

Data Structure Homework 4

Your task is to design a system which stores data in a binary search tree and let you perform different traversal methods.

User can choose the data from

- 1) read file (data.txt) or
- 2) allowing the user to generate the amount(1~99) of random variables(1~99)
for example , enter 5 , and then generate 4 22 5 16 8

and you should accomplish the following tasks

- 0) draw the binary search tree (level ,relations)
- 1) print Preorder traversal
- 2) print Inorder traversal
- 3) print Postorder traversal
- 4) print Breadth-first traversal(from left-up to right –down)

hint:

Depth-first traversal methods can be defined with recursive functions.

You can use a queue to implement the breadth-first traversal.

Example 1 :

read file (data.txt).

store the data in a binary search tree

print Preorder , Inorder , Postorder and BFT.

D:\Data_structure_2018\DS作業4範例\DS作業4範例\proj4.exe

```
please choose the data from 1. file 2. random:1
data: 78 91 52 63 34 89 10 78 14 99
```

```
for the clear program just print 6L
```

```

              78
            /  \
          52    91
         /  \  /  \
       34   63 89   99
      /  \
    10   78
   /  \
 14   -

```

```
left->root->right: 10 14 34 52 63 78 78 89 91 99
```

```
root->left->right: 78 52 34 10 14 63 91 89 78 99
```


```
left->right->root: 14 10 34 63 52 78 89 99 91 78
```

Example 2 :

Enter a number ,and generate the number of random variables.

store those random variables in a binary search tree.

print Preorder , Inorder , Postorder and BFT.

 D:\Data_structure_2018\DS作業4範例\DS作業4範例\proj4.exe

```
please choose the data from 1. file 2. random:2
please input count of random<1~99>:10
random:4 61 2 53 96 83 86 82 30 80
```

```
for the clear program just print 6L
```

```

      4
     / \
    2   61
   / \ / \
  53 96 30 83
 / \ / \
82 86 80
```

```
left->root->right: 2 4 30 53 61 80 82 83 86 96
```

```
root->left->right: 4 2 61 53 30 96 83 82 80 86
```

Notices

- ✓ Programming languages: C/C++
- ✓ Attach a description file to explain your programs.
- ✓ Please appropriately add comments in your code.
- ✓ This homework must contain the source code, the executable file (.exe) and the description file (.doc), and add to the compress file (.zip).
- ✓ File name: HW4_student number.zip
- ✓ Please do not copy.
- ✓ **Deadline: 6/10(Sun.) 23:55 upload to Moodle**