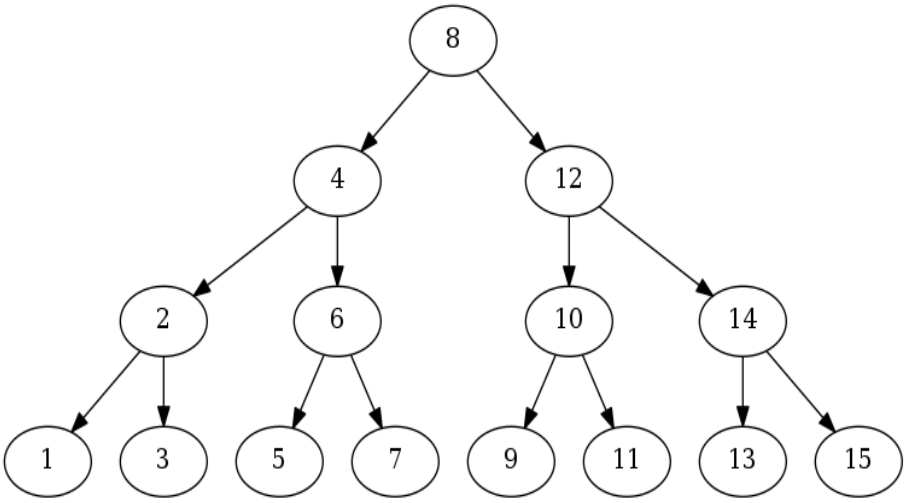
Concept Application & Algorithmic Part

Question 1: (20 points)

Suppose we have the following Binary Search Tree (BST).



Algorithm Write up. Write an algorithm to determine the nodes at k given distance from root.

Example -
Nodes at distance 2 from root=> 2, 6, 10, 14
Nodes at distance 1 from root=> 4,12
Nodes at distance 3 from root=> 1, 3, 5, 7, 9, 11, 13, 15

Algorithm:

- Invoke recursive method
- Input (level, root)
- Define base case (Termination Condition)
  If (root == null) { return }
- If (level == 0) { Print root.number }
  Else
  Repeating the method by its generic formula
  { Print (root.left, level-1)
  Print (root.right, level -1) }

Question 2: (20 points)

Using the same BST tree in Question 1, show the complete tracing of **Parent()** method (given in the code of BST slides) to find the parent of the node that stores the value **13**. You are required to show the complete tracing (drawing or boxes) of this method.

```
public BSTnode parent(BSTnode p) {
        return parent(root, p);
        }
private BSTnode parent(BSTnode root, BSTnode p) {
        if (root == null || root == p)
        return null;
        if (root.getLeft()==p || root.getRight()==p)
        return root;
        if (p.getData()< root.getData())
        return parent(root.getLeft(), p);
        else if (p.getData() >root.getData())
        return parent(root.getRight(), p);
        else return null;
```