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SE COMPS A-3

OPERATING SYSTEMS

EXPERIMENT - 1

THEORY

AIM: Explore the internal commands of linux and Write shell scripts to do the following:

1. Display top 10 processes in descending order
2. Display processes with highest memory usage.
3. Display current logged in user and no. of users.
4. Display current shell, home directory, operating system type, current working directory.
5. Display OS version, release number.
6. Illustrate the use of sort, grep, awk, etc.

1. Display top 10 processes in descending order

ps command

```
ps [options]
```

```
jarvis@linuxconfig: ~/Desktop/OS-Exp1
jarvis@linuxconfig:~/Desktop$ mkdir OS-Exp1
jarvis@linuxconfig:~/Desktop$ cd OS-Exp1/
jarvis@linuxconfig:~/Desktop/OS-Exp1$ echo "Top 10 processes in descending order"
Top 10 processes in descending order
jarvis@linuxconfig:~/Desktop/OS-Exp1$ ps axl|head -n 10
F  UID      PID     PPID  PRI  NI   VSZ   RSS WCHAN  STAT TTY      TIME COMMAND
4    0         1         0   20    0 167788 11792 -        Ss   ?        0:01 /sbin/init splash
1    0         2         0   20    0      0      0 -        S    ?        0:00 [kthreadd]
1    0         3         2    0 -20    0      0 -        I<   ?        0:00 [rcu_gp]
1    0         4         2    0 -20    0      0 -        I<   ?        0:00 [rcu_par_gp]
1    0         6         2    0 -20    0      0 -        I<   ?        0:00 [kworker/0:0H-kblockd]
1    0         8         2    0 -20    0      0 -        I<   ?        0:00 [mm_percpu_wq]
1    0         9         2   20    0      0      0 -        S    ?        0:00 [ksoftirqd/0]
1    0        10         2   20    0      0      0 -        I    ?        0:00 [rcu_sched]
1    0        11         2 -100   -      0      0 -        S    ?        0:00 [migration/0]
jarvis@linuxconfig:~/Desktop/OS-Exp1$
```

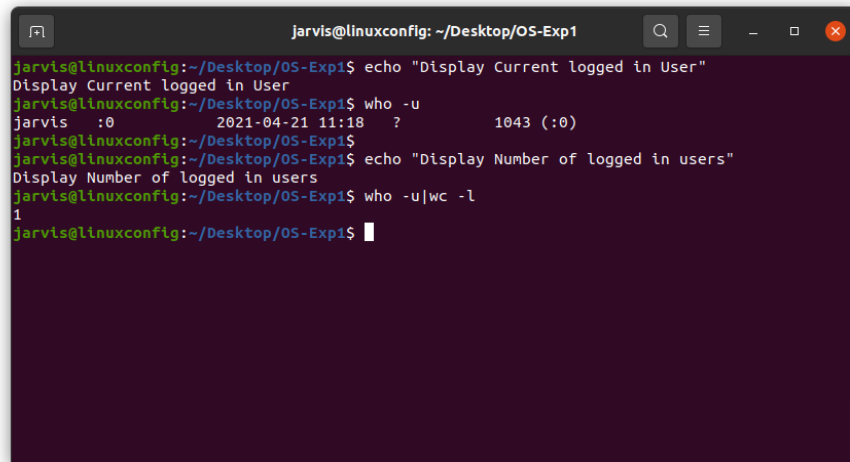
1. Display processes with highest memory usage.

```
jarvis@linuxconfig: ~/Desktop/OS-Exp1
jarvis@linuxconfig:~/Desktop/OS-Exp1$ echo " Display Processes with highest memory usage"
Display Processes with highest memory usage
jarvis@linuxconfig:~/Desktop/OS-Exp1$ ps -eopid,ppid,cmd,%mem,%cpu --sort=%mem |head
PID      PPID  CMD                                %MEM %CPU
2         0 [kthreadd]                        0.0  0.0
3         2 [rcu_gp]                          0.0  0.0
4         2 [rcu_par_gp]                      0.0  0.0
6         2 [kworker/0:0H-kblockd]            0.0  0.0
8         2 [mm_percpu_wq]                    0.0  0.0
9         2 [ksoftirqd/0]                     0.0  0.0
10        2 [rcu_sched]                       0.0  0.0
11        2 [migration/0]                     0.0  0.0
12        2 [idle_inject/0]                   0.0  0.0
jarvis@linuxconfig:~/Desktop/OS-Exp1$
```

2. Display current logged in user and no. of users.

who

Syntax : **\$who** [options] [filename]

A terminal window titled 'jarvis@linuxconfig: ~/Desktop/OS-Exp1' with standard window controls. The terminal shows the following commands and output:

```
jarvis@linuxconfig:~/Desktop/OS-Exp1$ echo "Display Current logged in User"
Display Current logged in User
jarvis@linuxconfig:~/Desktop/OS-Exp1$ who -u
jarvis  :0                2021-04-21 11:18  ?                1043 (:0)
jarvis@linuxconfig:~/Desktop/OS-Exp1$ 
jarvis@linuxconfig:~/Desktop/OS-Exp1$ echo "Display Number of logged in users"
Display Number of logged in users
jarvis@linuxconfig:~/Desktop/OS-Exp1$ who -u|wc -l
1
jarvis@linuxconfig:~/Desktop/OS-Exp1$
```

3. Display current shell, home directory, operating system type, current working directory.

1. whoami

Syntax : `$whoami`

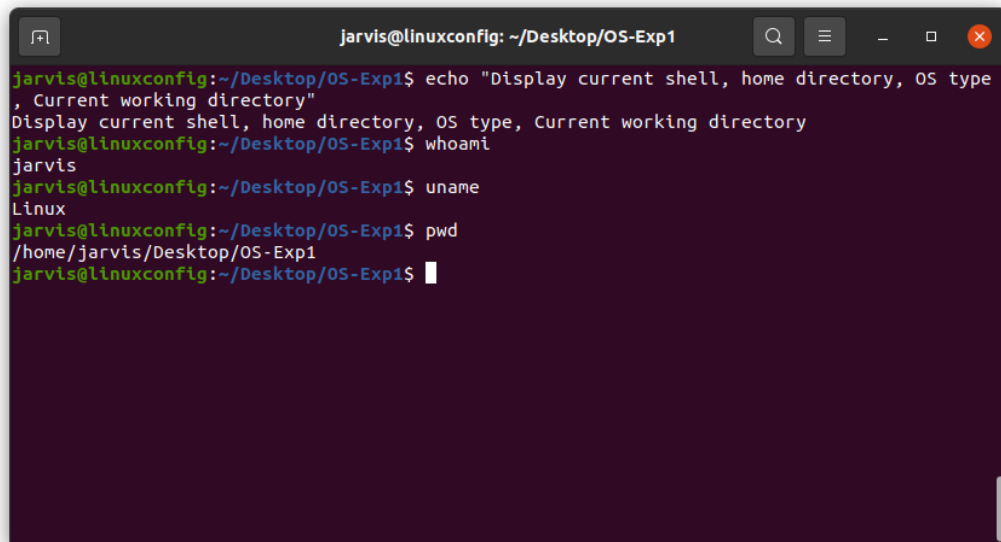
2. uname

Syntax: `$uname [OPTION]`

3. pwd

`$pwd -L`: Prints the symbolic path.

`$pwd -P`: Prints the actual path.

A terminal window titled 'jarvis@linuxconfig: ~/Desktop/OS-Exp1' with standard window controls. The terminal shows a series of commands and their outputs: an 'echo' command to display system info, 'whoami' showing 'jarvis', 'uname' showing 'Linux', and 'pwd' showing the current directory path. The prompt is green, and the output is white on a dark purple background.

```
jarvis@linuxconfig:~/Desktop/OS-Exp1$ echo "Display current shell, home directory, OS type
, Current working directory"
Display current shell, home directory, OS type, Current working directory
jarvis@linuxconfig:~/Desktop/OS-Exp1$ whoami
jarvis
jarvis@linuxconfig:~/Desktop/OS-Exp1$ uname
Linux
jarvis@linuxconfig:~/Desktop/OS-Exp1$ pwd
/home/jarvis/Desktop/OS-Exp1
jarvis@linuxconfig:~/Desktop/OS-Exp1$
```

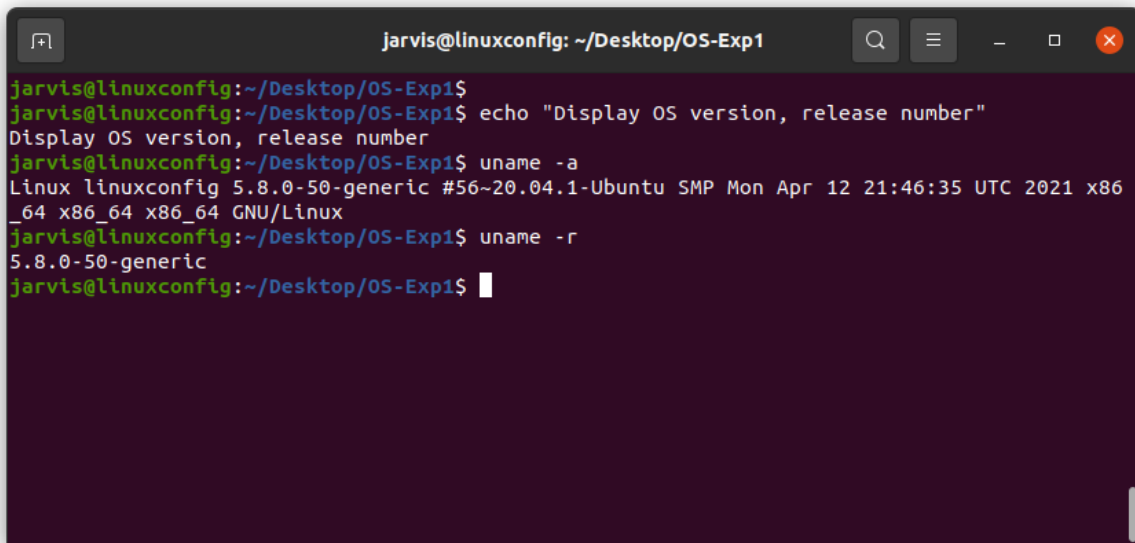
4. Display OS version, release number.

The command '`uname`' displays the information about the system.

Syntax: `uname [OPTION]`

OPTIONS:

- a option: It prints all the system information
- s option: It prints the kernel name.
- n option: It prints the hostname of the network node
- r option: It prints the kernel release date
- v option: It prints the version of the current kernel.
- m option: It prints the machine hardware name.
- p option: It prints the **type** of the processor.
- i option: It prints the platform of the hardware.
- o option: It prints the name of the operating system.

A terminal window titled 'jarvis@linuxconfig: ~/Desktop/OS-Exp1' with standard window controls. The terminal shows a series of commands and their outputs: 'echo "Display OS version, release number"' outputs 'Display OS version, release number'; 'uname -a' outputs 'Linux linuxconfig 5.8.0-50-generic #56~20.04.1-Ubuntu SMP Mon Apr 12 21:46:35 UTC 2021 x86_64 x86_64 x86_64 GNU/Linux'; and 'uname -r' outputs '5.8.0-50-generic'.

```
jarvis@linuxconfig:~/Desktop/OS-Exp1$  
jarvis@linuxconfig:~/Desktop/OS-Exp1$ echo "Display OS version, release number"  
Display OS version, release number  
jarvis@linuxconfig:~/Desktop/OS-Exp1$ uname -a  
Linux linuxconfig 5.8.0-50-generic #56~20.04.1-Ubuntu SMP Mon Apr 12 21:46:35 UTC 2021 x86_64 x86_64 x86_64 GNU/Linux  
jarvis@linuxconfig:~/Desktop/OS-Exp1$ uname -r  
5.8.0-50-generic  
jarvis@linuxconfig:~/Desktop/OS-Exp1$
```

5. Illustrate the use of sort, grep, awk, etc.

SORT:

Syntax : `$ sort filename.txt`

GREP:

Syntax: `grep [options] pattern [files]`

AWK:

Syntax: `awk options 'selection_criteria {action }' input-file > output-file`

```
jarvis@linuxconfig: ~/Desktop/OS-Exp1
jarvis@linuxconfig:~/Desktop/OS-Exp1$ cat > abc
Orange
Kiwi
Grapes
Mangoes
^C
jarvis@linuxconfig:~/Desktop/OS-Exp1$ ls
1.1.png 1.2.png 1.3.png abc
jarvis@linuxconfig:~/Desktop/OS-Exp1$ sort abc
Grapes
Kiwi
Mangoes
Orange
jarvis@linuxconfig:~/Desktop/OS-Exp1$ sort abc>lmn.txt
jarvis@linuxconfig:~/Desktop/OS-Exp1$ ls
1.1.png 1.2.png 1.3.png abc lmn.txt
jarvis@linuxconfig:~/Desktop/OS-Exp1$ cat lmn.txt
Grapes
Kiwi
Mangoes
Orange
jarvis@linuxconfig:~/Desktop/OS-Exp1$ awk '{print $1 "\t" $2}' abc
Orange
Kiwi
Grapes
Mangoes
jarvis@linuxconfig:~/Desktop/OS-Exp1$
```

CONCLUSION: We learned a few linux commands, their syntax and implemented them from the linux terminal.

OPERATING SYSTEMS

EXPERIMENT - 2

CODE

Aim- System calls for file manipulation

Problem Statement –

Try different file manipulation operations provided by linux

1. pwd Command

```
$ pwd
```

2. mkdir Command

```
$ mkdir directory_name
```

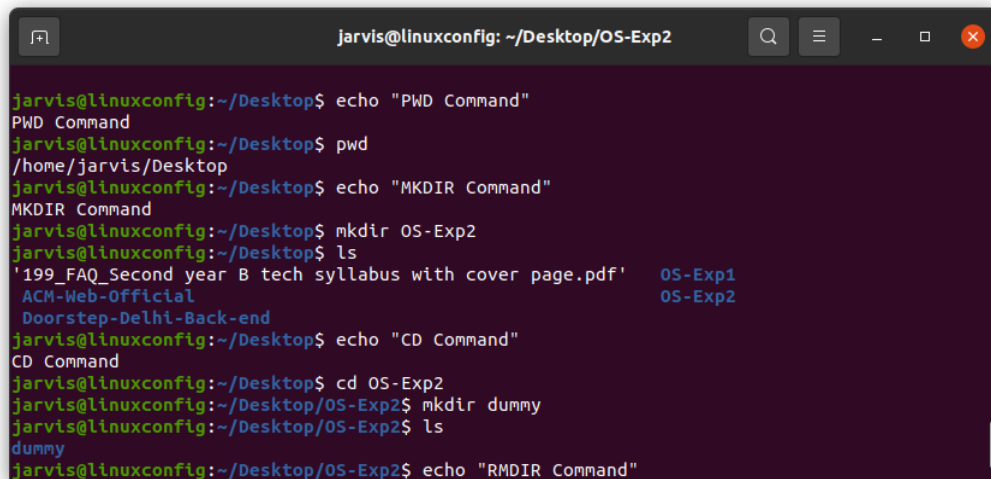
3. ls Command

```
$ ls
```

4. cd Command

```
$ cd directory_name
```

```
$ cd ..
```

A terminal window titled 'jarvis@linuxconfig: ~/Desktop/OS-Exp2'. The terminal shows a series of commands and their outputs: 'echo "PWD Command"' outputs 'PWD Command'; 'pwd' outputs '/home/jarvis/Desktop'; 'echo "MKDIR Command"' outputs 'MKDIR Command'; 'mkdir OS-Exp2' outputs nothing; 'ls' outputs a list of files including '199_FAQ_Second year B tech syllabus with cover page.pdf', 'ACM-Web-Official', and 'Doorstep-Delhi-Back-end', with 'OS-Exp1' and 'OS-Exp2' listed on the right; 'echo "CD Command"' outputs 'CD Command'; 'cd OS-Exp2' outputs nothing; 'mkdir dummy' outputs nothing; 'ls' outputs 'dummy'; and 'echo "RMDIR Command"' outputs 'RMDIR Command'.

5. rmdir Command

```
$ rmdir tutorials
```

6. touch Command

```
$ touch filename
```

For example, to create a file1.txt file, run the command:

```
$ touch file1.txt
```

7. cat Command

```
$ cat filename
```


A terminal window titled 'jarvis@linuxconfig: ~/Desktop/OS-Exp2'. The window has a dark purple background and a light gray title bar with standard Linux window controls. The terminal shows a series of commands and their outputs: 'echo "RMDIR Command"' outputs 'RMDIR Command'; 'rmdir dummy' is executed; 'ls' is executed; 'echo "Touch Command"' outputs 'Touch Command'; 'touch dummy.txt' is executed; 'cat dummy.txt' outputs 'This', 'Is', 'Dummy', and 'Data' on separate lines. The prompt 'jarvis@linuxconfig:~/Desktop/OS-Exp2\$' is visible at the end of the last line.

```
jarvis@linuxconfig:~/Desktop/OS-Exp2$ echo "RMDIR Command"
RMDIR Command
jarvis@linuxconfig:~/Desktop/OS-Exp2$ rmdir dummy
jarvis@linuxconfig:~/Desktop/OS-Exp2$ ls
jarvis@linuxconfig:~/Desktop/OS-Exp2$ echo "Touch Command"
Touch Command
jarvis@linuxconfig:~/Desktop/OS-Exp2$ touch dummy.txt
jarvis@linuxconfig:~/Desktop/OS-Exp2$ cat dummy.txt
This
Is
Dummy
Data
jarvis@linuxconfig:~/Desktop/OS-Exp2$
```

8. mv Command

```
$ mv filename /path/to/destination/
```

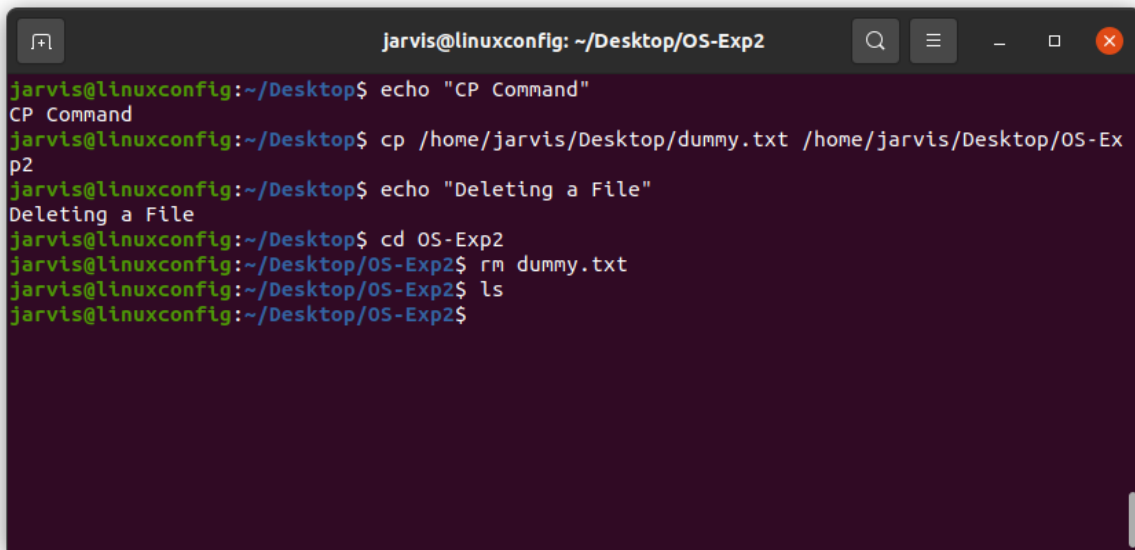
```
jarvis@linuxconfig: ~/Desktop/OS_Dummy/New Location
jarvis@linuxconfig:~/Desktop/OS_Dummy/Old Location$ echo "Files in Old Location"
Files in Old Location
jarvis@linuxconfig:~/Desktop/OS_Dummy/Old Location$ ls
FileToBeMoved
jarvis@linuxconfig:~/Desktop/OS_Dummy/Old Location$ cd ../New\ Location/
jarvis@linuxconfig:~/Desktop/OS_Dummy/New Location$ echo "Files in New Location Before Moving"
Files in New Location Before Moving
jarvis@linuxconfig:~/Desktop/OS_Dummy/New Location$ ls
jarvis@linuxconfig:~/Desktop/OS_Dummy/New Location$ cd ../Old\ Location/
jarvis@linuxconfig:~/Desktop/OS_Dummy/Old Location$ echo "Moving the File now"
Moving the File now
jarvis@linuxconfig:~/Desktop/OS_Dummy/Old Location$ mv FileToBeMoved /home/jarvis/Desktop/OS_Dummy/New\ Location/
jarvis@linuxconfig:~/Desktop/OS_Dummy/Old Location$ cd ../New\ Location/
jarvis@linuxconfig:~/Desktop/OS_Dummy/New Location$ echo "Files in new location after moving"
Files in new location after moving
jarvis@linuxconfig:~/Desktop/OS_Dummy/New Location$ ls
FileToBeMoved
jarvis@linuxconfig:~/Desktop/OS_Dummy/New Location$ 3~
```

9. cp Command

```
$ cp /file/path /destination/path
```

10. Deleting a File

```
$ rm filename
```

A terminal window titled 'jarvis@linuxconfig: ~/Desktop/OS-Exp2' with standard window controls. The terminal shows a series of commands and their outputs: 'echo "CP Command"' outputs 'CP Command'; 'cp /home/jarvis/Desktop/dummy.txt /home/jarvis/Desktop/OS-Exp2' copies the file; 'echo "Deleting a File"' outputs 'Deleting a File'; 'cd OS-Exp2' changes the directory; 'rm dummy.txt' deletes the file; and 'ls' lists the directory contents, which is empty.

```
jarvis@linuxconfig:~/Desktop$ echo "CP Command"
CP Command
jarvis@linuxconfig:~/Desktop$ cp /home/jarvis/Desktop/dummy.txt /home/jarvis/Desktop/OS-Exp2
jarvis@linuxconfig:~/Desktop$ echo "Deleting a File"
Deleting a File
jarvis@linuxconfig:~/Desktop$ cd OS-Exp2
jarvis@linuxconfig:~/Desktop/OS-Exp2$ rm dummy.txt
jarvis@linuxconfig:~/Desktop/OS-Exp2$ ls
jarvis@linuxconfig:~/Desktop/OS-Exp2$
```

CONCLUSION: We learnt about linux commands for file management, their syntax and also implemented these commands.