



CS & IT ENGINEERING

Data Structure & Programming

Tree

DPP - 02

Discussion Notes

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#Q. The minimum number of nodes in AVL tree of height 6 is 20.
(Assume that the height of the root node is 1)

AVL tree Height 6

Root Node is
at Height 1

$$N(h) = N(h-1) + N(h-2) + \underline{1}$$

$$N(0) = 1$$

$$N(1) = 2$$

$$N(2) = 4$$

$$N(3) = 7$$

$$N(4) = 12$$

$$\boxed{N(5) = 20} \leftarrow$$

$$\underline{N(6) = 33}$$

20 Node

[MCQ]



Binary Search Tree

#Q. Consider the following statements:

P: An AVL tree is a height-balanced complete binary tree. *False*

Q: A heap is necessarily a complete binary tree. *True*

Which of the following statement(s) is/are CORRECT?

A

P only

B

Q only ✓

[B]

C

Both P and Q

D

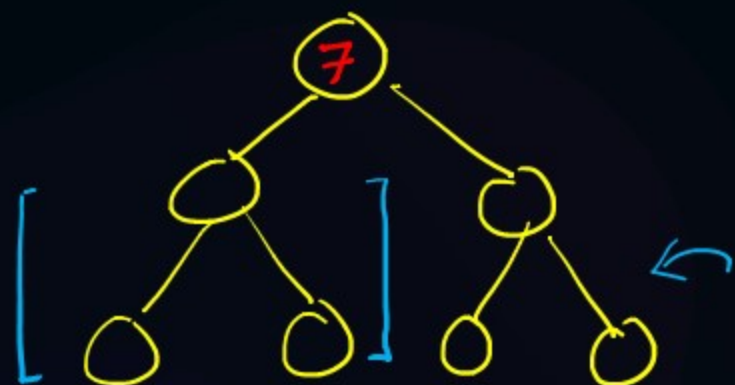
Neither P nor Q



#Q. The total number of ways in which a max-heap can be constructed with the keys-7, 6, 1, 4, 5, 2, 3 is 80.

Heap CBT

7 maximum element will be Root



$${}^6C_3 = \frac{6 \times 5 \times 4}{3 \times 2 \times 1} = 20$$

6, 1, 4

5, 2, 3

Hence = $20 \times 2 \times 2$

$$= \underline{80}$$



#Q. Consider the following statements:

P: If the root node of a BST is deleted, it can be replaced by inorder predecessor. *or Inorder Successor*

Q: If the root node of a BST is deleted, it can be replaced by preorder successor.

Which of the following is/are CORRECT?

- ☒ A P only
- ☐ B Q only
- ☐ C Both P and Q
- ☐ D Neither P nor Q



#Q. Consider the following operations in a BST-
INSERT(23), INSERT(17), INSERT(25), INSERT(4), INSERT(21), INSERT(1),
INSERT(7), DELETE(17), DELETE(23).

The post-order traversal of the resultant BST is-

- A 1, 7, 4, 21, 25 ✓
- B 1, 4, 7, 25, 21 ✓
- C 1, 4, 21, 7, 25 ✓
- D None of the above



#Q. Which of the following sequence(s) of array form a heap?

A

23, 17, 14, 6, 13, 10, 1, 12, 7, 5

B

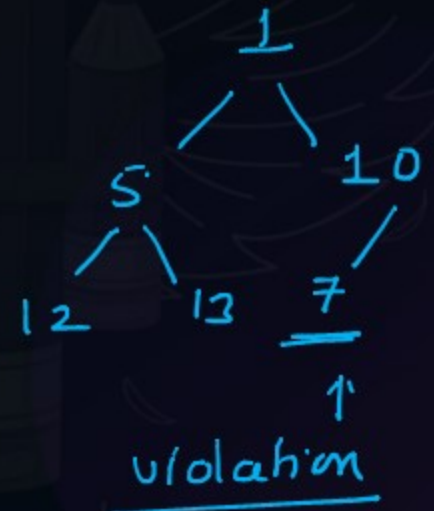
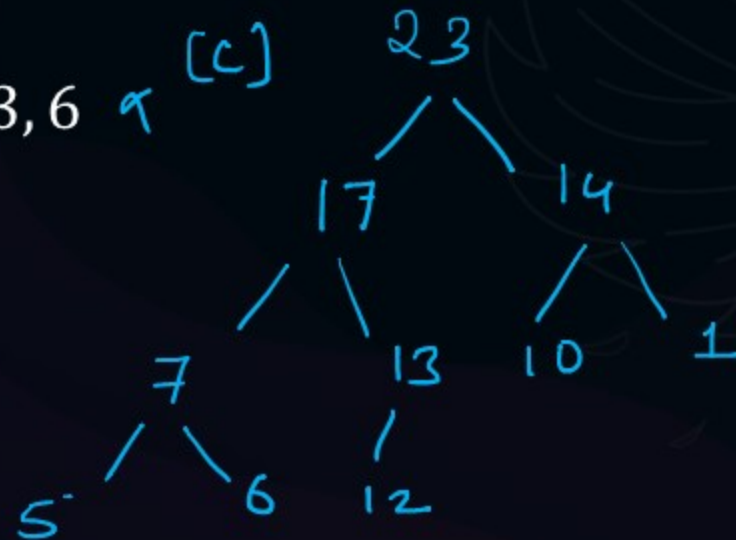
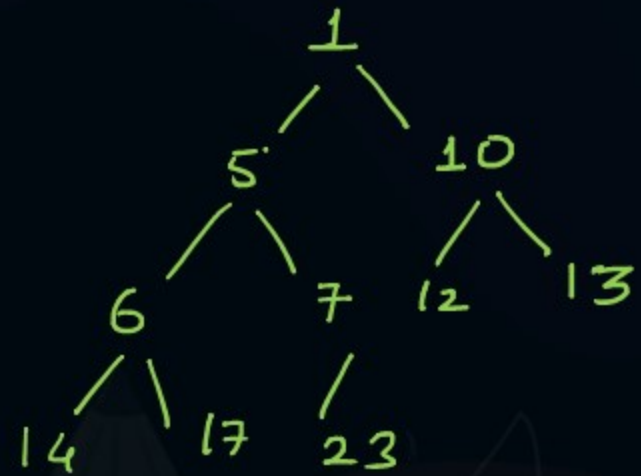
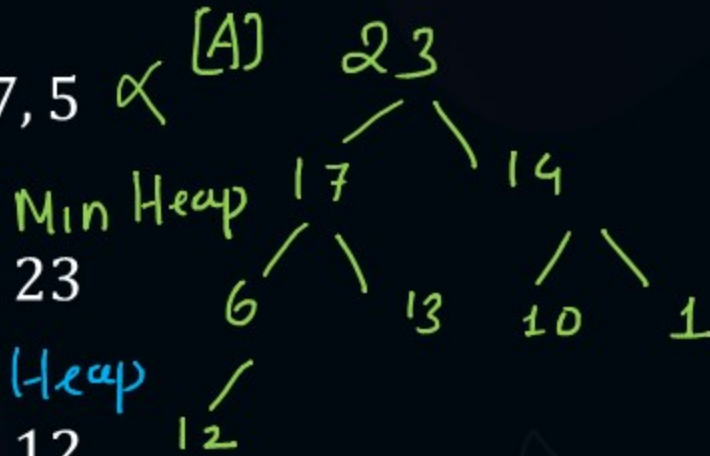
1, 5, 10, 6, 7, 12, 13, 14, 17, 23

C

23, 17, 14, 7, 13, 10, 1, 5, 6, 12

D

1, 5, 10, 12, 13, 7, 14, 17, 23, 6

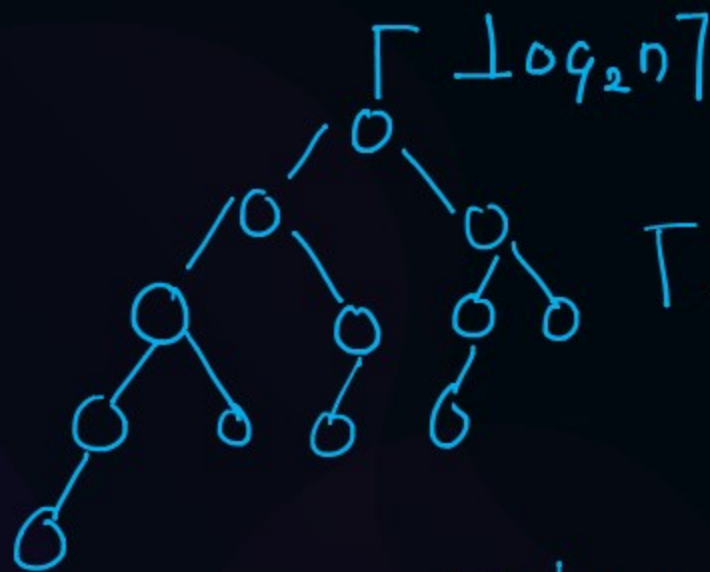


#Q. Consider the following statements:

P: The accepted balanced factor in an AVL tree are $-1, 0$ and $+1$.

Q: The height of an AVL tree with n nodes is given as $\lceil \log_2 n \rceil$. (Minimum)

The number of INCORRECT statements is 0.



$$\lceil \log_2 7 \rceil$$

$$= 3$$

Not work for maximum



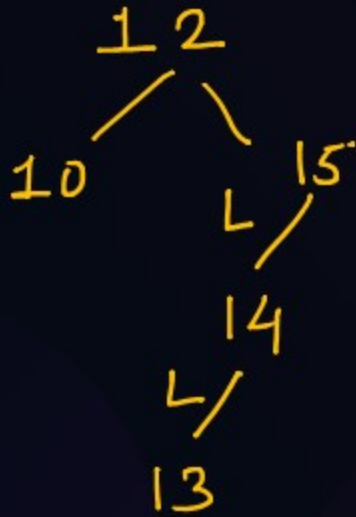
$$\lceil \log_2 12 \rceil = 4$$

$$\lceil \log_2 7 \rceil =$$

#Q. Construct an AVL tree with the following keys:

12, 10, 15, 14, 13, 17, 8

The immediate left child key value of the root node of the AVL tree is 12.



\Rightarrow





THANK - YOU

