What is a Binary Tree?

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What is a Binary Tree?

In the last lecture, we started our new chapter, trees. There, we saw the basics of trees, their structure, and some of the terminology that we would need to know to understand what was to come. In this lesson, we will learn about a special kind of tree called the binary tree.

Before we proceed to learn what binary trees are, we'll give ourselves a quick revision of what we learned in the previous lecture.

1. A tree is made up of nodes and edges.
2. The topmost node is called the Any node which points to another node, is the **parent** of that node and the node which the parent is pointing at is the **child** of that parent node. And nodes having the same parents are called **siblings** of each other.
3. Nodes having zero children are the **leaf nodes or the external nodes**, and nodes having at least one child are the **internal nodes**.
4. **Ancestors** of a node are the nodes accessible by traversing upwards along the edges. They are either the parents or the parents of the parents.
5. **Descendants** of a node are the nodes accessible by traversing downwards along the edges. They are either the children or the children of the children.
6. **Height** of a node is the number of edges in between the deepest leaf and that node. And **depth** of a node is the number of edges between the root and that node.

Apart from these, there are a few additional points that I would like to add.

1. A tree with **n** nodes has **n-1** Why n-1?

Because in a tree, there is one and only edge corresponding to all the nodes except the root node. The root node has no parent, hence no edge pointing to it. Therefore, a total of n-1 edges.

2. The **degree of a node** in a tree is the number of children of a node.
3. The **degree of a tree** is the highest degree of a node among all the nodes present in the tree.
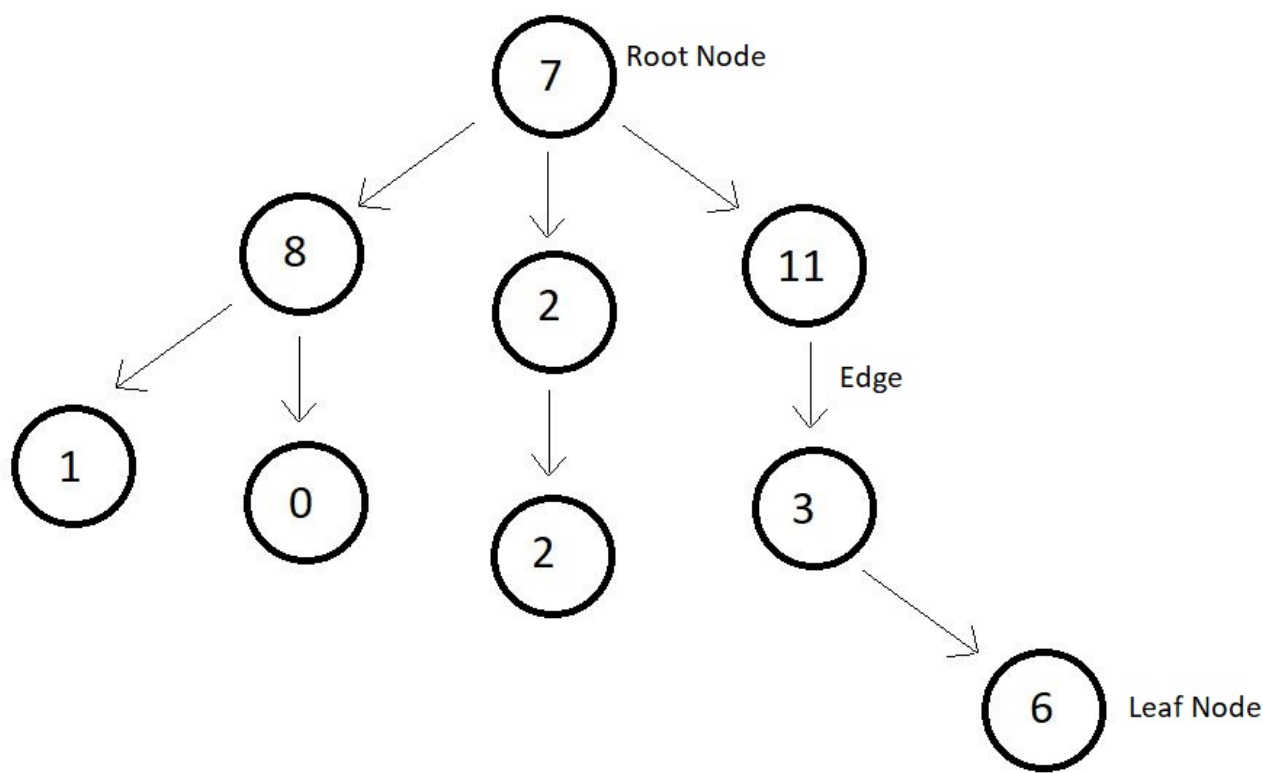
In the above tree, the number of nodes is 9, and hence the number of edges are 8. You can even count and verify the fact that a tree with n nodes has n-1 edges. Moreover, the highest degree of a node is that of the root node, which has 3 children. Hence the degree of the tree is also 3.
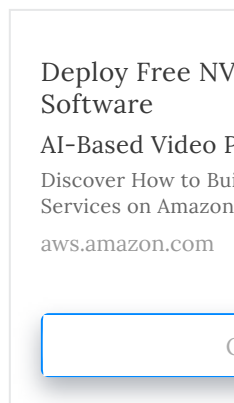
Binary Tree

A binary tree is a special type of tree where each node has a degree equal to or less than two which means each node should have at most two children.
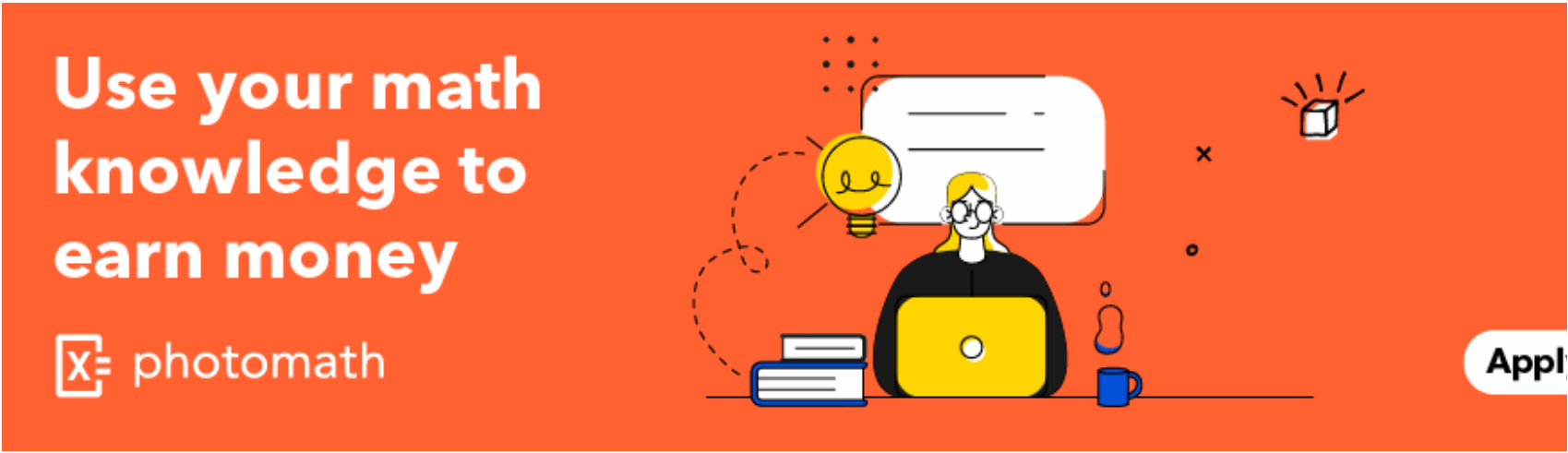
Few examples of a binary tree are mentioned below:
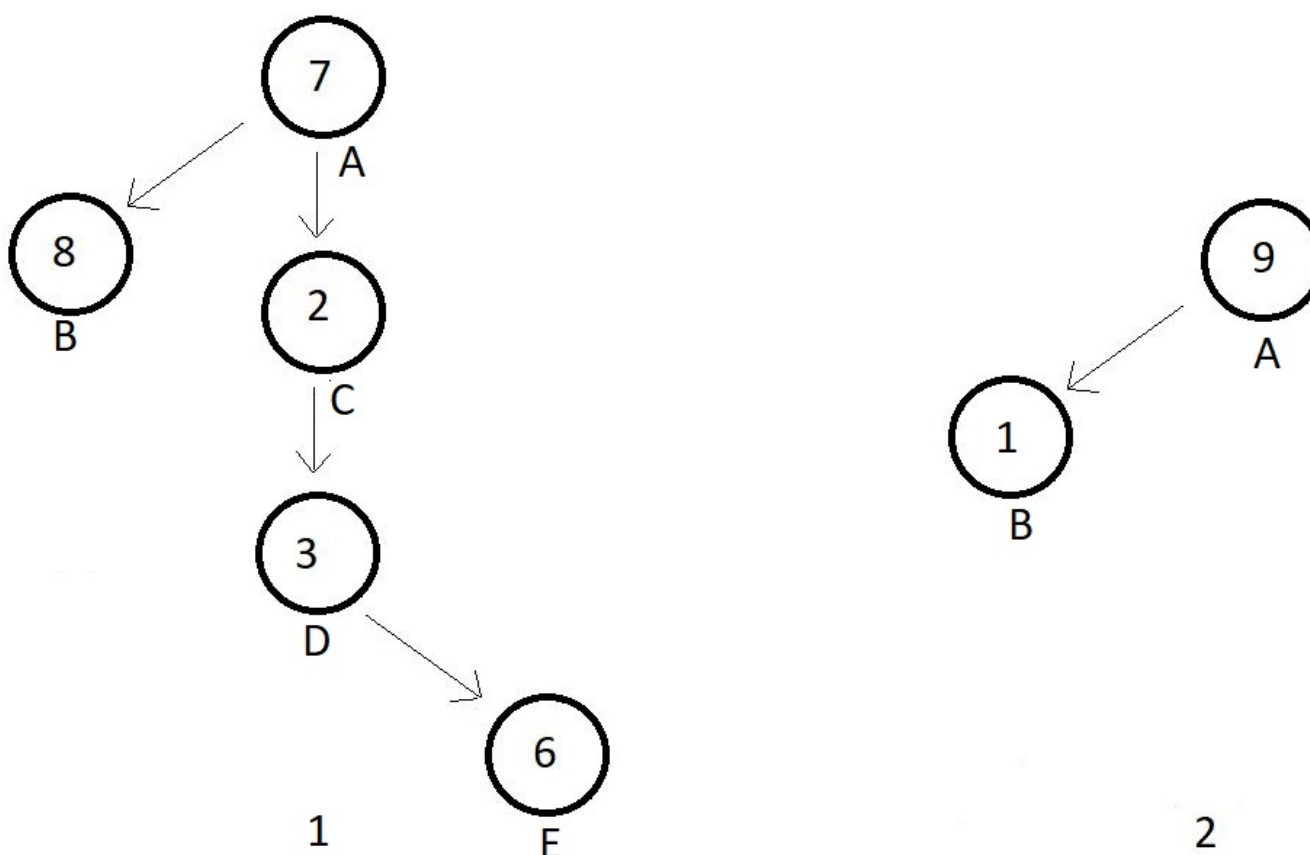
Example 1 has nodes A, B, C, D, E with degrees {2, 0, 1, 1, 0} respectively which satisfies the conditions for a binary tree. Similarly, example 2 has nodes A and B, having degrees 1 each, hence a binary tree.

This was the introduction of a binary tree. We have introduced to you both a simple and a binary tree. If you feel like anything is missing, you can always pin that out in the comment section. We are looking forward to your responses. We will see more in the following lectures.

I appreciate your support throughout. I hope you enjoyed the tutorial. If you genuinely appreciate my work, please let your friends know about this course too. If you haven't checked out the whole playlist yet, move on to codewithharry.com or my YouTube channel to access it. See you all in the next tutorial where we'll further learn about the types of binary trees we have. Till then keep coding.

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