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## Final Project

### Binary Search Trees

#### 1 Problem Statement

In this assignment, you are required to implement a spell checking system based on a binary search tree. You will be given a file containing all language words. The file would contain one word per line.

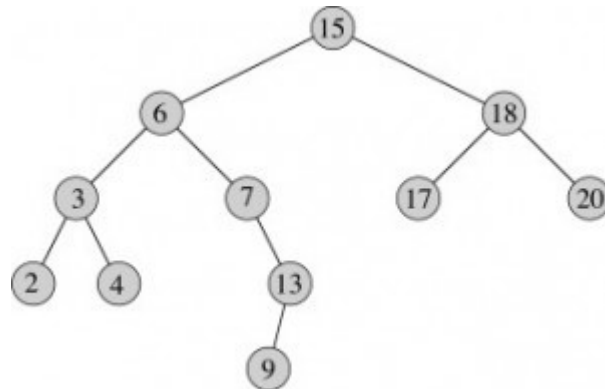
When the program starts the input file should be loaded and each word should be inserted in the binary search tree then you will ask the user to choose an option to achieve what user wants to do (will be described in part 3).

#### 2 Definitions

In Binary Search Tree, the inorder successor of an input node is defined as the node with the smallest key greater than the key of the input node.

Similarly, the inorder predecessor of an input node is defined as the node with the largest key smaller than the key of the input node.

## Example:



- In above binary search tree, in-order successor of 18 is 20, successor of 6 is 7 and successor of 13 is 15.
- In above binary search tree, in-order predecessor of 18 is 17, predecessor of 6 is 4 and predecessor of 13 is 9.

### 3 Application

- You will be given the path of the file containing the language words and by default you should insert those words into a Binary Search Tree
  
- **You should provide a menu asking user for the following options:**
  1. Print tree using in order traversal
  2. Print tree using post order traversal
  3. Print tree using pre order traversal
  4. Print tree size (number of words loaded in the tree)
  5. Print tree using BFS Traversal
  6. Print tree height
  7. Search for a word
    - (a) If the word exists, you will print that the word is correct.
    - (b) If the word does not exist, you will print three suggestions for the correct word:
      1. The word in the leaf node you reached before declaring that the word does not exist.
      2. The word in the inorder predecessor of that leaf node.
      3. The word in the inorder successor of that leaf node.
  8. Insert new word in the tree (user will enter the word and you should check first if the word exists or not before adding it.