Data Structure Assignment 3 – Tree

Task 1: Binary Search Tree

Given the serial positive numbers, please build a binary search tree and output the inorder and postorder traversals.

- Input Format:
  - The first line represents the amount of the input series.
  - Starting from the second line, each line represents a serial input of a binary search tree.
  - All input ends with a new line "\0"
  - The numbers in a serial input are positive integers (0 < number < 100), and they are separated by a white blank.
- Output Format:
  - For each serial input, output its inorder and postorder traversals, respectively.

Input1.txt	Output1.txt
3 7 3 2 8 5 9 4 58 90 34 12 99 15 26 1 67 49	Inorder: 2 3 4 5 7 8 9 Postorder: 2 4 5 3 9 8 7 Inorder: 12 34 58 90 Postorder: 12 34 90 58 Inorder: 1 15 26 49 67 99 Postorder: 1 49 67 26 15 99

Task 2: The Huffman Algorithm

Given the frequencies of the symbols in the message, please implement the Huffman algorithm and output the Huffman code of each symbol. The values of left branches are 0, and the values of right branches are 1. Please make sure that the value of the right node is always larger or equal than the value of the left node to ensure the binary tree is unique. If you do not follow the above rule to build up the binary tree, you will lose the point.

- Input Format:
  - Each line shows the frequencies of the symbols in a message.
  - The symbols are the uppercase English letters.
  - The maximum frequency of a symbol is 50.

- The input ends with new line.

- Output Format:
  - For each message, output the Huffman code of each symbol.

Input2.txt	Output2.txt
A:6,B:5,C:4,D:2,E:1 A:5,B:12,C:33,D:19,E:40,F:41	A:11,B:10,C:01,D:001,E:000 A:0100,B:0101,C:00,D:011,E:10,F:11

Note:

1. You can use C or C++ as your programming language.
2. Your program must include some comments to help others understand your program.
3. Please make sure your program can read the input file, and write the result to the output file automatically.
4. TA will use the version of the compiler "G++ follow the C++11 ISO C++ language standard [-std=c++11]" and G++ v7.1.0 on Windows system. It is recommended to build your program on the same environment.

Pack up the files below, and name it as "**studentID_studentName.rar**"

1. Two source code file (filename: StudentID_1.c, StudentID_2.c)
2. One report (filename: StudentID.pdf)
3. Two output file (filename: Output1, Output2.txt)

The report must include the programming language, programming environment(i.e. IDE), the version of the complier and the description of the program. Besides, you can add anything you want to share, such as the problems you encountered.

Deadline: Dec. 12 12:00 p.m.

Warning: You are encouraged to discuss homework assignments with each other. However, you are individually responsible for the homework assignments. Do not copy his/her assignment, or both of you will not get any point.