Data Structure Homework 6

繳交期限： 2020/11/27 17:00 前

補交期限(7 折)： 2020/12/4 17:00 前

手寫題：

8. Find a binary tree whose preorder and inorder traversals create the same result.

16. Find the root of each of the following binary trees:
    a. tree with postorder traversal: FCBDG
    b. tree with preorder traversal: IBCDFEN
    c. tree with inorder traversal: CBIDFGE

18. A binary tree has eight nodes. The postorder and inorder traversals of the tree are given below. Draw the tree.
    Postorder: FECHGDBA
    Inorder: FCEABHDG

26. Find the infix, prefix, and postfix expressions in the expression tree of Figure 6-27.

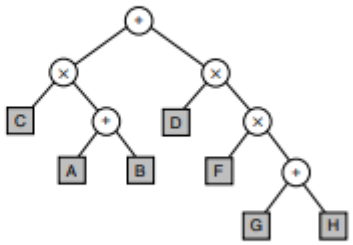

FIGURE 6-27 Expression Tree for Exercise 26

28. Draw the expression tree and find the infix and postfix expressions for the following prefix expression:

```
× - A B + × C D / E F
```

36. Write an algorithm that determines whether a binary tree is complete.

40. Rewrite the binary tree postorder traversal algorithm using a stack instead of recursion.

請記得考慮 empty tree 的情況

程式題：

48. Write the C implementation for the Huffman algorithm developed in Project 47. After it has been built, print the code. Then write a C program to read characters from the keyboard and convert them to your Huffman code. Include a function in your program that converts Huffman code back to text. Use it to verify that the code entered from the keyboard was converted correctly.

參考資料: Project 47 (即附件 “Hw6.txt”):

47. Write a pseudocode algorithm to build a Huffman tree. Use the alphabet as shown in Table 6-3.

Character	Weight	Character	Weight	Character	Weight
A	7	J	1	S	6
B	2	K	1	T	8
C	2	L	4	U	4
D	3	M	3	V	1
E	11	N	7	W	2
F	2	O	9	X	1
G	2	P	2	Y	2
H	6	Q	1	Z	1
I	6	R	6		

輸入內容:

1. “Hw6.txt” 檔案， 請用此建好 Huffman tree
2. 鍵入欲轉換之字串 (此鍵入功能一次就好)(請將鍵入字串轉為大寫)
3. 鍵入欲轉換之編碼 (此鍵入功能一次就好)

輸出內容:

1. 所有 Character 對應的編碼
2. 字串的編碼結果
3. 編碼的字串結果

! 請確保 2. 跟 3. 能夠互相對應

範例如下:

```
HW_6-48
A   = 1011
B   = 111000
C   = 111001
D   = 10011
E   = 010
F   = 111010
G   = 111011
H   = 0011
I   = 0110
J   = 1111110
K   = 1111111
L   = 11011
M   = 10010
N   = 1010
O   = 000
P   = 111100
Q   = 001000
R   = 0111
S   = 1000
T   = 1100
U   = 11010
V   = 001001
W   = 111101
X   = 001010
Y   = 111110
Z   = 001011
Enter any word that you want to encode :
DS
Encode result = 100111000

Enter any code you want to decode :
100111000
Decode result = DS
請按任意鍵繼續 . . .
```