Full Binary Tree:
no child is a single child

Announcements

MP4 available, due , 11:59p.

Perfect Binary tree -

Perfect tree of height h, P_h:

- if h= -1, then P_h is {}
- if h > -1, then P_h is {r, T_L, T_R}, where T_L and T_R are P_{h-1}.

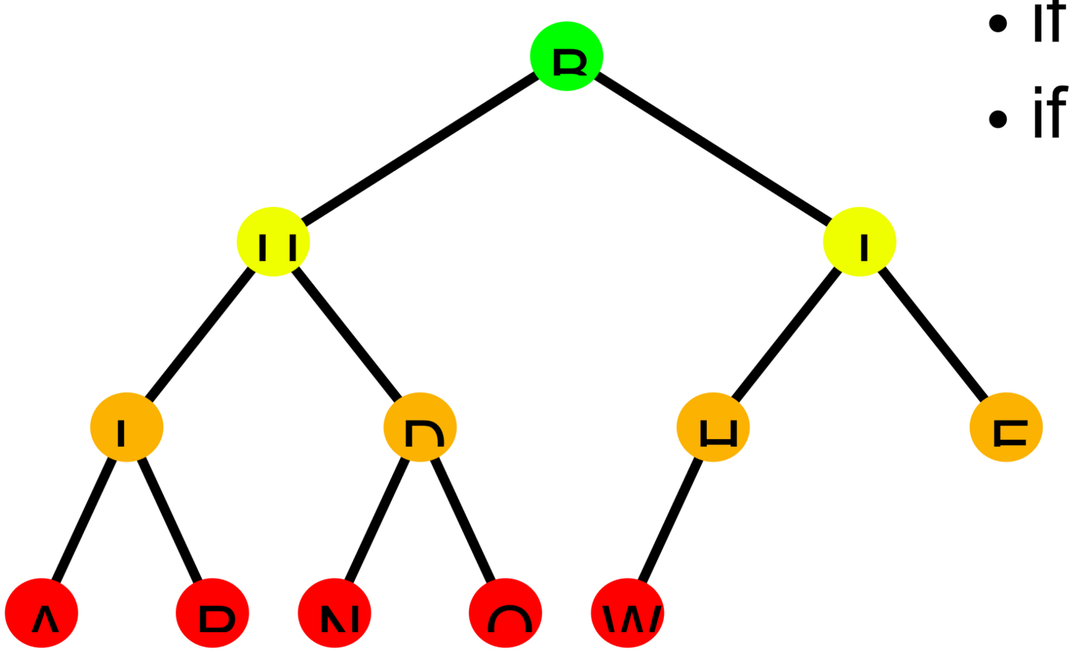
P_0:

P_2:

P_1:

Q: What is the minimum number of nodes in a - perfect tree of height h?
- in a full tree of height h?

Complete Binary tree: for any level k in [0,h-1], level k has 2^k nodes, and on level h, all nodes are pushed to the left.



Complete tree of height h, C_h:

- if h= -1, then C_h is {}
- if h > -1, then C_h is {r, T_L, T_R}, and either:

T_L is _____ and T_R is _____

OR

T_L is _____ and T_R is _____

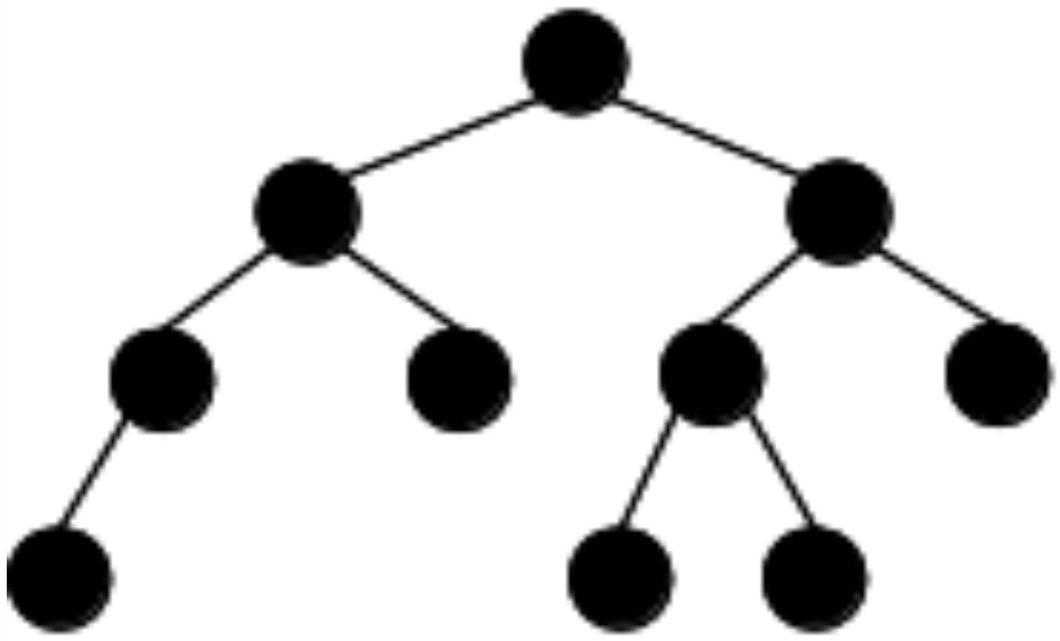
http://xlinux.nist.gov/dads//HTML/completeBinaryTree.html

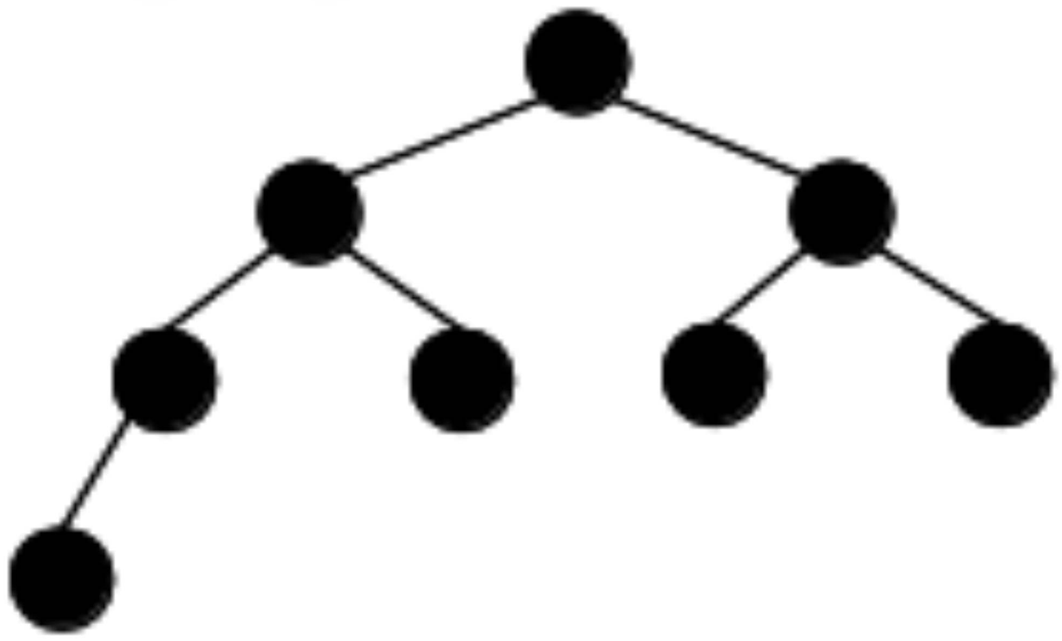
Check for understanding:

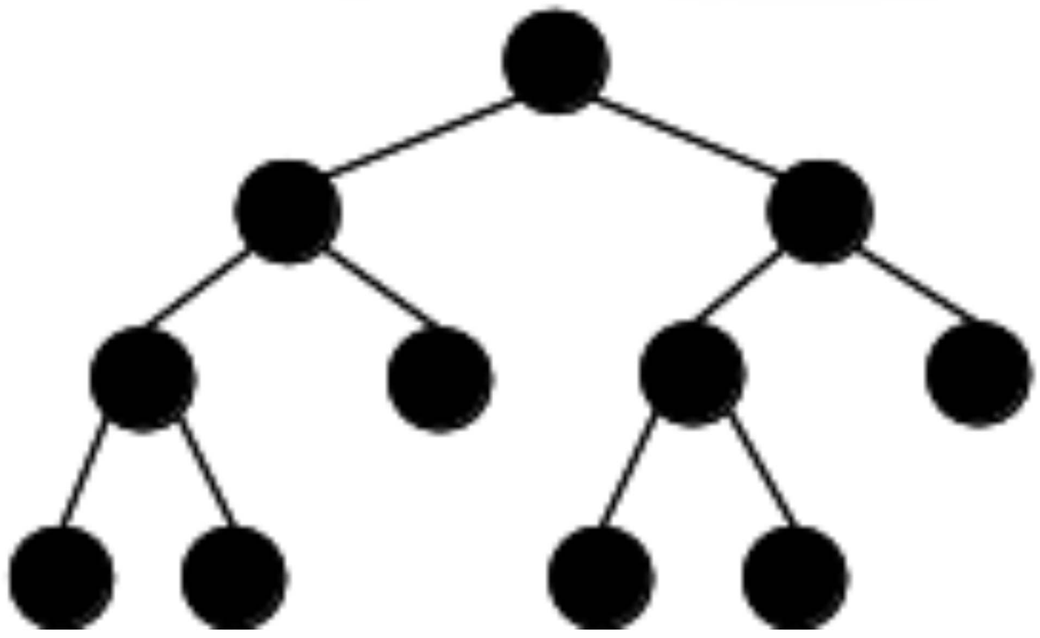
Is every full tree complete?

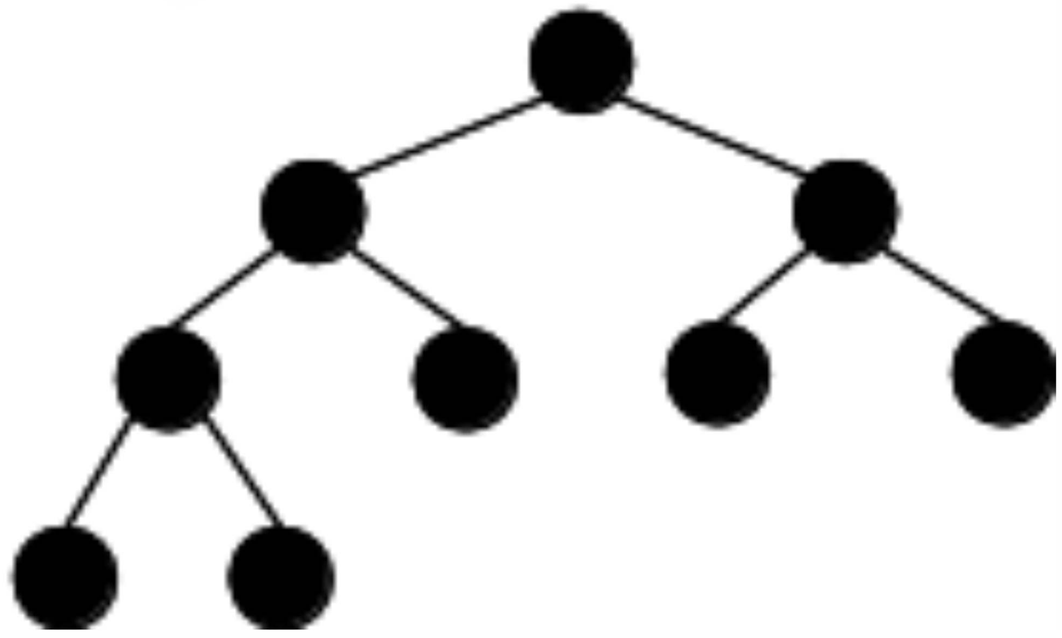
Is every complete tree full?

Mark each full, complete and perfect binary tree.

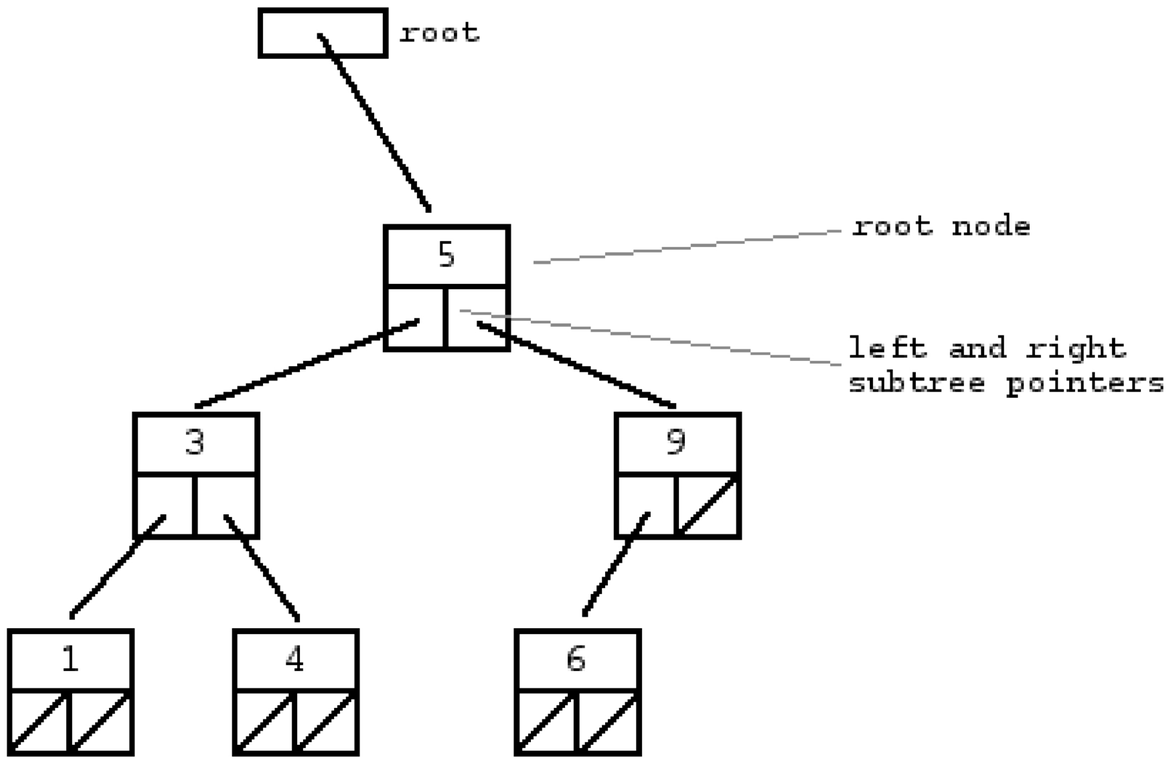








Rooted, directed, ordered, binary trees

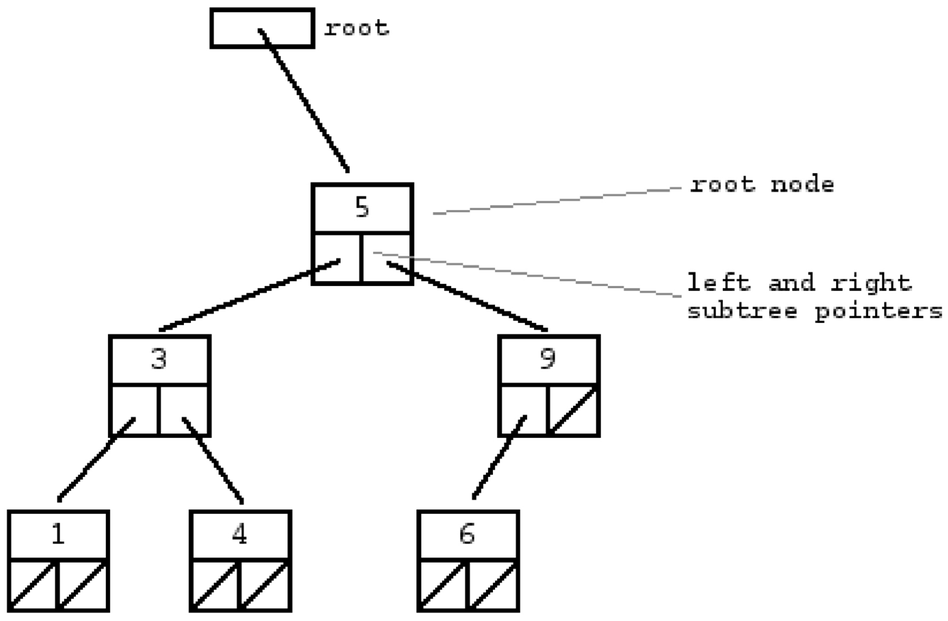


Tree ADT:

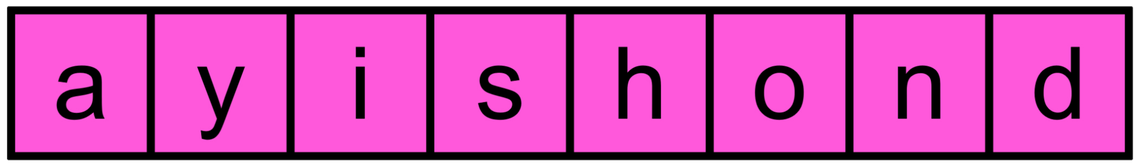
- insert
- remove
- traverse

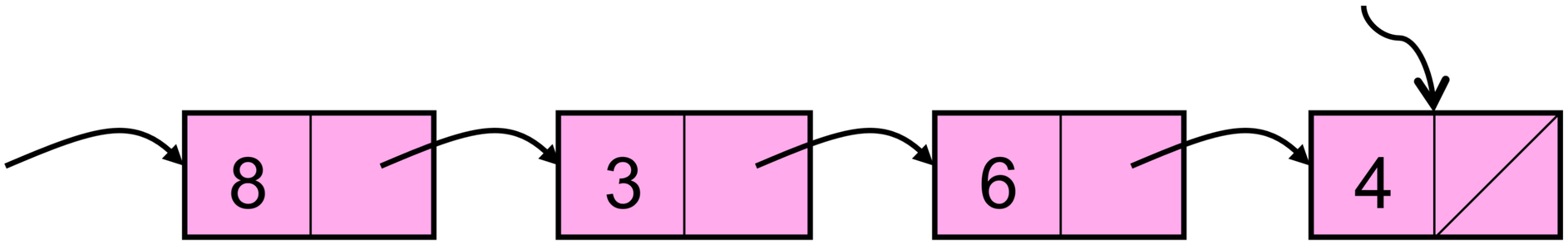
```
template <class T>
class tree{
public:
…
private:
    struct treeNode{
        T data;
        treeNode * left;
        treeNode * right;
    };
    treeNode * root
…
};
```

Theorem: if there are n data items in a binary tree, then there are _____ null pointers.



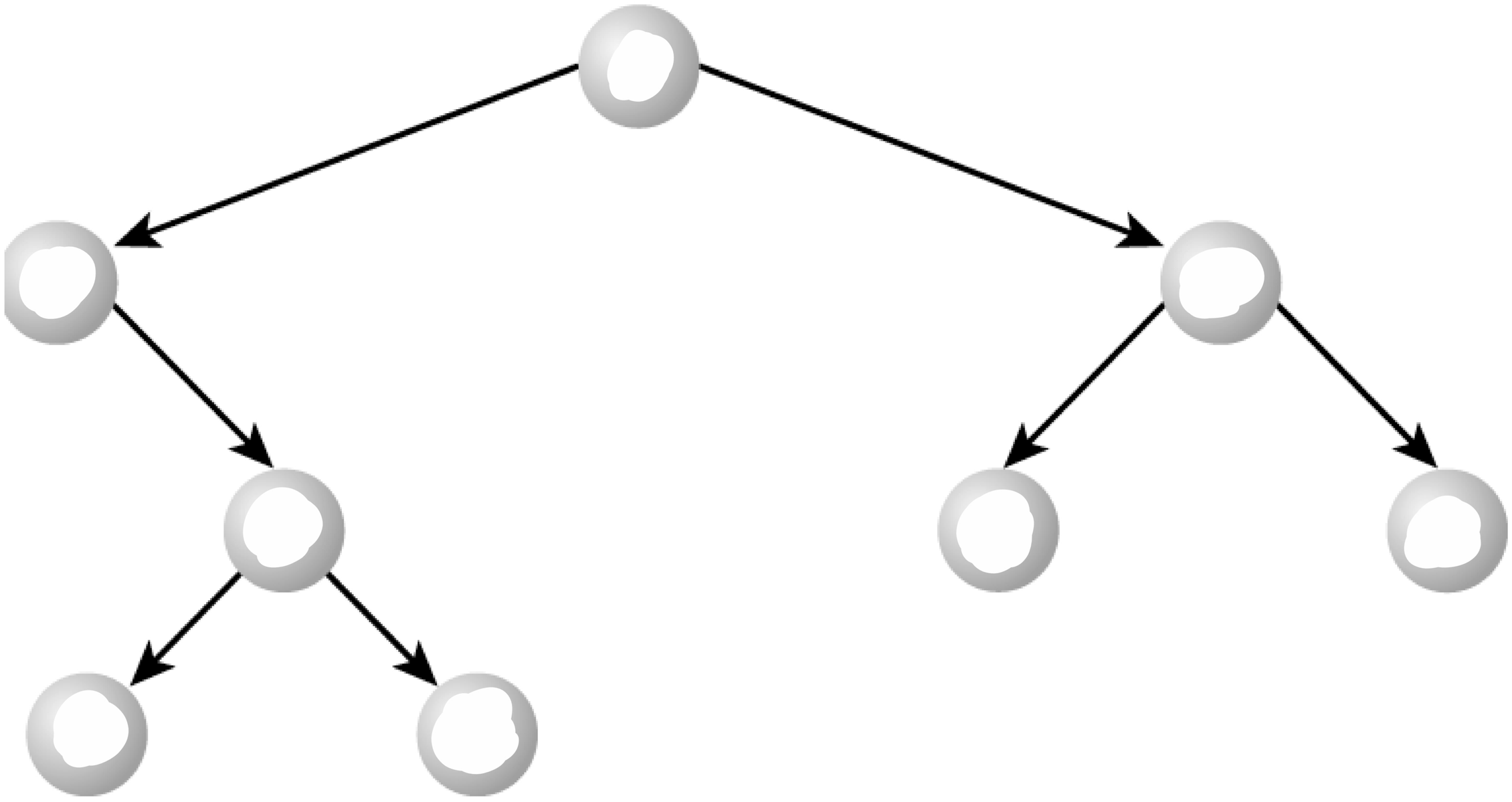
Traversal – scheme for processing all the data in the structure...



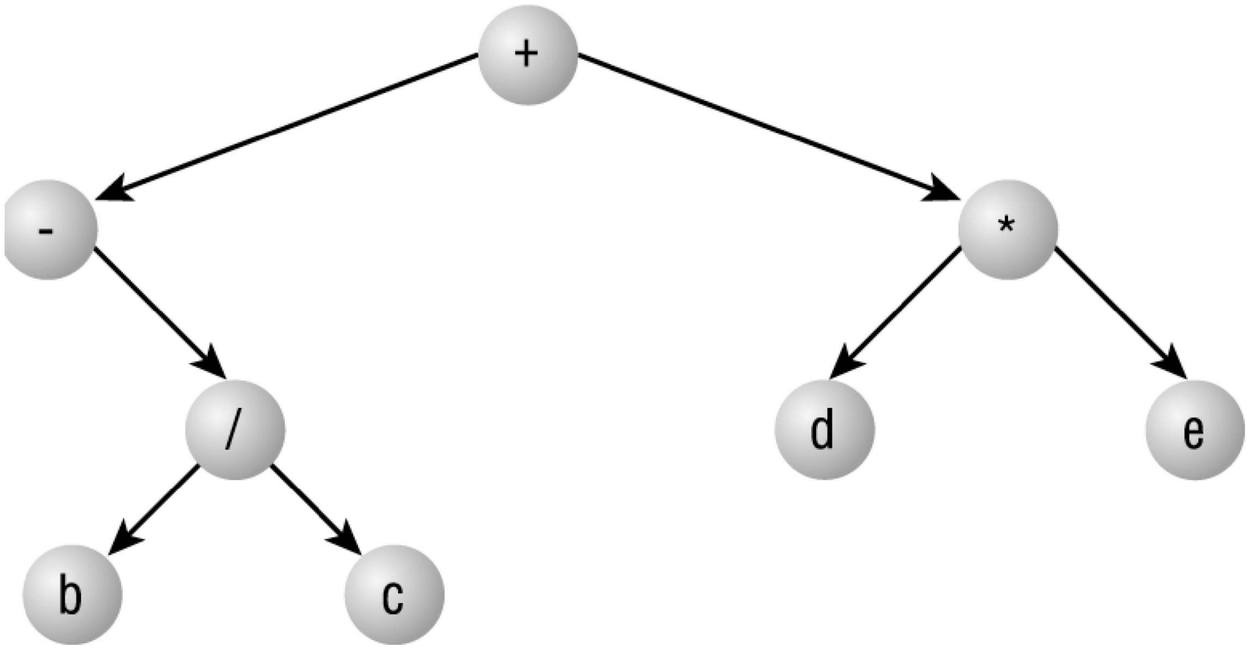


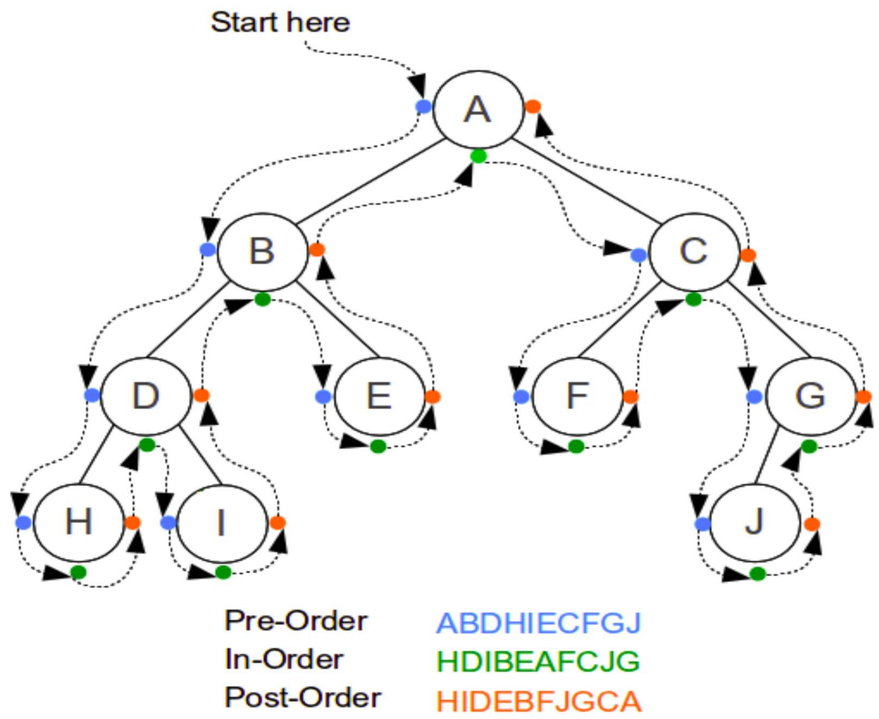
Traversal – scheme for visiting every node.

http://www.qmatica.com/DataStructures/Trees/AVL/AVLTree.html



Traversal – scheme for visiting every node.





- At each node, two choices for direction (left, right)
- After both subtrees of a node are complete, move back up tree
- Each node is “visited” 3 times in a traversal.
- Each of those visit times corresponds to a particular kind of traversal.

http://nova.umuc.edu/~jarc/idsv/lesson1.html