



Kunal Jha  
 Course: GATE  
 Computer Science Engineering(CS)

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## COMPUTER NETWORKS + DATABASES (GATE - 2021) - REPORTS

OVERALL ANALYSIS    COMPARISON REPORT    **SOLUTION REPORT**

ALL(33)    CORRECT(0)    INCORRECT(0)    SKIPPED(33)

Q. 1

[FAQ](#)    [Solution Video](#)    [Have any Doubt ?](#)

Consider the following Employee table:

ID	Salary	DeptName
1	10000	EC
2	40000	EC
3	30000	CS
4	40000	ME
5	50000	ME
6	60000	ME
7	70000	CS

How many rows are there in the result of following query?

```
SELECT E.ID
FROM Employee E
WHERE EXISTS (SELECT E2.salary
               FROM Employee E2
              WHERE E2.DeptName = 'CS'
                AND E.salary > E2.salary);
```

A 0

B 4

C 5

Correct Option

**Solution :**

- (c)  
 1. WHERE EXISTS tests for the existence of any records in a subquery.  
 2. EXISTS returns true if the subquery returns one or more records.

3. EXISTS is commonly used with correlated subqueries.  
 Here in the above question, there is a correlated subquery because the subquery references the enclosing query (relation Employee renamed as E)

The subquery (SELECT E2.salary FROM Employee E2

WHERE E2.DeptName = 'CS')

Filters out E2 relation as (all tuples where DeptName is CS and the respective salaries)

Now the correlated query works as follows:

```
SELECT E.ID
FROM Employee E
WHERE EXISTS (SELECT E2.salary FROM Employee E2
WHERE E2.DeptName = 'CS'
AND E.salary > E2.salary);
```

It takes one tuple from the Employee Relation and displays its ID if the WHERE EXISTS returns true i.e. the subquery returns one or more records. This happens in the case when the tuple from the Employee Relation E has the value of the salary attribute greater than any one of the values of the salary attribute filtered out above.

So tuples filtered out would be all the tuples that have their salary attribute value greater than the salary values of at least one from the E2 relation (3000 and 7000).

ID	Salary	DeptName
2	40000	EC
4	40000	ME
5	50000	ME
6	60000	ME
7	70000	CS

Finally it displays their ID's and the output would be:

2

4

5

6

7

Hence option (c) 5 rows.

D 6

QUESTION ANALYTICS

+

Q. 2

[Solution Video](#)    [Have any Doubt ?](#)

Consider the following three table to store student enrollments in different courses.  
 Student(EnrollNo, Name)

Course(CourseID, Name)

Enrollments (EnrollNo, CourseID)

What does the following query do?

```
SELECT S.Name
FROM Student S, Course C, Enrollments E
```

```
WHERE S.EnrollNo = E.EnrollNo AND
```

```
    C.Name = "DBMS" AND
```

```
    E.CourseID = C.CourseID AND
```

```
    S.EnrollNo IN
```

```
        (SELECT S2.EnrollNo
```

```
        FROM Student S2, Course C2, Enrollments E2
```

```
        WHERE S2.EnrollNo = E2.EnrollNo AND
```

```
            E2.CourseID = C2.CourseID
```

```
            C2.Name = "OS")
```

**A** Name of all students who are either enrolled in "DBMS" or "OS" courses

**B** Name of all students who are enrolled in "DBMS" and "OS"

Correct Option

**Solution :**

(b)  
Background Reading: The above query is an example of nested query i.e. query within a query. Firstly the inner query is solved and then the outer one depending on the result of the inner query.  
• WHERE IN returns values that matches values in a list or subquery.  
• WHERE IN is a shorthand for multiple OR conditions.  
Here, firstly the inner query is solved. It returns all the Enrollment Numbers (SELECT S2.EnrollNo) of students where the students' enrollment number matches with the enrollment number of the courses (WHERE S2.EnrollNo = E2.EnrollNo) which have the course IDs whose Course Name is "OS" (E2.CourseID = C2.CourseID and C2.Name = "OS"). Hence all the enrollment IDs are filtered out for the students who are enrolled for the "OS" course.

**C** Name of all students who are either enrolled in "DBMS" or "OS" or both.

**D** None of the above

 QUESTION ANALYTICS



**Q. 3**

? FAQ

Have any Doubt ?



Routers forward a packet using forwarding table entries. The network address of incoming packet may match multiple entries. How routers resolve this?

**A** Forward the packet to all routers whose network addresses match.

**B** Discard the packet.

**C** Forward it the router whose entry matches with the longest suffix of incoming packet.

**D** None of these

Correct Option

**Solution :**

(d)  
The network addresses of different entries may overlap in forwarding table. Routers forward the incoming packet to the router which has the longest prefix matching with the incoming packet.

 QUESTION ANALYTICS



**Q. 4**

? FAQ

Solution Video

Have any Doubt ?



Consider the following relational schema:

STUDENT(SNO, SNAME, DEPT)

ENROLL(CNO,SNO, GRADE)

COURSE(CNO, DEPT)

PREREQ(CNO, PNO)

Keys are underlined. The column ENROLL(SNO) is a foreign key referencing STUDENT(SNO). All the occurrences of the columns CNO and PNO, except for the one in COURSE, are foreign keys referencing COURSE(CNO).

SELECT E1.CNO, S.SNAME  
FROM ENROLL E1, STUDENT S  
WHERE E1.SNO = S.SNO  
AND NOT EXISTS (SELECT \* FROM ENROLL E2  
WHERE E2.CNO = E1.CNO  
AND E2.GRADE > E1.GRADE )

What is the output of the Query?

**A** For every course, return the names of the highest-scoring students.

Correct Option

**Solution :**

(a)  
Given SQL query,  
SELECT E1.CNO, S.SNAME  
FROM ENROLL E1, STUDENT S  
WHERE E1.SNO = S.SNO  
AND NOT EXISTS ( SELECT \* FROM ENROLL E2  
WHERE E2.CNO = E1.CNO  
AND E2.GRADE > E1.GRADE )  
It returns the names of the highest-scoring students, for every course.  
Option (a) is correct.

**B** For every student, return the names of the courses.

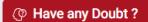
**C** For every course, return the names of the students who never score highest marks.

**D** None of these

 QUESTION ANALYTICS



Q. 5



Consider socket API on a Linux machine that supports connected UDP sockets. A connected UDP socket is a UDP socket on which connect function has already been called. Which of the following statements is/are CORRECT?

- I. A connected UDP socket can be used to communicate with multiple peers simultaneously.
- II. A process can successfully call connect function again for an already connected UDP socket.

 A Both are correct B I is correct but II is false C Both are false D Only II is true.

Correct Option

**Solution :**

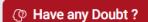
(d)

A process with a connected UDP socket can call connect again for that socket for one of two reasons:

- I. To specify a new IP address and port.
- II. To unconnect the socket.



Q. 6



What is the value of acknowledgement field in a segment?

 A Number of previous bytes to receive. B Total number of bytes to receive. C Number of next bytes to receive.

Correct Option

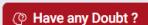
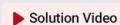
**Solution :**

(c)

The acknowledgement field in a segment defines the sequence number of the byte which is to be received next i.e., sequence number of byte that the sender should transmit next

 D Sequence of zero's and one's.

Q. 7



Consider the following functional dependencies for relation R(A, B, C, D, E) and find normal form.

$AB \rightarrow CD$ ,  $D \rightarrow A$ ,  $BC \rightarrow DE$

 A 1NF B 2 NF C 3NF

Correct Option

**Solution :**

(c)

Above relation is in 3NF

Candidate key are AB, BC, DB

For  $AB \rightarrow CD$  and  $BC \rightarrow DE$

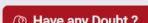
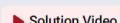
AB and BC are candidates

And

For  $D \rightarrow A$ , A is a prime attribute.

 D BCNF

Q. 8



Given below are some transaction schedules that involve three transactions  $T_1, T_2, T_3$ :

**Schedule 1:**  $R_2(x), R_3(y), W_1(x), W_3(y), W_2(z), W_2(z), R_1(z), W_2(y)$ .

**Schedule 2:**  $R_2(x), W_2(y), R_3(y), W_3(x), W_1(y), R_3(z), R_1(y), W_2(y)$ .

**Schedule 3:**  $R_1(x), R_2(y), W_2(y), R_2(z), R_3(z), W_1(z), W_1(y), W_2(y)$ .

**Schedule 4:**  $R_1(x), W_1(y), R_2(z), R_3(z), W_1(y), W_2(y), R_1(y), W_2(z)$ .

Which of the above given schedules is conflict serializable?

Mark the above given schedules to conflict serializable.

A Schedule 1

B Schedule 2

C Schedule 3

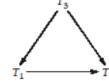
D Schedule 4

Correct Option

Solution :

(d)

If you construct precedence graphs for first three schedules we will get cycle, hence they are not conflict serializable. Precedence graph for schedule 4 is shown



QUESTION ANALYTICS +

Q. 9

? FAQ

Have any Doubt ?



In a network that has maximum packet size of 129 byte, a maximum packet lifetime of 30 second and a 8-bit packet sequence number. What is maximum rate/second? \_\_\_\_\_ bits/sec. (Upto 1 decimal place).

8806.4 (8806.0 - 8807.0)

Correct Option

Solution :

8806.4 (8806.0 - 8807.0)

Maximum number of packets that can be transmitted in 30 sec = 256

$$\begin{aligned} \text{Data size} &= 256 \times 129 \text{ bytes} \\ &= 256 \times 129 \times 8 \text{ bits} \end{aligned}$$

In 30 sec,  $(256 \times 129 \times 8)$  bits are transmitted

$$\text{In one second number of bits transmitted} = \frac{256 \times 129 \times 8}{30} = 8806.4 \text{ bps.}$$

QUESTION ANALYTICS +

Q. 10

? FAQ

▶ Solution Video

Have any Doubt ?



Let R and S be two compatible relation instances with 10 and 5 distinct tuples respectively.  
The minimum and maximum number of tuples in the result of  $R - S$  is  $x$  and  $y$  respectively then  $x + y$  is \_\_\_\_\_.

15

Correct Option

Solution :

15

$x$  = minimum number of tuples =  $10 - 5 = 5$  (if S is subset of R)

$y$  = maximum number of tuples =  $10 - 0 = 10$  (if S is not subset of R)

So,  $x + y = 10 + 5 = 15$

QUESTION ANALYTICS +

Item 1-10 of 33

« previous

1

2

3

4

next »



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ALL(33)

CORRECT(0)

INCORRECT(0)

SKIPPED(33)

Q. 11

FAQ

Solution Video

Have any Doubt ?



Number of concurrent schedules that can be formed over 4 transactions having 1, 3, 2, 2 operations respectively are \_\_\_\_\_.

1680

Correct Option

Solution :

1680

As we know that,

$$\text{Number of concurrent schedule} = \frac{(m_1 + m_2 + \dots + m_n)!}{m_1! m_2! \dots m_n!}$$

Where n is number of schedules and  $m_1, m_2, \dots$  are number of operations respectively

$$\text{So } \frac{(1+3+2+2)!}{1!3!2!2!} = 1680$$

QUESTION ANALYTICS



Q. 12

FAQ

Solution Video

Have any Doubt ?



Consider an ordered file with 1,00,000 records stored on a disk using un-spanned file organization. Block size is 2048 bytes and record length 256 bytes. If primary indexing with multilevel indexing is used over a field of size 10 bytes and block pointer size is 6 bytes. Then number of block access is required to search for a record is \_\_\_\_\_.

3

Correct Option

Solution :

3

QUESTION ANALYTICS



Q. 13

Solution Video

Have any Doubt ?

Consider  $x$  as number of prime attribute and  $y$  as number of non-prime attribute of relation R(m, n, o, p, q, r, s, t), from given functional dependencies:  
 $F = (q \rightarrow rst, mn \rightarrow pqrst, o \rightarrow pq, p \rightarrow m)$ .The value of  $x \times y$  is \_\_\_\_\_.

12

Correct Option

Solution :

12

(no)\* determines the entire attribute set of the relation.

n, o are prime attributes therefore the value of x is 2 and the value of y will be 6.

Therefore, the value of  $x \times y$  will be 12.

QUESTION ANALYTICS



Q. 14

FAQ

Have any Doubt ?



Which of the following is/are true about User Datagram Protocol in transport layer?

A Works well in unidirectional communication, suitable for broadcast information.

Correct Option

B It does three way handshake before sending datagrams.

C It provides datagrams, suitable for modeling other protocols such as in IP tunneling or Remote Procedure Call and the network file system.

Correct Option

D The lack of retransmission delays makes it suitable for real-time applications

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,c,d

STATUS - SKIPPED

Solution :

(a, c, d)

UDP is a connectionless protocol, so it doesn't establish connection. Three way handshake is done by transport layer.

A. UDP is a stateless protocol thus, useful in servers which answer small queries of large number

or clients as it doesn't need to store the state for each client. Thus, UDP is suitable for broadcast and unidirectional communication.  
 B. Three way handshake is performed by TCP before establishing the connection in which it first sends SYN packet then SYN-ACK is received, then ACK packet is sent. UDP is a connectionless protocol and thus, doesn't perform 3-way handshake.  
 C. IP tunneling is a communication channel between two different kind of networks. It is used to connect islands of IPv6 across the IPv4 internet by encapsulating the packets in the frame format of IPv4. Remote procedure call is when a program causes a subroutine to run in another address space. This address space can be on server. It is a request-response protocol and thus, UDP is suitable for it. Datagrams are also useful as UDP is a packet stream protocol.  
 D. TCP retransmits the erroneous packets from source to destination while UDP discards them.

### QUESTION ANALYTICS

Q. 15

Have any Doubt ?



Which of the following is/are correct?

A UDP (user datagram length) length = length of IP – length of IP header's.

Correct Option

B UDP (user datagram length) length = length of IP + length of IP header's.

C When we use slow-start algorithm, the size of the congestion window increases exponentially until it reaches a threshold.

Correct Option

D When we use slow-start algorithm, the size of the congestion window increases additively until it reaches a threshold.

YOUR ANSWER - NA

CORRECT ANSWER - a,c

STATUS - SKIPPED

Solution :

(a, c)

In slow-start algorithm, the size of the congestion window increases exponentially until it reaches a threshold.

### QUESTION ANALYTICS

Q. 16

Have any Doubt ?



Which of the following is/are true about UDP?

A Reliable

Correct Option

B Connection less

C Uses acknowledgment

D Uses checksum

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - b,d

STATUS - SKIPPED

Solution :

(b, d)

UDP is connection less protocol, it is an unreliable protocol. It does not use acknowledgment; it uses checksum for error detection.

### QUESTION ANALYTICS

Q. 17

FAQ Have any Doubt ?



Suppose that a transmitter operating at  $10^8$  bps is connected to one end of a 230 km length of coaxial cable. The signal propagation speed in the cable is 230000 km/sec. If packet switching is used with a packet length of 2000 bits, how many packets have been transmitted and are propagating along the cable when the first bit reaches the other end?

A 100

B 50

Correct Option

Solution :

(b)

$$\text{Propagation delay} = \frac{(230)}{230000} = 1 \text{ msec}$$

$$\text{Packet transmission time} = \frac{2000}{10^8} = 0.02 \text{ msec}$$

$$\text{Number of packets in transit} = \frac{1}{0.02} = 50 \text{ packets}$$

C 20

D 80

### QUESTION ANALYTICS



Q. 18

 Have any Doubt ?

In GO-BACK N ARQ and Stop and Wait ARQ, the receiver window size = 1. Consider the two statements regarding both the protocols:  
**S<sub>1</sub>** : They accepts out of order frames.  
**S<sub>2</sub>** : They accepts in order frames.

Which of the following is true regarding given data for the protocols?

 A Only S<sub>1</sub> is true B Only S<sub>2</sub> is true

Correct Option

**Solution :**

(b)

Since the receiver window size is 1, only in order packets are accepted. Out of Order packets are rejected by the receiver window.

 C Both are true D Both are false

Q. 19

 Have any Doubt ?

Assume for a network layer representation connection establishment overhead is 100 bytes and disconnection overhead is 28 bytes. What would be the minimum size of packet the transport layer should keep if it wishes to keep datagram services above the network layer and needs to keep its overhead to a minimum of 12.5% (ignore transport layer overhead)?

 A 1024 bits B 2048 bits C 4096 bits D 8192 bits

Correct Option

**Solution :**

(d)

$$\begin{aligned} \text{Total Overhead for the system} &= \text{Connection Overhead} + \text{Disconnection Overhead} \\ &= 100 \text{ B} + 28 \text{ B} = 128 \text{ B} \end{aligned}$$

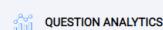
This overhead will be added at the network layer. Suppose size of data from transport layer should be  $x$ .

So to keep overhead to be 12.5%

$$\text{Total overhead} = 12.5 \times \frac{x}{100}$$

$$\text{Therefore, } 128 = 12.5 \times \frac{x}{100}$$

$$\begin{aligned} x &= 128 \times 8 \text{ B} \\ &= 1024 \text{ B} = 8192 \text{ Bits} \end{aligned}$$



Q. 20

 Have any Doubt ?

Which of the following is a class B host address?

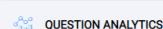
 A 230.0.0.0 B 130.4.5.6

Correct Option

**Solution :**

(b)

First octate define the range of classfull network  
 First few bit of first octate define the class full network. If first two bit (10) then it is class B,  
 10000000-128  
 10111111-191  
 Range: (128.....130.....191)  
 130 is in range between 128 ...191  
 130.4.5.6 Class B address.

 C 230.7.6.5 D 30.4.5.6





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CORRECT(0)

INCORRECT(0)

SKIPPED(33)

Q. 21

Have any Doubt?



There are n number of stations in a slotted Aloha channel, channel bandwidth is 32 Kbps and every channel send 512 bits frame on an average of 30 seconds what is the maximum number of station that can operate on this channel?

(A) 500

(B) 600

(C) 690

Correct Option

Solution :

(c)

Since its slotted aloha. So max Bandwidth utilization is 36.8% of 32 Kbps.  
Each station transmits 512 bits every 30 seconds.

$$\left(\frac{512}{30}\right) \text{ bits in 1 second}$$

We know there are n number of stations

$$n \times \left(\frac{512}{30}\right) = \left(\frac{36.8}{100}\right) \times 32 \times 1000$$

On solving

$$n = 690$$

(D) 590

QUESTION ANALYTICS



Q. 22

FAQ Have any Doubt?

We have three stations P, Q, R connected in serial manner. P is connected to Q through a 3 Gbps fibre optic link and length is 500 km. Q is connected to R through 60 Mbps link and length is 15 km. All the links are full duplex in nature. A file is sent from station A to C. Packet size is 1 KB. We use sliding window protocol such that SWS = RWS. Find the optimal SWS packets. (Assume signal speed  $2 \times 10^8$  m/s).

(A) 39

Correct Option

Solution :

(a)

First we have to calculate RTT.

RTT = Transmission period +  $2 \times$  Propagation delay

$$= \left(\frac{8192}{3 \times 10^8}\right) + \left(\frac{8192}{60 \times 10^6}\right) + 2 \times \left(\frac{5 \times 10^5}{2 \times 10^8}\right) \left(\frac{15 \times 10^3}{2 \times 10^8}\right) = 5.29 \text{ ms}$$

Number of packets to be sent =  $5.29 \times 60 \text{ Mbps} = 317400 \text{ bits}$ Number of packets =  $317400 / (1024 \times 8) = 39 \text{ packets}$ 

(B) 64

(C) 16

(D) 128

QUESTION ANALYTICS



Q. 23

Have any Doubt?



Consider a token bucket with maximum rate R = 20 Mbps. Suppose we want to make sure that the maximum rate can only be sent for atmost 5 seconds at a time, and atmost 150 Mbits can be sent over any 10 second window. Compute the required value for the bucket depth B in Mbits.

(A) 50

Correct Option

Solution :

(a)

We are sending at the maximum rate for 5 seconds, so we send  $20 \times 5 = 100 \text{ Mb}$  in 5 seconds. We can only send 150 Mb in any 10 second window, so  $150 - 100 = 50 \text{ Mb}$ , we can send in theremaining 5 seconds, so rate =  $\frac{50}{5} = 10 \text{ Mbps}$ .Now, in order to ensure the bucket has enough tokens to sustain a 5-second burst at 20 Mbps, we require  $B = (M - \text{rate}) \times 5 = (20 - 10) \times 5 = 50 \text{ Mb}$  bucket depth.

(E) 100

**C** 250

**D** 125

QUESTION ANALYTICS

Q. 24

? FAQ

Have any Doubt?



Mr. David invented a transmission link with "infinite" bandwidth. Vineet wants to use Mr. David's link to transmit his video files of size 2000 Mb. But he is contained by the maximum packet size of 2 Mb and during 1st RTT he can send 1 packet, 2 packets during 2nd RTT and 4 packets during 3rd RTT, 8 packets in 4th RTT and so on  $2^{n-1}$  packets during  $n^{\text{th}}$  RTT. If the RTT was 100 seconds, how long would it take Vineet to send his video file?

**A** 16.591 minute

Correct Option

Solution :

(a)

$$\text{Total number of packets to be sent} = \frac{2000 \text{ Mb}}{2 \text{ Mb}} = 1000 \text{ packets}$$

1<sup>st</sup> RTT = 1 packet (100 sec)

2<sup>nd</sup> RTT = 2 packets (100 sec)

3<sup>rd</sup> RTT = 4 packets (100 sec)

4<sup>th</sup> RTT = 8 packets (100 sec)

⋮

8<sup>th</sup> RTT = 128 packets (100 sec)

9<sup>th</sup> RTT = 256 packets (100 sec)

511 packets sent upto 9<sup>th</sup> RTT (in 800 sec)

So, 1000 - 511 = 489 packets to be sent

In 10<sup>th</sup> RTT he can send 512 packets in 100 seconds

489 packets can be sent in 95.50 seconds

$$\therefore \text{Total time} = \frac{900 + 95.50}{60 \text{ sec}} = 16.591 \text{ minute}$$

**B** 13.500 minute

**C** 21.347 minute

**D** 11.231 minute

QUESTION ANALYTICS

Q. 25

? FAQ

Solution Video

Have any Doubt?



Consider a block size 512 bytes, search key field 9 bytes long, block pointer size 6 bytes and record pointer 7 bytes long. If a level 3 B+ Tree is constructed considering root as level 0, find the maximum number of entries in the B+ tree as  $(34)^x \times y$  entries and give the value for  $x + y$ .

**34**

Correct Option

Solution :

34

$$n \times 6 + (n - 1) \times 9 \leq 512$$

$$6n + 9n - 9 \leq 512$$

$$15n \leq 521$$

$$n \leq 34$$

And, order of leaf node is

$$m \times (9 + 7) + 6 \leq 512$$

or

$$16m \leq 506$$

$$\Rightarrow m \leq 31$$

Then maximum number of entries in level 3 B+ tree is  $(34)^3 \times 31$ .

Hence,  $x + y = 34$

QUESTION ANALYTICS

Q. 26

? FAQ

Solution Video

Have any Doubt?



If the following sequence of keys is inserted into an empty B tree of order 4 then the search key value 31 will be placed at what level (Assume root node at level 0)? 2, 3, 5, 11, 19, 23, 29, 31.

**1**

Correct Option

Solution :

1

Level 0 →



## QUESTION ANALYTICS



Q. 27

[FAQ](#) [Solution Video](#) [Have any Doubt?](#)

For Relation R(A, B, C, D, E, F) with the FD set,  $F = \{A \rightarrow D, B \rightarrow E, C \rightarrow F\}$ . What is the minimum relation required for storing R such that highest normal form satisfied is 3NF. \_\_\_\_\_.

4

Correct Option

**Solution :**

4  
Here, Candidate key = {ABC}  
 $ABC^+ = \{ABCDEF\}$

This relation is in 1NF because all the functional dependencies are partial dependency.

2NF Decomposition:

Here,  $A^+ = \{AD\}$   
 $B^+ = \{BE\}$   
 $C^+ = \{CF\}$

Then for making it lossless, common attribute should be there.



Now, this decomposition is in 2NF as well as in BCNF. Hence, No of relation required is 4.

## QUESTION ANALYTICS



Q. 28

[FAQ](#) [Solution Video](#) [Have any Doubt?](#)

Consider the following schedule:

$S : W_1(A) W_2(B) W_3(B) W_4(B)$

The number of schedule which are view equal to S is \_\_\_\_\_.

8

Correct Option

**Solution :**

8  
For schedule to be view equal, three thing has to be considered:  
(a) Initial Read  
(b) Updated Read  
(c) Final Write

For this schedule, initial read and updated read does not count because no read operation is considered. So According to final write Transaction  $T_4$  should perform write on B finally.  $W_2(B)$  and  $W_3(B)$  can be executed in two ways and  $W_1(A)$  can be executed in four ways.

So total possibilities =  $4 * 2 = 8$

## QUESTION ANALYTICS



Q. 29

[Solution Video](#) [Have any Doubt?](#)

Consider a B+ tree in which the search key is 12 bytes long, block size is 1024 bytes, record pointer is 10 bytes long and block pointer is 8 bytes long. The maximum number of keys that can be accommodated in each non-leaf node of the tree is \_\_\_\_\_.

50

Correct Option

**Solution :**

50  
Let m be the order of B+ tree  
 $m(8) + (m - 1)12 \leq 1024$   
[Note that record pointer is not needed in non-leaf nodes]  
 $m \leq 51$

Since maximum order is 51, maximum number of keys is 50.

## QUESTION ANALYTICS



Q. 30

[Have any Doubt?](#)

In shared Ethernet link, each user is active only 10% of the time. Suppose packet switching is used for 10 users and each user is equally likely to transmit at any point of time. The probability p that at any given time exactly 8 users are transmitting simultaneously. What is the value of  $10^{10} \times p$ ?

3645

Correct Option

**Solution :**

3645  
 $p_{active}(8) = 10 \cdot {}_{C_8}^1 (0.1)^8 (0.9)^{10-8}$   
 $= 45 \times (0.1)^8 \times (0.9)^2 = 36.45 \times 10^{-8}$

$$= 0.0000003645 \times 10^{10} = 3645$$

QUESTION ANALYTICS +

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Kunal Jha

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ALL(33)

CORRECT(0)

INCORRECT(0)

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Q. 31

FAQ

Have any Doubt?



Which of the following statements is/are true?

- A Relational calculus is equivalent to relational algebra in its capabilities.
- B Relational calculus is stronger than relational algebra.
- C Relational algebra has the same power as safe relational calculus. Correct Option
- D Relational calculus is based on predicate calculus of formal logic. Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - c,d

STATUS - SKIPPED

Solution :

(c, d)  
 True statements are:  
 Relational calculus is weaker than relation algebra.  
 It is based on predicate calculus of formal logic.

QUESTION ANALYTICS



Q. 32

FAQ

Solution Video

Have any Doubt?

Relation R(ABCDE) with FD set  $F = [A \rightarrow BC, C \rightarrow DE, D \rightarrow E]$  and the decomposition  $[R_1(A, B, C, D) \text{ AND } R_2(D, E)]$ . A Loss less Correct Option B Lossy C Dependency Preserving Correct Option D Not Dependency Preserving

YOUR ANSWER - NA

CORRECT ANSWER - a,c

STATUS - SKIPPED

Solution :

(a, c)  
 Since D attribute is common in both the tables and D is the key in  $R_2$ , therefore the decomposition is lossless. All the dependencies are covered in both the relations therefore it is also dependency preserving.

QUESTION ANALYTICS



Q. 33

FAQ

Have any Doubt?



Which of the following is/are true about TCP acknowledgment?

 A It supports cumulative acknowledgment. Correct Option B Its size is 48-bits in length. C Its number does not go beyond lost data sequence number. Correct Option D It does not support selective acknowledgment.

YOUR ANSWER - NA

CORRECT ANSWER - a,c

STATUS - SKIPPED

Solution :

(a, c)  
 • Its word length of 32 bits because every byte of data is numbered in TCP stream.  
 • TCP always uses cumulative Ack. It ensures that all segments within its next sequence number are received.

QUESTION ANALYTICS



