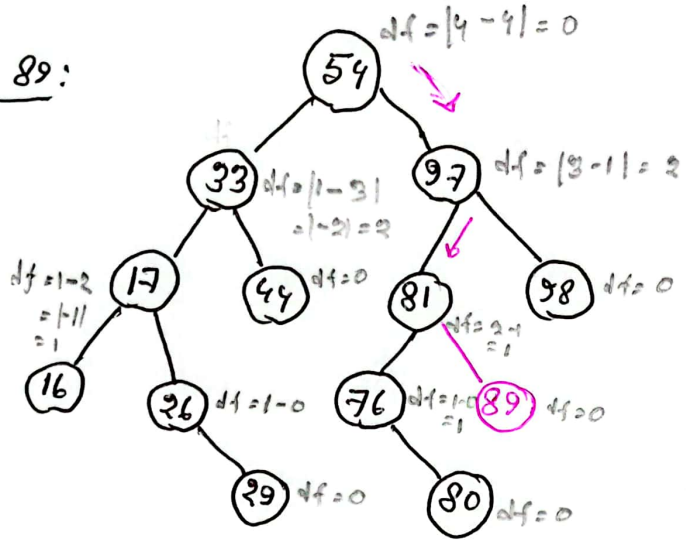
Summer24 Q4

a) Pre-order: Root, left, right.

54 33 17 16 | 26 29 | 44 | 97 | 81 76 80 | 98

b) Insert 89:



c) balanced tree: height of left & right subtree of any node differ by not more than 1.

height difference of 33 & 97 is over 1. Hence, not balanced.

d) Ascending order: In-order traversal → left root right

Descending order: reverse-in order-traversal → R root L

98 97 89 81 80 76 | 54 44 33 | 29 26 17 16

viii)

f(10)

10 > 6

↳ f(4) − 10 = 8 − 10 = −2

↳ 4 ≯ 6

↳ 4 − f(3) − 4 = 4 − (−4) = 8

↳ 3 ≯ 6

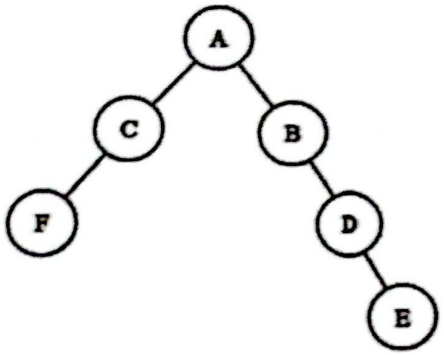
3 − f(N) = 3 − 7 = −4

↑
7

a) 1 2 4 8 16 b) 16 8 4 2 1
c) 1 16 8 4 2 d) 16 8 4 2 1 2 4 8 16

iii) Consider A to be the root of the following tree. What is the order of nodes when the tree is traversed in post-order?

a) ACFBDF **b)** FCEDBA
c) FCABDE **d)** None of the above

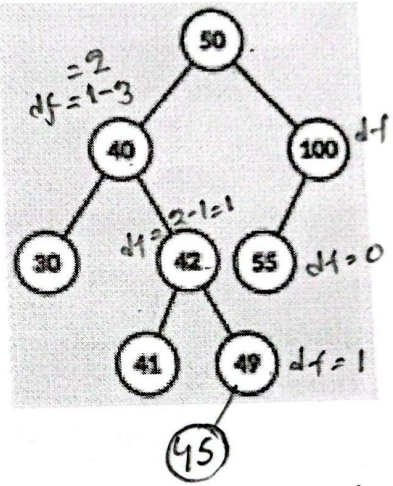


Post : L R root

F C | E D B A

iv) Suppose you inserted a node with value 45 in the given BST. Does this operation make this BST unbalanced? What would be the root of the BST if you want to make it balanced?

yes, unbalanced



a) BST will be balanced after the insertion
b) 45 **c)** 42 **d)** 50

Set-A

30	40	41	42	45	49	50	55	100
0	1	2	3	4	5	6	7	8

size/2 = 9//2 = 4.

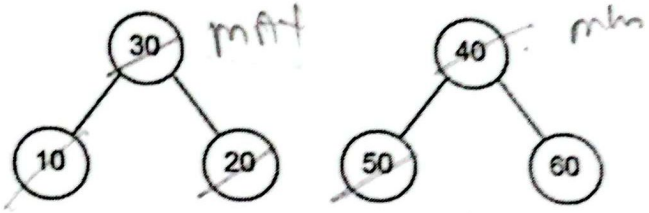
a) 7 b) 2 c) -2 d) 11

ix) Suppose, you are given the array representation of a binary tree:
[None, 6, 8, 4, 3, None, 11, 20, None, 2, None, None, 7, 5]

Which of the following statements is **NOT** correct?

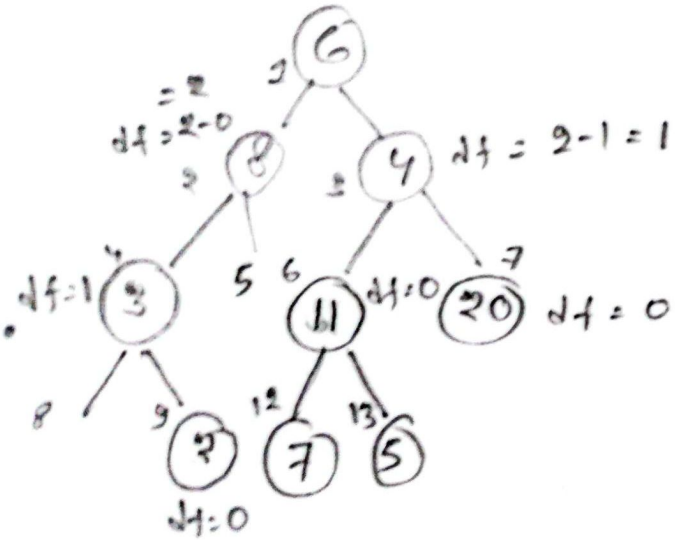
a) Node 20 is the parent of Node 7.
b) Node 11 is the parent of Node 5.
c) This binary tree is not balanced.
d) This binary tree is not full/strict.
(0 or 2 child.)

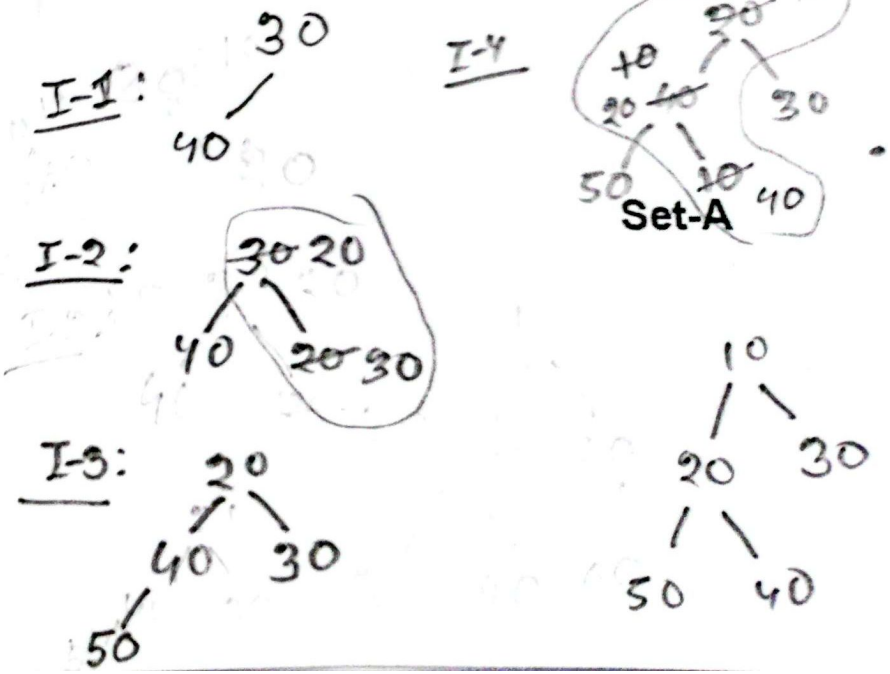
x) Consider the following heaps:



Take out one element at a time from each heap (first max heap then min heap) and add it to the new Merged Min Heap. How many total number of swaps you have to make to maintain the min property of the Merged Min Heap.

a) 4 b) 3 c) 5 d) 6





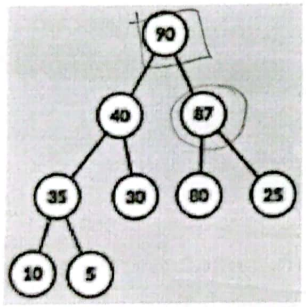
v) Which of the following scenarios requires shifting elements in an array?

a) Inserting an element at a specific position in the array.
b) Accessing an element at a given index.
c) Inserting an element to the end of the array.
d) Updating the value of an element at a specific index.

vi) Suppose, you are given the array representation of a perfect binary tree of height 4. If the index of the leftmost leaf is 16, what is the index of the rightmost leaf?

a) 17
b) 31
c) 4
d) Can't be determined using the provided information

vii) Consider the following heap

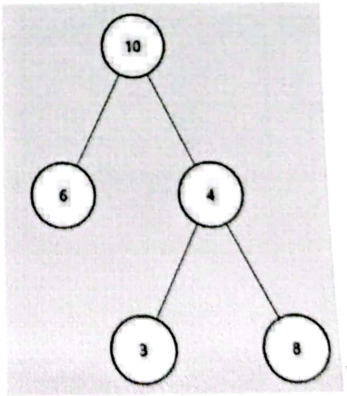


Suppose you are doing a heap sort based on the given heap. After the first step, which node will be the new root?

a) *Node with value 40*
b) *Node with value 87*
c) *Node with value 80*
d) *Node with value 10*

viii) Consider the following recursive function:

```
def fun(root):
    if root == None:
        return 7
    elif root.elem > 6:
        return fun(root.right) - root.elem
    else:
        return root.elem - fun(root.left)
```



Which of the following is the correct output of the given code for the given binary tree?

a) 7 b) 2 c) -2 d) 11