IC250 Lab 9

1. Create two binary search trees (BST) of integers. Read the input from a file. There are two input files: `random.txt` and `sorted.txt`. Each will result in two trees: `trand` and `tsort`. Perform the following operations:

   (a) Determine the height of `trand` and `tsort`.

   (b) Search for elements in the tree. The elements to be searched is specified in the file `search.txt`. How many comparisons are needed for each item to be searched? Plot the number of comparisons needed for `trand` and `tsort`. The X-axis will be the serial number of the number to be searched, and the Y-axis will be the number of comparisons needed.

2. Read an input arithmetic expression having only binary operators. Build an expression tree as a binary tree. Determine the inorder, preorder and postorder traversals of the expression tree. The input expressions will be in the infix form, for example:

$$a + b * c$$

$$a * b + c/d - g$$

   The number of variables can be arbitrary, and the only four common arithmetic operators need to be considered. Parenthesis need not be considered. You will require to convert the infix expressions to postfix to build the expression tree.

3. **Optional.** Evaluate the expression using a stack. For this, you will need to give values to the variables.(*3 marks*)