OPERATING SYSTEMS AND LINUX LAB

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UNIX Lab - Introduction to UNIX

1. Study of Unix/Linux general purpose utility commands

a) pwd Command :

The pwd command is used to display the location of the current working directory.

Syntax: pwd

Output :
$ pwd
/home/deepu

b) ls Command :

The ls command is used to display a list of content of a directory.

Syntax: ls [Options]

Output :
$ ls

a.out   Documents   p1.c   p2.java

$ls   -l

total 4

-rwxrwxr-x 1 deepu deepu 16696 Nov 14 10:43 a.out

drwxr-xr-x 3 deepu deepu 4096 Oct 5 22:09 Documents

-rw-rw-r-- 1 deepu deepu   51 Nov 14 10:43 p1.c

-rw-rw-r-- 1 deepu deepu   83 Sep 27 21:51 p2.java

c) date Command :

The date command is used to display date, time, time zone, and more.

Syntax: date

Output :

$ date

Sunday 14 November 2021 10:48:16 AM IST

d) cal Command :

The cal command is used to display the current month's calendar with the current date highlighted.

Syntax: cal

Output :

$ cal

November 2021

Su Mo Tu We Th Fr Sa

    1   2 3 4 5 6

7   8   9 10 11 12 13

14 15 16 17 18 19 20

21 22 23 24 25 26 27

28 29 30

e) clear Command :

Linux clear command is used to clear the terminal screen.

Syntax: clear

Output :

$clear

f) mkdir Command :

The mkdir command is used to create a new directory under any directory.

Syntax: mkdir <directory name>

Output :
$ mkdir os

g) cd Command :

The cd command is used to change the current directory.

Syntax: cd <directory name>

Output :
$ cd os

deepu@Vostro-3491:~/os$

h) rmdir Command :

The rmdir command is used to delete a directory.

Syntax: rmdir <directory name>

Output :
$ rmdir os

i) touch Command :

The touch command is used to create empty files. We can create multiple empty files by executing it once.

Syntax: touch <file name>

touch <file1> <file2> ....

Output :
$ touch file1
$ touch file2

j) cat Command :

The cat command is a multi-purpose utility in the Linux system. It can be used to create a file, display content of the file, copy the content of one file to another file, and more.

Syntax: cat [OPTION]… [FILE]..

To create a file, execute it as follows:

```
cat  >  <file name>
// Enter file content
```

Press "CTRL+ D" keys to save the file. To display the content of the file, execute it as follows:

```
cat    <file name>
```

Output :
```
cat > file3
MCA
Kakinada

$ cat file3
MCA
Kakinada
```

k) rm Command :

The rm command is used to remove a file.

Syntax: rm <file name>

Output :

```
$ rm file2
```

l) cp Command :

The cp command is used to copy a file or directory.

Syntax: cp <existing file name> <new file name>

Output :

```
$ cp  file3  file2
```

```
$ cat  file2
```

MCA

Kakinada

m) mv Command :

The <u>mv</u> command is used to move a file or a directory form one location to another location.

Syntax: mv <file name> <directory path>

Output :
$ mv file3 file4
$ cat file3
cat: file3: No such file or directory
$ cat file4
MCA
Kakinada

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2. Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.

SHELL is a program which provides the interface between the user and an operating system.

Types of Shells in Linux
 Bourne shell
 Bash shell
 C shell
 Korn shell

Bourne shell :
The Bourne shell, called "sh," is one of the original shells, developed for Unix computers by Stephen Bourne at AT&T's Bell Labs in 1977.
It offers features such as input and output redirection, shell scripting with string and integer variables, and condition testing and looping.

Bash shell :
The "Bourne-again Shell," based on sh -- has become the new default standard. One attractive feature of bash is its ability to run sh shell scripts unchanged. Shell scripts are complex sets of commands that automate programming and maintenance chores; being able to reuse these scripts saves programmers time.

C shell :
Developers have written large parts of the Linux operating system in the C and C++ languages. Using C syntax as a model, Bill Joy at Berkeley University developed the "C-shell," csh, in 1978.
Ken Greer, working at Carnegie-Mellon University, took csh concepts a step forward with a new shell, tcsh, which Linux systems now offer. Tcsh fixed problems in csh and added command completion, in which the shell makes educated "guesses" as you type, based on your system's directory structure and files.

Korn shell : David Korn developed the Korn shell, or ksh, about the time tcsh was introduced.

Ksh is compatible with sh and bash.

Ksh improves on the Bourne shell by adding floating-point arithmetic, job control, and command aliasing and command completion.

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3. Study of UNIX/LINUX File System(tree structure).
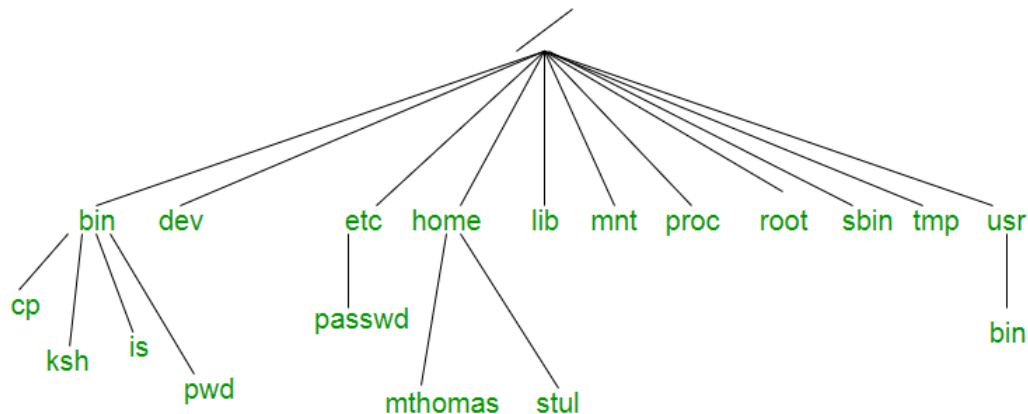
The UNIX file system called as hierarchical file system. The UNIX system has no limit to the number of files and directories you can create in a directory that you own.

/ (root):- This is the root directory of the file system, the main directory of the entire file system, and the root directory for the super user.

/bin:- bin stands for binary. This directory contains executable files for most of the Unix commands.

/dev: - This contains the special device files that includes terminals, printers and storage devices.

/etc: - This contains system administration and configuration databases.

/home:-This contains the home directories and files of all users. If your log name is Deepu, your default home directory is /home/Deepu.

/lib: - This directory contains all the library functions provided by UNIX for programmers.

/mnt: - Contains entries for removable media such as CD-ROMs.

/sbin: - This contains programs used in booting the system and in system recovery.

/tmp: - This contains all temporary files used by the UNIX system.

/usr: - This contains other accessible directories such as /usr/lib and /usr/bin

/var: - This contains Dans the directories of all files that vary among systems. These include files that log system activity, accounting files, mail files, application packages, backup files for editors and many other types of files that vary from system to system.

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4. C program to emulate the UNIX ls –l command

Output:

```
guest-glcbIs@ubuntu:~$gcc -o lsc.out lsc.c
guest-glcbIs@ubuntu:~$./lsc.out
total 100
-rwxrwx—x 1 guest-glcbls guest-glcbls 140 2012-07-06 14:55 f1
drwxrwxr-x 4 guest-glcbls guest-glcbls 140 2012-07-06 14:40 dir1
child complete
```

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5. C program that illustrates how to execute two commands concurrently with a command pipe. Ex: - ls –l | sort

Output:

```
[student@gcet ~]$ vi pipes2.c
[student@gcet ~]$ cc pipes2.c
[student@gcet ~]$ ./a.out
Parent reading from pipe
Total 24
-rwxrwxr-x l student student 5563Aug 3 10:39 a.out
-rw-rw-r—l
Student student 340 jul 27 10:45 pipe2.c
-rw-rw-r—l student student
Pipes2.c
-rw-rw-r—l student student 401 34127 10:27 pipe2.c
student
```

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LINUX LAB

1. Write a Shell program to check whether given number is prime or not.

Program:

```
Prime number program......
29
The number is Prime

Prime number program......
27
The number is Not Prime
```

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2. Write a shell script which will display Fibonacci series up to the given range.

Program:

Output:

```
How many number of terms to be generated ? 5
Fibonacci Series up to $n terms :
0
1
1
2
3
```

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3. Write a shell script to check whether the given number is Armstrong or not.
   Program:

Output:

```
Enter a number:
153
It is an Armstrong Number.
```

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4. Write a shell script to accept student number, name, marks in 5 subjects. Find total, average and grade using the following rules:

Avg>=80 then grade A
Avg<80&&Avg>=70 then grade B
Avg<70&&Avg>=60 then grade C
Avg<60&&Avg>=50 then grade D
Avg<50&&Avg>=40 then grade E

Program:

Output:

```
 Student Mark List
-----------------------------------
Enter the Student name
ADITYA
Enter the Register number
18
Enter the Mark1
89
Enter the Mark2
76
Enter the Mark3
98
Enter the Mark4
89
Enter the Mark5
96
-----------------------------------
 Student Mark List
-----------------------------------
 Student Name    : ADITYA
 Register Number : 18
 Mark1        : 89
 Mark2        : 76
 Mark3        : 98
 Mark4        : 89
 Mark5        : 96
 Total        : 448
 Average      : 89
 Result       : Pass
 Grade        : A
-----------------------------------
```

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5. Write a shell script to find minimum and maximum elements in the given list of elements.

Output:

```
[ubantu@localhost ~]$ cat numbers
10 20 30 40 50
[ubantu@localhost ~]$ sh minmax.sh
The max elements is 50
The min element is 10
```

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6. Write a shell program to check whether the given string is palindrome or not.

Program:

Output:

```
Enter the string:

madam

String is palindrome
Enter the string:

abc

String is not palindrome
```

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7. Write a shell script to compute no. of characters and words in each line of given file

Output:

```
Enter the filename abc
Number of characters in abc is 129
Number of words in abc is 23
Number of lines in abc is 2
```

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8. Write a shell script to check whether the given input is a number or a string

Output :

```
$ source alphanum.sh
Input :
The input contains special characters.
Input only alphanumeric characters.
Input : name@email
The input contains special characters.
Input only alphanumeric characters.
Input : a&j
The input contains special characters.
Input only alphanumeric characters.
Input : 12+34
The input contains special characters.
Input only alphanumeric characters.
Input : A1
Successful Input
```

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