



Kunal Jha

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OVERALL ANALYSIS

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SOLUTION REPORT

ALL(17)

CORRECT(7)

INCORRECT(6)

SKIPPED(4)

Q. 1

FAQ

Have any Doubt ?



Consider the following defined in C program.

int **fun (int**);

What does the above definition means:

A A function accepting pointer to pointer to an int and returns pointer to pointer to an int.

Correct Option

Solution :

(a)

- int indicates an integer variable.
- int * indicates a pointer to an integer variable.
- int ** indicate a pointer to pointer to an integer variable.

B A function accepting pointer to pointer to an int and returns pointer to an int.**C** A function accepting pointer to an int and returns pointer to pointer to an int**D** None of the above

QUESTION ANALYTICS



Q. 2

FAQ

Have any Doubt ?



A multi-dimensional array a[X][Y][Z] is same as

A $*(\ast(\ast(a + X) + Y) + Z)$

Your answer is Correct

Solution :

(a)

Multi-dimensional arrays are indexed in the order of highest to lowest. Here a[X] and $\ast(a + X)$ refer to the same "plane". Pointer arithmetic is done internally by the compiler the way it is suggested in the answers.

B $*(\ast(\ast(a + Z) + Y) + X)$ **C** $*(\ast(\ast(a + X + Y)) + Z)$ **D** None of these

QUESTION ANALYTICS



Q. 3

FAQ

Have any Doubt ?

Express the return value of fun2() in terms of a and b .

```
int fun1(int x, int y)
{
    if (x == 0) return 0;
    return (y + fun1(x - 1, y));
}
int fun2(int a, int b)
{
    if (a == 0) return 1;
    return fun1(fun2(a - 1, b), b);
}
```

A a^b **B** $a + a^b$ **C** $a^a b$ **D** b^a

Correct Option

Solution :

(d)

The function multiplies b to itself ' a ' times which is b^a .

Q. 4

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

Consider the following C program:

```
int fun (int n)
{
    static int i;
    if (n != 1)
    {
        n = n/2;
        i = i + 1;
        fun(n);
    }
    else
        return i;
}
```

What does fun(n) compute?

A Number of digits in n

Your answer is Wrong

B Integer part of logarithm of n base 2

Correct Option

Solution :

(b) The function computes the integer part of logarithm of n to the base 2.

C Function always return 0

D $n/2$

Q. 5

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

What happens if

```
main( )
{
    main( );
}
```

is executed.

A Compile time error

B The program will run forever and has to be manually terminated.

C The stack would overflow and eventually the program will be killed by the operating system.

Correct Option

Solution :

(c) It executes until there is overflow in the call stack.

D main() executes only once.

Q. 6

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

Consider the following statements:

I. In a function, at most 1 return statements is possible.

II. A pointer can be used to point function.

III. Assigning a value to an array elements whose index exceeds the size of the array then program may crash if some important data gets overwritten.

The number of the correct statements is/are _____.

2

Your answer is Correct2

Solution :

2

- II and III are correct statements.
- I is incorrect as, in a function there is no restriction to the number of returns statements in a program.

Q. 7

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

Consider the following C program:

```
#include <stdio.h>
int main()
int temp = 1;
temp += temp * temp << 2 + 3;
printf("%d", temp);
return 0;
}
```

The output of the above program is _____.

33

Correct Option

Solution :

33
The precedence order * > + > >>
Therefore, temp = temp +((temp * temp) << (2 + 3))
 = 1 + ((1 * 1) << 5)
 = 1 + 32 = 33

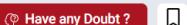


Your Answer is 64

QUESTION ANALYTICS



Q. 8

? FAQ  

Which of the four assignment(s) is/are illegal after the following declaration?
int A[10], B[20], *C;

A A = B;

Your option is Correct

B B = A;

Your option is Correct

C A = C;

Your option is Correct

D C = A;

YOUR ANSWER - a,b,c

CORRECT ANSWER - a,b,c

STATUS - 

Solution :

(a, b, c)

Only legal declaration is option (d) and all other are illegal.

QUESTION ANALYTICS



Q. 9

? FAQ  

Which of the following is/are legal name of a C variable?

A _123var

Your option is Correct

B 123_var

C var_123

Your option is Correct

D var123_

Your option is Correct

YOUR ANSWER - a,c,d

CORRECT ANSWER - a,c,d

STATUS - 

Solution :

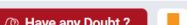
(a, c, d)

Only option (b) cannot be the legal name for a C-variable since variable name cannot starts from numbers.

QUESTION ANALYTICS



Q. 10

? FAQ  

What will be the output of the following program?

```
#include <stdio.h>
void demo( );
int main( )
{
    void (*fun)( );
    fun = demo;
    (*fun) ();
    fun();
    return 0;
}
```

```
'  
void demo( )  
{  
    printf("India");  
}
```

A India

B India India

Correct Option

Solution :

(b)
This is a simple program with function pointers. Fun is assigned to point to demo. So, the two statements "(x fun 1); " and "fun(); " mean the same thing.

C India India India

D Compilation error

QUESTION ANALYTICS



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Q. 11
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Let S be a stack of size $n \geq 1$. Initially the stack is empty. Suppose we push the first n natural numbers in sequence and then perform n pop operations. Assume that push and pop operations take X minutes each and Y minutes elapse between the end of one such stack operation and the start of the next operation. For $m \geq 1$, define the stack-life of m as the time elapsed from the end of push(m) to the start of the pop operation that removes m from s . The average stack life of an element of this stack is

A $n(X + Y) - X$

 Your answer is **Correct**
Solution :

(a) Take $n = 1$. So it means that only 1 is pushed into the stack.

So, time to push = X minutes.

Now before 1 gets popped, another Y minutes will be elapsed as it is given that, the time between any two successive operations is Y minutes.

So, time at this instant (before 1 gets popped out) = $X + Y$ minutes.

Now in the options, put $n = 1$.

- Option (b) becomes, $X + Y \rightarrow$ Wrong
- Option (c) becomes, $Y + 2X \rightarrow$ Wrong
- Option (d) becomes, $4Y + 2X \rightarrow$ Wrong
- Option (a) becomes, $X + Y - X \rightarrow$ Correct

B $n(X + Y)$

C $Y + 2X$

D $4Y + 2X$

QUESTION ANALYTICS


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


Consider the following C functions:

```
void f(int m, int n)
{
    while (m ≤ n)
    {
        m++;
        n--;
    }
}
```

A function $f(54, 136)$ is called. How many times the comparison ($m \leq n$) is performed?

A 189

B 53

C 48

D 42

 Your answer is **Correct**
Solution :

(d)

Number of times the comparison is performed = # f times loop executed +1.

Let x denote the # f times loop executed

$$136 - x = 54 + x$$

$$K = 41$$

So, the required comparison = $41 + 1 = 42$.

QUESTION ANALYTICS


Q. 13
[FAQ](#) [Have any Doubt?](#)


Assume the following C variable declaration:

```
int *A[10], B[10][10];
```

Consider the following expressions:

- | | |
|-----------|-------------|
| I. A[2] | II. A[2][1] |
| III. B[1] | IV. B[2][0] |

Among the above expressions, which will not give compile time errors if used as left hand sides of assignment statements in a C program?

A I, II and IV only

 Your answer is **Correct**

Solution :

- (a) • I is valid, assigning value to pointer A[2].
- II is valid, possible due to array styled indexing of pointer.
- IV is valid, simple assignment to 2-dimensional array.

B II, III and IV only**C** I, III and IV only**D** IV only

QUESTION ANALYTICS



Q. 14

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

Consider a 2 dimensional array $A[0 \dots 39, 0 \dots 39]$ in lower triangular matrix representation. The size of each element in the array is 1 byte. If the array is implemented in the memory in the form of row major order and base address of the array is 500. The address of $A[16][9]$ will be _____

645

Correct Option

Solution :

645

Let array be $A[lb_1 \dots ub_1][lb_2 \dots ub_2]$ Then $\text{loc}[i][j]$ of an element in lower triangular matrix in row major order is

$$\text{loc}[i][j] = \text{Base address} + \left[\frac{(i - lb_1) \times (i - lb_1 + 1)}{2} + (j - lb_2) \right] \times \text{Data type size}$$

For lower triangular matrix row major order.

$$\begin{aligned} \text{loc}(A[16][9]) &= 500 + \left[\frac{(16 - 0)(16 - 0 + 1)}{2} + (9 - 0) \right] \times 1 \\ &= 500 + \frac{16 \times 17}{2} + 9 = 645 \end{aligned}$$

Your Answer is 628

QUESTION ANALYTICS



Q. 15

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

Consider the following C function:

```
void f(int m)
{
    while (m != 0)
    {
        if (!(m & 1))
            printf("hello");
        m = m >> 1;
    }
}
```

The number of times `printf("hello")` statement is executed, when 2048 is passed to the function `f()` _____.**11**

Correct Option

Solution :

11

The above function prints "hello" as many times as the number of zeros in the binary representation of n . $2048 = 2^{11} = 10 \dots 0 (zero 11 times) thus 11 times hello is printed by the above function.$

Your Answer is 6

QUESTION ANALYTICS



Q. 16

[FAQ](#)[Have any Doubt ?](#)Assume that a and b are int variables and x is a float variable holding the values 3, 6 and 4.5 respectively. Which of the following conditions is/are false?**A** $(a * b > x * x)$

Your option is Correct

B $(a * b > (\text{int})x * x)$

Correct Option

C $(a * b > (\text{int})(x * x))$

Your option is Correct

D $(a * b > (\text{int})x * (\text{int})x)$

YOUR ANSWER - a,c

CORRECT ANSWER - a,b,c

STATUS -

Solution :
(a, b, c)

QUESTION ANALYTICS

+

Q. 17

? FAQ

Have any Doubt ?

Q

Which of the following condition(s) is/are not equivalent to the condition $(!(x \geq y) \&\& (y \geq z))$?

A $(!(x \geq z))$

Your option is Correct

B $(x \leq z)$

Your option is Correct

C $((x < y) \&\& (y < z))$

Correct Option

D $((x < y) \mid\mid (y < z))$

YOUR ANSWER - a,b

CORRECT ANSWER - a,b,c

STATUS - ✘

Solution :
(a, b, c)

QUESTION ANALYTICS

+

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ALL(17) CORRECT(3) INCORRECT(9) SKIPPED(5)

Q. 1

Have any Doubt?



Preorder Traversal of a BST is 5, 4, 3, 2, 10, 9, 12. What will be the postorder traversal of the tree?

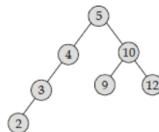
- A 2, 3, 4, 5, 9, 10, 12
- B 2, 3, 4, 10, 12, 9, 5
- C 2, 3, 4, 9, 12, 10, 5

Correct Option

Solution:

(c)

Since its given that tree is BST, then its inorder will be 2, 3, 4, 5, 9, 10, 12. So, tree can be uniquely constructed as



- D Can not be determined

QUESTION ANALYTICS



Q. 2

FAQ Have any Doubt?



This function SumElements finds the sum of all the elements in the binary tree. Which of the following completes the code, i.e., filled in the blanks.

```

Struct BTnode {
    Struct BTnode *left;
    Struct BTnode *right;
    int value;
};

int SumElements (Struct BTnode *root)
{
    if(root == NULL)
        return 0;
    else
        return _____
}
  
```

- A root → value = Sum Elements (root → left)
- B root → value = Sum Elements (root → right)
- C root → value + = Sum Elements (root → left) + Sum Elements (root → right)

Correct Option

Solution:

(c)

Need to add recursively, left subtree sum, right subtree sum and add value of correct node.

- D root → value + = Sum Elements (root → right)

QUESTION ANALYTICS



Q. 3

FAQ Have any Doubt?



Following is C like pseudo code of a function that takes a stack S and an element 'e', determine the status of the stack S passed after the call to hello () .

```

void hello (Stack S, int e)
{
    Stack tmp; // stack creates a temporary empty stack
    while (!S.isEmpty())
        /* is empty check whether stack is empty or not and return 1 if it is empty */
        tmp.push (S.pop())
    S.push (e);
    S=tmp;
}
  
```

- A S will remain same

B S will contain only e

Your answer is Wrong

C S will contain e followed by previous elements of stack in same order

D S will contain previous elements of stack in reverse order

Correct Option

Solution :

(d)

QUESTION ANALYTICS

Q. 4

? FAQ

Have any Doubt ?



Consider the following pseudo C program:

```
struct point {
    int X, Y;
};

typedef struct point P;
struct plist {
    P pt;
    struct plist *next;
};

```

Struct Ptlist *head;

head is a pointer to the head of a linked list of points that is built. How do you access the member X of the head node of the list?

A head → Pt → X

B head → Pt.X

Correct Option

Solution :

(b)

A pointer to a structure lets access to the member variables using “`→`” operator and a normal variable lets access Hooligan the “`.`” operator.

C Both (a) and (b)

Your answer is Wrong

D None of these

QUESTION ANALYTICS

Q. 5

? FAQ

Have any Doubt ?



Assume that the operators `+`, `-`, `×` are left associative and `^` is right associative. The order of precedence (from highest to lowest) is `^ > × > + > -`. Find the postfix expression corresponding to the infix expression:

`a + b × c - d ^ e ^ f`

A abc × + def ^ ^ -

Your answer is Correct

Solution :

(a)

Putting rounding braces based on precedence and associativity can be given by
`((a + (b × c)) - (d ^ (e ^ f)))`

Hence postfix expressions will be given by abc × + def ^ ^ -.

B abc × + de ^ f ^ -

C ab + c × d - e ^ f ^

D - + a × bc ^ ^ def

QUESTION ANALYTICS

Q. 6

? FAQ

Have any Doubt ?



Consider the following statements:

- I. Minimum number of nodes in AVL tree of height h is 2^h .
- II. Maximum number of nodes in AVL tree of height h is $2 \cdot 2^h - 1$.

The number of correct statements is/are _____.

1

Correct Option

Solution :

1

Minimum number of nodes in AVL of height h

$$N(h) = N(h-1) + N(h-2) + 1$$

Maximum ($h = 1$)

$$\text{Diagram: A binary tree with root } 1 \text{ having children } 2 \text{ and } 3. \text{ Node } 2 \text{ has child } 4. \text{ Node } 3 \text{ has child } 5. \text{ Node } 4 \text{ has child } 6.$$

$$= 2^{h+1} - 1 = 2^2 - 1 = 3$$

Your Answer is 2

QUESTION ANALYTICS

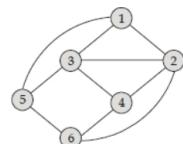


Q. 7

? FAQ Have any Doubt ?



Consider the following graph:



Consider the following traversing sequence of nodes:

- I. 1 2 3 4 5 6
- II. 1 3 5 6 4 2
- III. 3 2 1 5 6 4
- IV. 5 1 6 2 4 3

How many of the above sequence corresponds to the depth first search for the graph is _____.

2

Your answer is Correct

Solution :

2

- Depth first search uses stack.
- Only II and III are correct as traversing must be in LIFO order.
- I and IV does not maintain LIFO order and not traversing neighbouring unvisited node.

QUESTION ANALYTICS



Q. 8

? FAQ Have any Doubt ?



Which of the following is/are false?

- A To say whether an element x does not exist, in worst case in AVL tree is $O(n)$. Correct Option
- B To find smallest element in worst case, in BST is $O(\log n)$ Correct Option
- C To insert an element in BST, takes $O(n \log n)$ in worst case. Your option is Correct
- D To find an element, in Binary tree it takes $O(\log n)$ in worst case. Your option is Correct

YOUR ANSWER - c,d

CORRECT ANSWER - a,b,c,d

STATUS -

Solution :

(a, b, c, d)

QUESTION ANALYTICS



Q. 9

? FAQ Have any Doubt ?



Which of the following is/are dynamic data structure?

- A Linked list Your option is Correct
- B Stack Your option is Correct
- C Array Your answer is Wrong
- D Binary tree Correct Option

YOUR ANSWER - a,b,c

CORRECT ANSWER - a,b,d

STATUS -

Solution :

(a, b, d)

Except array all other data structures are dynamic i.e., the size of those can increase or decrease at run time.

QUESTION ANALYTICS





A node in a linked list is defined as:

```
struct node {
    int data;
    struct node *next;
}
List has elements 4 → 5 → 3 → 2 → 1 → 2
The following function is executed.
Void print (struct node *head, int flag)
{
    while(head!=NULL)
    {
        if (flag)
            head = head → next;
        printf("% d/t", head → data);
    }
    else
        printf("% d/t", head → data);
    head = head → data;
}
return;
```

Variables head stores the pointer to the head of the list. What is the output of print (head, 1)?

A 5 3 1

B 5 3 2 1 2

Your answer is Correct

C 5 2 2

D 4 5 3 2 1 2

QUESTION ANALYTICS





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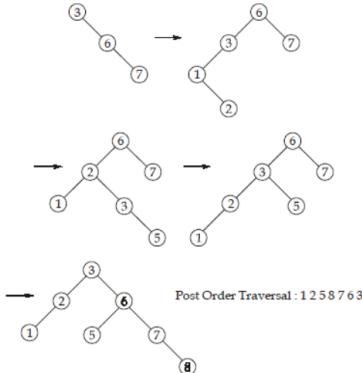
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Q. 11
[FAQ](#) [Have any Doubt ?](#)


AVL tree is constructed by inserting the keys 3, 6, 7, 1, 2, 5, 8 in the given order. (Assume the tree is initially empty). Then the post order traversal of the above binary tree will be

A 1 2 5 8 7 6 3

[Correct Option](#)
Solution :

 (a)
 After inserting, the tree will be as follows:

B 1 2 3 5 6 7 8

C 3 2 6 1 5 8 7

D 3 6 7 1 2 5 8

[QUESTION ANALYTICS](#)

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


Consider the following bubble sort function:

```
bubble sort (A, n)
{
    for i ← 1 to n
        do for j ← n down to i + 1
            do it (X) then exchange A[j] ↔ A[j - 1]
}
```

What is the missing statement at X if the bubble sort function is to be implemented correctly to sort the elements in the ascending order?

A A[J] < A[J - 1]

[Correct Option](#)
Solution :

 (a)
 If A[J] is smaller than A[J - 1] then exchange A[J] and A[J - 1] to get the smaller first.

B A[J] > A[J - 1]

C A[J] ≠ A[J - 1]

D A[J] = A[J - 1]

[QUESTION ANALYTICS](#)

Q. 13
[FAQ](#) [Have any Doubt ?](#)

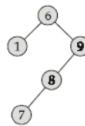

Consider the following function h(), to which the pointer to the root node of a binary tree shown below is passed.

```
#define max(a, b) (a > b)? a : b
Note that max(a, b) is defined by the above declaration.
int h (Node *root)
{
    if (!root) return -1;
    if (root → left && !root → right)
        return 1 + h (root → left);
```

```

        if (!root->left && root->right)
            return 1 + h(root->right);
        return 1 + max(h(root->left), h(root->right));
    }

```



The output obtained when the root of the tree given below is passed to the above function is

- A 1
- B 2
- C 3
- D None of these

Correct Option

Solution :

(d)

- The output will be -1. The reason is the expansion of $\max(a, b)$.
- There is a problem as we need another set of Parenthesis like below
 $((a > b) ? a : b)$
- In the absence of the brackets, the conditional operation $:>$ has lower precedence than '+', so first the comparison between a and b (left height and right height) will be done and then + will be evaluated before ?, leading to a different result than expected, and it can be verified that the program will output -1 for the given input.

QUESTION ANALYTICS



Q. 14

? FAQ Have any Doubt ?



Consider the following statements:

- I. In BST, the time taken to find a non-existent element ' x ' in the best case is $O(1)$.
 - II. In AVL, the time taken to find a non-existent element ' x ' in the best case is $O(\log n)$.
 - III. In binary tree, the time taken to find a non-existent element ' x ' in the best case is $O(n)$.
 - IV. In Minheap Tree, the time taken to find a non-existent element in the best case is $O(1)$.
- The number of correct statements is/are _____.

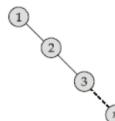
- 4

Correct Option

Solution :

4

- In BST, time taken to find non-existent element in best case is $O(1)$.
For consider a BST as,



If we tries to find element 0, we only need one comparison to figure out that it will not be in BST.
Hence only $O(1)$ time.
So, statement '1' is true.
Statement '2' is true since AVL tree is balanced BST which can't have skew structure.
Statements '3' is also true, since in binary tree we need to check all the nodes.
Statements '4' is also true, if the value of non existential element is smaller than root node itself.

Your Answer is 2

QUESTION ANALYTICS



Q. 15

? FAQ Have any Doubt ?



Let X be the maximum possible height of a binary search tree with 33 nodes. Let Y be the maximum possible height of an AVL tree with 36 nodes. Assume root is at height 0, then value of $[X - Y]$ is _____.

- 26

Correct Option

Solution :

26

- $X = (33 - 1) = 32$ (skew tree)
- For Y, use the recurrent relation

$$\begin{aligned} N(h) &= N(h-1) + N(h-2) + 1; h \geq 2 \\ &= 1; \text{ if } h = 0 \\ &= 2; \text{ if } h = 1 \\ N(2) &= N(1) + N(0) + 1 \\ &= 2 + 1 + 1 = 4 \\ N(3) &= N(2) + N(1) + 1 \\ &= 7 + 4 + 1 = 12 \\ N(5) &= N(4) + N(3) + 1 \\ &= 12 + 7 + 1 = 20 \end{aligned}$$

$$\begin{aligned}
 N(6) &= N(5) + N(4) + 1 \\
 &= 20 + 12 + 1 = 33 \\
 \text{So,} \quad \bullet \quad \text{Then} \quad Y &= 6 \\
 X - Y &= 32 - 6 = 26
 \end{aligned}$$

Your Answer is 3

QUESTION ANALYTICS

Q. 16

? FAQ

Have any Doubt?



Which of the following data structures can be used by recursion directly? (Choose all the correct options)

A Stack

Your option is Correct

B Queue

Your answer is Wrong

C Array

Your answer is Wrong

D Tree

YOUR ANSWER - a,b,c

CORRECT ANSWER - a

STATUS - ✘

Solution :

(a)

Only stack can fulfill the requirement of recursion.

QUESTION ANALYTICS

Q. 17

? FAQ

Have any Doubt?



Select the correct statement(s). Binary search trees (regardless of the order in which the values are inserted into the tree):

A Always have multiple links per node.

Correct Option

B Can be sorted efficiently.

Your option is Correct

C Always have the same shape for a particular set of data.

D Are non linear data structures.

Your option is Correct

YOUR ANSWER - b,d

CORRECT ANSWER - a,b,d

STATUS - ✘

Solution :

(a, b, d)

Binary search trees can have different shape for a particular set of data. Specifically, the shape of the binary search trees depends upon the sequence of elements inserted and not on data sets.

QUESTION ANALYTICS



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

Q. 1

? FAQ Have any Doubt?



Predict output of following program:

```
int main()
{
    int i;
    int arr[5] = {1};
    for (i = 0; i < 5; i++)
        printf("%d", arr[i]);
    return 0;
}
```

A 1 followed by four garbage values

B 1 0 0 0 0

Correct Option

C 1 1 1 1 1

D 0 0 0 0 0

QUESTION ANALYTICS



Q. 2

? FAQ Have any Doubt?



Predict output of the following program:

```
int main()
{
    int a[ ][ ] = {{1, 2}, {3, 4}};
    int i, j;
    for (i = 0; i < 2; i++)
        for (j = 0; j < 2; j++)
            printf("%d ", a[i][j]);
    return 0;
}
```

A 1 2 3 4

B Compiler Error in line " int a[][] = {{1, 2}, {3, 4}};"

Correct Option

C 4 garbage values

D 4 3 2 1

QUESTION ANALYTICS



Q. 3

? FAQ Have any Doubt?



Convert the following infix expression into its equivalent post fix expression
 $(A + B^D) / (E - F) + G$

A ABD^A + EF - / G+

Correct Option

Solution :

$$\begin{aligned}
 (a) \quad (A + B^D) / (E - F) + G &= (A + B^D)(E - F) / + G \\
 &= (A + B^D)(E - F) / G+ \\
 &= A + BD^A(E - F) / G+ \\
 &= ABD^A + EF - / G+
 \end{aligned}$$

So, option (a) is correct.

B ABD + ^EF - / G+

C ABD + ^EF / - G+

D ABD^ + EF / - G+

QUESTION ANALYTICS

Q. 4

? FAQ

Have any Doubt ?



A Priority-Queue is implemented as a Max-Heap. Initially, it has 5 elements. The level-order traversal of the heap is given below:

10, 8, 5, 3, 2

Two new elements "1" and "7" are inserted in the heap in that order. The level-order traversal of the heap after the insertion of the elements is:

A 10, 8, 7, 5, 3, 2, 1

B 10, 8, 7, 2, 3, 1, 5

C 10, 8, 7, 1, 2, 3, 5

D 10, 8, 7, 3, 2, 1, 5

Correct Option

QUESTION ANALYTICS

Q. 5

? FAQ

Have any Doubt ?



Give the visited node order for Breadth First Search, starting with s, given the following adjacency lists:

lists:

adj(s) = [a, c, d],

adj(a) = [],

adj(c) = [e, b],

adj(b) = [d],

adj(d) = [c],

adj(e) = [s].

A s a c d e b

Correct Option

B s a c e b d

C s c a e b d

D None of the above

QUESTION ANALYTICS

Q. 6

? FAQ

Have any Doubt ?



What will be the output of the following C code?

```
#include<stdio.h>
main()
{
    int n, i;
    n = f(6);
    printf("%d", n);
}
f(int x)
{
    if(x == 2)
        return 2;
    else
    {
        printf("+");
        f(x - 1);
    }
}
```

A +++++2

Correct Option

Solution :

(a)

When x = 6: '+' is printed.

When x = 5: '+' is printed.

When x = 4: '+' is printed.

When x = 3: '+' is printed.

When x = 2: 2 is printed.

Hence the output is: +++++2

B +++++2

C +++++

D 2

Q. 7

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

How many times is 'a' printed when the following C code is executed?

```
#include<stdio.h>
main()
{
    int a;
    a = f1(10);
    printf("%d", a);
}
f1(int b)
{
    if(b == 0)
        return 0;
    else
    {
        printf("a");
        f1(b--);
    }
}
```

 A 9 times B 10 times C 0 times D Infinite number of times

Correct Option

Solution :

(d)

Although we have specified the exit condition, the code above results in an infinite loop because we have used b⁻-(decrement operator) to call the recursive function. Due to this, the loop goes on infinitely. However, if we had used f1(b - 1) instead, the answer would have been 10 times.

Q. 8

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

The five items A, B, C, D and E are pushed in a stack, one after other starting from A. The stack is popped four items and each element is inserted in a queue. The two elements are deleted from the queue and pushed back on the stack. Now one item is popped from the stack. The popped item is

 A A B B C C D D

Correct Option

Q. 9

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

What will be the output of the following C code?

```
#include<stdio.h>
main()
{
    int n;
    n = f1(4);
    printf("%d", n);
}
f1(int x)
{
    int b;
    if(x == 1)
        return 1;
    else
        b = x*f1(x - 1);
    return b;
}
```

24

Correct Option

Solution :

24

The above code returns the factorial of a given number using the method of recursion. The given

Q. 10

? FAQ

Have any Doubt ?



For 8 keys and 6 slots in a hashing table with uniform hashing and chaining, what is the expected number of items that hash to a particular location _____. (Exactly upto 2 decimal places)

1.33 [1.30 - 1.35]

Correct Option

Solution :

1.33 [1.30 - 1.35]

Probability that key 1 ends up in slot x = 1/6

Probability that key 2 ends up in slot x = 1/6

Probability that key 3 ends up in slot x = 1/6

Probability that key 4 ends up in slot x = 1/6

Probability that key 5 ends up in slot x = 1/6

Probability that key 6 ends up in slot x = 1/6

Expected number of items that hash to a particular location = 8/6



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Q. 11

FAQ

Have any Doubt ?



How many queues are needed to implement a stack?



2

Correct Option

Solution :

2

Algorithm:

1. For Push operation
 - (a) Enqueue element to queue 1.
 2. For Pop operation
 - (a) Dequeue all the elements from queue 1 to queue 2 except last element. This last element is the one that needs to be popped. Pop it.
 - (b) Swap the names of queue1 and queue 2. (or swap the contents from queue 1 to queue 2).

QUESTION ANALYTICS



Q. 12

FAQ

Have any Doubt ?



How many distinct binary search trees can be created out of 4 distinct keys?



14

Correct Option

QUESTION ANALYTICS



Q. 13

FAQ

Have any Doubt ?



Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree.

The binary search tree uses the usual ordering on natural numbers. What would be the last element in the in-order traversal sequence of the resultant tree?



9

Correct Option

Solution :

9

In-order traversal of a BST gives elements in increasing order.

QUESTION ANALYTICS



Q. 14

Have any Doubt ?



Which of these is/are an application of linked list?

 A To implement file systems

Correct Option

 B For separate chaining in hash-tables

Correct Option

 C To implement non-binary trees

Correct Option

 D Random Access of elements

YOUR ANSWER - NA

CORRECT ANSWER - a,b,c

STATUS - SKIPPED

Solution :

(a, b, c)

To implement file system, for separate chaining in hash-tables and to implement non-binary trees linked lists are used. Elements are accessed sequentially in linked list. Random access of elements is not an applications of linked list.

QUESTION ANALYTICS



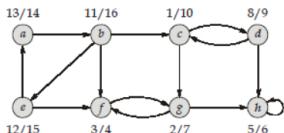
Q. 15

FAQ

Have any Doubt ?



In the following graph, discovery time stamps and finishing time stamps of Depth First Search (DFS) are shown as x/y , where x is discovery time stamp and y is finishing time stamp.



It shows which of the following is/are depth first forest?

A {a, b, e} {c, d, f, g, h}

Correct Option

B {a, b, e} {c, d, h} {f, g}

C {a, b, e} {f, g} {c, d} {h}

D {a, b, c, d} {e, f, g} {h}

YOUR ANSWER - NA

CORRECT ANSWER - a

STATUS - SKIPPED

Solution :

QUESTION ANALYTICS

+

Q. 16

FAQ

Have any Doubt ?

Bookmark

Given the following input (4322, 1334, 1471, 9679, 1989, 6171, 6173, 4199) and the hash function $x \bmod 10$, which of the following statement(s) is/are true?

A 9679, 1989, 4199 hash to the same value

Correct Option

B 1471, 6171 has to the same value

Correct Option

C All elements hash to the same value

D Each element hashes to a different value

YOUR ANSWER - NA

CORRECT ANSWER - a,b

STATUS - SKIPPED

Solution :

(a, b)

Index hash value 9679, 1989 and 4199 has same hash value and 1471 and 6171 has the same hash value as a and 1 respectively.

QUESTION ANALYTICS

+

Q. 17

FAQ

Have any Doubt ?

Bookmark

```
#include <stdio.h>
int main( )
{
    int a[5] = {1, 2, 3, 4, 5};
    int *ptr = (int*)(&a + 1);
    printf("%d %d", *(a + 1), *(ptr - 1));
    return 0;
}
```

A 2 5

Correct Option

Solution :

(a)

The program prints "2 5".

Since compilers convert array operations in pointers before accessing the array elements, $(a + 1)$ points to 2.

The expression $(\&a + 1)$ is actually an address just after end of array (after address of 5) because $\&a$ contains address of an item of size 5*integer_size and when we do $(\&a + 1)$ the pointer is incremented by 5*integer_size.

ptr is type-casted to int^* so when we do $\text{ptr}-1$, we get address of 5.

B Garbage Value

C Compiler Error

D Segmentation Fault

QUESTION ANALYTICS

+

Q. 18

FAQ

Have any Doubt ?

Bookmark

```
#include <stdio.h>
int main( )
{
    int a[ ][3] = {1, 2, 3, 4, 5, 6};
    int (*ptr)[3] = a;
    printf("%d %d ", (*ptr)[1], (*ptr)[2]);
    ++ptr;
    printf("%d %d\n", (*ptr)[1], (*ptr)[2]);
    return 0;
}
```

A 2 3 5 6

Correct Option

B 2 3 4 5

C 4 5 0 0

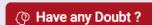
D None of the above

 QUESTION ANALYTICS



Q. 19

? FAQ

 Have any Doubt?



Which of the following options are correct with respect to the following statement.

S₁ : Suppose we do a DFS on a directed graph G. If we remove all of the back edges found, the resulting graph is now acyclic.

S₂ : While running DFS on a directed graph, if from vertex u we visit a finished vertex v, then the edge (u, v) is a cross-edge.

A S₁ is true only

Correct Option

Solution :

(a)

S₁ is TRUE : Suppose we do a DFS on a directed graph G. If we remove all of the back edges found, the resulting graph is now acyclic.

S₂ is FALSE : The edge could be either a cross-edge or a forward edge.

Note : The edge cannot be a back edge—a back edge goes to a vertex that has started, but not finished.

B S₂ is true only

C Both are true

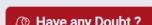
D None of the above

 QUESTION ANALYTICS



Q. 20

? FAQ

 Have any Doubt?



Which of the following options are correct with respect to the following statement.

S₁ : A depth-first search of a directed graph always produces the same number of tree edges (i.e. independent of the order in which the vertices are provided and independent of the order of the adjacency lists).

S₂ : If a topological sort exists for the vertices in a directed graph, then a DFS on the graph will produce no back edges.

A S₁ is true only

Correct Option

B S₂ is true only

Solution :

(b)

S₁ is False. The DFS forest may contain different numbers of trees (and tree edges) depending on the starting vertex and upon the order in which vertices are searched.

Consider the example below. If the DFS starts at a, then it will visit b next, and (a, b) will become a tree edge. But if the DFS visits b first, then a and b become separate trees in the DFS forest, and (a, b) becomes a cross edge.

S₂ is True. Both parts of the statement hold if and only if the graph is acyclic.

C Both are true

D None of the above

 QUESTION ANALYTICS





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ALL(33)

CORRECT(0)

INCORRECT(0)

SKIPPED(33)

Q. 31



Modulus operator is applicable for

 A Double B Float C Int

Correct Option

 D None of these

YOUR ANSWER - NA

CORRECT ANSWER - c

STATUS - SKIPPED

Solution :

(c) % operator can only be used with int.

QUESTION ANALYTICS



Q. 32



C language is

 A Procedural language

Correct Option

 B Not strictly typed language C Strictly typed language

Correct Option

 D Medium level language

Correct Option

YOUR ANSWER - NA

CORRECT ANSWER - a,c,d

STATUS - SKIPPED

Solution :

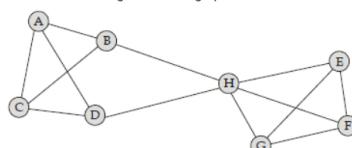
QUESTION ANALYTICS



Q. 33



Consider the following undirected graph with 8 nodes: Now consider the following traversals made on the graph



Which of the following is/are valid Breadth First traversals?

 A ABCDHEFG

Correct Option

 B ACBDHFGE

Correct Option

 C ADBCHGFE

Correct Option

 D HBDEGACF

YOUR ANSWER - NA

CORRECT ANSWER - a,b,c

STATUS - SKIPPED

Solution :

QUESTION ANALYTICS





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

Q. 21

? FAQ Have any Doubt?



What is the time complexity of inserting at the end in dynamic arrays?

- A O(1)
- B O(n)
- C O(logn)
- D Either O(1) or O(n)

Correct Option

Solution :

(d)
 Depending on whether the array is full or not, the complexity in dynamic array varies. If you try to insert into an array which is not full, then the element is simply stored at the end, this takes O(1) time. If you try to insert into an array which is full, first you will have to allocate an array with double the size of the current array and then copy all the elements into it and finally insert the new element, this takes O(n) time.

QUESTION ANALYTICS



Q. 22

? FAQ Have any Doubt?



Which of the following options are correct with respect to the following statement.

S₁ : If a depth-first analysis of a graph contains at least one back edge, any other depth-first analysis of the same graph will also contain at least one back edge.
 S₂ : Any DFS forest of an undirected graph contains the same number of trees.

- A S₁ is true only
- B S₂ is true only
- C Both are true
- D None of the above

Correct Option

Solution :

(c)
 S₁ is True. This follows from the fact that an analysis contains a back edge if and only if the graph contains a cycle.
 Consider the example below. If the DFS starts at a, then it will visit b next, and (a, b) will become a tree edge. But if the DFS visits b first, then a and b become separate trees in the DFS forest, and (a, b) becomes a cross edge. S₂ is True. In an undirected graph, each connected component of the graph will be a single tree in a DFS.

QUESTION ANALYTICS



Q. 23

? FAQ Have any Doubt?



Suppose that a hash table of m slots contains a single element with key k and the rest of the slots are empty. Suppose further we search r times in the table for various other keys not equal to k. Assuming simple uniform hashing, what is the probability that one of the r searches probes the slot containing the single element stored in the table?

- A $\frac{r}{m}$
- B $\left(1 - \frac{1}{m}\right)^r$
- C $\left(\frac{1}{m}\right)^r$
- D $1 - \left(1 - \frac{1}{m}\right)^r$

Correct Option

Solution :

(d)
 It is equal to 1 minus the probability that none of the r searches collides with the single element stored in the table.

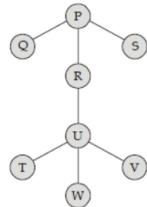
i.e., $P = 1 - \left(1 - \frac{1}{m}\right)^r$

Q. 24

FAQ Have any Doubt ?



Consider the following rooted tree with the vertex P labelled as root



The order in which the nodes are visited during in-order traversal is

A Q T W U V R P S

Correct Option

Solution :

- (a)
Algo can be of two types:
1. inorder (root)
{
 inorder (root → lc);
 inorder (root → mc);
 print (root);
 inorder (root → rc);
}
2. inorder (root)
{
 inorder (root → lc);
 print (root);
 inorder (root → mc);
 inorder (root → rc);
}

On solving using Algo 1, only option (a) is possible.

B Q T U W V P R S

C Q T U V W R P S

D Q T U V S W R P

Q. 25

Have any Doubt ?



The value of j at the end of the execution of the following C program

```

int incr (int i)
{
    static int count = 0;
    count = count + i;
    return (count);
}
main()
{
    int i, j;
    for (i = 0; i <=4; i++)
        j = incr(i);
}
  
```

10

Correct Option

Solution :

10
Count is static variable in incr(). Statement static int count = 0 will assign count to 0 only in first call.
Other calls to this function will take the old values of count.
Count will become 0 after the call incr(0).
Count will become 1 after the call incr(1).
Count will become 3 after the call incr(2).
Count will become 6 after the call incr(3).
Count will become 10 after the call incr(4).

Q. 26

FAQ Have any Doubt ?



Let P be a singly linked list. Let Q be the pointer to a non intermediate node x in the list. Suppose the worst-case time complexity of the best known algorithm to delete the node x from the list is $O(n^2 \log n)$ then the value of a + b is _____.

1

Correct Option

Solution :

1
To delete a non intermediate node, the next pointer of Q should be copied to previous node's next pointer.
For this to happen, previous node address should be known.
So a traversal of linked list should be done which has time complexity of $O(n)$.

QUESTION ANALYTICS



Q. 27

? FAQ

Have any Doubt ?



Number of sorting algorithms given below that has a time complexity $O(n^2)$.

S_1 : Bubble sort S_2 : Selection sort
 S_3 : Quick sort S_4 : Merge sort

4

Correct Option

Solution :

4

QUESTION ANALYTICS



Q. 28

? FAQ

Have any Doubt ?



What is the number of binary search trees with 20 nodes with elements 1, 2, 3, ..., 20 such that the root of tree is 12 and the root of left subtree is 7?

2642640

Correct Option

Solution :

2642640
Number of nodes in left subtree = 11 {1, 2, 3, 4, ..., 11}
Number of nodes in the right subtree = 8 {13, 14, ..., 20}
Since for the left subtree root is 7
Number of elements in the left part of left subtree = 6 {1, 2, 3, ..., 6}
Number of elements in the right part of left subtree = 4 {8, 9, 10, 11}
We know number of Binary Search trees with n nodes = $C(2n, n)/n + 1$
Number of BST with 6 nodes = $C(12, 6)/7 = 132$
Number of BST with 4 nodes = $C(8, 4)/5 = 14$
Number of BST with 8 nodes = $C(16, 8)/9 = 1430$
Total number of BST = 2642640.

QUESTION ANALYTICS



Q. 29

Have any Doubt ?



In a binary max heap containing n numbers, the smallest element can be found in $O(n^a \log^b n)$. What is the value of a + b?

1

Correct Option

Solution :

1
In a max heap, the smallest element is always present at a leaf node. So, we need to check for all leaf nodes for the minimum values. Worst case will be $O(n)$.

QUESTION ANALYTICS



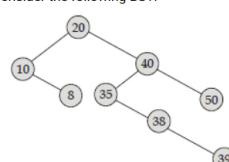
Q. 30

? FAQ

Have any Doubt ?



Consider the following BST:



If we randomly search one of the keys present in above BST, what would be the expected number of comparisons? (upto 2 decimal places)

2.875 (2.87 - 2.90)

Correct Option

Solution :

2.875 (2.87 - 2.90)
It is given that search key is randomly chosen from one of the keys present in the tree. So probability for each item being the key is $\frac{1}{n}$ where n = total number of keys in the BST.

⇒ In binary search tree if a item matches at level h , we would have done h comparisons.

So, expected number of comparisons

$$\sum_{i=1}^n h_i \times \frac{1}{n}, \text{ where } h_i = \text{level of node } i$$

So, number of nodes at level 1 = 1

Number of nodes at level 2 = 2

Number of nodes at level 3 = 3

Number of nodes at level 4 = 1

Number of nodes at level 5 = 1

Here,

$$n = 8$$

$$\begin{aligned}\sum_{i=1}^n h_i \times \frac{1}{n} &= \frac{1}{8} + \left(\frac{2}{8} + \frac{2}{8} \right) + \left(\frac{3}{8} + \frac{3}{8} + \frac{3}{8} \right) + \frac{4}{8} + \frac{5}{8} \\ &= \frac{1+4+9+4+5}{8} = \frac{23}{8} = 2.875\end{aligned}$$

 QUESTION ANALYTICS



Item 21-30 of 33 « previous 1 2 3 4 next »