Doubt Clearing Session

Course on C-Programming & Data Structures: GATE - 2024 & 2025

Vishvadeep Gothi • Lesson 50 • Jan 30, 2023

Data Structure:
Doubts

By: Vishvadeep Gothi

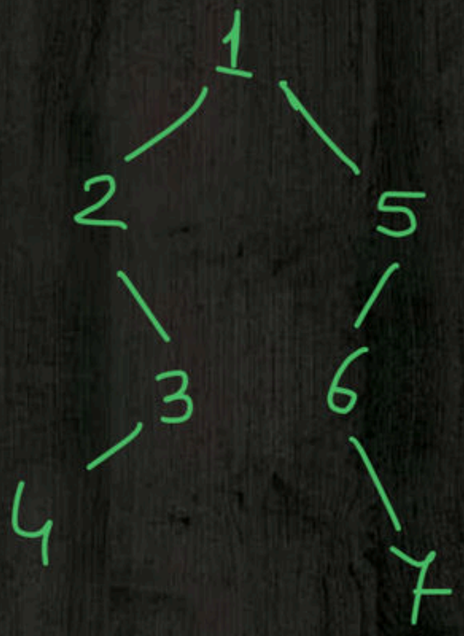
DPP

Question

Draw the tree for:

Preorder: 1 2 3 4 5 6 7

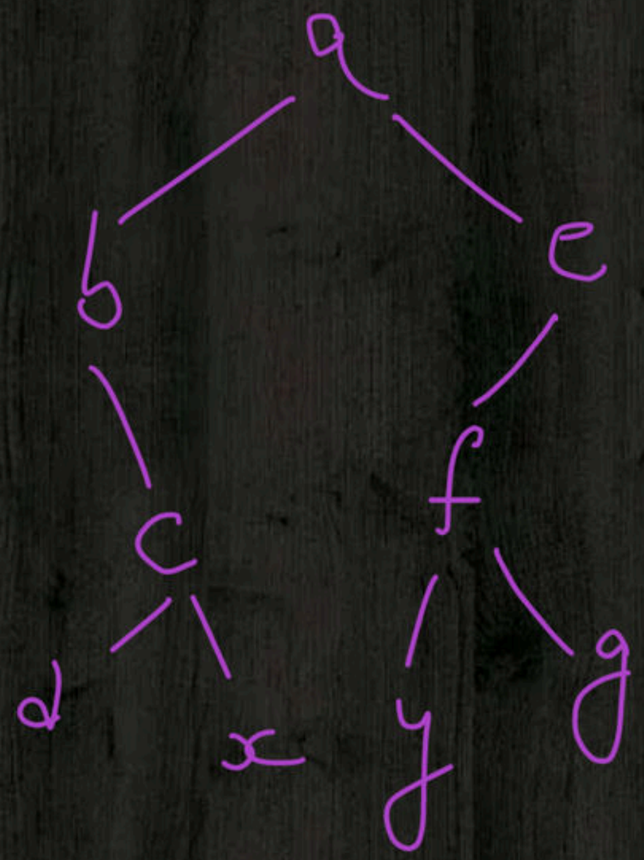
Inorder: 2 4 3 1 6 7 5



Question

Postorder: dxcbygfea

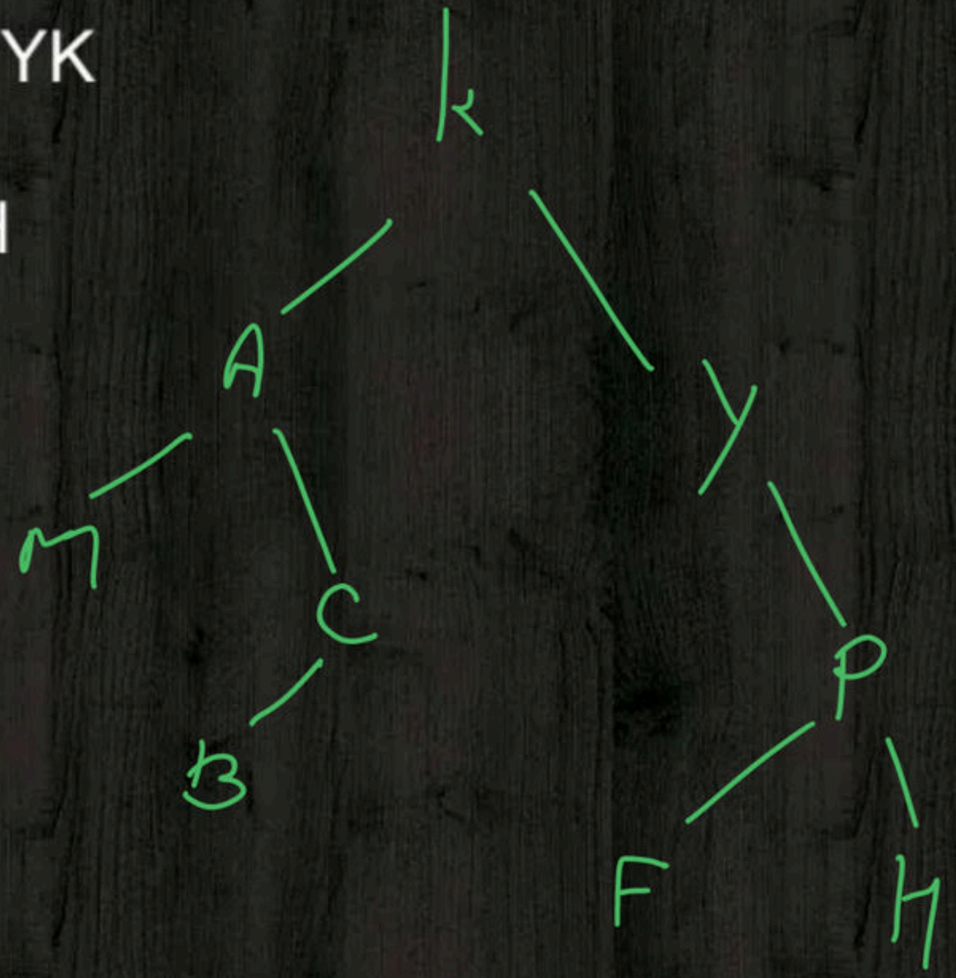
Inorder: bdcxayfge



Question

Postorder: MBCAFHPYK

Inorder: MABCKYFPH



Question

Converse Postorder: 9, 10, 8, 7, 3, 6, 5, 4, 2, 1

Reverse

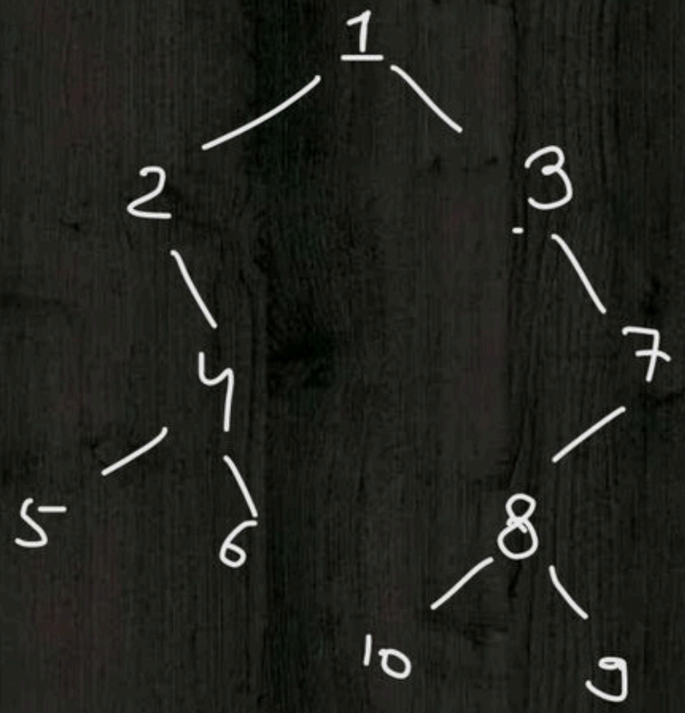
Pre

1, 2, 4, 5, 6, 3, 7, 8, 10, 9

Converse Inorder: 7, 9, 8, 10, 3, 1, 6, 4, 5, 2

In

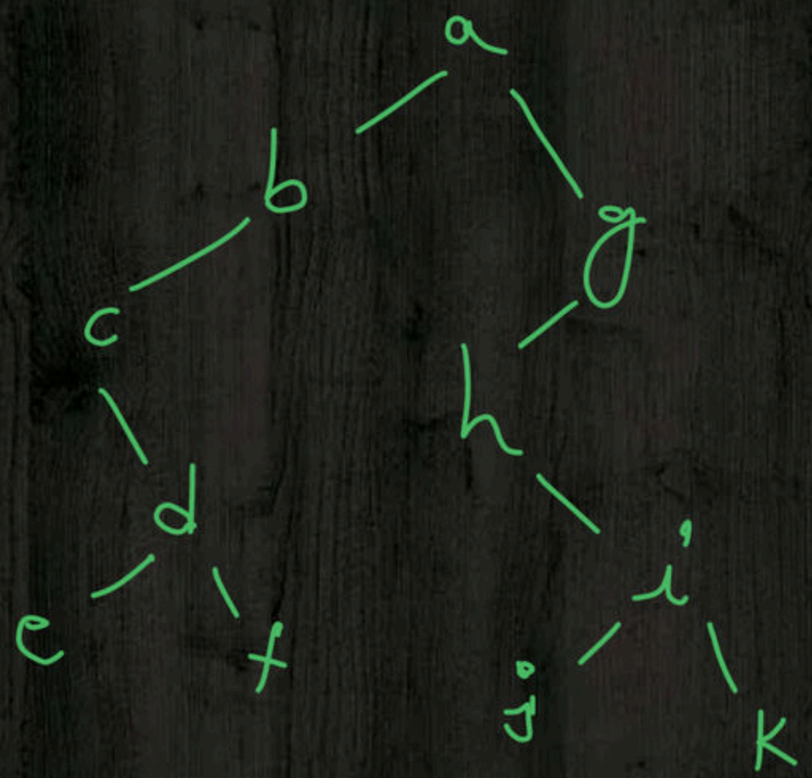
2, 5, 4, 6, 1, 3, 10, 8, 9, 7



Question

Converse Preorder: a, g, h, i, k, j, b, c, d, f, e ⇒ e, f, d, c, b, j, k, i, h, g, a

Inorder: c, e, d, f, b, a, h, j, i, k, g

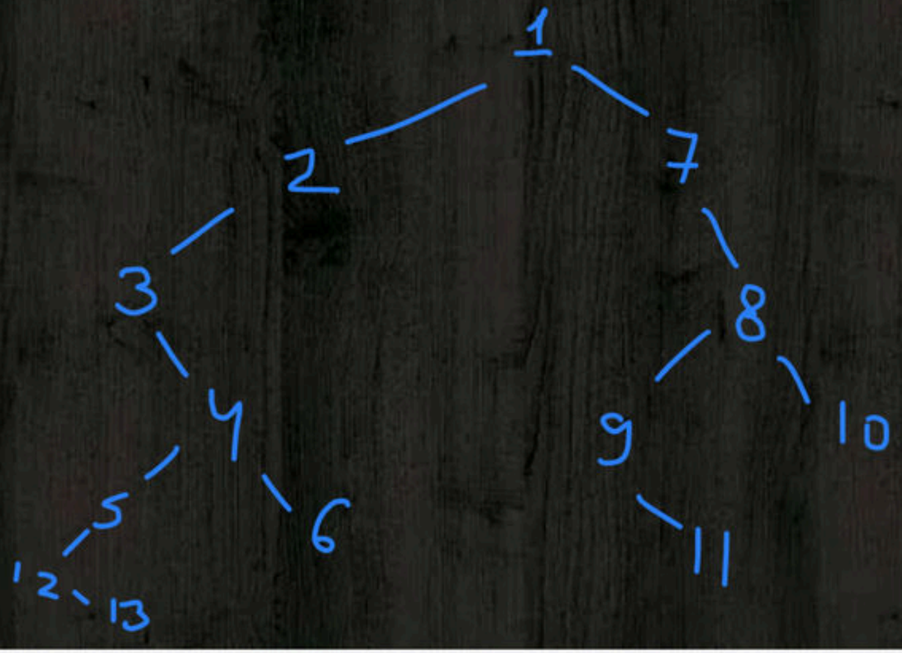


Question

Preorder: 1, 2, 3, 4, 5, 12, 13, 6, 7, 8, 9, 11, 10

Converse Inorder: 10, 8, 11, 9, 7, 1, 2, 6, 4, 5, 13, 12, 3

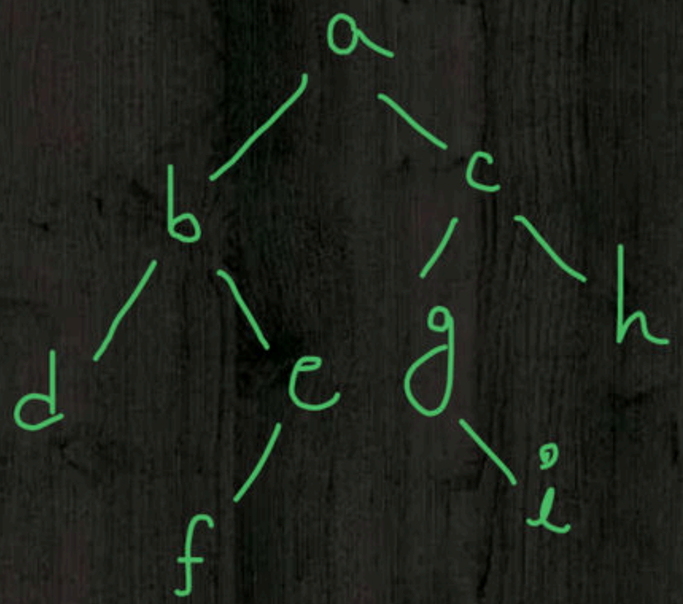
3, 12, 13, 5, 4, 6, 2, 1, 7, 9, 11, 8, 10



Question

Preorder: a ,b, d, e, f, c, g, i, h

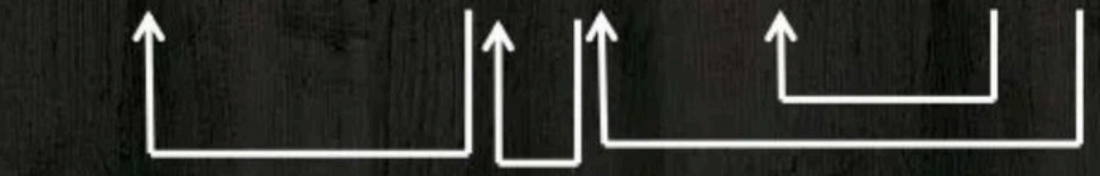
RightPointer:

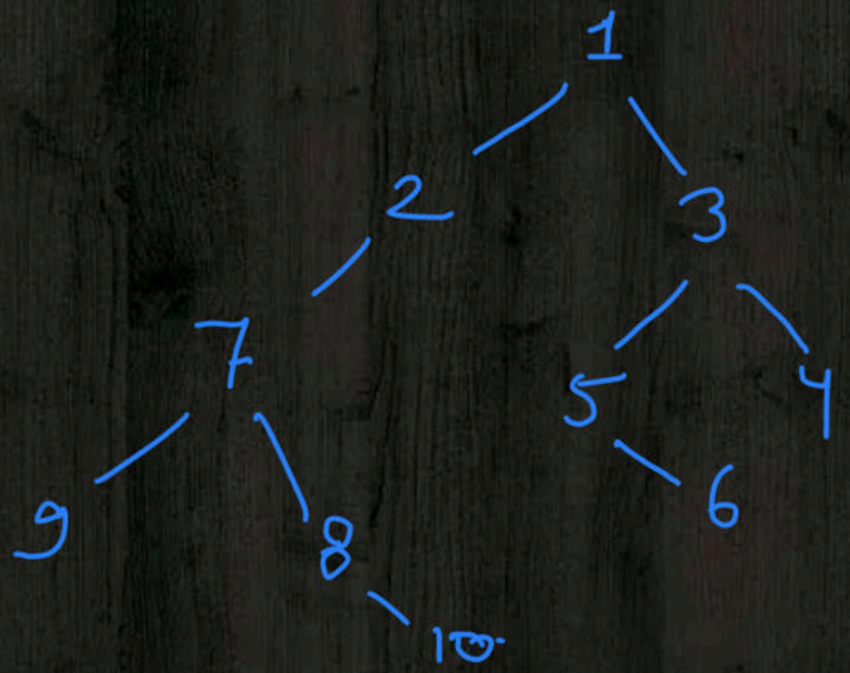


Question

Postorder: 9, 10, 8, 7, 2, 6, 5, 4, 3, 1

LeftPointer:

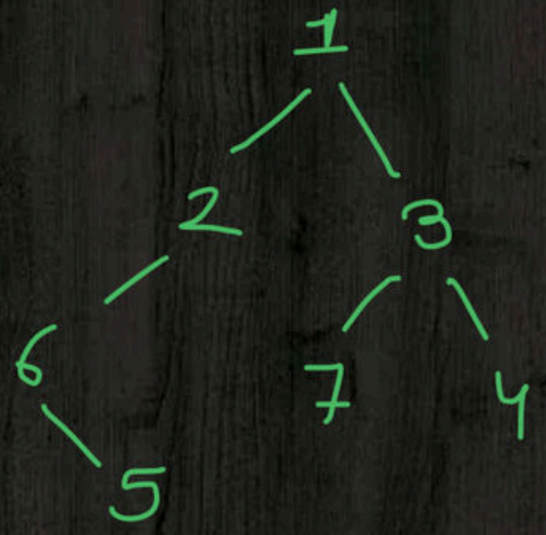




Question

Postorder: 5, 6, 2, 7, 4, 3, 1

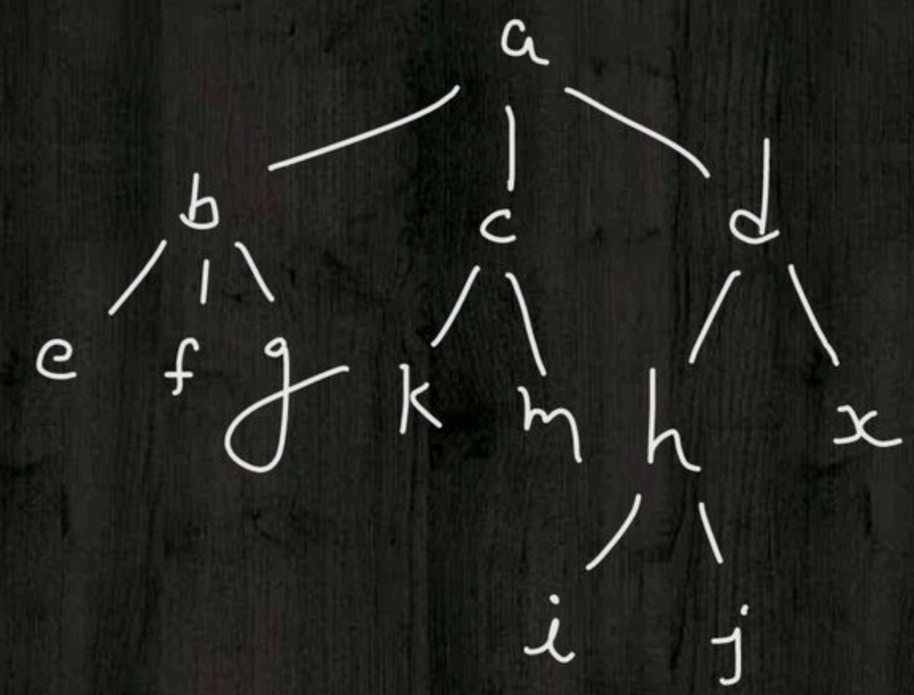
LeftPointer:



Question

Preorder: a, b, e, f, g, c, k, m, d, h, i, j, x

Postorder: e, f, g, b, k, m, c, i, j, h, x, d, a



Question

What does the following return

```
void m(struct BTNode *t)
{
  If(t)
  {
      n(t → Leftchild);
      printf("%c", t → data);
      n(t → Rightchild);
  }
}
```

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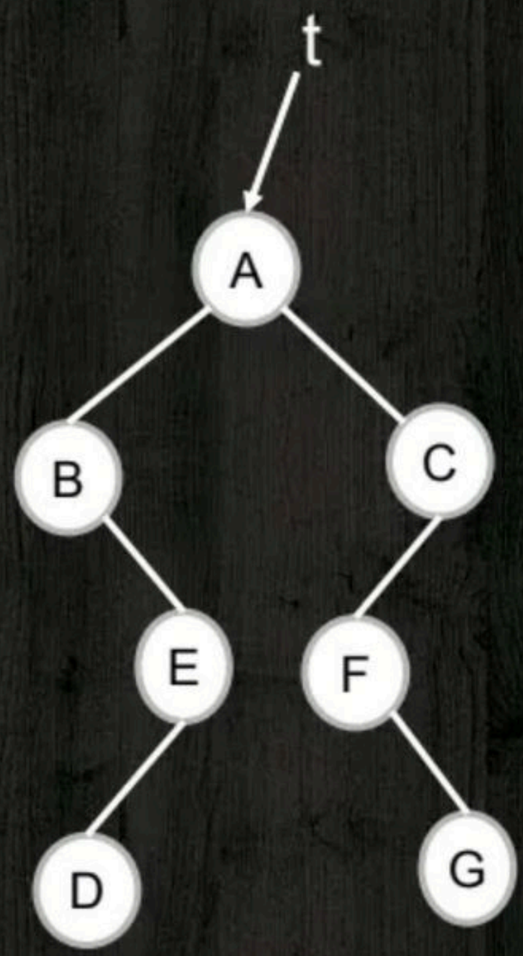

Get the value of m(t) for the given tree?

B D E A C F G

Question

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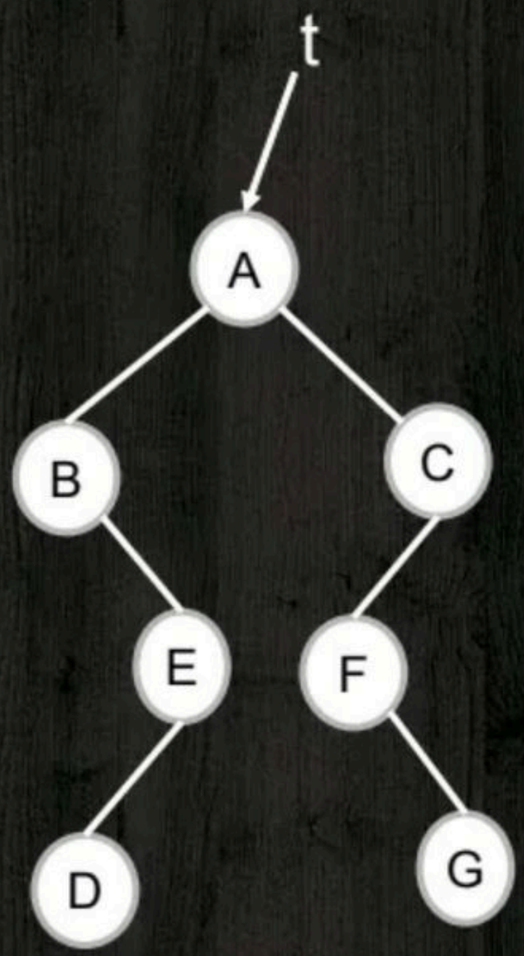


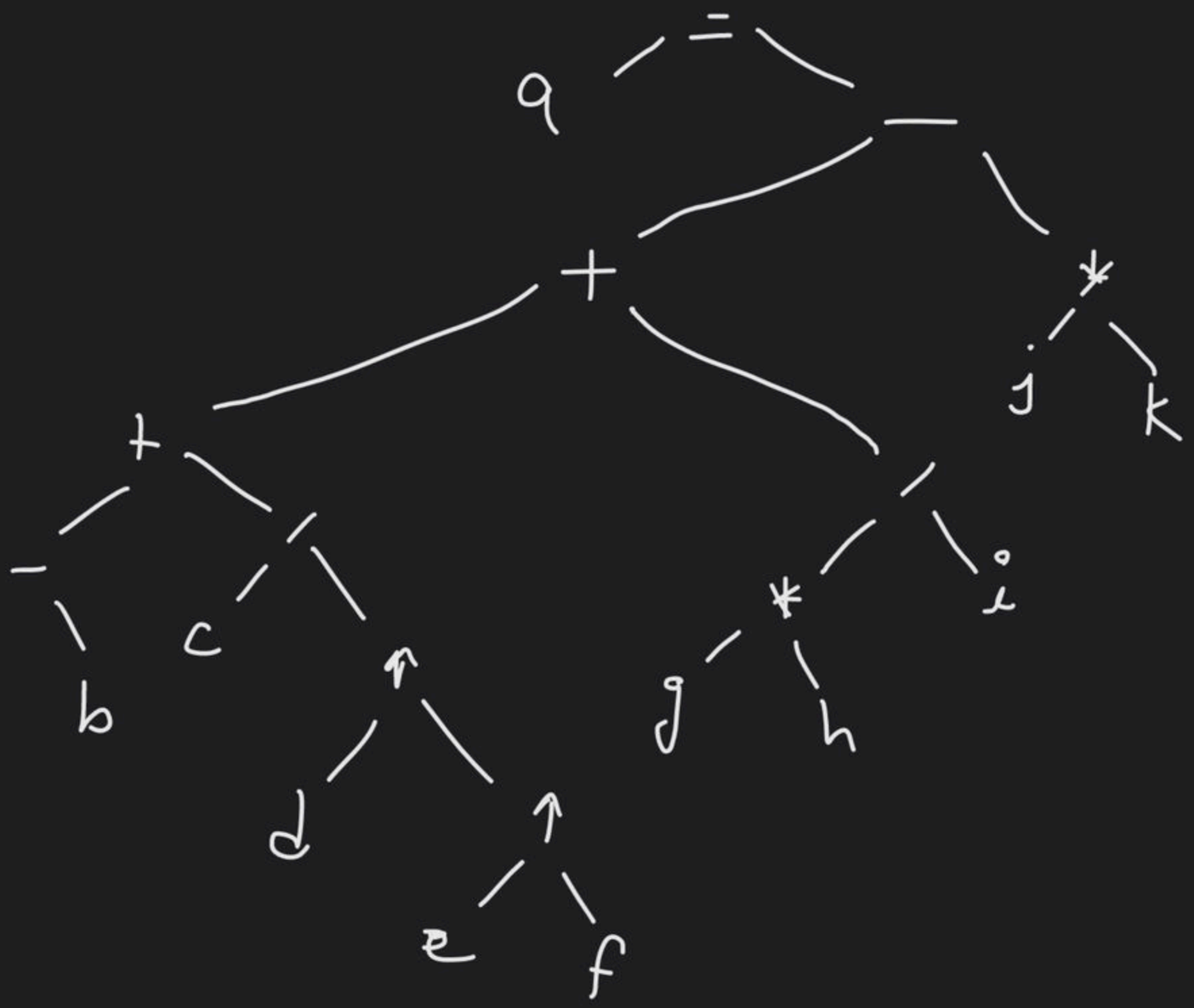
Get the value of m(t) for the given tree?

CGFABED

Question

Draw expression tree for:

1. (A + B) * (C – D) / F – X * Y / Z
2. a + b * c – d ^ e ^ f
3. $\boldsymbol{A+B*(C+D)/F+D*E}$
4. $\boldsymbol{3*log(x+1)-a/2}$
5. a= − b + c / d ↑ e ↑ f + g * h / i − j * k

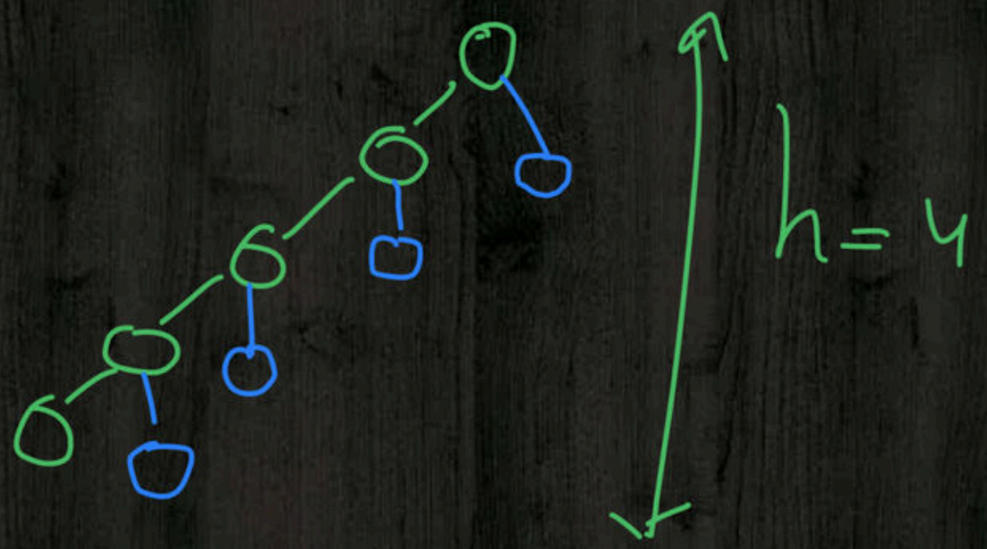

=
a
+
*
+
j
k
t
*
i
c
g
h
d
e
f

Question

Consider a left skewed binary tree of height h.
How many minimum nodes to be inserted into this tree to convert this tree into a full binary tree of height h.

Ans ⇒ h

Note: Height of tree with single node is 0



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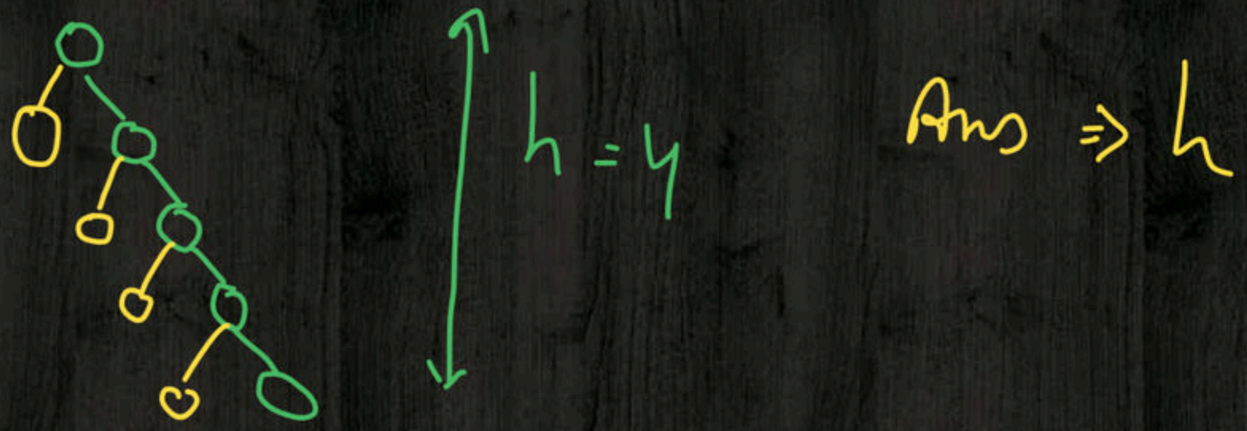

Question

Consider a left skewed binary tree of height h.
How many minimum nodes to be inserted into this tree to convert this tree into a complete binary tree of height h.

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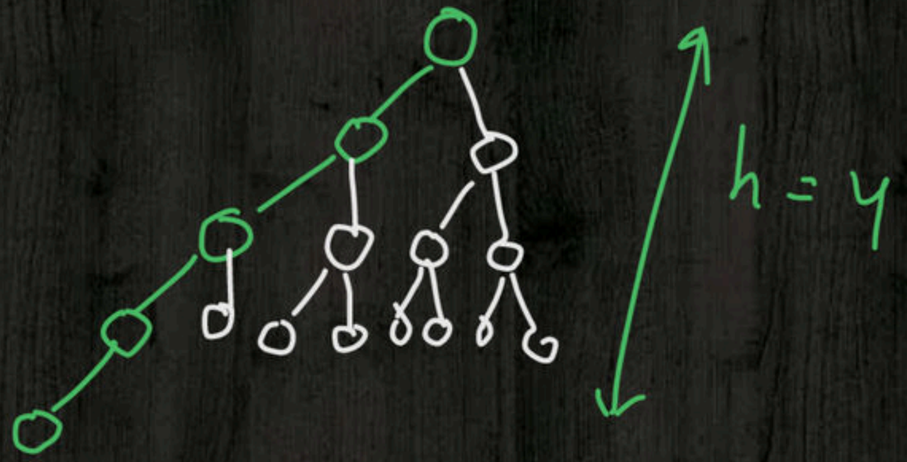


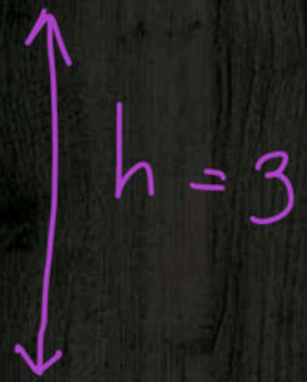
$= 2^h - (h+1)$

$= 2^h - h - 1$

Question

Consider a right skewed binary tree of height h.
How many minimum nodes to be inserted into this tree to convert this tree into a complete binary tree of height h.

Note: Height of tree with single node is 0



$$= 2^{h+1} - 1 - (h+1)$$

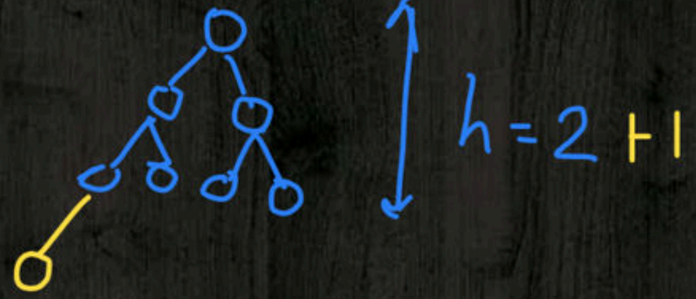
$$= 2^{h+1} - h - 2$$

Question

Consider a complete binary tree of height h.
How many minimum nodes to be inserted into this tree to convert this tree into a complete binary tree of height h+1, in the best case and worst case both.

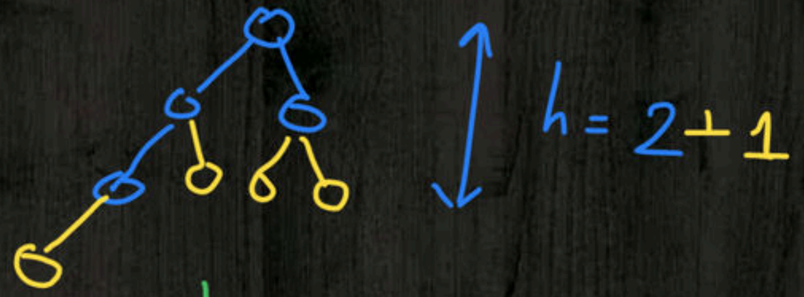
Note: Height of tree with single node is 0

Best case :-



Ans = 1

worst case :-



Ans = 2^h

Question

Consider a full binary tree with 31 nodes. Number of leaf nodes and internal nodes are?

$L = I + 1$

$N = L + I$

$= 2I + 1$

$I = \frac{N-1}{2}$

$I = 15$

$L = 16$

Question

Consider a full binary tree with 50 internal nodes. Number of leaf nodes and total number of nodes are?

$L = 50 + 1 = 51$

$N = 50 + 51 = 101$

Question

Is it possible to have a full binary tree with 178 nodes? ⟶ not possible

In full BT, no. of nodes always odd.

Question GATE-2002

The number of leaf nodes in a rooted tree of n nodes, with each node having 0 or 3 children is:

(A) n/2
(B) (n – 1)/3
(C) (n – 1)/2
(D) (2n + 1)/3

$L = 2I + 1$

$I = \frac{L-1}{2}$

$n = L + I$

$n = L + \frac{L-1}{2}$

$n = \frac{3L-1}{2}$

$L = \frac{2n-1}{3}$

Question GATE-2005

In a complete k-ary tree, every internal node has exactly k children. The number of leaves in such a tree with n internal node is:

A. nk
B. (n−1)k+1
C. n(k−1)+1
D. n(k−1)

Question GATE-2010

In a binary tree with n nodes, every node has an odd number of descendants. Every node is considered to be its own descendant. What is the number of nodes in the tree that have exactly one child?

(A) 0
(B) 1
(C) (n-1)/2
(D) n-1

↳ full BT

Happy Learning