Republic of the Philippines
CAVITE STATE UNIVERSITY
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DATA STRUCTURES AND ALGORITHM

Short Quiz

TREES

Score

Submitted by:

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Submitted to:

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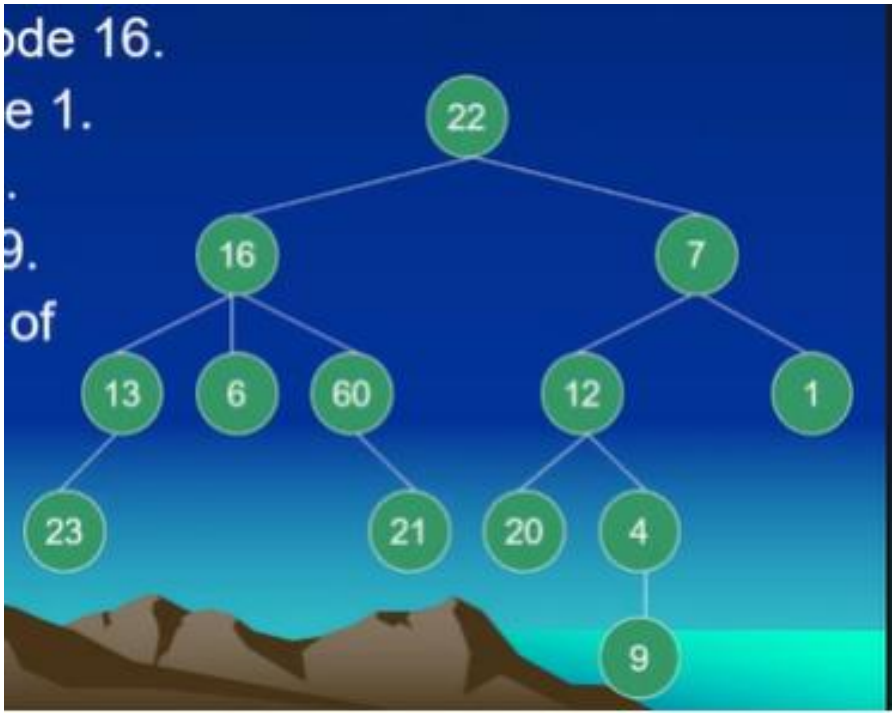

6. Children of Node 16.

-13, 6, 60

7. Parent of node 1.

-7

8. Siblings of 23.

-No Siblings.

9. Ancestors of 9.

-22, 7, 12, 4

10. Descendants of 16.

-13, 6, 60, 23, 21

11. Leaves.

    -23, 6, 21, 20, 9, 1

12. Non-leaves.

    -22, 16, 7, 13, 60, 12, 4

13. Depth of node 4.

    -Depth 3

14. Degree of the tree.

    -3

15. Height of the tree.

    -4

16. Weight of the tree.

    -6

17. Is the tree a binary tree?

    -No, due to the degree of the given tree is not equal to 2

18. Removing 6, is the tree a full binary tree?

    -No because some node exhibit a degree of 1

19. Removing 6, is the tree a complete binary tree?

    -No as stated above it will not be a complete binary tree due to some node have a degree of 1

20. Is a full binary tree complete?

    -No, A full binary tree is where each node is either a leaf or has a degree of 2 however the depth of its leaves can be different with it can't be concluded as complete binary tree.

21. Is a complete binary tree full?

A complete binary tree is full because each node is either a leaf or a branch. or has a 2 degree. Moreover, the internal nodes in a complete binary tree is exactly equal to 2 as a result, a complete binary tree can also be a full binary tree.

22. How many leaves does a complete *n*-ary tree of height *h* have?

-number of leaves = n^h

23. What is the height of a complete *n*-ary tree with *m* leaves?

-The height of a complete n-ary tree = $\log_n m$.

24. What is the number of internal nodes of a complete *n*-ary tree of height *h*?

-The number of internal nodes is:

$$1 + n + n^2 + \cdots + n^{h-1} = \sum_{i=0}^{h-1} n^i = \frac{n^h - 1}{n - 1}$$

25. In order for us to get the total number of nodes of a complete n-ary tree of height h , we need to combine the number of leaves and the number of internal nodes of the tree.

$T = n^h + \frac{n^h - 1}{n-1}$; $\boldsymbol{Where\ T = total\ number\ of\ nodes\ in\ a\ complete\ n-ary\ tree}$