Report on Lab4/Array implementation of binary search tree

There are four files altogether; BST.h arrayBST.cpp arrayBST.h and main.cpp

1. **BST.h**: This file contains the class definition for nodes of BST and BST. The node class has two data members; key and value. The BST class is an interface class and has six pure virtual methods: isEmpty, add, search,remove, largest and smallest.

2. **arrayBST.h**: This file contains class arrayBST publicly derived from the class BST. This class has three additional data members; rightSubtreeIndex, leftSubtreeIndex and an array of nodes.

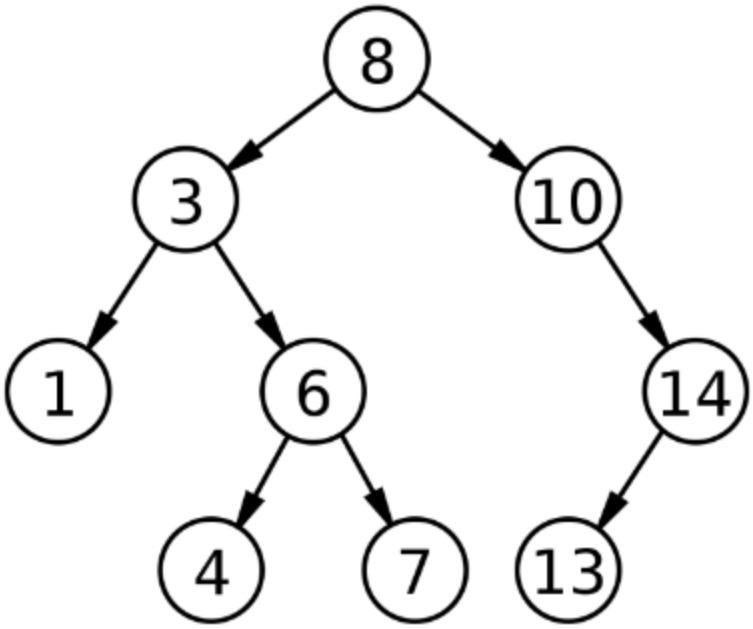
3. **arrayBST.cpp:** This file contains the definition of functions included in header files arrayBST.h and BST.h. The methods defined here are as follows:

    - isEmpty: This method checks if the given root is empty.
    - Add: This method inserts a new node to the BST.
    - Largest: This method searches for the largest key in the tree and returns the index of node which has the largest key.
    - Smallest: This method searches for the smallest key in the tree and returns the index of node which has the smallest key.
    - Search: This method returns true if the given key is found in the BST.
    - Remove: This method removes a node from the tree

    The other methods defined in this file are the constructors and destructors of class node and arrayBST.

4. Main.cpp: This file contains the main function where array BST is implimented. Firstly, an arrayBST ‘A’ is created. Then some nodes are created and added to the BST. Then the contents of BST are displayed. Then the keys “14” and “99” are searched and a key “10” is removed. Finally the contents of BST are again displayed to make sure that the key “10” is removed.

The arrayBST used in the program is:



The above BST in array:

Before removing 10	0	8	3	10	1	6	0	14	0	0	4	7	0	0	13	0
After removing 10	0	8	3	13	1	6	0	14	0	0	4	7	0	0	0	0

Note: in removing the node same block of code has been used for single child and two children conditions.

Output: