CS & IT ENGINEERING

Data Structure & Programming

1500 Series

Lecture No.- 03

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Recap of Previous Lecture

Topic Problem Practice Part-02

Topics to be Covered

Topic Problem Practice Part-03

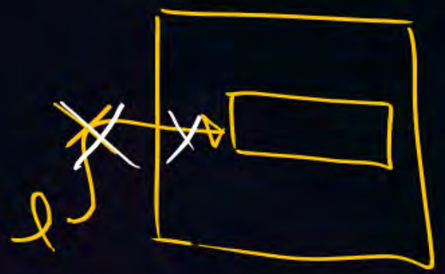
[MCQ]

#Q.
```
int * f1() {
    int * l;
    *l = 8;
    return l;
}
int * f2() {
    int * l = malloc(8);
    l = null;
    return l;
}
void f3 () {
    int * p;
    p = (int*) malloc(sizeof(int));
    *p = 10;
    free(p);
    *p = 11;
}
```

What are the problems within above functions f1,f2,f3 respectively.

wild pointer (uninitialized pointer)

lost memory



A None, dangling Pointer, Lost Memory

B Dangling pointer, None, uninitialized pointer

C Uninitialized pointer, Lost Memory, dangling pointer

D Dangling pointer, Lost Memory, unintialized pointer

[NAT]

pointer size - 8 byte
char - 1 byte
int - 4 byte

#Q. struct test {

struct test * i; → 8

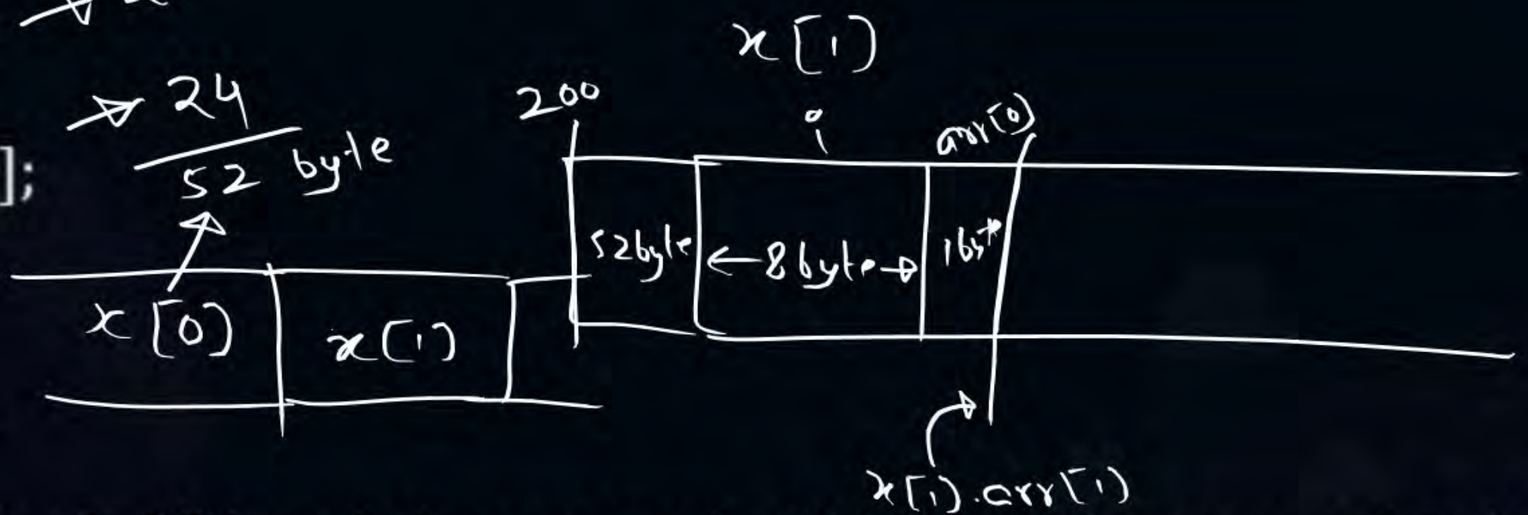
char arr[20]; → 20

int arr2 [2][3]; → 24

};

52 byte

struct test x[10];



if base address of x is 200 and the system is 64 bit architecture, what is the address of x[1].arr[1] _____.

[MCQ]

#Q. Stack s1 has elements 5 4 3 2 1 in the sequence where 1 is at top. s2 is an empty stack. when an element popped from s1, it can be either printed or pushed into s2 not both. But when you pop from s2 it can only be printed. Which permutation is not possible.

A 1 2 3 4 5

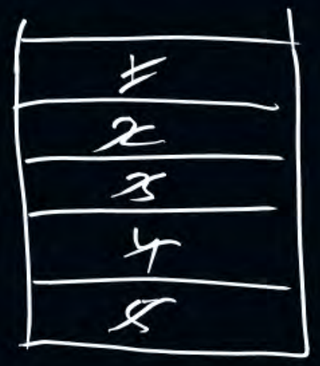
B 3 4 5 2 1

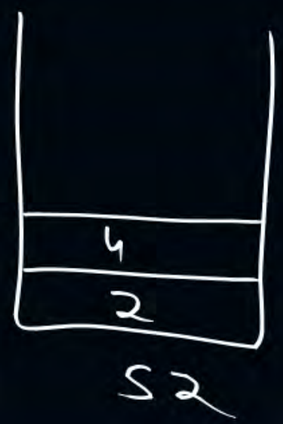
C 3 4 5 1 2

D 1 3 5 4 2

[MCQ]

#Q. Stack s1 has elements 5 4 3 2 1 in the sequence where 1 is at top. s2 is an empty stack. when an element popped from s1, it can be either printed or pushed into s2 not both. But when you pop from s2 it can only be printed. Which permutation is not possible.





1 4

A 1 2 3 4 5

B 3 4 5 2 1

C 3 4 5 1 2

D 1 3 5 4 2

[MCQ]

#Q. Stack s1 has elements 5 4 3 2 1 in the sequence where 1 is at top. s2 is an empty stack. when an element popped from s1, it can be either printed or pushed into s2 not both. But when you pop from s2 it can only be printed. Which permutation is not possible.

A 1 2 3 4 5

B 3 4 5 2 1

C 3 4 5 1 2

D 1 3 5 4 2

[NAT]

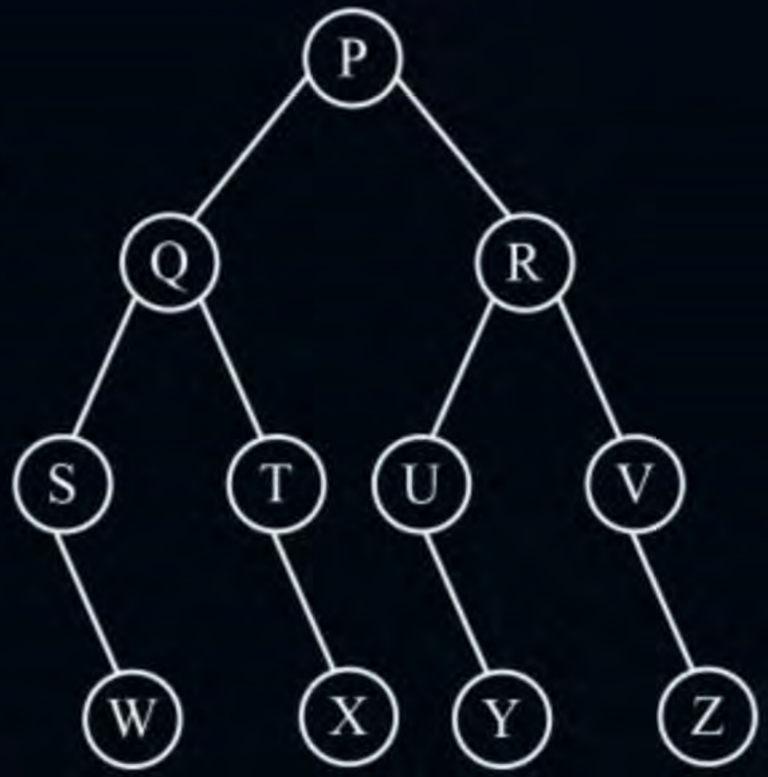
#Q. Consider the following tree

PT: W S X T Q Y U Z V R P

3 – 9 + X 14 + 17 – + /

S W Q X P Y V Z

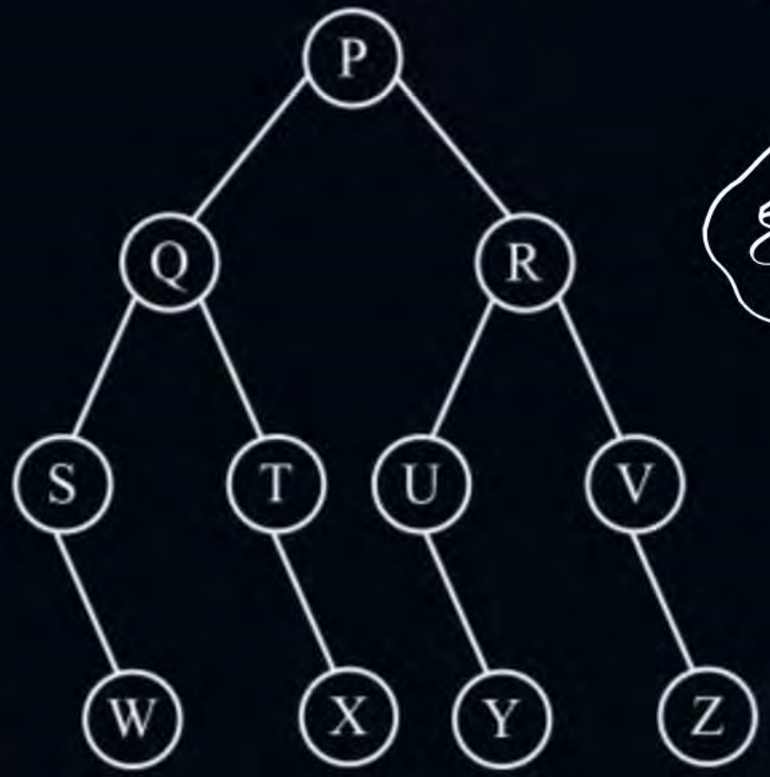
– 3 X 9 / 14 – 17



If the postorder traversal of above tree is, 3–9+ * 14 + 17 – + /. Then the SWQXPYVZ = _____(round off two decimal places)

[NAT]

#Q. Consider the following tree



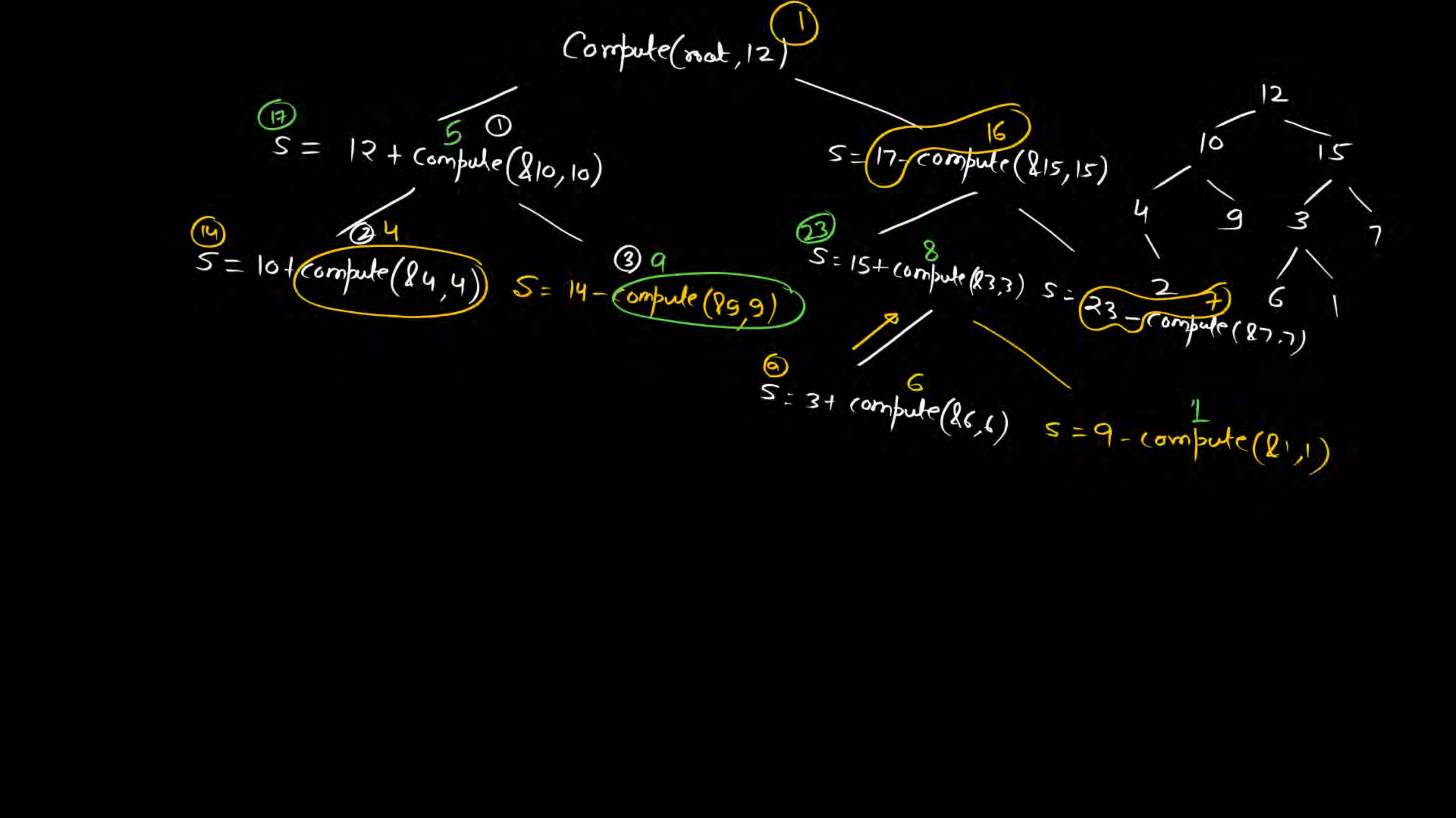
If the postorder traversal of above tree is, 3–9+ * 14 + 17 – + /. Then the SWQXPYVZ = _____(round off two decimal places)

[NAT]

#Q. Consider a binary tree,

Following pseudocode executed on function compute (root, 12) then return value is _____.

```
Compute (V, S)    // V is node, S is value of node
{
  if (V. is leaf ( ) || V. left = =  Null || V. right == null)
      return S;
S = S + compute (V. left, S)
S = S – compute (V. right, S); // For parameter 'S' is value of respective node.
return S;
}
```


Compute(root, 12)
1
17
S = 12 + compute(&10, 10)
5
1
16
S = 17 - compute(&15, 15)
14
S = 10 + compute(&4, 4)
2
4
S = 14 - compute(&9, 9)
3
9
23
S = 15 + compute(&3, 3)
8
S = 23 - compute(&7, 7)
2
7
6
S = 3 + compute(&6, 6)
6
S = 9 - compute(&1, 1)
1
12
10
15
4
9
3
7
6
1

[NAT]

#Q. Height balanced trees are binary tree with the following restrictions.

(i) The height difference of the children is atmost 1.

(ii) $h \leq |$ right child length – left child length$|$

Maximum height of this tree with 232 nodes is 10.

(Assume that the height of a tree with a single node is 0.)

AVL tree

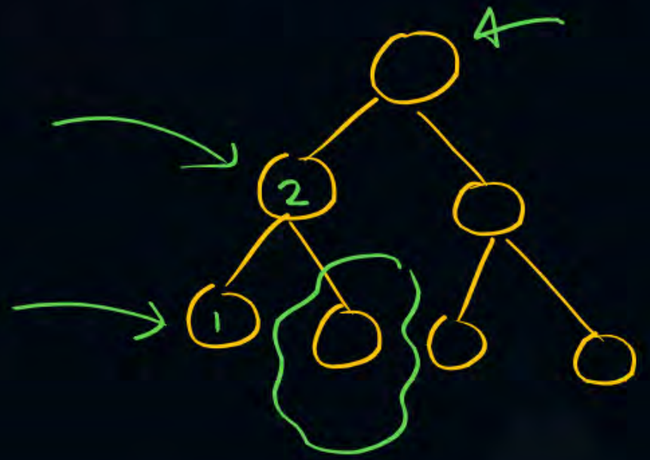
{ min height / max. nodes
  max height / min nodes }

h	0	1	2	3	4	5	6	7	8	9	10
n_{min}	1	2	4	7	12	20	33	54	88	143	232

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

[MCQ]

#Q. Which traversal is the most suitable for deleting all the nodes in a binary tree?



A Inorder

B Preorder

C Postorder

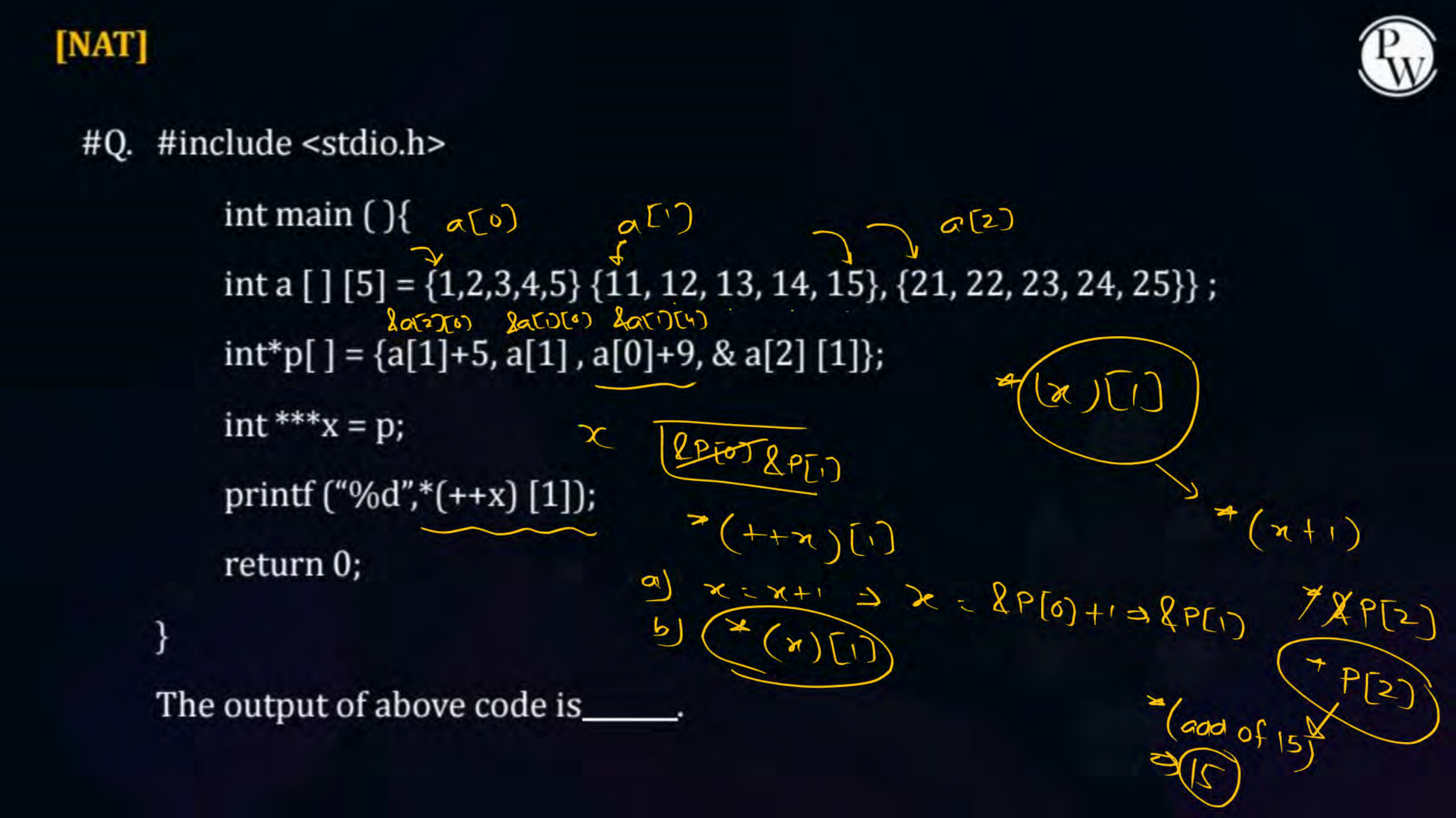
D Any Traversal

[NAT]

#Q. #include <stdio.h>

```
int main ( ){
int a [ ] [5] = {1,2,3,4,5} {11, 12, 13, 14, 15}, {21, 22, 23, 24, 25}} ;
int*p[ ] = {a[1]+5, a[1] , a[0]+9, & a[2] [1]};
int ***x = p;
printf ("%d",*(++x) [1]);
return 0;
}
```

The output of above code is_____.



[NAT]

#Q. Array of 1023 elements used to construct the binary heap with starting index '0'. If the right child node is stored at index 510 then its parents parent node is at index_____.

$2i+2 = 510$

$2i = 508$

$i = 254$

[MCQ]

#Q. Which data is most efficient to find top k largest items out of n items stored in file?

Try to write Pseudo code / logic

A Max heap

B Min heap

C BST

D Sorted array

[NAT]

#Q. The height of a binary tree is the maximum number of edges in any root node to leaf node path. The maximum number of nodes in a binary of height 15 is_____.

tree

$n_{max} = 2^{h+1} - 1$

$= 2^{15+1} - 1$

$= 2^{16} - 1$

$= 65536 - 1$

$= 65535$

[NAT]

Operators

#Q. int a =5, b = 6, c, d = 7;

c = a++ + b-- * d / 2; (No space)

print ("%d", c);

What is the output 26.

c = (a++) + (b--) * d/2

c = 5 + 6 * 7/2

5 + 42/2

5 + 21

[NAT]

#Q. int a = 7, b = 6, c;

c = a>> 2 + 3 * 8 == 8 * 8 + b;

printf ("%d", c);

Output is 0.

$c = 7>>2+3\times8 == 8+6$

$c = 7>>2+24 == 8*8+6$

$c = 7>>2+24 == 64$

$c = 7>>26 == 64+6$

$c = 7>>26 == 70$

$c = 0 == 70$

$c = 0$

[NAT]

H.W → Try

t.me/PWpankajsir0P

#Q.
```
Struct temp {
        int data ;
    }
    struct temp2{
        int data ;
        struct temp*h;
    }
    int main ( ) {
        struct temp h ;
        h. data = 5;
        struct temp2 x;
        x.data  = 6;
        x.h = &h;
        printf ("%d", 5*x.data + (x.h)→data);
    }
```

What will be the output of the above code?

2 mins Summary

Topic One -

Topic Two -

Topic Three

Topic Four

Topic Five

THANK - YOU