



Kunal Jha

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Q. 1
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Complete the sentence by filling in the appropriate words from the options provided.
 Our job as teachers is to _____ the thirst for knowledge and _____ the spark of enthusiasm.

A quench, ignite

[Correct Option](#)
Solution :

(a)

Our job as teachers is to quench the thirst for knowledge and ignite the spark of enthusiasm. The word 'quench' relates to 'thirst' while 'ignite' relates to 'spark'.

B substantiate, quell

C sensitize, douse

D sustain, mitigate

QUESTION ANALYTICS

Q. 2
[▶ Solution Video](#)
[Have any Doubt ?](#)


Choose the correct pair from the options provided, which has a similar relationship to the given pair.
 SEETHE : ANGER :: ?

A chortle : distress

B snarl : confusion

C fidget : uneasiness

[Correct Option](#)
Solution :

(c)

Seethe is a more intense form of anger just as fidget is of uneasiness.

D waddle : embarrassment

QUESTION ANALYTICS

Q. 3
[▶ Solution Video](#)
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Two bus tickets from city A to B and three tickets from city A to C cost ₹77 but three tickets from city A to B and two tickets from city A to C cost ₹73. What are the fares for cities B and C from A?

A ₹4, ₹23

B ₹13, ₹17

[Correct Option](#)
Solution :

(b)

Let ₹x be the fare of city B from city A and ₹y be the fare of city C from city A.

Then, $2x + 3y = 77$

.....(i)

and $3y + 2x = 73$

.....(ii)

Multiplying (i) by 3 and (ii) by 2 and subtracting, we get: $5y = 85$ or $y = 17$.

Putting $y = 17$ in (i), we get: $x = 13$

C ₹15, ₹14

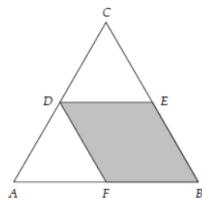
D ₹17, ₹13

QUESTION ANALYTICS

Q. 4
[▶ Solution Video](#)
[Have any Doubt ?](#)


*ABC is a triangle in which D, E and F are the mid – points of the sides AC, BC and AB respectively.
 What is the ratio of the area of the shaded to the unshaded region in the triangle?*

What is the ratio of the area of the shaded to the unshaded region in the triangle?

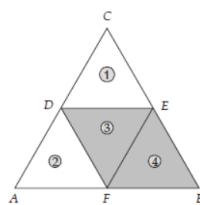


A 1 : 1

Correct Option

Solution :

(a) There are 4 triangles (smaller) which are congruent.



So, out of these 4 triangles 2 triangles are taken, thus the ratio of the shaded to the unshaded region is 1 : 1 (since two triangles are shaded and 2 are unshaded).

B 3 : 4

C 4 : 5

D none of the above

QUESTION ANALYTICS



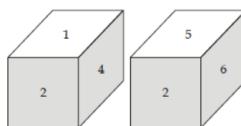
Q. 5

Solution Video

Have any Doubt ?



Two views of a dice are shown below. When the digit 5 is on the bottom then which number will be on its upper surface is_____



C 1

Correct Option

Solution :

1

Common faces with number 2 are in same positions. Hence when the digit 5 is on the bottom then 1 will on the upper surface.

QUESTION ANALYTICS



Q. 6

Solution Video

Have any Doubt ?



From a group of 7 men and 6 women, five persons are to be selected to form a committee so that at least 3 men are there on the committee. In how many ways can it be done?

A 564

B 654

C 735

D 756

Correct Option

Solution :

(d)

We may have (3 men and 2 women) or (4 men and 1 woman) or (5 men only).

∴ Required number of ways = ${}^7C_3 \times {}^6C_2 + {}^7C_4 \times {}^6C_1 + {}^7C_5$

$$= \left(\frac{7 \times 6 \times 5}{3 \times 2 \times 1} \times \frac{6 \times 5}{2 \times 1} \right) + \left(\frac{7 \times 6 \times 5}{3 \times 2 \times 1} \times 6 \right) + \left(\frac{7 \times 6}{2 \times 1} \right)$$
$$= (525 + 210 + 21) = 756$$

QUESTION ANALYTICS



Q. 7

Solution Video

Have any Doubt ?



A wrist watch which is running 12 minutes late on a Sunday noon is 16 minutes ahead of the correct time at 12 noon on the next Sunday. When is the clock 8 minutes ahead of time?

A Thursday 10 am

B Friday noon

Correct Option

Solution :

(b)

Actually the watch gains $(12 + 16) = 28$ min in $7 \times 24 \times 60$ minutes
Thus, it gains 1 min in 360 minutes.

Therefore, it will gain $(12 + 8)$ min in $\frac{20 \times 360}{60 \times 24} = 5$ days
Hence, (b) is the correct choice.

C Friday 8 pm

D Tuesday noon

 QUESTION ANALYTICS

+

Q. 8

 Solution Video

 Have any Doubt ?

Q

A shopkeeper sells one transistor for Rs. 840 at a gain of 20% and another for Rs. 960 at a loss of 4%. His total gain or loss percent is:

A $5\frac{15}{17}\%$ Loss

B $5\frac{15}{17}\%$ gain

Correct Option

Solution :

(b)

$$\text{C.P. of 1st transistor} = \left(\frac{100}{120} \times 840 \right) = \text{₹}700$$

$$\text{C.P. of 2nd transistor} = \left(\frac{100}{96} \times 960 \right) = \text{₹}1000$$

$$\text{So, total C.P.} = \text{₹}(700 + 1000) = \text{₹}1700.$$

$$\text{S.P.} = \text{₹}(840 + 960) = \text{₹}1800.$$

$$\text{Gain \%} = \left(\frac{100}{1700} \times 100 \right)\% = 5\frac{15}{17}\%$$

C $6\frac{2}{3}\%$ gain

D None of these

 QUESTION ANALYTICS

+

Q. 9

 Solution Video

 Have any Doubt ?

Q

On dividing a number by 357, we get 39 as remainder. On dividing the same number by 17, what will be the remainder?

A 0

B 3

C 5

Correct Option

Solution :

(c)

Let x be the number and y be the quotient. Then,

$$\begin{aligned}x &= 357y + 39 \\&= (17 \times 21y) + (17 \times 2) + 5 \\&= 17 \times (21y + 2) + 5\end{aligned}$$

$$\therefore \text{Required remainder} = 5.$$

D 11

 QUESTION ANALYTICS

+

Q. 10

 Solution Video

 Have any Doubt ?

Q

In a badminton tournament each player played one game with all the other players. The number of players who participated in the tournament if they played 105 games in all is

15

Solution :

15

 ${}^nC_2 = 105$, where n is the number of players

$$\Rightarrow \frac{n(n-1)}{2} = 105$$

$$\Rightarrow n = 15$$

 QUESTION ANALYTICS

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Q. 11
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Consider the following statements:

 I. L is regular only if $h(L)$ is regular.

 II. $h(L)$ is regular only if L is regular.

Which of the above statements are true?

A I only

Correct Option

Solution :

(a)

Regular languages are closed under homomorphism, which means I is true.

 But II is not true. For example, take a non regular language say $L = \{0^n1^n \mid n > 0\}$ over $\{0, 1\}$.

 Further, define a homomorphism over the alphabet $\{a, b\}$ such that $h(0) = a$ and $h(1) = \epsilon$.

 Clearly $h(L) = a^n$, which is regular. So we've shown a non regular language whose homomorphism happens to be regular, and hence II is false.

B II only

C Both I and II

D None of these

QUESTION ANALYTICS


Q. 12
[Have any Doubt ?](#)

 Consider a hash table of size 11. Let $h(k) = k \bmod 11$ be the hash function used. A sequence of records with keys {33, 68, 62, 47, 48, 60, 104, 23, 19, 120, 87} is inserted into an initially empty hash table, the bins of which are indexed from zero to ten.

Which of the following is true?

A If, collisions are resolved by linear probing then maximum number of comparisons in worst case can be 2.

B If chaining is used to resolve collision, the average chain length will be 1.09.

C Both of these

D None of these

Correct Option

Solution :

(d)

Inserting keys in the hash table, we get:

33	0
23	1
68	2
47	3
48	4
60	5
104	6
62	7
19	8
97	9
120	10

Since, there is no collision in the hash table.

- Using linear probing, maximum comparison will be 1.
- Using chaining, the average chain length will be 1.

QUESTION ANALYTICS


Q. 13
[▶ Solution Video](#)
[Have any Doubt ?](#)

 Let P denotes the set of all Turing machines which accept their own encoding, and Q denote the set of all Turing Machines which reject their own encoding. Now let $X = P \cup Q$ and $Y = P \cap Q$. Then

A Both X and Y are decidable

Correct Option

Solution :

(a)

 Clearly, Q is actually P . Their union will contain every possible string over the alphabet, and their intersection will be empty. And we know that both the sets are regular, hence X and Y are therefore decidable.

Hence recursive, therefore decidable.
So (a) is the right choice.

- B Only X is decidable
- C Only Y is decidable
- D Both X and Y are undecidable

QUESTION ANALYTICS



Q. 14

Solution Video

Have any Doubt?



Assume CPU is implemented using 4 stage pipeline IF, ID, EX and WB latencies are 6, 4, 8 and 4 respectively (in ns). If ALU is made 50% faster then find time (in ns) to execute N instructions?

- A $[4 + (N - 1)] 6$

- B $[4 + (N - 1)] 6$

Correct Option

Solution :

(b)
Latency of ALU after enhancement (50%) \Rightarrow EX latency is 4.
Slowest stage is 6 ns by IF. Execution time for N instructions in 4 stage pipeline CPU = $[4 + (N - 1)] 6$ ns.

- C $[4 + (N - 1)] 4$

- D None of these

QUESTION ANALYTICS



Q. 15

Solution Video

Have any Doubt?



Let $f(n) = O(n)$, $g(n) = \Omega(n)$ and $h(n) = \Theta(n)$. Then $g(n) + f(n) \cdot h(n)$ is _____

- A $\Omega(n)$

Correct Option

Solution :
(a)

$$\begin{aligned}f(n) &= O(n), g(n) = \Omega(n), h(n) = \Theta(n) \\g(n) + f(n) \cdot h(n) &= \Omega(n) + O(n)\Theta(n) \\&= \Omega(n) + [(n) \leftrightarrow (n^2)] = \Omega(n^2)\end{aligned}$$

- B $\Theta(n^2)$

- C $\Omega(n^2)$

- D $\Theta(n)$

QUESTION ANALYTICS



Q. 16

Solution Video

Have any Doubt?



Which of following statement(s) is/are correct?

- I. If a connected, simple graph of order 10 has more than 24 edges surely it is non-planar.
II. If a connected, simple graph of order 10 has less than 24 edges surely it is planar.

- A Both I and II

- B Only I

Correct Option

Solution :
(b)

Theorem: If G is connected planar simple graph with e edges and v vertices, where $v \geq 3$, then
 $e \leq 3v - 6$.

Statement I:

$$\begin{aligned}v &= 10 \\e &> 24 \quad [\text{Assume } 25]\end{aligned}$$

Applying above theorem,

$$\begin{aligned}25 &\leq 3v - 6 \\25 &\leq 24 \quad (\text{which is false})\end{aligned}$$

Taking contrapositive form of above theorem: $e > 3v - 6 \rightarrow G$ is non planar.

Hence, statement I is true.

Statement II is false because above theorem only goes one way i.e., we cannot say if $e \leq 3v - 6$ is true then graph must be planar.

C Only II

D None of these

QUESTION ANALYTICS

Q. 17

Solution Video

Have any Doubt?

A single processor system has three resource types X, Y and Z, which are shared by four processes. There are 12 units of each resource type. Consider the following scenario, where the column allocation denotes the units of each resource type allocated to each process, and the column request denotes the number of units of each resource type requested by a process in order to complete execution.

Process	Allocation			Request		
	X	Y	Z	X	Y	Z
P_0	2	3	2	5	5	8
P_1	3	1	2	1	2	3
P_2	3	3	2	5	8	1
P_3	3	2	3	2	2	4

Which of the following is correct?

A P_1 is the first process to execute

Correct Option

Solution :

(a)

$$\begin{aligned} \text{Available} &= \text{Total resources} - \text{Total of } (X, Y, Z) \\ &= (12, 12, 12) - (11, 9, 9) \\ &= (1, 3, 3) \end{aligned}$$

Process	Allocation			Request			Current Available		
	X	Y	Z	X	Y	Z	X	Y	Z
P_0	2	3	2	5	5	8	1	3	3
P_1	3	1	2	1	2	3	9	9	10
P_2	3	3	2	5	8	1	4	4	5
P_3	3	2	3	2	2	4	12	12	12

So, P_1 is the first process to execute.

B P_2 execute at 2nd position

C P_0 executed at 4th position

D All of these

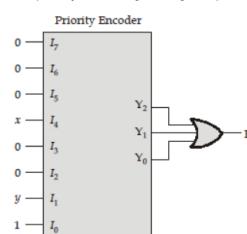
QUESTION ANALYTICS

Q. 18

Solution Video

Have any Doubt?

The shown priority encoder gives highest priority to I_7 . The output F:



A is = 0 when $x = 0$ and $y = 0$

Correct Option

Solution :

(a)

B is = 0 when $x < y$, i.e. $x = 0$ and $y = 1$

C is = 0 when $x = y = 1$, i.e. $x = 1$ and $y = 1$

D is = 0 when $x > y$, i.e. $x = 1$ and $y = 0$

QUESTION ANALYTICS

Q. 19

Solution Video

Have any Doubt?

An IPv4 packet is fragmented into three smaller fragments which of following is True?

A The DF bit is set to 1 for all three fragments.

B The MF bit is set to 0 for all three fragments.

C The ID field is same for all three fragments.

Correct Option

Solution :

(c) Identification field should be same to know that the all fragments belong to same packet.

D The offset field is same for all three fragments.

 QUESTION ANALYTICS



Q. 20

 Have any Doubt ?



Which of the following represents the time complexity to convert binary number into hexadecimal number? (Each binary number is represented by n -bits)

A $O(n)$

Correct Option

Solution :

(a)

In binary to hexadecimal conversion each bit multiplied by 16. Each multiplication take $O(1)$ time.

So, Total time = n -bits $\times O(1) = O(n)$

B $O(n \log n)$

C $O(\log n)$

D $O(n^2)$

 QUESTION ANALYTICS



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Q. 21
[Have any Doubt ?](#)


In a lottery, 10 tickets are drawn at random out of 50 tickets numbered from 1 to 50. What is the expected value of the sum of numbers on the drawn tickets?

A 250

B 51

C 255

Correct Option

D 500

A 500

[QUESTION ANALYTICS](#)

Q. 22
[Solution Video](#)
[Have any Doubt ?](#)

 Consider the algebraic structure $(X, *)$, such that $X = P(S)$, where $S = \{1, 2, 3, 4, \dots, 64\}$. The operation $*$ is defined as, $a * b = a \oplus b$. Then how many of the following properties are satisfied by X ? (where \oplus is this symmetric difference operation)

- Closure
- Associative
- Identity
- Inverse
- Commutative

A 2

B 3

C 4

D 5

Correct Option

A 2

B 3

C 4

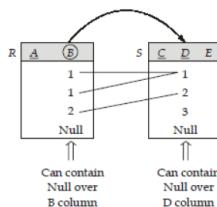
D 5

13 Consider the following relations:
 R(A,B) A primary key, S(C,D,E) C primary key, D alternative key and "B" foreign key references to alternative key D of relation S.
 Which of the following statement true?

- A Each record of S must related by zero or more records of R.

Correct Option

Solution :
 (a)



Each record of S must related by zero or more records of R.

- B Each record of S must related by one or more records of R.

- C Each record of S can related by at most one record of R.

- D Each record of S can related by exactly one record of R

QUESTION ANALYTICS

+

The number of integers from 100 to 1000 which are divisible by 2 or 3 is equal to _____.

- A 667

Correct Option

Solution :
 (b)

First find n_1 = Number of integers between 1 and 1000 which are divisible by 2 or 3 and n_2 = Number of integers between 1 and 99 which are divisible by 2 or 3.
 Then $(n_1 - n_2)$ will give us the required answer.

$$\text{So calculating, } n_1 = \left\lfloor \frac{1000}{2} \right\rfloor + \left\lfloor \frac{1000}{3} \right\rfloor - \left\lfloor \frac{1000}{6} \right\rfloor \\ = (500 + 333 - 166) = 667$$

$$\text{Similarly, } n_2 = \left\lfloor \frac{99}{2} \right\rfloor + \left\lfloor \frac{99}{3} \right\rfloor - \left\lfloor \frac{99}{6} \right\rfloor \\ = (49 + 33 - 16) = 66$$

$$\text{Therefore, } n_1 - n_2 = 667 - 66 = (601)$$

Hence option (b) is the answer

- C 600

- D Not possible to determine

QUESTION ANALYTICS

+

A 2 MHz signal is applied to the input of a J-K flip-flop which is operating in the 'toggle' mode.
 The frequency of the signal at the output will be

- A 1 MHz

Correct Option

Solution :

(a)
 Toggle flip-flops are used for frequency division by 2.
 Hence option (a) is correct.

- B 2 MHz

- C 4 MHz

- D 8 MHz

QUESTION ANALYTICS

+

Q. 26

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

What is the average time (in ms) to read or write a 1 KB sector for a typical disk rotation at 20750 rpm? The advertised average seek time is 4 ms, the transfer rate is 200 MB/sec, and the controller overhead is 1 ms. Assume that the disk is idle so that there is no waiting time is _____. (Upto 1 decimal place)

6.4 [6.1 - 6.7]

Correct Option

Solution :
6.4 [6.1 - 6.7]

$$\text{Average disk access time} = \text{Average seek time} + \text{Average rotational latency} + \text{Transfer time} \\ + \text{Controller overhead}$$

$$\text{Average rotational latency is } \left(\frac{R}{2}\right), (R \text{ is time for 1 rotational})$$

$$= 4 \text{ ms} + \frac{0.5 \times 60 \text{ sec}}{20750} + \frac{1 \text{ KB}}{200 \text{ MB}} + 1 \text{ ms}$$

$$= 4 \text{ ms} + 1.44 \text{ ms} + 0.005 \text{ ms} + 1 \text{ ms} = 6.44 \text{ ms}$$

QUESTION ANALYTICS



Q. 27

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

The value of expression $3^{85} \pmod{17}$ in the range of 0 to 16 _____.

5

Correct Option

Solution :
5

We know that, Little fermat's theorem $3^x \pmod{p} = 1$ when p is prime number and $x = p - 1$.

$$3^{(16 \times 5)} + 5 \pmod{17}$$

$$3^{(16 \times 5)} \pmod{17} \times 3^5 \pmod{17}$$

$$\therefore \quad 3^{16} \pmod{17} = 1 \\ 3^5 \pmod{17} = 5$$

QUESTION ANALYTICS



Q. 28

[Have any Doubt ?](#)

The probability of the sale of a car, S on any day of a year in a store is given by

$$g(s) = \begin{cases} \frac{1}{8} & 0 \leq s \leq 5 \quad \text{car/day} \\ \frac{1}{5} & 5 < s < 10 \quad \text{car/day} \\ 0 & \text{otherwise} \end{cases}$$

The probability that s lies in between 3 and 8 cars per day is _____. (Upto 2 decimal places)

0.85 [0.83 - 0.87]

Correct Option

Solution :
0.85 [0.83 - 0.87]

The probability that s lies in between 3 and 8 cars per day is

$$\int_3^5 g(s) ds + \int_5^8 g(s) ds = \int_3^5 \frac{1}{8} ds + \int_5^8 \frac{1}{5} ds \\ = \frac{1}{8}[5 - 3] + \frac{1}{5}[8 - 5] \\ = \frac{2}{8} + \frac{3}{5} = \frac{1}{4} + \frac{3}{5} = 0.25 + 0.60 = 0.85$$

QUESTION ANALYTICS



Q. 29

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

Consider the following characteristics of disk system:

- Seek time is 6 ms per cylinder.
- Disk uses shortest seek time first scheduling.
- Disk requests for cylinders 8, 24, 51, 5, 41, 18, 30 in that order come into the driver.
- Initially disk arm is at cylinder 20 (in ms).

The total seek time for the above requests is _____. (in ms).

486

Correct Option

Solution :
486

Requests: 8, 24, 51, 5, 41, 18, 30

20 → 18 → 24 → 30 → 41 → 51 → 8 → 5

$$\text{Seek time} = [(20 - 18) + (24 - 18) + (30 - 24) + (41 - 30) + (51 - 41) + (51 - 8) + (8 - 5)] \times 6 \\ = [2 + 6 + 6 + 11 + 10 + 43 + 3] \times 6$$

$$\text{Seek time} = 486 \text{ ms}$$

Q. 30

Solution Video

Have any Doubt?



A team is to be formed out of a committee consisting of 3 boys and 3 girls. Then the number of ways of teaming up the boys and girls such that there are an equal number of boys and girls in the team, assuming at least one boy and girl is selected, is equal to _____.

19

Correct Option

Solution :
 19

$$\text{Number of ways} = {}^nC_1 \times {}^nC_1 + {}^nC_2 \times {}^nC_2 + {}^nC_3 \times {}^nC_3 + \dots + {}^nC_n \times {}^nC_n$$

↓ ↓ ↓ ↓
 (1 boy, 1 girl) (2 boys, 2 girls) (3 boys, 3 girls) (n boys, n girls)

Which is nothing but,

$$= \sum_{r=1}^n {}^nC_r^2$$

We know that,

$$\sum_{r=0}^n {}^nC_r^2 = {}^{2n}C_n$$

$$\text{or, } \left[{}^nC_0^2 + \sum_{r=1}^n {}^nC_r^2 \right] = {}^{2n}C_n$$

$$\text{or, } \sum_{r=1}^n {}^nC_r^2 = ({}^{2n}C_n - 1)$$

Putting, $n = 3$, we get $({}^6C_3 - 1) = 19$

Hence 19 is the answer.



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Q. 31
[Have any Doubt ?](#)


Given finite alphabet $S = \{A, B, C\}$ and stack S of size 100. There are only three stack operations we can perform as mentioned below.

- push (A): push the letter A from the alphabet on to the stack

- emit (): output the top letter from the stack

- pop (): pop the top letter from the stack.

Stack is initially empty and we do not perform pop () on empty stack. Assume that only emit () can print output and stack may or may not be empty finally. The minimum number of stack operations to get "A B C A C B A" as output are _____.

14
[Correct Option](#)
Solution :
14

The minimum set of operation are

```

Push A
emit
Push B
emit
Push C
emit
Push A
emit
POP
emit
POP
emit
POP
emit
    
```

14 operations

After the above operations final content of stack is



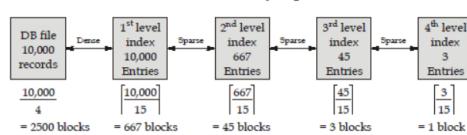
Q. 32
[Solution Video](#)
[Have any Doubt ?](#)


Database relation has 10,000 records. Block can hold either 4 records or 15 key and pointer pairs. If dense index used at 1st level and multilevel indexing is used for 1st level index. Total block required to store database relations and multilevel index is/are_____.

3216
[Correct Option](#)
Solution :
3216

Database size = 10,000 records

Block = 4 records or 15 [key + pointers]



So, Total blocks = $2500 + 667 + 45 + 3 + 1 = 3216$

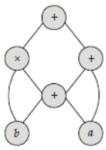

Q. 33
[FAQ](#)
[Have any Doubt ?](#)


Consider the following code segment:

 $c = b + a$
 $e = c - a$
 $f = c \times e$
 $h = c + a$
 $i = h + f$

The minimum number of temporary variable required to convert the above code segment to static single assignment form is _____.

4
[Correct Option](#)
Solution :
4



Minimum number of total variable required are 4.

QUESTION ANALYTICS

Q. 34

Solution Video

Have any Doubt ?



Consider an unsorted array contain elements 7, 12, 15, 35, 55, 60, 80, 90, 95. After applying quick sort portion algorithm one time, we get output as: 12, 7, 15, 35, 60, 55, 80, 95, 90
Then, the number element that could have been chosen as pivot, to generate the given output, for the given input, are _____.

3

Correct Option

Solution :

3

Since after portion algorithm, pivot is going to its correct place. So, the number of element at its correct position can be choose as pivot i.e. 15, 35, 80 are the only element.

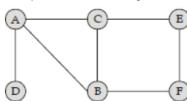
QUESTION ANALYTICS

Q. 35

Have any Doubt ?



The depth first search algorithm has been implemented using the stack data structure. Consider the given possible order of visiting the node of the following graph.



- I. A D E B C F E
III. B A C D F E

- II. A C E B F D
IV. B C E F A D

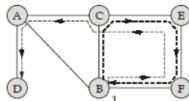
The number of the possible sequence for above graph is _____.

1

Correct Option

Solution :

1



∴ B C E F A D is correct depth first search order.

QUESTION ANALYTICS

Q. 36

Solution Video

Have any Doubt ?



What is the worst case time complexity to count pairs of numbers with difference 'K' from an input array of 'n' numbers?

A O(log n)

Correct Option

B O(n log n)

Solution :
(b)
Since given array may be unsorted so sorting array will take $O(n \log n)$. Now take one element and applied binary search to check difference between two number is 'K' or not. It will take $O(n \log n)$ more.
So total, $O(n \log n + n \log n) = O(n \log n)$

C $O(n)^2$

D $O(n^2 \log n)$

QUESTION ANALYTICS

Q. 37

Solution Video

Have any Doubt ?



Assume a new TCP connection starts by sending 1 segment, and then increases its congestion window by 1 segment each time it receives an acknowledgment i.e., after 1 RTT congestion window is 2 segments in slow start. What is the number of RTT's it takes to send 'n' segments?
(Assume connection never leaves slow start)

A $n+1$

B $\log_2(n+1)$

Correct Option

Solution :
(b)

Window size [WS = 1] initially
After 1 RTT, WS = 2, number of segments sent = 1
After 2 RTT's, WS = 4, number of segments sent = 3 (total)
After 3 RTT's, WS = 8, number of segments sent = 7 (total)
After 4 RTT's, WS = 16, number of segments sent = 15 (total)
:
 x RTT's \Rightarrow number of segments sent = $2^x - 1 = n$
 $2^x - 1 = n \Rightarrow x = \log_2(n + 1)$

C 2^{n+1}

D $2^{(n+1)}$

QUESTION ANALYTICS



Q. 38

Solution Video

Have any Doubt ?



Consider the following first order logic formulae, taking the domain to be the set of all real numbers.

- I. $\exists x \exists y (\neg \text{Rational}(x) \wedge \neg \text{Rational}(y) \wedge \text{Rational}(x \times y))$
II. $\exists x \exists y (\neg \text{Rational}(x) \wedge \neg \text{Rational}(y) \wedge \text{Rational}(x - y))$

Which of the above is/are true?

A I only

B II only

C Both I and II

Correct Option

Solution :
(c)

Let's see why I is true.

Take $x = \sqrt{2}$ and $y = \sqrt{2}$
Both are irrational.

Now, $x \times y = (\sqrt{2} \times \sqrt{2}) = (\sqrt{2})^2 = 2$

Which is rational. Thus, I is true.

Now for II, take $x = y = \sqrt{2}$

Now, $x - y = \sqrt{2} - \sqrt{2} = 0$

Which is again a rational number.

Hence both are true and option (c) is appropriate choice.

D None of these

QUESTION ANALYTICS



Q. 39

Solution Video

Have any Doubt ?



Consider a page size of 1 KB and that each page table entry take 4 bytes. If every page table fits into a single page then what is the number of levels required to map a 30-bit virtual address and the size of last level page table?

A 2 and 64 B

B 3 and 64 B

Correct Option

Solution :
(b)

$$\begin{aligned}
\text{Page size} &= 1 \text{ KB} = 2^{10} \text{ bytes} \\
\text{Page table entry} &= 4 \text{ B} = 2^2 \text{ bytes} \\
\text{1st level page table} &= \text{Number of page table entries} \times \text{Page table entry size} \\
&= \frac{2^{30}}{2^{10}} \times 2^2 \text{ bytes} \\
&= 2^{20} \times 2^2 = 2^{22} \text{ bytes} \\
\text{2nd level page table} &= \text{Number of page table entries} \times \text{Page table entry size} \\
&= \frac{2^{22}}{2^{10}} \times 2^2 \text{ bytes} \\
&= 2^{12} \times 2^2 = 2^{14} \text{ bytes} \\
\text{3rd level page table} &= \text{Number of page table entries} \times \text{Page table entry size} \\
&= \frac{2^{14}}{2^{10}} \times 2^2 \text{ bytes} \\
&= 2^4 \times 2^2 = 2^6 \text{ bytes}
\end{aligned}$$

Now page size = 3rd level size.

So 3 levels are required and the size of 3rd level is 64 bytes.

C 4 and 64 B

D 3 and 32 B

QUESTION ANALYTICS

+

Q. 40

Solution Video

Have any Doubt ?

Q

Consider the following relation:

$R(A B C D E F)$ with FD set of relation R. $\{A \rightarrow B, C \rightarrow D, E \rightarrow F\}$

What is the minimum number of relations required to decompose relation R into BCNF which satisfy lossless join and dependency preserving decomposition?

A 2

B 3

C 4

Correct Option

Solution :
(c)

$R(A B C D E F)$
 $\{A \rightarrow B, C \rightarrow D, E \rightarrow F\}$ candidate key $\{ACE\}$

$A \rightarrow B$
 $C \rightarrow D$
 $E \rightarrow F$

Partial dependencies

So decomposition $R_1(AB)$ $R_2(CD)$ $R_3(EF)$ and $R_4(ACE)$ lossless and dependency preserving decomposition for 2NF and every relation now also in BCNF.

D 5

QUESTION ANALYTICS

+

Item 31-40 of 65 « previous 1 2 3 4 5 6 7 next »



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Q. 41
[Solution Video](#)
[Have any Doubt ?](#)


Let $E = xy' + xyz' + x'yz'$ is a boolean expression, then consider the following:

- I. $xz' + E = E$
- II. $x + E \neq E$
- III. $z' + E \neq E$

Which of the following is correct?

 A I and II only

 B II and III only

 C I and III only

 D All I, II and III

Correct Option
Solution :

(d)

$$xy' + xyz' + x'yz' = xy' + yz' (x + x') \\ = xy' + yz'$$

Now,

- | | |
|----------------------------|------|
| I. $xz' + E = E$ | True |
| II. $x + E$ | |
| $x(1 + y' + z') + yz'$ | |
| $x + yz' \neq E$ | True |
| III. $z'(1 + x + y) + xy'$ | |
| $z' + xy' \neq E$ | True |

[QUESTION ANALYTICS](#)

Q. 42
[Solution Video](#)
[Have any Doubt ?](#)


Consider a host sending 3000 Byte datagram into a link that has MTU of 500 Byte. Assume the original datagram has identification number is 420. Assume 20 byte header, then which of the following is true?

 A 7 segments, last fragment = 100 Byte

Correct Option
Solution :

(a)

$$\begin{aligned} \text{Datagram size} &= 3000 \text{ Byte} \\ \text{Data} &= 3000 - 20 \text{ Byte} = 2980 \text{ Byte} \\ \text{MTU size} &= 500 \text{ Byte} \\ \text{Data can be send} &= 500 \text{ Byte} - 20 \text{ Byte} = 480 \text{ Byte} \\ \text{Number of fragments} &= \left\lceil \frac{2980}{480} \right\rceil = 7 \end{aligned}$$

Each fragment except last fragment can have 480 Byte data.
 So last fragment = $2980 - (6 \times 480) = 100 \text{ Byte}$

 B 6 fragments, last fragment = 120 Byte

 C 7 segments, last fragment = 140 Byte

 D 6 fragments, last fragment = 100 Byte

[QUESTION ANALYTICS](#)

Q. 43
[Solution Video](#)
[Have any Doubt ?](#)


Consider the following languages:

$L_1 = \{ \text{M} \mid \text{M is a DFA which doesn't accept any string containing an odd number of 1's} \}$

$L_2 = \{ \text{G} \mid \text{G is a CFG and } L(\text{G}) \text{ is infinite} \}$

Which of the above languages are recursive?

 A Only L_1
 B Only L_2
 C Both L_1 and L_2
Correct Option

Solution :

(c) Both the languages are decidable.

Let's see why I is decidable, by showing an algorithm to decide L_1 .

Let O be the language consisting of strings having an odd number of 1's.

So given a DFA M, we will find the intersection of M and O; if the resulting language is empty, we will say 'yes', else we'll simply say 'no'. Since we have an algorithm for L_1 , we can conclude that L_1 is decidable.

II is the well known infiniteness problem for CFGs, and falls under the category of decidable problems. Hence II is also recursive.

Therefore (c) is the correct option.

D None of these

QUESTION ANALYTICS



Q. 44

Solution Video

Have any Doubt ?



Match List-I (Dynamic algorithm) with List-II (Average case running time) and select the correct answer using the codes given below the lists:

List-I (Dynamic algorithm)

List-II (Average case running time)

- | | |
|--------------------------------|-------------|
| A. Matrix chain multiplication | 1. $O(mn)$ |
| B. Travelling salesman problem | 2. $O(n^3)$ |
| C. 0/1 Knapsack | 3. $O(n^n)$ |
| D. Fibonacci series | 4. $O(n)$ |

Codes:

- | | | | |
|-------------|---|---|---|
| A | B | C | D |
| (a) 1 3 2 4 | | | |
| (b) 1 3 3 2 | | | |
| (c) 2 3 3 2 | | | |
| (d) 2 3 1 4 | | | |

A a

B b

C c

D d

Correct Option

Solution :

(d)

- A. Matrix chain multiplication : (n^3)
- B. Travelling salesman problem : (n^n)
- C. 0/1 Knapsack : (mn)
- D. Fibonacci series : $O(n)$

QUESTION ANALYTICS



Q. 45

Have any Doubt ?



Consider the implementation of multiple stacks in single array S of size P from index 0 to $P - 1$. Size of each stack is Q. The following function PUSH (), used to push data x on to a particular stack i where T_i is used as top variable for stack i (i indicates stack number).

```
PUSH (S, P, Q, Ti, x)
{
    if (      A      )
    {
        printf ("stack overflow");
        exit (1);
    }
    else
        Ti++;
    S[Ti] = x;
}
```

Stack 0 stores elements from 0 to $Q - 1$, stack 1 stores from q to $2Q - 1$, and similarly other stack will store elements. Which of the following is the correct expression to replace A in the above function?

A $T_i == \left(\frac{P}{Q} \times i - 1 \right)$

B $T_i == \left(\frac{P}{Q} \times i + 1 \right)$

C $T_i == \left(\frac{P}{Q} \times (i - 1) - 1 \right)$

D $T_i == \left(\frac{P}{Q} \times (i + 1) - 1 \right)$

QUESTION ANALYTICS



Q. 46

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

Consider the following transactions:

$T_1 : r_1(x), r_1(z), r_1(y), w_1(z)$

$T_2 : r_2(z), r_2(x), r_2(y), w_2(x)$

Which of the statement is true about transactions T_1 and T_2 ?

S_1 : Every non-serial schedule between T_1 and T_2 are conflict serializable schedule.

S_2 : Some non-serial schedule between T_1 and T_2 is conflict serializable schedule.

S_3 : Some non-serial schedule between T_1 and T_2 forms deadlock using 2PL protocol.

S_4 : Some non-serial schedule between T_1 and T_2 is allowed using 2PL protocol.

A Only S_1 and S_4

B Only S_2 and S_4

C Only S_2 and S_3

D Only S_3

Correct Option

Solution :

(d)

- Since the schedules are non-serial, hence, every interleaving between T_1 and T_2 will lead to a dependency between them in the graph. Hence none of the schedule will be conflict serializable.

T_1	T_2
$S(z), S(x), S(y)$	$S(z), S(x), S(y)$
$r(x)$	$r(z)$
$r(z)$	$r(x)$
$r(y)$	$r(y)$
Exclusive lock on z not possible	Exclusive lock on x not possible
$w(z)$	$w(z)$

- No non-serial schedule between T_1 and T_2 is allowed under 2PL protocol. Because, both the transaction are reading on the data item, that is written by other transaction as a last operation.
- Even if we try for upgradation of the locks, that is also not possible because, other transaction has already locked that data item is shared mode.

QUESTION ANALYTICS



Q. 47

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

A certain processor executes the following set of machine instructions sequentially.

$MOV R_0, \# 0$

$MOV R_1, 100(R_0)$

$ADD R_1, 200(R_0)$

$MOV 100(R_0), R_1$

Assuming that memory location 100 contains the value 35 (Hex), and the memory location 200 contains the value A4 (Hex), what could be said about the final result?

A Memory location 100 contains value A4

B Memory location 100 contains value DA

C Memory location 100 contains value D9

Correct Option

Solution :

(c)

- $R_0 = 0$
- $R_1 = M[100] = 35$
- $R_1 = M[R_1] + M[200] = 35 + A4$
- $R_1 = D9$

So atleast memory location 100 contain D9.

D Memory location 200 contains value 35

QUESTION ANALYTICS



Q. 48

[Have any Doubt ?](#)

Consider the following production, along with the syntax directed definition:

$A \rightarrow QR$

$Q.in = f.(R.s) \parallel 1^{st} \text{ rule}$

$R.in = f.(A.s) \parallel 2^{nd} \text{ rule}$

Where .in and .s have their regular meaning i.e., inherited and synthesized attributes respectively.

Which of the following option is true?

A Syntax directed definition are L-attributed.

B Syntax directed definition is not L-attributed because of 2nd rule.

C Syntax directed definition is not L-attributed because of 1st rule.

Correct Option

Solution :

(c)

SDD is L-attributed iff:

The inherited attributes of Y_i in the production.

$X \rightarrow Y_1 Y_2 \dots Y_i Y_{i+1} \dots Y_j$

- Should only be derived from only attributes Y_1 to Y_{i-1} .

- Should only be derived from inherited attribute of X .

Hence in first production rule θ is being derived from synthesized attribute of A . Hence SDD is not L-attribute because of 1's rule.

D Syntax directed definition is not L-attributed because of both rule.

 QUESTION ANALYTICS



Q. 49

 Have any Doubt ?



Determine the rank of the matrix:

$$A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$$

A 3

B 2

Correct Option

Solution :

(b)

Given $A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$

$C_1 \rightarrow C_3 - C_1; \quad C_4 \rightarrow C_4 - C_1$

$$A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 0 & 0 \\ 3 & 1 & -3 & -1 \\ 1 & 1 & -3 & -1 \end{bmatrix}$$

$R_3 \rightarrow R_3 - R_1; \quad R_4 \rightarrow R_4 - R_1$

$$A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 0 & 0 \\ 3 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix}$$

$R_3 \rightarrow R_3 - 3R_2; \quad R_4 \rightarrow R_4 - R_2$

$$A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

$C_3 \rightarrow C_3 + 3C_2; \quad C_4 \rightarrow C_4 + C_2$

$$A = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

$\Rightarrow \delta(A) = 2$

C 4

D 1

 QUESTION ANALYTICS



Q. 50

 Have any Doubt ?



Consider the following C program segment:

```
struct node
{
    int value;
    struct node * left;
    struct node * right;
};

void find (node * root, int K)
{
    if (root == NULL || K < 0)
        return 0;
    if (K == 0)
        printf("%d", root -> value);
    else
    {
        find (root -> left, K - 1);
        find (root -> right, K - 1);
    }
}
```

What is the output of above C program when it runs on a root node of a binary tree?

A prints nodes at K distance from root node.

Solution :

a

The above program segment print the node value when it is at distance 'K' from root node otherwise it return '0', If length of binary tree from root node is less than 'K' then program return '0'.
Only when height is greater than 'K' the program prints the node value of distance 'K' from root node.

B print nodes of K^{th} level of binary tree.

C Both (a) and (b)

D None of these

 QUESTION ANALYTICS



Item 41-50 of 65 « previous 1 2 3 4 5 6 7 next »



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OVERALL ANALYSIS COMPARISON REPORT **SOLUTION REPORT**

ALL(65) CORRECT(0) INCORRECT(0) SKIPPED(65)

Q. 51

Solution Video

Have any Doubt ?



Consider the 3 context free grammars as shown below:

$$G_1: S \rightarrow aSc \mid \#T$$

$$T \rightarrow bTc \mid \#$$

$$G_2: S \rightarrow aaSc \mid \#T$$

$$T \rightarrow bTc \mid \#$$

$$G_3: S \rightarrow aSc \mid \#T$$

$$T \rightarrow bbTcc \mid \#$$

Which of the following is

A $L(G_1) \subseteq L(G_2), L(G_1) \subseteq L(G_3)$

B $L(G_1) \subseteq L(G_2), L(G_1) \supseteq L(G_3)$

C $L(G_1) \supseteq L(G_2), L(G_1) \subseteq L(G_3)$

D $L(G_1) \supseteq L(G_2), L(G_1) \supseteq L(G_3)$

Correct Option

Solution :

(d)

$$L(G_1) = \{a^m \# b^n \# c^{m+n} \mid m, n \geq 0\}$$

$$L(G_2) = \{a^{2m} \# b^n \# c^{2m+n} \mid m, n \geq 0\}$$

$$L(G_3) = \{a^m \# b^{2n} \# c^{m+2n} \mid m, n \geq 0\}$$

Clearly $L(G_1) \supseteq L(G_2)$; and $L(G_1) \supseteq L(G_3)$.

Hence option (d) is the answer.

QUESTION ANALYTICS



Q. 52

Solution Video

Have any Doubt ?



An 8-Bit DMA Device is operating in Cycle Stealing Mode (Single Transfer Mode). Each DMA cycle is of 6 clock states and DMA clock is 2 MHz. Intermediate CPU machine cycle takes 2 μ s, the DMA Data Transfer Rate is

A 100 Kbytes/sec

B 142.85 Kbytes/sec

Correct Option

Solution :

(b)

DMA Clock is 2 MHz \Rightarrow Each DMA Clock state is 0.5 μ s

Each DMA Cycle has 6 Clock States \Rightarrow Each DMA cycle is of 3 μ s

In Cycle Stealing 1 CPU and 1 DMA Cycles run alternately and the CPU Cycle takes 2 μ s.

Therefore, every $2 + 3 + 2 = 7 \mu$ s, 1 byte is transferred by DMA device.

$$\text{Data transfer rate} = \frac{1}{7} \times 10^6 \text{ Bytes/second} = 142.85 \text{ Kbytes/sec}$$

C 350.5 Kbytes/sec

D None of these

QUESTION ANALYTICS



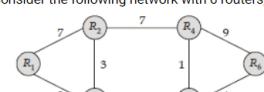
Q. 53

Solution Video

Have any Doubt ?



Consider the following network with 6 routers, R_1 to R_6 connected with links having weights as shown in the following diagram:



All the routers use the distance vector based routing algorithm to update their routing tables. Each router starts with its routing table initialized to contain an entry for each neighbour with the weight of the respective connecting link. After all the routing tables stabilize, Which of the following links of the network if goes down, does not cause count-to-infinity problem?

A R_1 to R_2 and R_2 to R_4

B R_2 to R_4 and R_4 to R_6

C R₁ to R₂ and R₄ to R₆

Correct Option

Solution :

(c)

If we prepare the routing tables for each of the six routers, we will get

R ₁	R ₂	R ₃	R ₄	R ₅	R ₆
R ₂ 6 R ₃	R ₁ 6 R ₃	R ₁ 3 -	R ₁ 13 R ₂	R ₁ 13 R ₃	R ₁ 17 R ₆
R ₃ 3 -	R ₃ 3 -	R ₂ 3 -	R ₂ 7 -	R ₂ 8 R ₂	R ₂ 12 R ₅
R ₄ 13 R ₃	R ₄ 7 -	R ₄ 10 R ₂	R ₃ 10 R ₂	R ₃ 10 -	R ₃ 14 R ₆
R ₅ 13 R ₃	R ₅ 8 R ₄	R ₅ 10 -	R ₅ 1 -	R ₄ 1 -	R ₄ 5 R ₅
R ₆ 17 R ₃	R ₆ 12 R ₄	R ₆ 14 R ₅	R ₆ 5 R ₅	R ₆ 4 -	R ₆ 4 -

So, it can be clearly visualize from all the routing table construction that we never use the direct path



D R₃ to R₅ and R₄ to R₆

QUESTION ANALYTICS

Q. 54

Solution Video

Have any Doubt ?



Let A and B be two sets, where A = {1, 2, 3, 4, ..., 2020}. Let X be the set of all possible one-one functions defined from B to A. Then the minimum size of B such that the size of X is maximized is equal to _____.

2019

Correct Option

Solution :
2019

$$\begin{aligned}X &= \text{Number of one-one functions from } B \text{ to } A \\&= 2020! p_m \text{ (assuming } m \text{ as the cardinality of } B) \\&= \frac{2020!}{(2020-m)!}\end{aligned}$$

In order to maximize the value of X, since numerator is constant, denominator must be kept minimum.

So the value of m (i.e. |B|) can be equal to 2020 or 2019. In both the cases, the size of X will be 2020!

Since the question asks for minimum size of B, therefore |B| will be 2019. So 2019 will be the answer.

QUESTION ANALYTICS

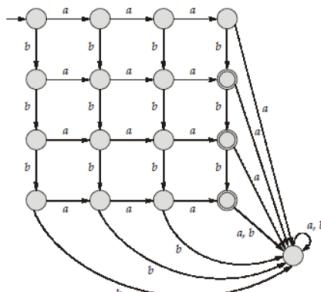
Q. 55

Solution Video

Have any Doubt ?



Consider the following DFA over {a, b}:



Let L(M) denote the language generated by the above DFA. Then the number of strings present in L(M) is equal to _____.

34

Correct Option

Solution :
34

$$L(M) = \{w \mid n_a(w) = 3, 1 \leq n_b(w) \leq 3\}$$

We need to find the number of strings satisfying the above condition.

So we can have the following cases.

Case I: $n_a(w) = 3; n_b(w) = 1$

Number of such strings = ${}^4C_3 = 4$

Case II: $n_a(w) = 3; n_b(w) = 2$

Number of such strings = ${}^5C_3 = 10$

Case III: $n_a(w) = 3; n_b(w) = 3$

Number of such strings = ${}^6C_3 = 20$

So, total = $|L(M)| = 4 + 10 + 20 = 34$

Hence 34 will be the answer.

QUESTION ANALYTICS

Q. 56

Solution Video

Have any Doubt ?



In TCP header, to make the initial sequence number a random number, most systems starts the counter at 1 during bootstrap and increments the counter by 64000 every 0.5 sec. How long does it take for the counter to wrap around _____ (Upto 2 decimal places)

33554.43 [33554.00 - 33555.00]

Correct Option

Solution :

33554.43 [33554.00 - 33555.00]

TCP sequence number is of 32 bits.

Thus, 2^{32} sequence number are possible.

Thus, number of increments of 64000 needed to exhaust 2^{32} sequence numbers is given as:

$$\frac{2^{32}}{64000} = 67108.864$$

Time taken = $67108.864 \times 0.5 = 33554.432$ sec

QUESTION ANALYTICS



Q. 57

Solution Video

Have any Doubt ?



Consider a system has following set of processes with arrival times and the CPU burst times given in milliseconds with their priority.

Process	Arrival Time	Burst Time	Priority
P ₁	0	5	0 (High)
P ₂	2	3	1
P ₃	1	3	5 (Low)
P ₄	4	1	4
P ₅	3	3	3

The average turn around time of these processes using non preemptive priority scheduling in _____ (msec). (Upto 1 decimal place)

8.2 [8.1 - 8.2]

Correct Option

Solution :

8.2 [8.1 - 8.2]

Gantt chart for priority scheduling is:

P ₁	P ₂	P ₃	P ₄	P ₅
0	5	8	11	12
				15

Process	Arrival Time	Burst Time	Priority	Completion Time	Turn Around Time
P ₁	0	5	0 (High)	5	5
P ₂	2	3	1	8	6
P ₃	1	3	5 (Low)	15	14
P ₄	4	1	4	12	8
P ₅	3	3	3	11	8

$$\text{Avg. TAT} = \frac{41}{5} = 8.2$$

QUESTION ANALYTICS



Q. 58

Solution Video

Have any Doubt ?



Consider two strings A = "12341" and B = "341213". Let y be the length of the longest common subsequence between A and B and let x be the number of such longest common subsequences between A and B. Then $x + 10y = _____$.

33

Correct Option

Solution :

33

A = 12341

B = 341213

LCS (A, B) = 123

(or) = 121

(or) = 341

x = length of LCS (A, B) = 3

y = # LCS (A, B) = 3

∴ x + 10y = 3 + 10 × 3 = 33

QUESTION ANALYTICS



Q. 59

Solution Video

Have any Doubt ?



Consider a computer system having 20 physical page frames numbered from 1 to 20 which are initially empty. Now, a program accesses the pages numbered 1, 2 100 twice. The number of page fault generated by optimal page replacement policy is _____.

180

Correct Option

Solution :

180

Using optimal page replacement policy:

Sequence : 1, 2, 3 20, 21, 22 100, 1, 2 100

(a) Initially, there is compulsory miss from page number 1 to 20.

(b) At 21, there will be a miss, which will be replaced by 20. Same process will go on till 100.

- (c) Now, page frame have content from 1 to 19 to 100.
 (d) Initially on second access, there will be hit from 1 to 19. Now on a 'miss' on '20', it will be replaced by '1' and so on.
 Hence total misses will be from [20 to 99]
 On 1st access → 0 to 100 → 100
 On 2nd access → 20 to 99 → 80
 Total page faults = 180

QUESTION ANALYTICS



Q. 60

Have any Doubt ?



number x is selected from first 100 natural numbers. The probability that x satisfies the condition $x + \frac{100}{x} > 50$ is _____ (Upto 2 decimal places)

0.55 [0.54 - 0.56]

Correct Option

Solution :

0.55 [0.54 - 0.56]

Total number of ways of selecting x is 100.

Now the given condition is $x + \frac{100}{x} > 50$, on analyzing, we see that this equation is satisfied for all

x such that $x \geq 48$ and also for $x = 1, 2$

So, favorable number of cases is 55.

Therefore, probability = $\frac{55}{100} = \frac{11}{20} = 0.55$

QUESTION ANALYTICS



Item 51-60 of 65 « previous 1 2 3 4 5 6 7 next »



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Q. 61
[Have any Doubt?](#)


Consider the following statements:

 S_1 : A key has to be inserted in a table of size ' n ' having already ' K ' items by using a hash function.

 The probability of hitting a free location in the first time is $\left(1 - \frac{K}{n}\right)$. Assume that the collisions are resolved using linear probing.

 S_2 : In hash function using linear probing to reduce collision, the number of probes required to insert an item is identical with number of probes needed to retrieve it. The number of statements correct are _____.

2

[Correct Option](#)
Solution :

2

Consider each statement:

 S_1 : Since, K items have already been inserted in the hash table. So, $\left(\frac{K}{n}\right)$ denotes that the key, hit a location out of ' K ' location, in which insertions have already been made.

Hence, for a free location:

$$\text{Probability} = \left[1 - \frac{K}{n}\right]$$

 S_2 : This is correct because in case of collision, key probes to the next free location and to retrieve also, offer not getting the element on its expected position, the key need to be searched further in the table.

QUESTION ANALYTICS

Q. 62
[Solution Video](#)
[Have any Doubt?](#)


A table 'Employee' with schema (Emp_no., Ename, Efloor, Eage), and another table 'Hobby' with schema (Emp_no., Hobby) contains records as shown below:

Table Employee			
Emp_no.	Ename	Efloor	Eage
1798	Rohit Kumar	7	55
2154	Rahul Verma	5	28
2369	Kuldeep	7	46
2581	Mukesh	6	52
2643	Dharamveer Singh	5	38
2711	Chetan Sharma	8	32
2872	Sushil Kumar	5	52
2926	Pradeep Choudhary	5	54
2959	Rakesh Sharma	7	48
3125	Vikas Singh	5	42

Hobby	
Emp_no.	Hobby
1798	Chess
1798	Music
2154	Music
2369	Swimming
2581	Cricket
2643	Chess
2643	Hockey
2711	Volleyball
2872	Football
2926	Cricket
2959	Photography
3125	Music
3125	Chess

The following SQL query is executed on the above tables:

```
Select Efloor
from Employee natural join Hobby
where Eage >= 35 and Emp_no. between 1797 and 3000;
Relations E and H with the same schema as those of these two tables respectively contain the
same information as tuples. A new relation E' is obtained by the following relational algebra operation:
E' = Π_Efloor ((σ_E.Emp_no. = H.Emp_no. ∧ (σ_E.Eage ≥ 35 and Emp_no. ≥ 1797 and Emp_no. ≤ 3000 (E)) × (H)))
```

The difference between the number of rows output by the SQL statement and the number of tuples in E is _____.

6

[Correct Option](#)
Solution :

6

SQL query will return the following output.

Emp_no.	Efloor
1798	7
1798	7 Duplicate Row is present in Hobby table
2369	7
2581	6
2643	5
2643	5 Duplicate Row is present in Hobby table
2872	5
2926	5
2959	7

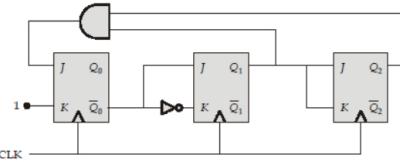
Total 9 rows are selected

In Relation Algebra, only distinct values of Efloor are selected i.e. 5,6,7.

Therefore SQL row count RA row count = 9 - 3 = 6.

QUESTION ANALYTICS


Consider the following digital circuit:



The number of clock cycles required to reach at 110 if initial stage is 110 _____

3

Correct Option

Solution :

3

The sequence generated is 110, 011, 100, 110.

So after 3 clock starting from 110 we will have 110 again.

QUESTION ANALYTICS

+

Consider the following grammar G and given statements:

 $S \rightarrow AB|d$ $A \rightarrow aA|b$ $B \rightarrow bB|c$

I. Grammar is only LL(1)

II. Grammar is CLR(1) but not SLR(1).

III. Grammar is SLR(1) and LR(0) both.

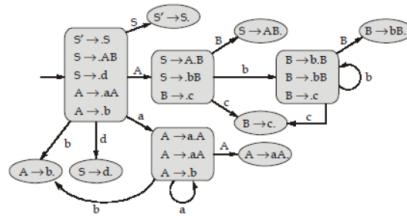
The number of correct statement(s) _____

1

Correct Option

Solution :

1

 $S \rightarrow AB|d \Rightarrow F_1(AB) \cap F_1(d) = \emptyset$ $A \rightarrow aA|b \Rightarrow F_1(aA) \cap F_1(b) = \emptyset$ $B \rightarrow bB|c \Rightarrow F_1(bB) \cap F_1(c) = \emptyset$ \Rightarrow Grammar looks like LL (1).

No conflicts in above DFA of LR(0) parser.

Hence, above grammar is LL(1), LR(0), SLR(1), LALR(1) and CLR(1).

Only statement I is correct.

QUESTION ANALYTICS

+

Consider a pipeline processor with 4 stages S_1 to S_4 . We want to execute the following loop: for

 $(i = 1; i < 500; i++) [I_1, I_2, I_3, I_4]$ Where the time taken (in ns) by instructions I_1 to I_4 for stages S_1 to S_4 are given below:

	S_1	S_2	S_3	S_4
I_1	1	2	1	2
I_2	2	1	2	1
I_3	1	1	2	1
I_4	2	1	2	1

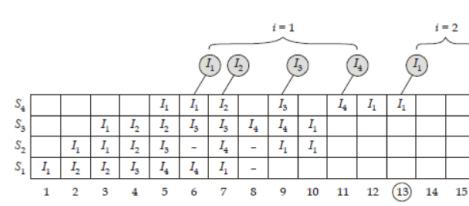
The output of I_1 for $i = 2$ will be available after _____ ns.

13

Correct Option

Solution :

13



Total time = 13 ns

