CO322 Data Structures & Algorithms

Lab 05 – Trees

Task 1

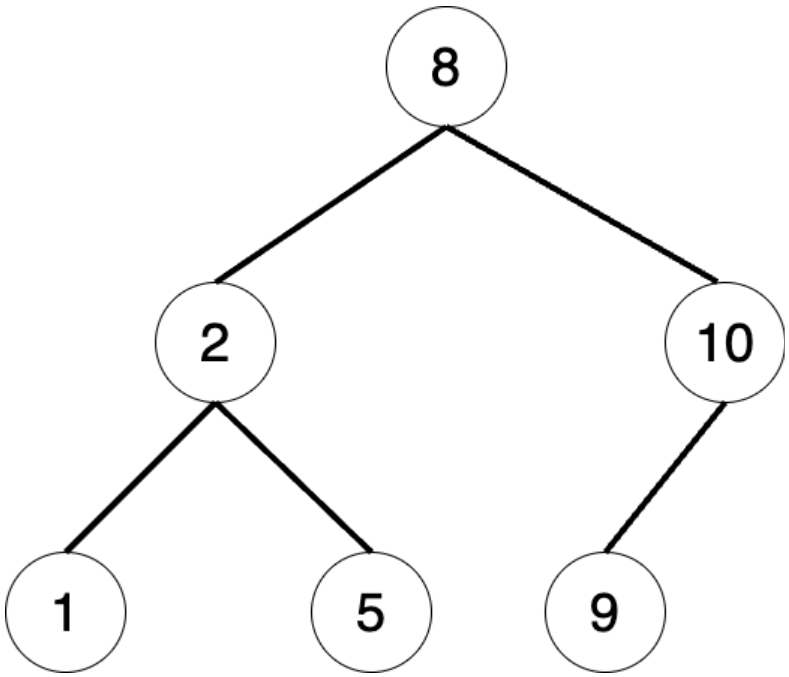
Have a look at the following Java class for an AVL tree node.

```
class Node
{
        int key, height;
        Node left, right;

        Node(int d)
        {
                key = d;
                height = 1;
        }
}
```

The height of a node is calculated as the height of the taller of its subtrees + 1. When a node is created, its height is initialized to 1.

Consider the given AVL tree below.



1. Implement the above AVL tree using the given Node class.
2. Write methods for tree traversal:
    Pre-order
    In-order
    Post-order
   Write a main method to demonstrate these traversals on your AVL tree.
3. Implement AVL tree operations,
    Insert a node
    Remove a node
    Search for a value
   Write a main method to demonstrate these operations.

Task 2

1. Implement a min-heap using an array. The maximum size of the heap is passed in at the time of construction. For each element i, the left child is at 2i + 1 position and the right child is at 2i + 2 position.
2. Write a main method and demonstrate insertion and removal from the heap.