Assignment 3

Problem statement :

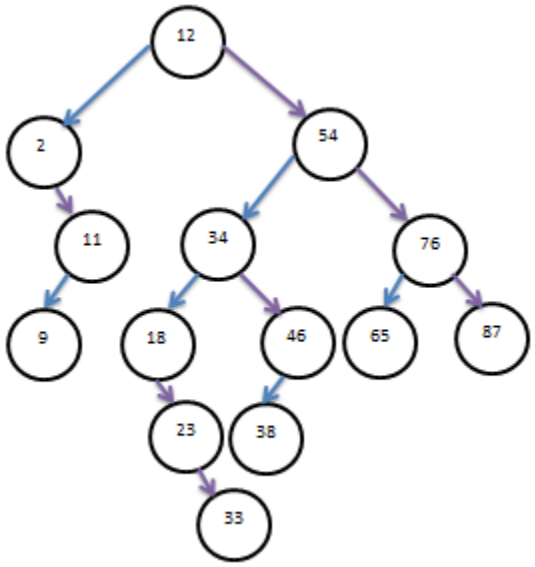
Write a program to delete an item from Binary Search Tree.

1. Make a BST with the following numbers:
   12 54 34 76 46 2 18 38 23 11 9 87 33 65
   show the resulting tree

2. Delete 54
   Show the resulting tree

Solution :

The Binary Search Tree looks as below:



A pre-order traversal of the same should give the following result:
12 -> 2 -> 11 -> 9 -> 54 -> 34 -> 18 -> 23 -> 33 -> 46 -> 38 -> 76 -> 65 -> 87

Deletion of a node :

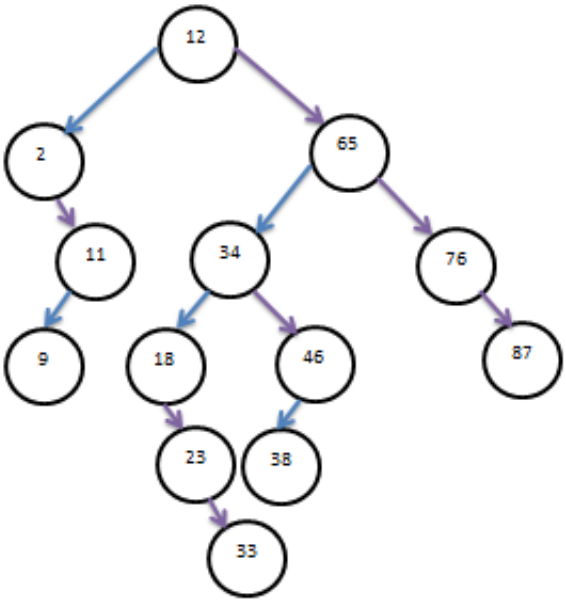
While deleting a node from a Binary Search tree, we can consider the following three cases:

(i) If the node is a leaf node(without any children) – Then, the node can be just deleted by freeing the memory.

(ii) If the node has one child – Then, the node can be deleted after linking the child to the parent

(iii) If the node has two children – Then the node can be swapped with
   a. Minimum node in the right subtree or
   b. Maximum node in the left subtree

Deletion of node 54 would result in a tree as below:



A pre-order traversal of the above tree should give the below result :
12 -> 2 -> 11 -> 9 -> 65 -> 34 -> 18 -> 23 -> 33 -> 46 -> 38 -> 76 -> 87