

Experiment No. 1

Author: Vidyut Chakrabarti

Semester/section: IV Sem/ B

Roll no.: 68

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Script files: 1. Shellscrip_vid_prac1_set1.sh
2. vidprac1_set2.sh

Aim: To study and execute basic Linux System Commands and write shell scripts to display the system particulars processor, processes and memory.

Problem Statement(A): Execute following Linux commands:

- [1] Display the current directory
- [2] Display the OS kernel information
- [3] Display the username and other particulars
- [4] Display contents of a directory (various options for structuring the output)
- [5] Display contents of a file
- [6] Create an empty file
- [7] Create a directory
- [8] Switch to a directory
- [9] Display no. of lines, words & characters in a file
- [10] Locate & display records with matching text

Shell Script: Shellscrip_vid_prac1_set1.sh

```
#!/usr/bin/sh
echo "Current directory..."
pwd
echo "=====
echo ""
echo "OS kernel info..."
uname -r
echo "=====
echo ""
echo "Linux System info..."
uname -a
echo "=====
echo ""
echo "Username/Hostname:"
whoami
echo "other particulars: "
echo ""
w
echo "=====
```

```

id
echo "=====
last
echo "=====
who
echo "No users logged into the system."
echo "=====
echo ""
echo "Contents of a directory(/proc):"
cd /proc
ls
echo "=====
echo ""
echo "Detailed info: "
ls -al
echo "=====
echo "one per line: "
ls -l
echo "=====
echo "multiple columns: "
ls -x
echo "=====
echo "Comma seperated: "
ls -m
cd /
cd /home/user
echo "=====
echo ""
echo "Displaying contents of a file: "
cat viddata.txt
echo ""
echo "=====
echo ""
echo "Creating an empty file and deleting it:"
touch tempfile.txt
echo "Created"
ls
rm tempfile.txt
echo "Deleted"
ls
echo "=====
echo ""
echo "Creating a directory: "
mkdir Vidyutdir
echo "Before shifting directory: "
pwd
echo "after shifting: "
cd Vidyutdir
pwd
cd /
cd /home/user
echo "=====
echo ""
echo "Display number of lines: (viddata.txt): "
grep "\n" viddata.txt | wc -l

```

```

echo "Number of words: "
cat viddata.txt | wc -w
echo "No. of characters: "
cat viddata.txt | wc -m
echo "=====
echo ""
echo "Locating fields with name Harry and displaying info: "
cat matching.txt | grep "Name\|Harry"

```

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CLI Trace/ Outputs:

[1],[2]: Display the current directory,
Display the OS kernel:

```

~$ chmod +x Shellscrip_vid_prac1_set1.sh
~$ ./Shellscrip_vid_prac1_set1.sh
Current directory...
/home/user
=====

OS kernel info...
5.15.0-1046-gcp
=====

Linux System info...
Linux project-8d0221b7-5ea2-4506-acc3-ac6e8aa29d9d 5.15.0-1046-gcp #54~20.04.1-Ubuntu SMP Wed C
=====

```

[3] Display the username and other
particulars

Username/Hostname:

user

other particulars:

```

09:46:17 up 5:42, 0 users, load average: 3.07, 2.13, 1.80
USER      TTY      FROM          LOGIN@  IDLE   JCPU   PCPU WHAT
=====
uid=2001(user) gid=2001(user) groups=2001(user)
=====

```

wtmp begins Mon Jan 9 10:42:18 2023

No users logged into the system.

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[4] Display contents of a directory (various options for structuring the output)

Contents of a directory(/proc):

| | | | | | | |
|------|------------|-----------|---------------|------------|-------------|------------|
| 1 | 7 | cmdline | dma | fs | kcore | kpageflags |
| 1190 | acpi | consoles | driver | interrupts | key-users | loadavg |
| 1332 | bootconfig | cpuinfo | dynamic_debug | iomem | keys | locks |
| 1340 | buddyinfo | crypto | execdomains | ioports | kmsg | mdstat |
| 211 | bus | devices | fb | irq | kpagecgroup | meminfo |
| 6 | cgroups | diskstats | filesystems | kallsyms | kpagecount | misc |

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Detailed info:

total 4

| | | | | | | | | |
|------------|------|------|------|------|-----|---|-------|------|
| dr-xr-xr-x | 1067 | root | root | 0 | Feb | 2 | 09:40 | . |
| drwxr-xr-x | 1 | root | root | 4096 | Feb | 2 | 09:40 | .. |
| dr-xr-xr-x | 9 | user | user | 0 | Feb | 2 | 09:40 | 1 |
| dr-xr-xr-x | 9 | user | user | 0 | Feb | 2 | 09:40 | 1190 |
| dr-xr-xr-x | 9 | user | user | 0 | Feb | 2 | 09:46 | 1332 |
| dr-xr-xr-x | 9 | user | user | 0 | Feb | 2 | 09:46 | 1341 |
| dr-xr-xr-x | 9 | user | user | 0 | Feb | 2 | 09:40 | 211 |
| dr-xr-xr-x | 9 | user | user | 0 | Feb | 2 | 09:40 | 6 |
| dr-xr-xr-x | 9 | user | user | 0 | Feb | 2 | 09:40 | 7 |

.
.
.

multiple columns:

| | | | | | | | |
|-------------|------------|---------|---------|----------|-------------------|-------------|-----------|
| 1 | 1190 | 1332 | 1343 | 211 | 6 | 7 | acpi |
| cmdline | consoles | cpuinfo | crypto | devices | diskstats | dma | driver |
| fs | interrupts | iomem | ioports | irq | kallsyms | kcore | key-users |
| kpageflags | loadavg | locks | mdstat | meminfo | misc | modules | mounts |
| pressure | schedstat | scsi | self | slabinfo | softirqs | spl | stat |
| thread-self | timer_list | tty | uptime | version | version_signature | vmallocinfo | vmstat |

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Comma seperated:

1, 1190, 1332, 1344, 211, 6, 7, acpi, bootconfig, buddyinfo, bus, cgroups, cmdline, consoles, c
dynamic_debug, execdomains, fb, filesystems, fs, interrupts, iomem, ioports, irq, kallsyms, kco
kpageflags, loadavg, locks, mdstat, meminfo, misc, modules, mounts, mtrr, net, pagetypeinfo, pa
spl, stat, swaps, sys, sysrq-trigger, sysvipc, thread-self, timer_list, tty, uptime, version, v

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[5] Display contents of a file: (Viddata.txt)

Displaying contents of a file:

This is a file created for displaying info....

An operating system (OS) is the program that, after being initially loaded into the computer by a boot program, manages all of the other application programs in a computer.

The application programs make use of the operating system by making requests for services through a defined application program interface (API). In addition, users can interact directly with the operating system through a user interface, such as a command-line interface (CLI) or a

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[6] Create an empty file:

Creating an empty file and deleting it:

Created

Shellscript_vid_prac1_set1.sh matching.txt tempfile.txt viddata.txt vidprac1_set2.sh

Deleted

Shellscript_vid_prac1_set1.sh matching.txt viddata.txt vidprac1_set2.sh

=====

[7] Create a directory:

[8] Switch to a directory:

Creating a directory:

Before shifting directory:

/home/user

after shifting:

/home/user/Vidyutdir

=====

[9] Display no. of lines, words, & characters in a file:

Display number of lines: (viddata.txt):

6

Number of words:

83

No. of characters:

524

=====

[10] Locate & display records with matching text: (matching.txt)

Locating fields with name Harry and displaying info:

| Name | AGE | ID |
|---------|-----|----|
| Harry : | 23 | 1 |
| Harry : | 19 | 2 |
| Harry : | 11 | 3 |
| Harry : | 14 | 4 |

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Problem Statement (B): Write shell scripts to -

- [1] Display the number of processors and cores on the host machine
- [2] Display the speed (frequency) of each processor.
- [3] Display the total, available and free memory on the host machine
- [4] Display the total number processes spawned and the number of context switches performed since the system boot.

Shell Script: vidprac1_set2.sh

```
#!/usr/bin/sh
echo "No. of processors: "
cat /proc/cpuinfo | grep "processor" | wc -l
echo "2nd method (with nproc)"
nproc
echo "=====
echo ""
echo "No. of cores in one processor: "
cat /proc/cpuinfo | grep "cpu cores" | uniq
echo "2nd method: (through lscpu): "
lscpu | grep "Core(s)"
echo "=====
echo ""
echo "Frequency of each processor: "
cat /proc/cpuinfo | grep "cpu MHz"
echo "=====
echo ""
echo "Total, Available and free memory: "
head -3 /proc/meminfo
echo "=====
echo ""
echo "No. of forks or process spawned: "
vmstat -f
echo "=====
echo ""
echo "No. of Context switches performed: "
cat /proc/stat | grep "ctxt"
```

CLI/Outputs:

[1] Display the number of processors and cores on the host machine :

```
~$ chmod +x vidprac1_set2.sh
~$ ./vidprac2.sh
bash: ./vidprac2.sh: No such file or directory
~$ ./vidprac1_set2.sh
No. of processors:
4
2nd method (with nproc)
4
=====
```

[2] Display the speed (frequency) of each processor:

```
Frequency of each processor:
cpu MHz      : 2799.998
cpu MHz      : 2799.998
cpu MHz      : 2799.998
cpu MHz      : 2799.998
=====
```

[3] Display the total, available and free memory on the host machine :

```
Total, Available and free memory:
MemTotal:      32860436 kB
MemFree:       5801996 kB
MemAvailable:  26061340 kB
=====
```

[4] Display the total number processes spawned and the number of context switches performed since the system boot:

```
No. of forks or process spawned:
1278390 forks
=====

No. of Context switches performed:
ctxt 508242397
```