U18CO018

Shekhalliya Shubham

Sub: Operating System

Lab Assignment – 8

1. To simulate the following file organization techniques

    a) Single level directory

    b) Two level directory

Description

In a single-level directory system, all the files are placed in one directory. There is a root directory which has all files. It has a simple architecture and there are no sub directories. In the two-level directory system, each user has own user file directory (UFD). The system maintains a master block that has one entry for each user. This master block contains the addresses of the directory of the users. When a user job starts or a user logs in, the system's master file directory (MFD) is searched. When a user refers to a particular file, only his own UFD is searched. This effectively solves the name collision problem and isolates users from one another.

Operation: Create, Display, Delete, Search files

a) Single Level Directory

- Code:

```
#include <bits/stdc++.h>
using namespace std;

int main(){
    set <string> root;

    while(true){
        cout<< "1. Create\n2. Display\n3. Delete\n4. Search\n5. Exit
\n";
        int choice;
        cout<<"Enter your choice: ";
        cin>>choice;
        string filename;
        switch(choice){
            case 1:
                cout<<"Enter the file name: ";
                cin>>filename;
                if(root.find(filename)!=root.end()){
                    cout<< "File already exists\n\n";
                }
                else{
                    root.insert(filename);
                    cout<< "File created\n\n";
                }
                break;
            case 2:
                cout<< "Files present in the root directory are:\n\n
\n{ ";
                for(string file_name:root){
                    cout<<file_name<<", ";
                }
                cout<<" }\n\n";
                break;
            case 3:
                cout<<"Enter the file name: ";
                cin>>filename;
                if(root.find(filename)!=root.end()){
                    root.erase(filename);
                    cout<<"File successfully deleted\n\n";
                }
                else{
```

```
                    cout<<"No such file exists\n\n";
                }
                break;
            case 4:
                cout<<"Enter file name: ";
                cin>>filename;
                if(root.find(filename)!=root.end()){
                    cout<<"File exists\n\n";
                }
                else{
                    cout<<"File doesn't exist\n\n";
                }
                break;
            case 5:
                cout<< "Good Bye!\n\n";
                return 0;
            default:
                cout<< "Invalid choice\n\n";
                break;
        }
    }


    return 0;
}
```

- Output

```
1. Create
2. Display
3. Delete
4. Search
5. Exit
Enter your choice: 1
Enter the file name: main.txt
File created

1. Create
2. Display
3. Delete
4. Search
5. Exit
Enter your choice: 1
Enter the file name: main.cpp
File created

1. Create
2. Display
3. Delete
4. Search
5. Exit
Enter your choice: 1
Enter the file name: Main.java
File created

1. Create
2. Display
3. Delete
4. Search
5. Exit
Enter your choice: 1
Enter the file name: main.py
File created
```

```
1. Create
2. Display
3. Delete
4. Search
5. Exit
Enter your choice: 2
Files present in the root directory are:


{ Main.java, main.cpp, main.py, main.txt,  }

1. Create
2. Display
3. Delete
4. Search
5. Exit
Enter your choice: 4
Enter file name: main.cs
File doesn't exist

1. Create
2. Display
3. Delete
4. Search
5. Exit
Enter your choice: 3
Enter the file name: main.txt
File successfully deleted

1. Create
2. Display
3. Delete
4. Search
5. Exit
Enter your choice: 2
Files present in the root directory are:


{ Main.java, main.cpp, main.py,  }

1. Create
2. Display
3. Delete
4. Search
5. Exit
Enter your choice: 5
Good Bye!
```

b) Two Level Directory

- Code

```
#include <bits/stdc++.h>
using namespace std;

int main(){

    map <string,set <string> > root;

    while(true){
        cout<<"1. Create Directory\n2. Create File\n3. Delete File\n
4. Search File\n5. Display\n6. Exit\n";
        int choice;
        cout<<"Enter your choice: ";
        cin>>choice;
        string dir_name,file_name;
        switch(choice){
            case 1:
                cout<< "Enter directory name: ";
                cin>>dir_name;
                if(root.find(dir_name)==root.end()){
                    root[dir_name]={};
                    cout<<"Directory Successfully Created\n\n";
                }
                else{
                    cout<<"Directory already exists! Overwrite exist
ing directory(Y/N)? All your files will be deleted\n";
                    char ch;
                    cin>>ch;
                    if(ch=='Y' or ch=='y'){
                        root[dir_name]={};
                        cout<<"Successfully Overwritten\n\n";
                    }
                    else if(ch=='N' or ch=='n'){
                        cout<< "Operation Discarded\n\n";
                    }
                    else{
                        cout<<"Invalid Choice\n\n";
                    }
                }
                break;
            case 2:
                cout<<"Enter directory name: ";
```

```
                cin>>dir_name;

                if(root.find(dir_name)==root.end()){
                    cout<<"No such directory exists\n\n";
                }
                else{
                    cout<< "Enter file name: ";
                    cin>>file_name;
                    if(root[dir_name].find(file_name)==root[dir_name
].end()){
                        root[dir_name].insert(file_name);
                        cout<<"File Successfully Created\n\n";
                    }
                    else{
                        cout<< "File already exists in the directory
\n\n";
                    }
                }

                break;
            case 3:
                cout<<"Enter directory name: ";
                cin>>dir_name;

                if(root.find(dir_name)==root.end()){
                    cout<<"No such directory exists\n\n";
                }
                else{
                    cout<<"Enter file name: ";
                    cin>>file_name;
                    if(root[dir_name].find(file_name)==root[dir_name
].end()){
                        cout<< "No such file exists\n\n";
                    }
                    else{
                        root[dir_name].erase(file_name);
                        cout<<"File Successfully Deleted\n\n";
                    }
                }

                break;
            case 4:
                cout<< "Enter directory name: ";
                cin>>dir_name;

                if(root.find(dir_name)==root.end()){
                    cout<<"No such directory exists\n\n";
                }
```

```
                else{
                    cout<< "Enter file name: ";
                    cin>>file_name;
                    if(root[dir_name].find(file_name)==root[dir_name
].end()){
                        cout<< "File not found\n\n";
                    }
                    else{
                        cout<< "File found\n\n";
                    }
                }

                break;
            case 5:
                for(auto p:root){
                    cout<< "Files in directory "<<p.first<<" are: {
";
                    for(string f_name:p.second){
                        cout<<f_name<<", ";
                    }
                    cout<<" } ";
                    if(p.second.empty()) cout<<"No files yet";
                    cout<<"\n";
                }
                cout<<"\n";
                break;
            case 6:
                cout<<"Good Bye!\n\n";
                return 0;
            default:
                cout<<"Invalid Choice\n\n";
                break;
        }
    }

    return 0;
}
```

- Output

```
1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 1
Enter directory name: Assignment
Directory Successfully Created

1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 1
Enter directory name: Tutorial
Directory Successfully Created

1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 1
Enter directory name: Projects
Directory Successfully Created

1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 1
Enter directory name: Assignment
Directory already exists! Overwrite existing directory(Y/N)? All your files will be deleted
N
Operation Discarded
```

```
1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 2
Enter directory name: Assignment
Enter file name: Lab_Assignment
File Successfully Created

1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 2
Enter directory name: Assignment
Enter file name: first.cpp
File Successfully Created

1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 2
Enter directory name: Tutorial
Enter file name: second.c
File Successfully Created

1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 5
Files in directory Assignment are: { Lab_Assignment, first.cpp,  }
Files in directory Projects are: {  } No files yet
Files in directory Tutorial are: { second.c,  }
```

```
1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 4
Enter directory name: Assignment
Enter file name: first.cpp
File found

1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 3
Enter directory name: Assignment
Enter file name: Lab_Assignment
File Successfully Deleted

1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 5
Files in directory Assignment are: { first.cpp,  }
Files in directory Projects are: {  } No files yet
Files in directory Tutorial are: { second.c,  }

1. Create Directory
2. Create File
3. Delete File
4. Search File
5. Display
6. Exit
Enter your choice: 6
Good Bye!
```