

## Question - 1

SCORE: 10 points

## Question 1

Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?

- ☐ 7 5 1 0 3 2 4 6 8 9
- ☐ 0 2 4 3 1 6 5 9 8 7
- ☒ 0 1 2 3 4 5 6 7 8 9
- ☐ 9 8 6 4 2 3 0 1 5 7

## Question - 2

SCORE: 10 points

## Question 2

The following numbers are inserted into an empty binary search tree in the given order: 10, 1, 3, 5, 15, 12, 16. What is the height of the binary search tree ?

The height is the maximum distance of a leaf node from the root, with the leaf and root included.

- ☐ 2
- ☒ 3
- ☐ 4
- ☐ 6

## Question - 3

SCORE: 30 points

## BST

Implement binary search tree Insert and Search operations.

The first line of the input is number of operations that will happen.  
The subsequent lines represent the operation and key, value pair.

Sample Input1:  
4 // number of operations

```
1,5 //(operation,nodeValue)
1,1
1,3
2,3
```

Sample Output1:  
true

Sample Input2:  
4 // number of operations  
1,5 //(operation,nodeValue)  
1,1  
1,3  
4

Sample Output2:  
3

Types of Operation:  
1 -> insert (inserts an element into the tree)  
2 -> search (returns true/false depending on whether or not the value is found)  
3 -> isEmpty (returns true for an empty tree else false)  
4 -> countNodes (returns number of nodes in the tree)  
5 -> preorder traversal  
6 -> inorder traversal  
7 -> postorder traversal