of the schedules below is the correct serialization of the above?

|  |  |
| --- | --- |
| A | T1->>T3->>T2 |
| B | T2->>T1->>T3 |
| C | T2->>T3->>T1 |
| D | T3->>T1->>T2 |

Solution :

->Option A

T1 can complete before T2 and T3 as there is no conflict between Write(X) of T1 and the operations in T2 and T3 which occur before Write(X) of T1 in the above diagram.  
T3 should can complete before T2 as the Read(Y) of T3 doesn’t conflict with Read(Y) of T2. Similarly, Write(X) of T3 doesn’t conflict with Read(Y) and Write(Y) operations of T2.  
Another way to solve this question is to create a dependency graph and topologically sort the dependency graph. After topologically sorting, we can see the sequence T1, T3, T2.

## Q.3)

Which of the following functional dependencies hold for relations R(A, B, C) and S(B, D, E):

B -> A

A -> C

The relation R contains 200 tuples and the rel ation S contains 100 tuples. What is the maximum number of tuples possible in the natural join of R and S (R natural join S)

|  |  |
| --- | --- |
| A | 100 |
| B | 200 |
| C | 300 |
| D | 2000 |

Solution:

->Option A

From the given set of functional dependencies, it can be observed that B is a candidate key of R. So all 200 values of B must be unique in R. There is no functional dependency given for S. To get the maximum number of tuples in output, there can be two possibilities for S.  
1) All 100 values of B in S are same and there is an entry in R that matches with this value. In this case, we get 100 tuples in output.  
2) All 100 values of B in S are different and these values are present in R also. In this case also, we get 100 tuples.

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## GATE

## Year 2011

## Q.1)

Consider a relational table with a single record for each registered student with the following attributes.

1. *Registration\_Num*: Unique registration number

of each registered student

2. *UID*: Unique identity number, unique at the

national level for each citizen

3. *BankAccount\_Num*: Unique account number at

the bank. A student can have multiple accounts

or join accounts. This attribute stores the

primary account number.

4. *Name*: Name of the student

5. *Hostel\_Room*: Room number of the hostel

Which one of the following option is **INCORRECT**?

|  |  |
| --- | --- |
| A | BankAccount\_Num is candidate key |
| B | Registration\_Num can be a primary key |
| C | UID is candidate key if all students are from the same country |
| D | If S is a superkey such that S∩UID is NULL then S∪UID is also a superkey |

Solution :

->Option A

 A [Candidate Key](http://en.wikipedia.org/wiki/Candidate_key) value must uniquely identify the corresponding row in table. BankAccount\_Number is not a candidate key. As per the question “A student can have multiple accounts or joint accounts. This attributes stores the primary account number”. If two students have a joint account and if the joint account is their primary account, then BankAccount\_Number value cannot uniquely identify a row.

## Q.2)

Consider a database table T containing two columns X and Y each of type integer. After the creation of the table, one record (X=1, Y=1) is inserted in the table. Let MX and My denote the respective maximum values of X and Y among all records in the table at any point in time. Using MX and MY, new records are inserted in the table 128 times with X and Y values being MX+1, 2\*MY+1 respectively. It may be noted that each time after the insertion, values of MX and MY change. What will be the output of the following SQL query after the steps mentioned above are carried out?

SELECT Y FROM T WHERE X=7;

|  |  |
| --- | --- |
| A | 127 |
| B | 255 |
| C | 129 |
| D | 257 |

Solution :

->Option A

First entry of the table will be

X | Y

1 1

2 3

3 7

4 15

5 31

6 63

7 127

So, when X=7 the value of Y is 127

## Q.3)

Database table by name Loan\_Records is given below.

Borrower Bank\_Manager Loan\_Amount

Ramesh Sunderajan 10000.00

Suresh Ramgopal 5000.00

Mahesh Sunderajan 7000.00

What is the output of the following SQL query?

SELECT Count(\*)

FROM ( ( SELECT Borrower, Bank\_Manager

FROM Loan\_Records) AS S

NATURAL JOIN ( SELECT Bank\_Manager, Loan\_Amount

FROM Loan\_Records) AS T );

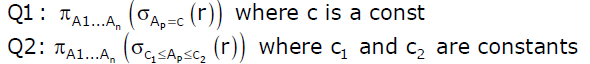
|  |  |
| --- | --- |
| A | 3 |
| B | 9 |
| C | 5 |
| D | 6 |

Solution :

->Option C

The two given subquery brings the table S and T on there cross product we get the 3X3 = 9 tuples. Making the Natural Join we will get only those values of the Bank\_Manager which are matching. This will produce a table of 5 tuples. Aggregate Function Count will give us total number of tuples that is equal to 5

## Q.4)

Consider a relational table r with sufficient number of records, having attributes A1, A2,…, An and let 1 <= p <= n. Two queries Q1 and Q2 are given below. [](http://www.geeksforgeeks.org/wp-content/uploads/gq/2013/12/GATE2011DBMS1.png) The database can be configured to do ordered indexing on Ap or hashing on Ap. Which of the following statements is TRUE?

|  |  |
| --- | --- |
| A | Ordered indexing will always outperform hashing for both queries |
| B | Hashing will always outperform ordered indexing for both queries |
| C | Hashing will outperform ordered indexing on Q1, but not on Q2 |
| D | Hashing will outperform ordered indexing on Q2, but not on Q1. |

Solution :

->Option C

If record are accessed for a particular value from table, hashing will do better. If records are accessed in a range of values, ordered indexing will perform better.