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**Memory Based Questions of
GATE 2020
Computer Science & IT**

Detailed Solutions

**Date of Exam : 08/02/2020
Afternoon Session**

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GENERAL APTITUDE

- Q.1** Raman is confident of speaking English ____ six months. He has been practicing regularly _____ the last three weeks
- (a) during, for (b) for, since
(c) within, for (d) for, in

Ans. (c)

- 'within' is a preposition that is used to express something that occurs inside a particular period of time.
- 'for' is used here because
 - (i) Sentence is in 'present perfect continuous tense'.
 - (ii) For is used when we talk about a period of time.

End of Solution

- Q.2** Select the word that fits the analogy

Cook : Cook :: Fly :

- (a) Fighter (b) Flew
(c) Flyer (d) Flying

Ans. (c)

Flyer: Relation is Verb : Noun

One who cooks is a cook and one who flies any aircraft is a flyer.

End of Solution

- Q.3** This knowledge of the subject was excellent but his class room performance was ____.

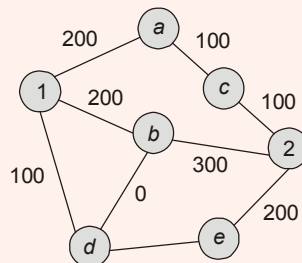
- (a) Extremely poor (b) Praise worthy
(c) Desirable (d) Good

Ans. (a)

'But' is used for introducing an idea which contrasts with the statement that has been already said.

End of Solution

- Q.4** Mode *a* and *e* are toll booths which costs 200 and all other toll both *b*, *c*, *d*, *f* costs only 100. Minimum cost for each from 1 to 2. (Path was given)



Ans. (*)

End of Solution

Q.5 Goods services tax (GST) in an indirect tax introduced in India in 2014 that is imposed on the supply of goods and services used and it subsumes all indirect taxes except few. It is a district based tax imposed on goods and services used it is not imposed at the point of origin from where goods come.

GST also has a few components specific to state government, central government and UTs? Which one of the following can be inferred from given passage?

- (a) GST includes all indirect taxes
- (b) GST is imposed on the product of goods and services
- (c) GST imposed at point of usage of goods and services
- (d) GST does not has a component specific for UT

Ans. (c)

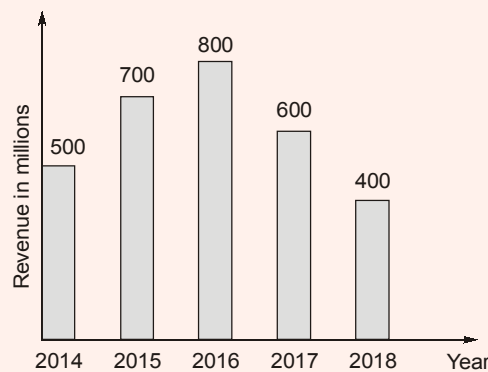
End of Solution

Q.6 If $P = 3$, $R = 27$, $T = 243$, then $Q + S =$
(a) 80 (b) 110
(c) 90 (d) 40

Ans. (c)

End of Solution

Q.7 The total revenue of a company during 2014-2018 is shown in bar graph. The total expenditure of the company in each year is 500 million rupees. The aggregate profit/loss percentage on the total expenditure of the company during 2014-2018 is _____.



Ans. (20% profit)

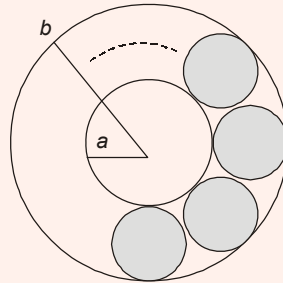
Total expenditure = 2500 million

Total revenue = 3000 million

So, $\text{profit \%} = \frac{500}{2500} \times 100 = 20\%$

End of Solution

- Q.8** The figure below shows an annular ring with outer inner radii b and a . The angular space between the inner and outer peripheries is shaded in blue. If maximum n number of circles can be placed touching the inner and outer peripheries then unpainted area available in angular space is _____.



- (a) $\pi \left[(b^2 - a^2) - n(b-a)^2 \right]$ (b) $\pi \left[(b^2 - a^2) - n \left(\frac{a}{2} \right)^2 \right]$
 (c) $\pi \left[(a^2 - b^2) - n \left(\frac{b}{2} \right)^2 \right]$ (d) $\pi \left[(b^2 - a^2) - n \left(\frac{b-a}{2} \right)^2 \right]$

Ans. (d)

The area of unpainted region will be $\pi \left[(b^2 - a^2) - n \left(\frac{b-a}{2} \right)^2 \right]$

End of Solution

- Q.9** The straight lines are drawn perpendicular to each other in XY plane. The angle α and β are acute angles made by line as with x-axis then $\alpha + \beta = ?$
 (a) 180° (b) 90°
 (c) 60° (d) 120°

Ans. (b)

End of Solution

COMPUTER SCIENCE

- Q.10** In a decoder with m input lines and n output lines, then 1 KB RAM is given and now find $(m + n)$.

Ans. (1034)

We need 2^{10} outputs to map 1 kB RAM.

For this we need 10×2^{10} decoder.

Here $m = 10$ and $n = 2^{10}$

$$m + n = 1034$$

End of Solution

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Q.11 Given main memory with single level paging main memory access time 100 ns TLB access time 20 ns. TLB hit ratio 95% page fault rate 10% and when there is page fault in 20% cases it uses write back and retrieve page from secondary memory with 5000 ns access time calculate average access time? With upto 1 decimal place.

Ans. (*)

End of Solution

Q.12 Consider the following statements:

- I. Daisy chain uses priorities for selecting devices.
- II. When there is vectored interrupt then polling is used for getting address.
- III. Polling processor uses periodically checks status bit to check if interrupt needs to process.
- IV. DMA access processor and DMA controller can simultaneously access at the same time.

- (a) I and II only
- (b) I and III only
- (c) I, II and IV only
- (d) I, and IV only

Ans. (b)

End of Solution

Q.13 A non-pipeline processor having 2.5 GHz clock frequency. Where each instruction takes 5 cycles and when this processor utilize with a same 5 stage pipeline having 2 GHz clock frequency and 30% are memory instruction 60% are ALU instruction and remaining are branch instruction. Given that 5% memory instruction take 50 stall cycles and 50% branch instruction takes 2 cycles then what will be the speed up when pipeline processor is used over non-pipeline processor _____.

Ans. (2.16)

Non-pipeline:

$$\text{Clock frequency} = 2.5 \text{ GHz}$$

$$\text{Cycle time} = \frac{1}{2.5 \text{ GHz}} = 0.4 \text{ ns}$$

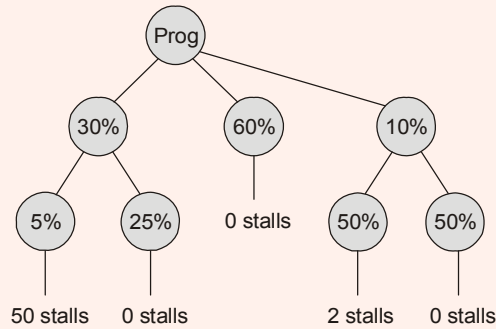
$$\text{CPI} = 5$$

$$\begin{aligned} \text{So, } ET_{\text{non-pipe}} &= \text{CPI} \times \text{Cycle time} \\ &= 5 \times 0.4 \text{ ns} = 2 \text{ ns} \end{aligned}$$

Pipeline:

$$\text{Clock frequency} = 2 \text{ GHz}$$

$$\text{Cycle time} = \frac{1}{2 \text{ GHz}} = 0.5 \text{ ns}$$



Number of stalls/instruction = 0.85

Average instruction $ET_{pipe} = (1 + \text{Number of stalls/instruction}) \times \text{Cycle time}$
 $= (1 + 0.85) \times 0.5 \text{ ns} = 0.925 \text{ ns}$

$$S = \frac{ET_{non-pipe}}{ET_{pipe}} = \frac{2}{0.925} = 2.16$$

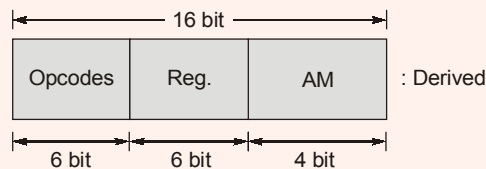
End of Solution

Q.14 A 16-bit instruction having two type of instruction i.e. R-type and I-type where 16-bit instruction supports 64 registers set. Now I-type of instruction has 1 register field and 4-bit immediate field. R-type instruction supports 2 register address field and given that there are 8 different I-type instruction then how many different R-type of instruction are possible _____.

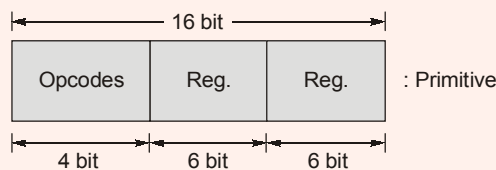
Ans. (14)

Given, 16 bit instruction and 64 registers

I type:

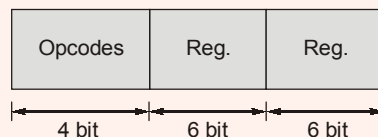


R type:



1. Primitive instruction

R-type:



2. Number of operation possible = $2^4 = 16$

3. Number of tree opcodes = $(16 - x)$

Assume x is number of R-type instruction existed.

$$4. \text{ Number of I-type instruction possible} = (16 - x) \times 2^2$$

$$8 = 64 - 4x$$

$$4x = 64 - 8 = 56$$

$$x = \frac{56}{4} \Rightarrow 14$$

End of Solution

Q.15 The number of permutations of the characters LILAC if no characters appears in its original position if two Ls are indistinguishable is _____.

Ans. (12)

Number of derangement.

Since both L's are indistinguishable.

First L's can be arranged remaining 3 positions in 3C_2 ways.

[i.e., L or L or L]

For each of these cases remaining 3 letters can be deranged in $2 \times 2!$ ways = 4 ways

[i.e., L C can take only 1 or 3 positions $\rightarrow 2$ ways. For each of this IA can be arranged in remaining 2 positions in 2 ways].

Number of derangements = ${}^3C_2 \times 2 \times 2! = 12$

End of Solution

Q.16 $A = \{1, 2, 3\}$. What is the probability of getting reflexive relation on A. By choosing any relation randomly.

Ans. (0.125)

$$A = \{1, 2, 3\}$$

$$\text{Number of relations on } A = 2^{3^2} = 2^9$$

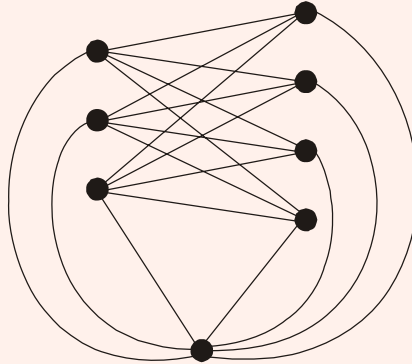
$$\text{Number of reflexive relations on } A = 2^{3^2-3} = 2^6$$

$$P[\text{reflexive}] = \frac{2^6}{2^9} = \frac{1}{8}$$

End of Solution

Q.17 A graph G $K_{3,4}$ is given. Suppose, a vertex 'S' is added which is adjacent to every vertex in $K_{3,4}$ then the minimum number of edge-color required _____.

Ans. (7)



Minimum number of edge-colors required = 3 + 4 = 7.

End of Solution

Q.18 Rank(M) is rank of matrix M and $\det(M)$ is determinant of matrix M then

1. Rank(AB) = Rank(A) · Rank(B)
2. $\det(AB) = \det(A) \cdot \det(B)$
3. Rank(A + B) ≤ Rank(A) + Rank(B)
4. $\det(A + B) \leq \det(A) + \det(B)$

Which of above statement is correct?

- | | |
|-------------|-------------|
| (a) 2 and 3 | (b) 3 and 4 |
| (c) 1 and 2 | (d) 1 and 4 |

Ans. (a)

Statement 2 and 3 are correct statements directly based on properties of matrices.

End of Solution

Q.19 A group with 35 elements has subgroups. The maximum size of the proper subgroup is _____.

Ans. (7)

$$\text{Size of group} = O(G) = 35$$

Let H be subgroup of G

$$\therefore O(H) | O(G)$$

Possible orders of H are 1, 5, 7, 35

Size of largest possible proper subgroup = 7.

End of Solution

Q.20 Which of the following is not valid?

- (a) $\exists x (p(x) \rightarrow w) \equiv \forall x p(x) \rightarrow w$
- (b) $\forall x (p(x) \rightarrow w) \equiv \forall x p(x) \rightarrow w$
- (c) $\exists x (p(x) \wedge w) \equiv \exists x p(x) \wedge w$
- (d) $\forall x (p(x) \vee w) \equiv \forall x p(x) \vee w$

Ans. (b)

$\forall x (p(x) \rightarrow w) \equiv \forall x p(x) \rightarrow w$ is wrong

Since $\forall x [p(x) \rightarrow w]$

$$\equiv \forall x [\neg p(x) \vee w]$$

$$\equiv \forall x (\neg p(x) \vee w)$$

$$\equiv \neg(\exists x p(x)) \vee w$$

$$\equiv \exists x p(x) \rightarrow w$$

End of Solution

Q.21 Given vertex set $(v_1, v_2, v_3, \dots, v_{100})$, the edge weight is $|v_i - v_j|$ where $i \leq i \leq j \leq 100$ then the weight of minimum spanning tree is _____.

Ans. (99)

End of Solution

Q.22 $T(n) = T(n^{1/a}) + 1$, $T(b) = 1$ find $T(n)$

(a) $\theta(\log_b \log_a n)$

(b) $\theta(\log_a \log_b n)$

(c) $\theta(\log_{ab} n)$

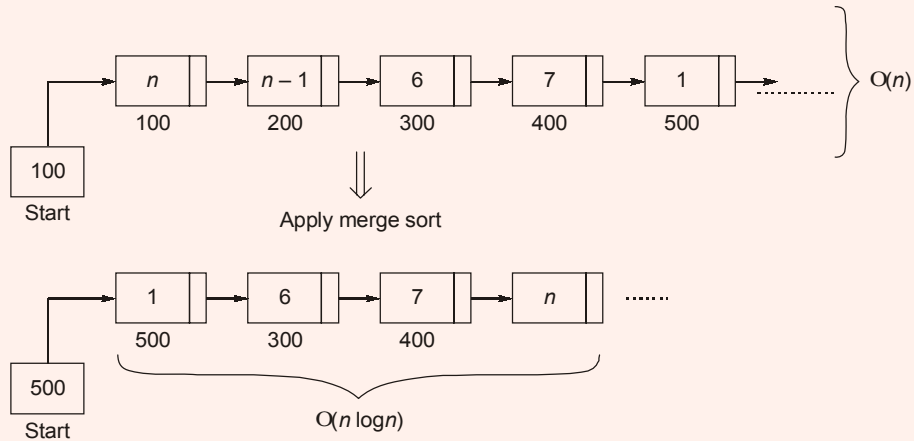
(d) $\theta(\log_2 n)$

Ans. (a)

End of Solution

- Q.23** What is the worst case time complexity of inserting n elements in empty linked list in the sorted order?
 (a) n (b) $n \log n$
 (c) n^2 (d) $n^2 \log n$

Ans. (b)
 Insert element at the beginning of linked list, take $O(1)$



End of Solution

- Q.24** In the AVL tree n elements are there what is the time complexity of inserting other n^2 elements?
 (a) n^2 (b) $O(n^2 \log n)$
 (c) $O(n)$ (d) $O(n \log n)$

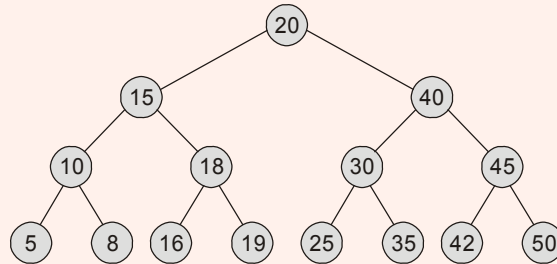
Ans. (b)
 AVL with n elements: [height balanced $[-1, 0, +1]$ BST]
 $\log n$ level due to balanced BST.
 (i) Every insertion of element:
 $\log n$: Find place to insert.
 $\log n$: If property not satisfied do rotation.
 $\therefore n^2$ element insertion:
 For 1 element $\equiv 2 \log n$
 So, for n^2 elements $\equiv O(n^2 \log n)$

End of Solution

Q.25 There are n elements in the balanced binary search tree. What is the time complexity to report the k elements in the range $[a, b]$?

- (a) $O(\log n + k)$ (b) $O(k \log n)$
(c) $O(k)$ (d) $O(kn)$

Ans. (a)



Let $a = 16, b = 42$

16: Find the '16' element in the BST = $O(\log n)$

42: Find the '42' element in the BST = $O(\log n)$

[16, 42]: Inorder sorted element between 16 to 42

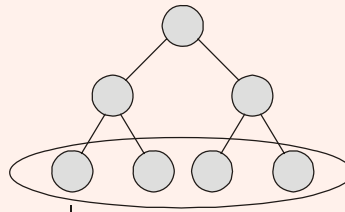
{16, 18, 19, 20, 25, 30, 35, 40, 42} \Rightarrow requires $O(k)$ time for k element

So total time: $O(2 \log n + k) \equiv O(\log n + k)$

End of Solution

Q.26 Binary min-heap has 1023 element. Find the number of comparisons required to find the maximum element?

Ans. (511)



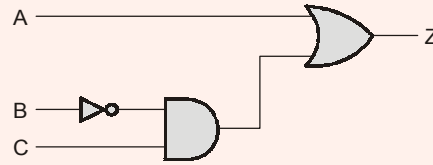
Maximum element at leaf level

$$\text{Number of element} = \left\lceil \frac{1023}{2} \right\rceil = 512$$

No apply bubble sort requires 511 comparisons.

End of Solution

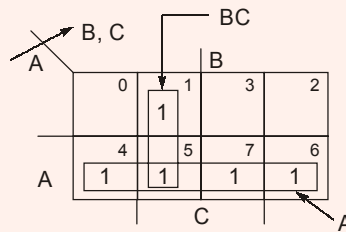
Q.27 Let A, B, C be the inputs which give output Z as shown in below figure. The minterms required to represent the output function Z(A, B, C) is _____.



- (a) $\sum m(1, 3, 5, 6, 7)$ (b) $\sum m(1, 4, 5, 6, 7)$
(c) $\sum m(1, 2, 3, 6, 7)$ (d) $\sum m(4, 5, 6, 7)$

Ans. (b)

$\therefore Z(A, B, C) = A + \bar{B}C$
K-map of the output Z is



$\therefore Z(A, B, C) = \sum m(1, 4, 5, 6, 7)$

End of Solution

Q.28 You are given accumulator and memory of 32 registers in between then there is a multiplexer the number of select lines in multiplexer.

Ans. (5)

Number of registers = $n = 32$
Required multiplexer size is $n : 1$ i.e. $32 : 1$
No of select lines required to the multiplexer = m
 $\therefore m = \log_2 n$
 $m = \log_2 32$
 $m = 5$

End of Solution

Q.29

Catalog		
sno	pno	cost
S ₁	P ₁	50
S ₁	P ₂	50
S ₁	P ₃	100
S ₂	P ₄	200
S ₂	P ₅	250
S ₃	P ₁	250
S ₃	P ₂	150
S ₃	P ₅	300
S ₄	P ₄	250

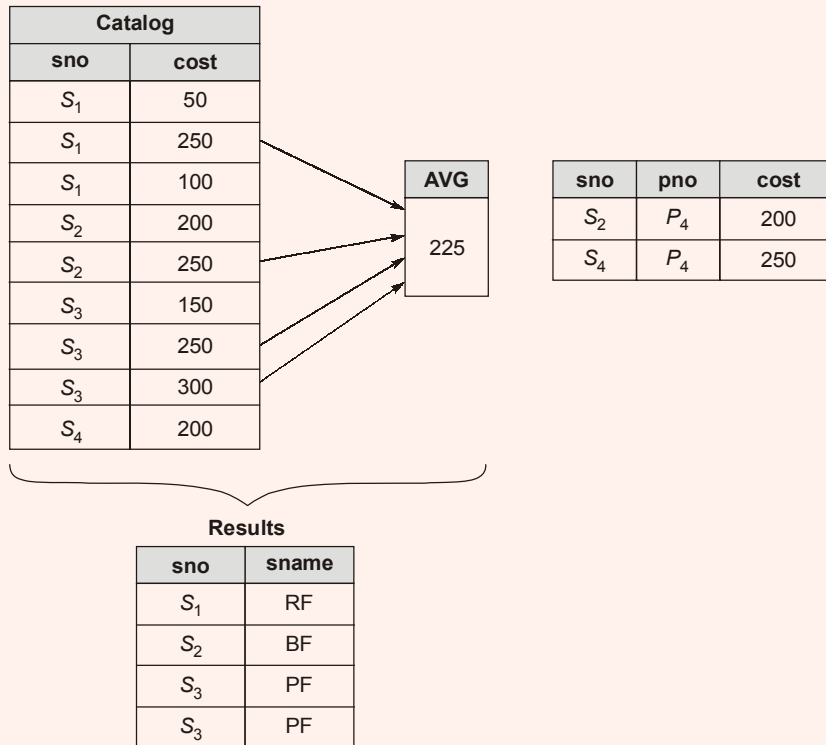
Supplies		
sno	sname	location
S ₁	RF	Delhi
S ₂	BF	Bangalore
S ₃	PF	Chennai

```
SELECT S.sno, S.sname
FROM Supplier S, catalog C
WHERE S.sno = C.sno AND
      cost > (SELECT AVG (cost)
              FROM Catalog
              WHERE pno = 'P4' GroupBy pno);
```

Number of rows returns by above query _____.

Ans. (4)

```
SELECT S.sno, S.sname
FROM Supplier S, catalog C
WHERE S.sno = C.sno AND
      cost > (SELECT AVG (cost)
              FROM Catalog
              WHERE pno = 'P4' GroupBy pno);
```



∴ 4 rows in table.

End of Solution

- Q.30** Given relation is in 3NF but not in BCNF
- (a) because for non-trivial FD $x \rightarrow A$, with x is not super key and A is prime attribute.
 - (b) because for non-trivial FD $x \rightarrow A$, with x is not super key and A is not prime attribute, x is not proper subset of key.
 - (c) because for non-trivial FD $x \rightarrow A$ with x is not super key and A is not prime attribute, x is proper subset of key.
 - (d) None of these

Ans. (a)

R(A, B, C, D, E)

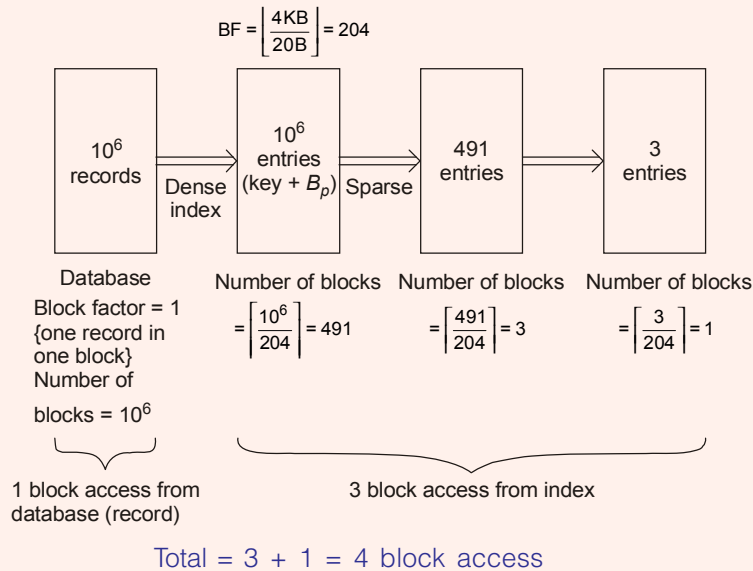
Key: ABC, BCD

FD: $\underbrace{BC}_x \rightarrow \underbrace{D}_A$: 'x' is not super key and 'A' is prime attribute.

End of Solution

Q.31 For a database we are using B+ tree indexing with 1 million records in database, each record fits in one block. Block size is 8 KB and search key size is 12 bytes, block pointer size is 8 bytes. Minimum number of block access required for database record is _____.

Ans. (4)

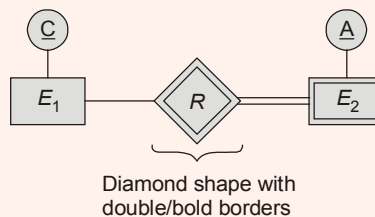


End of Solution

Q.32 Which of the following many-to-one roles of weak-entity set in an ER diagram?

- (a) Oval shape with double/bold borders
- (b) Diamond shape with double/bold borders
- (c) Rectangular shape with double bold/borders
- (d) Oval shape with identifier underlined

Ans. (b)



End of Solution

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Q.33 TCP connection maximum segment size = 2 KB is starting at $t = 0$ and threshold is 32 KB and calculate sender window size at $(t + 60 \text{ ms})$ where $(\text{RTT} = 6 \text{ ms})$ given 50 KB as maximum segment.

Ans. (44)

End of Solution

Q.34 A web page has some text and 4 small size images, used non-persistent HTTP connection, then the number of HTTP connection required _____.

Ans. (5)

In non persistent HTTP for every objects there is a TCP connection required.
Hence 1 TCP connection for text and 4 TCP connections for images required.

End of Solution

Q.35 $L_1 = \{wxyx \mid w, x, y \in (0 + 1)^+\}$
 $L_2 = \{xy \mid x, y, \in (a + b)^*, |x| = |y|, x \neq y\}$
 (a) L_1 is not regular but L_2 is CFL (b) L_1 is CFL and L_2 is not CFL
 (c) L_1 and L_2 are not CFL (d) L_1 is regular and L_2 is CFL

Ans. (d)

L_1 is regular and L_2 is CFL.

In L_1 putting x as 0 and 1 we get a subset

$$w0y0 + w1y1 = (0 + 1)^+ 0 (0 + 1)^+ 0 + (0 + 1)^+ 1(0 + 1)^+ 1$$

Now by putting x as 00, 01, 10, 11 we can show that above minimal regular expression covers all such things and hence above expression is not a subset but is equal to given language.

Since we wrote regular expression for L_1 , it is regular.

End of Solution

Q.36 $S \rightarrow aSB \mid d$
 $B \rightarrow b$
 "aaadb" which using bottom up parser, how many step required?

Ans. (7)

$S \rightarrow aSB$
 $\rightarrow aaSBB$ [$S \rightarrow aSB$]
 $\rightarrow aaaSBBB$ [$S \rightarrow aSB$]
 $\rightarrow aaadBBB$ [$S \rightarrow d$]
 $\rightarrow aaadbBB$ [$B \rightarrow b$]
 $\rightarrow aaadbbB$ [$B \rightarrow b$]
 $\rightarrow aaadbbb$ [$B \rightarrow b$]

Total 7 steps required.

End of Solution

- Q.37** Which of the following regular expression will contain set of all binary strings containing odd number of 1's?
- (a) $1 0^* (0^* 1 0^* 1 0^*)^*$ (b) $0^* (0^* 1 0^* 1 0^*)^* 1 0^*$
(c) $(0^* 1 0^* 1 0^*)^* 0^* 1$ (d) $((0 + 1)^* 1 + (0 + 1)^*) 1 0^*$

Ans. (b)

Try to find counter example to show expression incomplete.

- (a) is incorrect because it forces the string to start with "1" and hence cannot generate a string like "01", which has odd number of ones.
(c) is incorrect because it force to end with "1" and hence cannot generate "10".
(d) is same as $(0 + 1)^* 1 0^*$ which will generate some wrong strings like "110" which has even number of 1's. It is a superset and hence not correct.
(b) is same as $(0^* 1 0^* 1 0^*)^* 1 0^*$ which is correct.

End of Solution

- Q.38** Given $L = \{a^n \mid n \geq 0\} \cup \{a^n b^n \mid n \geq 0\}$. Tell us where L is
- (a) DCFL (b) Non-DCFL
(c) Context-free language (d) CFL but not DCFL

Ans. (a)

$\{a^n b^n \mid n \geq 0\}$ is a well known DCFL.

$\{a^n \mid n \geq 0\}$ is a well known regular language.

So, $L = \text{DCFL} \cup \text{Regular} = \text{DCFL}$ by closure properly
DCFL is the strongest correct answer.

End of Solution

- Q.39** Given four languages, which of the following are undecidable?
Where $\langle M \rangle$ denotes encoding of a Turing Machine M
- $L_1 = \{\langle M \rangle \mid L(M) = \phi\}$
 $L_2 = \{\langle M \rangle \mid L(M) \text{ is non recursive}\}$
 $L_3 = \{\langle M, w, q \rangle \mid M \text{ will visit the state } q \text{ when } M \text{ execute on } w \text{ and take exactly 100 steps}\}$
 $L_4 = \{\langle M \rangle \mid L(M) \text{ accept strings where strings length is atleast 20}\}$
- Which one of the following are/in undecidable?
- (a) L_1 and L_2 (b) L_2 and L_3
(c) L_1 and L_4 (d) L_1, L_2 and L_3

Ans. (d)

- (i) $L(M) = \phi$ is emptiness problem of TM, which is undecidable, by Rice's theorem since it is a non-trivial problem.
(ii) $L(M) = \text{non-recursive}$ is also non-trivial question, since some TM can accept non-recursive language and some may not, so by Rice's theorem it is undecidable.
(iii) Rice's theorem applied and hence L_3 is undecidable.
(iv) With UTM we can check if M accept string by 100 steps. So L_4 decidable
 L_1, L_2 and L_3 are undecidable.

End of Solution

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Q.40 Which of the following is true?

- I. If $L_1 \cup L_2$ is regular, then both L_1 and L_2 must be regular.
 - II. The class of regular language is closed under infinite union.
- (a) I only (b) Both I and II
(c) II only (d) Neither I nor II

Ans. (d)

- I is false, since $\{a^n b^n\} \cup \{a^n b^n\} = \Sigma^*$ which is regular, but $\{a^n b^n\}$ not regular.
- II is false, since may infinite language can be broken into individual strings which will be infinite union of finite languages. So if regular is closed under infinite union, then all infinite language will become regular, which is untrue. So II is also false.

End of Solution

Q.41 The number of states in a minimal DFA accepting all strings on $\{a, b\}^*$ with number of a's multiple of 2 but not multiple of 3 is _____.

Ans. (6)

$$L = \{w \in \{a, b\}^* \mid n_a(w) = \text{multiple of 2 but not 3}\}$$

Let,

$$L_1 = \{w \in \{a, b\}^* \mid n_a(w) = \text{multiple of 2}\}$$

$$L_2 = \{w \in \{a, b\}^* \mid n_a(w) = \text{multiple of 3}\}$$

Given language is $L_1 - L_2 = L_1 \cap L_2^c$

We can make a DFA for L_1 with 2 states.

We can make a DFA for L_2^c with 3 states.

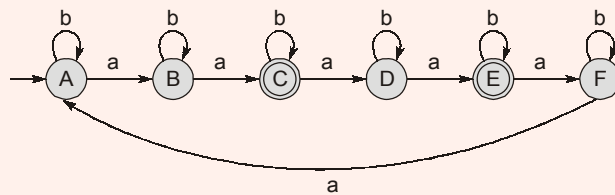
Then use product automata construction to get a DFA for $L_1 - L_2 = L_1 \cap L_2^c$ with 6 states.

Since neither of the L_1 or L_2^c has a trap state, so resulting product automata also has no trap state.

So, min DFA has 6 states.

Alternate solution:

We can directly design DFA for multiple of 2 but not 3 with 6 states as shown below with 6 states by accepting 2a's, 4a's but not 6a's in trap.

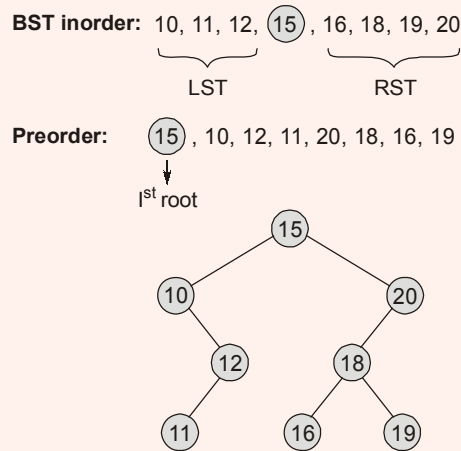


End of Solution

Q.42 Preorder of a binary search tree is 15, 10, 12, 11, 20, 18, 16, 19. Then what would be its postorder.

- (a) 11, 12, 10, 16, 19, 18, 20, 15 (b) 12, 10, 16, 19, 18, 20, 15, 11
- (c) 15, 16, 12, 19, 11, 18, 20, 15 (d) 15, 20, 10, 16, 19, 18, 11, 12

Ans. (a)



Postorder: 11, 12, 10, 16, 19, 18, 20, 15

End of Solution

Q.43 Consider the codes given below:

```

fun 1 (int n)
{
    static int i = 0;
    if(n > 0)
    {
        i++;
        fun1(n - 1);
    }
    return (i);
}

fun2 (int n)
{
    static int i = 0;
    if(n > 0)
    {
        i = i + fun1(n);
        fun2(n - 1);
    }
    return i;
}
  
```

What the program will return when fun2(5) is called _____

Ans. (55)

End of Solution

Q.44 Consider the C program:

```
Arr [4] [5] = {{1, 2, 3, 4, 5}
               {6, 7, 8, 9, 10}
               {11, 12, 13, 14, 15}
               {16, 17, 18, 19, 20}}
printf("%d", *(a + **a) + 3)
```

The output of the above C program is _____.

Ans. (19)

End of Solution

Q.45 Consider to semaphore a and b whose initial values are 1 and 0 respectively. Count is the shared variable which is not used in code section P:

Code section P

```
wait (a);
if (count == n); signal(b);
signal(a); wait(b); signal(b);
```

Code section Q

What does this code achieve?

- (a) At any time there will be 2 processes in Q.
- (b) All process will run P and then enter into Q.
- (c) $(n - 1)$ process will run P and then Q.
- (d) All process run P in mutual exclusive manner.

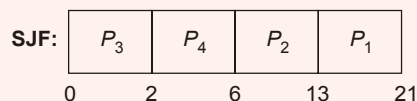
Ans. (a)

End of Solution

Q.46 Assume all the processes arrive at time 0. Find the absolute difference between average Turn Around Time (TAT) in SJF and Round Robin if time quantum 4 ns

Process	Burst time (ns)
P_1	8
P_2	7
P_3	2
P_4	4

Ans. (5.25)



Turn Around Time (TAT) = $(21 - 0) + (13 - 0) + (2 - 0) + (6 - 0)$

$$\text{Average TAT} = \frac{42}{4} = 10.5$$

RR:

P_1	P_2	P_3	P_4	P_1	P_2	
0	4	8	10	14	18	21

$$\begin{aligned} \text{Turn Around Time (TAT)} &= (18 - 0) + (21 - 0) + (10 - 0) + (14 - 0) \\ &= 18 + 21 + 10 + 14 \end{aligned}$$

$$\text{Average TAT} = \frac{63}{4} = 15.75$$

$$\begin{aligned} \text{Hence, } | \text{SJF (TAT)} - \text{RR(TAT)} | \\ = | 10.5 - 15.75 | = 5.25 \end{aligned}$$

End of Solution

Q.47 Consider the following state changes for a preemptive scheduling OS:

- I. Ready to running
 - II. Running to ready
 - III. Blocked to running
 - IV. Blocked to ready
- Which of the above statement
- (a) I and II only
 - (b) I only
 - (c) I and III only
 - (d) I, II and IV only

Ans. (d)

End of Solution

Q.48 A new process needs to be allocated memory. The size of process cannot be exactly fit in available holes. If memory is allocated to any of the available holes, then a new smaller hole will be created. Which of the following option is correct in this context?

- (a) The size of hole created using best fit is never greater than size created by first fit
- (b) The size of hole created using best fit is never greater than size created by next fit
- (c) The size of hole created using next fit is never greater than size created by first fit
- (d) The size of hole created using worst fit is never greater than size created by first fit

Ans. (a)

End of Solution

Q.49 Which of the following statements are TRUE?

- 1. Symbol table is accessed only during lexical analysis and syntax analysis.
 - 2. Compilers for programming L that support recursion necessarily need heap storage for memory allocation in the runtime environment.
 - 3. Errors violating the condition any variable must be declared before its use are detected during syntax analysis.
- (a) None of 1, 2, 3
 - (b) 1 and 3
 - (c) 2 only
 - (d) 1 only

Ans. (a)

End of Solution

Q.50 Consider $A \rightarrow PQ$, $A \rightarrow XY$ are production of a grammar P, Q, X, Y, A are non-terminals, s is synthesized attribute, i is inherited attribute

Rule 1: $P . i = A . i + 2$, $Q . i = P . i + A . i$, $A . s = P . s + Q . s$

Rule 2: $X . i = A . i + Y . s$ and $Y . i = X . s + A . i$

Which of the following is TRUE?

- (a) Only Rule 1 is L attributed
- (b) Rule 1 and Rule 2 are L attributed
- (c) Neither Rule 1 Nor Rule 2
- (d) Only Rule 2 is L attributed

Ans. (a)

End of Solution

