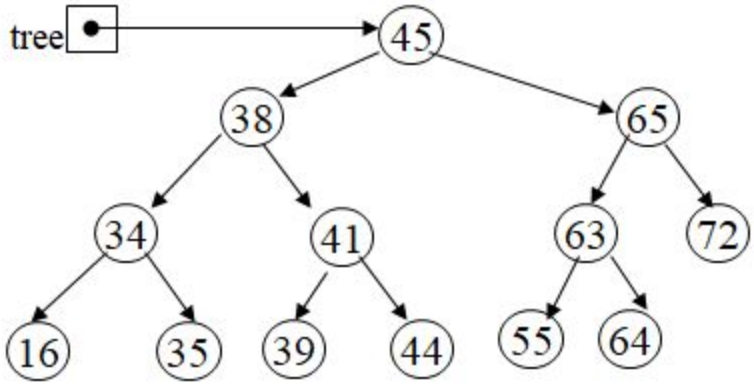
Raymond Karyshyn
March 26th, 2021
CMSC-204-33085

CMSC 204 - Trees Lab

Module 14 - "Trees, Binary Search Tree, & Balanced Search Trees"

Problem 1:
Given the following binary tree:



A. Inorder traversal:
`{16, 34, 35, 38, 39, 41, 44, 45, 55, 63, 64, 65, 72}`
B. Preorder traversal:
`{45, 38, 34, 16, 35, 41, 39, 44, 65, 63, 55, 64, 72}`
C. Postorder traversal:
`{16, 35, 34, 39, 44, 41, 38, 55, 64, 63, 72, 65, 45}`
D.
   i. Height: `4`
   ii. Nodes on Level 2: `{38, 65}`

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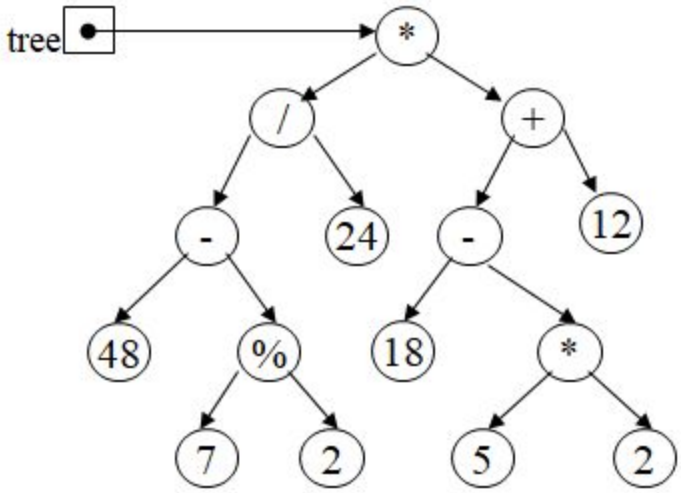
Problem 2:
Given the following binary expression tree:



A. Inorder traversal:
```
((48 - (7 % 2)) / 24) * ((18 - (5*2)) + 12)
```
B. Postorder traversal:
```
{48, 7, 2, %, -, 24, /, 18, 5, 2, *, -, 12, +, *}
```
C. Evaluate using integer division: `20`
D. Evaluate using float division: `39.1667`

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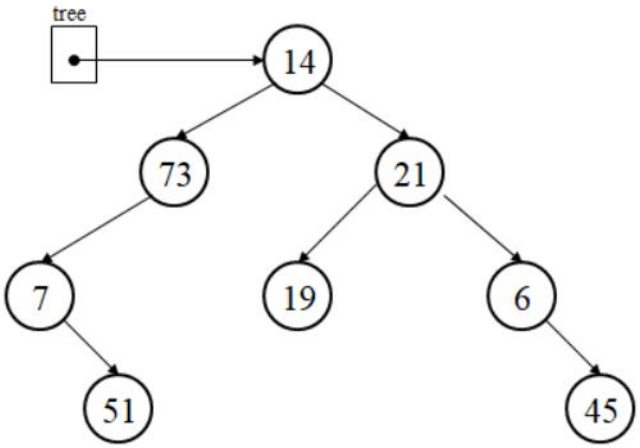
Problem 3:
The elements in a binary tree area to be stored in an array.
Each element is a nonnegative int value.

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

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Problem 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