Complexity for genData():

In this function, the loop run n times and everytime it insert a random value in a vector. So, complexity of loop is O(n) and complexity of random number generating is constant. So, the overall complexity of this function is O(n).

Complexity for makeBST():

The for loop runs until the list is not empty which is n times. The complexity of this loop is O(n). Inside the for loop, it insert the list in binary search tree by calling the insert function. Complexity for insert in BST is log(n) because half the node every time and insert value in the tree in the best case. So, total complexity for best case is O(nlogn).

Complexity for print()

This function calls two functions , inorder and preorder. The complexity of inorder is O(n) because it go through every node in a BST and print the data. The complexity for preorder is also same. So, the total complexity for this function is O(n) + O(n) = O(n).

Complexity for height()

This function calls getHeight function in bst. The complexity of this function is

$T(n) = 2T(n/2) + c$ [c is constant]

$= 2(2T(n/4 + c) + c$

……

$= 2^kT(n/2^k) + n(c)$ $[T(n/2^k) = T(1) = 1]$

$= \log(n) + n(c)$

$= n$

So, complexity for this function is O(n)