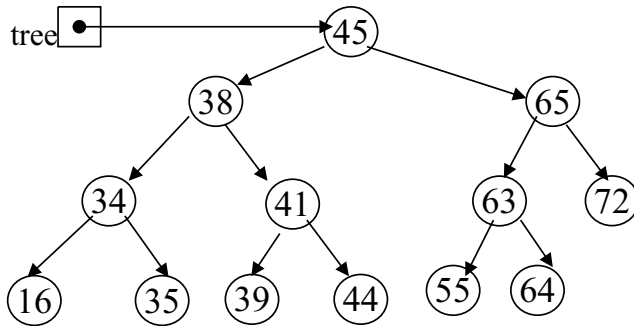


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CAN: 34208.

1. Given the following binary tree:



(a) What is the inorder traversal of the tree?

Left - Root - Right.

$16 \rightarrow 34 \rightarrow 35 \rightarrow 38 \rightarrow 39 \rightarrow 41 \rightarrow 44 \rightarrow 45 \rightarrow 55 \rightarrow 63 \rightarrow 64 \rightarrow 65 \rightarrow 72$

(b) What is the preorder traversal of the tree?

Root - Left - Right

$45 \rightarrow 38 \rightarrow 34 \rightarrow 16 \rightarrow 35 \rightarrow 41 \rightarrow 39 \rightarrow 44 \rightarrow 65 \rightarrow 63 \rightarrow 55 \rightarrow 64 \rightarrow 72$

(c) What is the postorder traversal of the tree?

Left - Right - Root

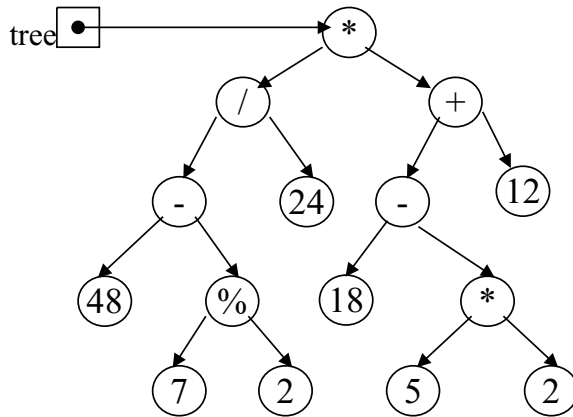
$16 \rightarrow 35 \rightarrow 34 \rightarrow 39 \rightarrow 44 \rightarrow 41 \rightarrow 38 \rightarrow 55 \rightarrow 64 \rightarrow 63 \rightarrow 72 \rightarrow 65 \rightarrow 45$

(d) What is the height of the tree? What nodes are on level 2?

Height: 3

$34 \rightarrow 41 \rightarrow 63 \rightarrow 72$ .

2. Given the following binary expression tree:



(a) What is the inorder traversal of the tree?

$$((48 - (7 \% 2)) / 24) * ((18 - (5 * 2)) + 12)$$

(b) What is the postorder traversal of the tree?

$$48 \ 7 \ 2 \ \% \ - \ 24 \ / \ 18 \ 5 \ 2 \ * \ - \ 12 \ + \ *$$

(c) What does it evaluate to if using integer division?

$$((48 - (7 \% 2)) / 24) = 1 \text{ and } ((18 - (5 * 2)) + 2) = 20 \therefore 1 * 20 = 20.$$

(d) What does it evaluate to if using float division? *It evaluates to 20.*

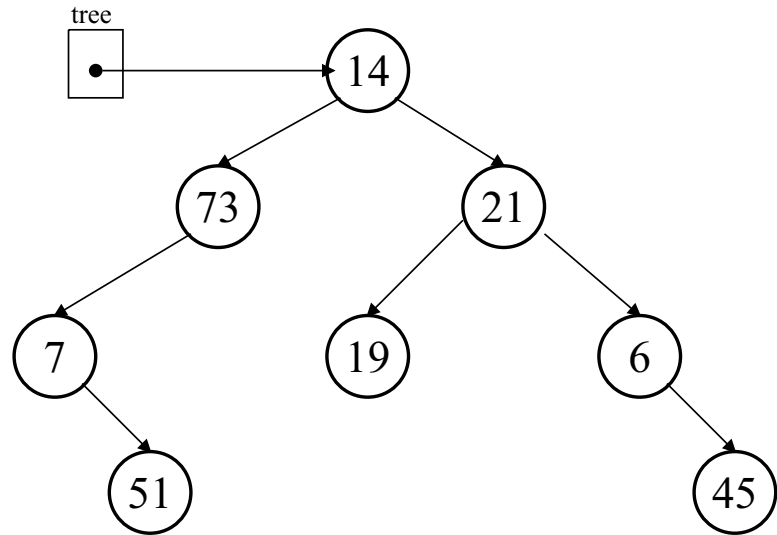
$$((48 - (7 \% 2)) / 24) = 1.958 \text{ and } ((18 - (5 * 2)) + 12) = 20.$$

$$\therefore 1.958 * 20 = 39.16.$$

$$\therefore \text{It evaluates to } 39.16.$$

3. The elements in a binary tree area to be stored in an array. Each element is a nonnegative int value.
- a. What value can you use as a dummy value, if the binary tree is not complete? null
- b. Show the contents of the array, given the tree illustrated below

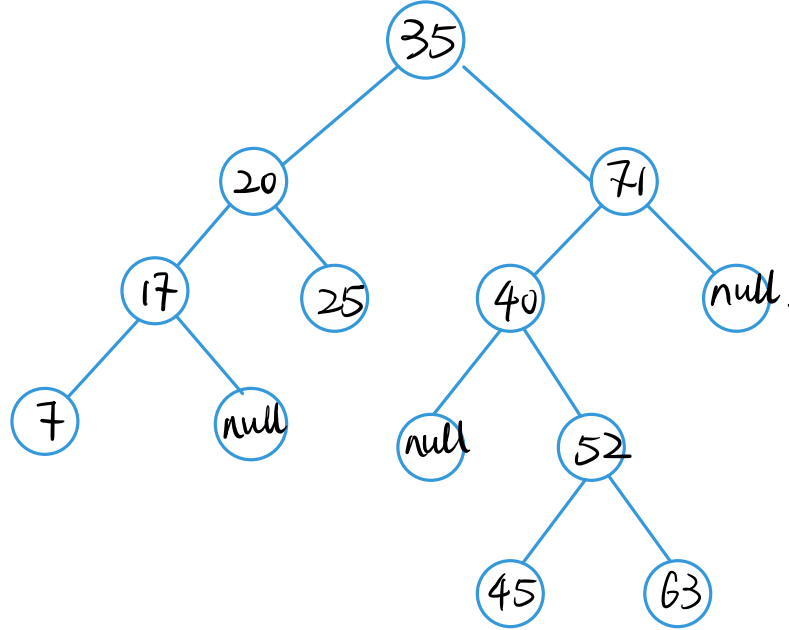
[0]	14
[1]	73
[2]	21
[3]	7
[4]	null
[5]	19
[6]	6
[7]	null
[8]	51
[9]	null
[10]	null
[11]	null
[12]	null
[13]	null
[14]	45



$2i + 1/2i + 2.$   
in an array.

4. Given the array pictured below, draw the binary tree that can be created from its elements.

[0]	35
[1]	20
[2]	71
[3]	40
[4]	52
[5]	63
[6]	null
[7]	17
[8]	25
[9]	null
[10]	7
[11]	null
[12]	45



$$2i + 1/2i + 2$$