

**Assignment:** Write a program that inserts identifiers in a binary tree. Print the tree four (4) times. Print a graphical representation of the tree where the depth of each node is indented a multiple of five (5) spaces and lexicographically smaller nodes are printed before larger nodes. List the node of the tree three times, once using a preorder traversal, once using an inorder traversal, and once using a postorder traversal.

**Prohibition:** Use of the C++ Standard Template Library is prohibited in the implementation of this project.

**Program Files:** Project 8 consists of files **p08.cpp**, **Tree08.h**, **Tree08.cpp**, and **p08make**. Project file names are exactly as given. Failure to employ the foregoing names will result in a score of **zero (0)** for this project

Project files must be stored in the **root directory of your student account**. Failure to store project files in the root directory of your student account will result in a score of **zero (0)** for this project.

File	Description
<b>p08.cpp</b>	File <b>p08.cpp</b> contains functions that process command line arguments. File <b>p08.cpp</b> contains functions create and traverse a binary tree.
<b>Tree08.h</b>	File <b>Tree08.h</b> contains the definition of class <i>Tree</i> . Class <i>Tree</i> implements a binary tree by dynamically allocating nodes. Each node references an identifier.
<b>Tree08.cpp</b>	File <b>Tree08.cpp</b> contains the implementation of member functions of class <i>Tree</i> .
<b>p08make</b>	File <b>p08make</b> contains instructions for creating executable file <b>p08</b> . Instructions in file <b>p08make</b> are accepted by the UNIX utility <i>make</i> .

**Command Line:** Project 8 can be invoked with zero, one, or two program parameters. The first program parameter is the input file name. The second parameter is the output file name. Sample command lines together with corresponding actions by program **p08** are shown below. Boldfaced type indicates data entered at the keyboard by the user.

```
$ p08
Enter the input file name: i08.dat
Enter the output file name: o08.dat
```

```
$ p08 i08.dat
Enter the output file name: o08.dat
```

```
$ p08 i08.dat o08.dat
```

**Input files:** The input file contains a list of identifiers similar to the list given in Figure 1.  
**Output files:** Identifiers given in the input file are listed four (4) times in the output file. Figure 2 illustrates how program **p08** lists the identifiers given in Figure 1.

**Figure 1.**

**Input file format:** fantine rachel ilse karen deborah abigail zoe

**Figure 2.**  
**Output**  
**format:**

**file** Graphical Representation

```

                                deborah
                               /  \
          fantine             /    \
                           /        \
                        rachel      karen
                           /
                        ilse
                           \
                           zoe
                                abigail
```

Preorder Traversal

fantine  
deborah  
abigail  
rachel  
ilse  
karen  
zoe

Inorder Traversal

abigail  
deborah  
fantine  
ilse  
karen  
rachel  
zoe

Postorder Traversal

abigail  
deborah  
karen  
ilse  
zoe  
rachel  
fantine