School of Engineering and Applied Science
Ahmedabad University

BTech(ICT) : Operating Systems Lab (CSE341)

Semester -V

Project Title -Shell design for Windows OS

Instructor- Prof. Mansukh Savaliya

Group no - 07

Name - 1) Ajay Bechara (1741054)   2) Akshay Gopani (1741063)

Content

Acknowledgements

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Overview

This report discusses the result of the work done in the development of "Implementation of windows from C++ language". It is a part of OS LAB (Operating Systems Lab) project going on in BTech(ICT),Ahmedabad University and aims of the development of a C++ program to perform linux command in windows.

Background and Motivation

Shell is a user interface to access the service of the operating system .Most of the programmers are familiar with the unix bash system. Understanding it sheds light on many of Unix's ideas. To support linux type of command in windows microsoft launched The Windows subsystem for linux . enabling developers to call through to Linux commands from Windows by proxying them through `wsl.exe` (Ex. `wsl ls`).

Each time Prefixing commands with wsl is tedious and unnatural . The result of these kinds of issues is that Linux commands feel like second-class citizens to Windows and are harder to use than they should be.For a command to feel like a native Windows command,

Microsoft addressed these issues by launching the power shell. Where wsl wrapper issue is removed.

In this project we have tried to implement a power shell kind of implementation. Where user will enter command in linux syntax and get the same linux kind of output.This project help us to explore the system level programming of two different os . We have implemented basic file and directory management related commands .

Implementation

Command is read through the command line. After a command is entered, the following things are done:

1. Parsing : Parsing is the breaking up of commands into individual words and strings. We use getline(),stringstream() to break the scanned strings into small words.

2. Checking for linux command syntax is done . if syntax is correct then the next step will be taken.

3. If command exists in our list then we will call the corresponding function to execute system level program for that command.

4. If some commands use the output of another command as an input then pipelining will be implemented.

5. createprocess() and thread is used in some commands.

6. Printing the current directory name and asking for the next input.

Result

- ## Pwd , ls , touch

Name	Date modified	Type	Size
Folder1	23-11-2019 05:40	File folder	
Folder11	23-11-2019 05:40	File folder	
a	23-11-2019 06:07	Application	1,666 KB
file	23-11-2019 05:40	Text Document	0 KB
FindFirstFile	23-11-2019 05:23	CPP File	3 KB
GetFullPathName	22-11-2019 13:14	CPP File	1 KB
main	23-11-2019 06:07	CPP File	14 KB
new	23-11-2019 06:11	Text Document	0 KB


```
C:\Users\ADANI\Desktop\OS_PROJECT>a
Available Commands :
touch  ..  pwd  ..  ls  ..  mkdir  ..  cd  ..  rm  ..  cp  ..  rmdir  ..  diskspace  ..  help  ..  countFiles  ..  exit
 ..


C:\Users\ADANI\Desktop\OS_PROJECT >>>pwd
pwd
The full path name is:  C:\Users\ADANI\Desktop\OS_PROJECT


C:\Users\ADANI\Desktop\OS_PROJECT >>>ls
a.exe    file.txt    FindFirstFile.cpp    'Folder1'  'Folder11'  GetFullPathName.cpp    main.cpp

Total Files : 5 & Total Directories 2


C:\Users\ADANI\Desktop\OS_PROJECT >>>touch new.txt
new.txt
new.txt


C:\Users\ADANI\Desktop\OS_PROJECT >>>
```

- rm

Name	Date modified	Type	Size
Folder1	23-11-2019 05:40	File folder	
Folder11	23-11-2019 05:40	File folder	
a	23-11-2019 06:07	Application	1,666 KB
file	23-11-2019 05:40	Text Document	0 KB
FindFirstFile	23-11-2019 05:23	CPP File	3 KB
GetFullPathName	22-11-2019 13:14	CPP File	1 KB
main	23-11-2019 06:07	CPP File	14 KB

```
Command Prompt - a                                                    —    □    ×

C:\Users\ADANI\Desktop\OS_PROJECT>a
Available Commands :
touch  ..  pwd  ..  ls  ..  mkdir  ..  cd  ..  rm  ..  cp  ..  rmdir  ..  diskspace  ..  help  ..  countFiles  ..  exit
..


C:\Users\ADANI\Desktop\OS_PROJECT >>>pwd
pwd
The full path name is:  C:\Users\ADANI\Desktop\OS_PROJECT


C:\Users\ADANI\Desktop\OS_PROJECT >>>ls
a.exe   file.txt   FindFirstFile.cpp   'Folder1'  'Folder11'  GetFullPathName.cpp   main.cpp

Total Files : 5 & Total Directories 2


C:\Users\ADANI\Desktop\OS_PROJECT >>>touch new.txt
new.txt
new.txt


C:\Users\ADANI\Desktop\OS_PROJECT >>>rm new.txt
new.txt
filedeleted


C:\Users\ADANI\Desktop\OS_PROJECT >>>
```

- cd

This PC > Desktop > OS_PROJECT   Search OS_PR...

Name	Date modified	Type	Size
Folder1	23-11-2019 05:40	File folder	
Folder11	23-11-2019 05:40	File folder	
a	23-11-2019 06:07	Application	1,666 KB
file	23-11-2019 05:40	Text Document	0 KB
FindFirstFile	23-11-2019 05:23	CPP File	3 KB
GetFullPathName	22-11-2019 13:14	CPP File	1 KB
main	23-11-2019 06:07	CPP File	14 KB
main2	23-11-2019 06:07	CPP File	14 KB

```
Command Prompt - a                                                    —    □    ×

C:\Users\ADANI\Desktop\OS_PROJECT >>>cp main.cpp main2.cpp
main.cpp
filecopied


C:\Users\ADANI\Desktop\OS_PROJECT >>>cd Folder1
Folder1
directory changed successfully


C:\Users\ADANI\Desktop\OS_PROJECT\Folder1 >>>ls
file.txt   'Folder2'

Total Files : 1 & Total Directories 1


C:\Users\ADANI\Desktop\OS_PROJECT\Folder1 >>>cd ..
..
directory changed successfully


C:\Users\ADANI\Desktop\OS_PROJECT >>>
```

Name	Date modified	Type	Size
Folder2	23-11-2019 05:40	File folder	
file	23-11-2019 05:40	Text Document	0 KB

```
Command Prompt - a                                              —    □    ×

C:\Users\ADANI\Desktop\OS_PROJECT >>>cp main.cpp main2.cpp
main.cpp
filecopied


C:\Users\ADANI\Desktop\OS_PROJECT >>>cd Folder1
Folder1
directory changed successfully


C:\Users\ADANI\Desktop\OS_PROJECT\Folder1 >>>ls
file.txt   'Folder2'

Total Files : 1 & Total Directories 1


C:\Users\ADANI\Desktop\OS_PROJECT\Folder1 >>>
```

- mkdir

This PC > Desktop > OS_PROJECT >

Name	Date modified	Type	Size
Folder1	23-11-2019 05:40	File folder	
Folder11	23-11-2019 05:40	File folder	
new_folder	23-11-2019 06:20	File folder	
a	23-11-2019 06:07	Application	1,666 KB
file	23-11-2019 05:40	Text Document	0 KB
FindFirstFile	23-11-2019 05:23	CPP File	3 KB
GetFullPathName	22-11-2019 13:14	CPP File	1 KB
main	23-11-2019 06:07	CPP File	14 KB
main2	23-11-2019 06:07	CPP File	14 KB

```
Command Prompt - a                                              —    □    ×

C:\Users\ADANI\Desktop\OS_PROJECT >>>help

Available Commands :
touch  ..  pwd  ..  ls  ..  mkdir  ..  cd  ..  rm  ..  cp  ..  rmdir  ..  diskspace  ..  help  ..  countFiles  ..  exit
 ..


C:\Users\ADANI\Desktop\OS_PROJECT >>>mkdir new_folder
new_folder
directory created successfully


C:\Users\ADANI\Desktop\OS_PROJECT >>>
```

d

Name	Date modified	Type	Size
Folder1	23-11-2019 05:40	File folder	
Folder11	23-11-2019 05:40	File folder	
a	23-11-2019 06:07	Application	1,666 KB
file	23-11-2019 05:40	Text Document	0 KB
FindFirstFile	23-11-2019 05:23	CPP File	3 KB
GetFullPathName	22-11-2019 13:14	CPP File	1 KB
main	23-11-2019 06:07	CPP File	14 KB
main2	23-11-2019 06:07	CPP File	14 KB

```
Select Command Prompt                                          —    □    ×
ajay
directory deleted


C:\Users\ADANI\Desktop\OS_PROJECT >>>help

Available Commands :
touch  ..  pwd  ..  ls  ..  mkdir  ..  cd  ..  rm  ..  cp  ..  rmdir  ..  diskspace  ..  help  ..  countFiles  ..  exit
 ..



C:\Users\ADANI\Desktop\OS_PROJECT >>>mkdir new_folder
new_folder
directory created successfully



C:\Users\ADANI\Desktop\OS_PROJECT >>>rmdir new_folder
new_folder
directory deleted


C:\Users\ADANI\Desktop\OS_PROJECT >>>countFiles
Enter Path : Folder1
Enter FileName : file.txt
Count = 2
```

- cp

Folder1	23-11-2019 05:40	File folder	
Folder11	23-11-2019 05:40	File folder	
a	23-11-2019 06:07	Application	1,666 KB
file	23-11-2019 05:40	Text Document	0 KB
FindFirstFile	23-11-2019 05:23	CPP File	3 KB
GetFullPathName	22-11-2019 13:14	CPP File	1 KB
main	23-11-2019 06:07	CPP File	14 KB
main2	23-11-2019 06:07	CPP File	14 KB

```
Command Prompt - a                                          —    □    ×

C:\Users\ADANI\Desktop\OS_PROJECT >>>cp main.cpp main2.cpp
main.cpp
filecopied


C:\Users\ADANI\Desktop\OS_PROJECT >>>
```
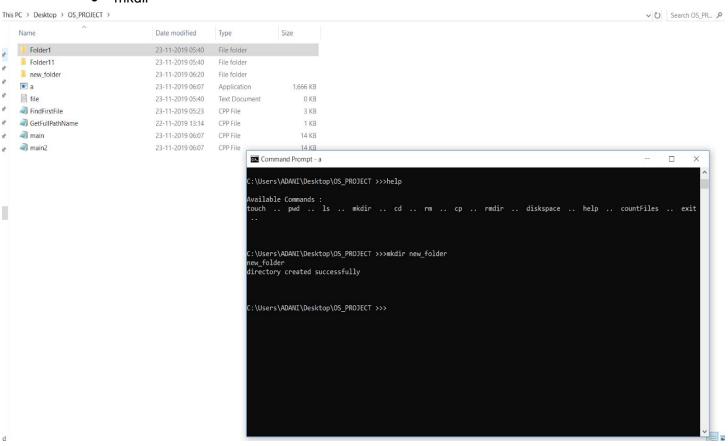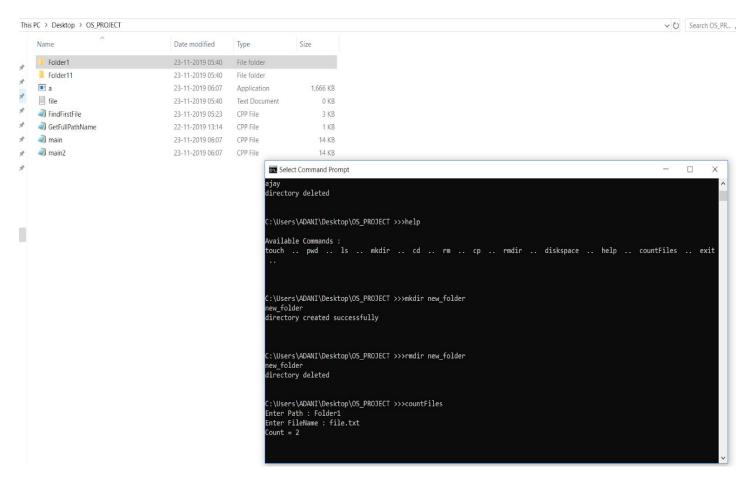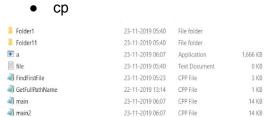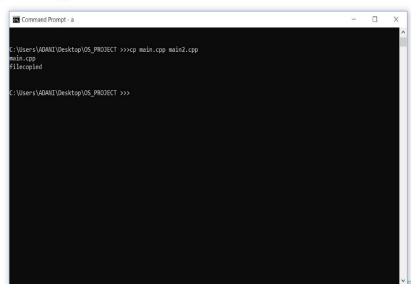
Problems Faced

- Syntax of system calls in windows is far different compared to linux system calls.

References

1) fileapi.h header,https://docs.microsoft.com/en-us/windows/win32/api/fileapi/.
2) Mike,Integrate Linux Commands into Windows with PowerShell and the Windows Subsystem for Linux ,26th september 2019 , https://devblogs.microsoft.com/commandline/integrate-linux-commands-into-windows-with-powershell-and-the-windows-subsystem-for-linux/