National University of Computer and Emerging Sciences

School of Computing Spring 2021 Islamabad Campus

CS218/201: Data Structures (Spring 2021)

Assignment 3

(Deadline:31st May, 2021, 08:30 AM)

File Directory Tree Shell

You are hired by SkyElectric Inc., Islamabad for a sub product operating system used in their smart solar systems. The operating system is deployed in these smart solar systems just for debugging purposes and it maintains only the files classified in different categories. Eskye.txt, Etc is to name a few. Currently in their operating system they don't have any file management system. The task assign to you from SkyElectric Inc. is to develop a File Directory Tree Shell for their operating system. The support team have some diverse people and they want to code such that they are able to see the file directory tree in Tree View (level order). The team also want to be able to merge directories of the given sub tree or tree, create, or delete file/directory.

Operations and Details

The Directory Tree

You are required to generate an N-ary Tree from the root directory "/" (see log.txt) (attached with the assignment statement and should be placed in source folder) such that:

- The root of the tree becomes the **"/"** directory
- The sub directories and files become child nodes of the root
- Files should always be the leaf nodes

In order to satisfy the support team, you are required to display the directory tree in Tree form (level order traversal). An Example Tree form and output are as followed

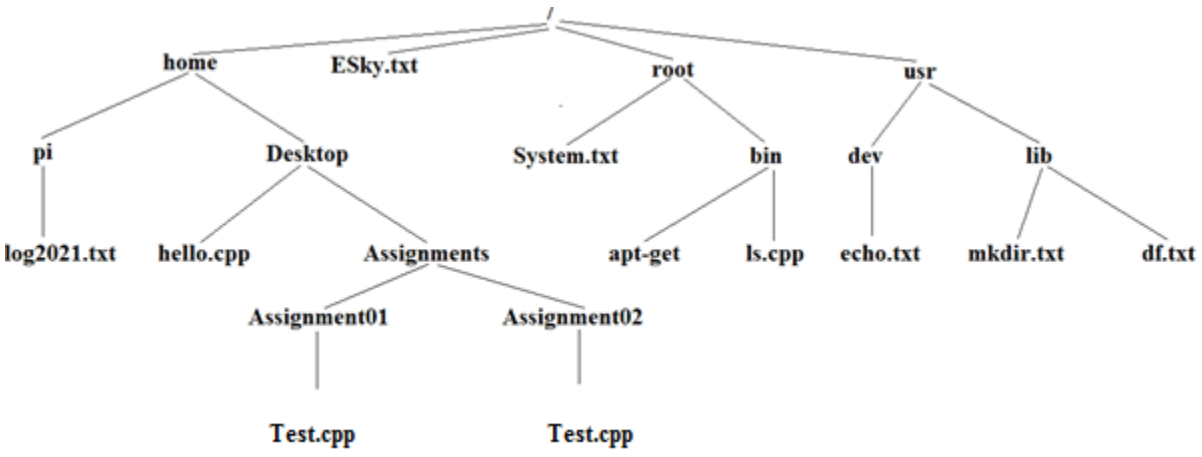

Figure01: Tree directory

```
/
home            ESky.txt        root            usr
pi              Desktop         System.txt      bin     dev     lib
log2021.txt     hello.cpp       Assignments     apt-get ls.cpp  echo.txt    mkdir.txt   df.txt
Assignment01    Assignment02
Test.cpp        Test.cpp
```

Figure02: Level order Output of Tree directory

Trees Operations

- File writing
  - Level order Output of Tree directory (Figure02)

Note: File writing will be used for testing purposes.

- Insert File/Folder
  The support team should be able to insert a specific node in the directory tree, this should update the quick search tree and actual directory accordingly. You have to provide absolute path for insertion.

- Delete File/Folder
  The support team should be able to delete a specific node from the directory tree, this should update the quick search tree and actual directory accordingly.
  Note: "/" directory can't be deleted.

- Merge Folders
  The support team should be able to merge two directories (two nodes in directory tree and in actual). Merging can be done by copying all the content of first directory (sub directories or files) into second directory.
- Search File/Folder
  Will return the path to file or folder if duplicate then return all paths. (Output must be in file).

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Instructions

1- Do not delete public functions.
2- Only submit header file. All code must be in single header file.
3- Submission: You are required to use Visual Studio 19 only . Combine all your work in one .h file and name it rollNo_section_A3.h. Submit header file in classroom within given deadline. Failure to submit according to above format would result in ZERO marks. You MUST check your file [1) Is it virus free 2) Is required file present or not.]. The student is solely responsible to check the final file for issues like corrupt file, virus in the file, mistakenly exe sent. If we cannot download the file from Google classroom due to any reason it will lead to zero marks in the assignment.
4- You must write generic codes.
5- If the file is not generated in required path no marks will be awarded.
6- Use Classes. If the assignment is classes less no marks will be awarded. Function prototypes given in the header file. Do not edit or remove Test functions.
7- Use templates.
8- Files should be read once.
9- Do not use STLs, only String and file streaming library is allowed.
10- If the required output is generated, you will be awarded full marks. Failing to generate the correct output will result in zero marks(black box checking only).
11- If we unable to compile because of syntax error no marks will awarded.
12- Plagiarism cases will be dealt strictly. If found plagiarized, both the involved parties will be awarded zero marks in this assignment. Copying from the internet is the easiest way to get caught!
13- Deadline: Deadline to submit assignment is 31st May, 2021 08:30 AM. Correct and timely submission of assignment is responsibility of every student; hence no relaxation will be given toss anyone.