

Practical no: 1

Name: Saloni Vishwakarma

Batch-Roll no: C1-13

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

Theory:

Q: Run command `more /proc/cpuinfo` and explain the following terms: processor and cores. Use the command `lscpu` to verify your definitions. Writing shell scripts.

Solution: `cd /proc`

`echo Directory changed`

`pwd`

`ls`

`lscpu`

Q: How many cores does your machine have?

Solution: `echo Total cores`

`cat /proc/cpuinfo | grep cores`

Q: How many processors does your machine have?

Solution: `echo Total Processor`

`nproc --all`

Q: What is the frequency of each processor?

Solution: `echo frequency of processor`

`cat /proc/cpuinfo | grep Mhz`

Q: What is the architecture of your CPU?

Solution: `echo Architecture of Cpu:`

`lscpu`

Q: How much physical memory does your system have?

Solution: `echo Total Memory`

`cat /proc/meminfo | grep MemTotal`

Q: How much of this memory is free?

Solution: `echo Avialable Memory`

`cat /proc/meminfo | grep MemAvailable`

Q: What is total number of number of forks and context switches since the system booted up?

Solution: `echo Total Forks`

`vmstat -f`

`echo 3`

```
echo Total number of Context Switches:  
cat /proc/stat | grep ctxt
```

Output:

[illegible]

```
es May 3 15:03
```

```
Terminal
```

```
rcoem@rcoem-Veriton-M200-H510: /proc
```

```
cpu cores : 6
cpu cores : 6
cpu cores : 6
cpu cores : 6
cpu cores : 6
cpu cores : 6
cpu cores : 6
rcoem@rcoem-Veriton-M200-H510:/proc$ nproc --all
12
rcoem@rcoem-Veriton-M200-H510:/proc$ echo Frequency of processor
Frequency of processor
rcoem@rcoem-Veriton-M200-H510:/proc$ cat /proc/cpuinfo | grep MHz
cpu MHz : 2600.000
cpu MHz : 2600.000
cpu MHz : 2600.000
cpu MHz : 2600.000
cpu MHz : 901.845
cpu MHz : 2600.000
cpu MHz : 2600.000
cpu MHz : 2600.000
cpu MHz : 2600.000
cpu MHz : 976.292
cpu MHz : 2600.000
cpu MHz : 2600.000
rcoem@rcoem-Veriton-M200-H510:/proc$ echo Available memory
Available memory
rcoem@rcoem-Veriton-M200-H510:/proc$ cat /proc/meminfo | grep MemAvailable
MemAvailable: 6661372 kB
rcoem@rcoem-Veriton-M200-H510:/proc$ echo Total forks
Total forks
rcoem@rcoem-Veriton-M200-H510:/proc$ vmstat -f
2841 forks
rcoem@rcoem-Veriton-M200-H510:/proc$ echo Total no. of context switches
Total no. of context switches
rcoem@rcoem-Veriton-M200-H510:/proc$ cat /proc/stat | grep ctxt
ctxt 583295
rcoem@rcoem-Veriton-M200-H510:/proc$ echo Architecture of CPU
Architecture of CPU
```

```
Architecture of CPU
rcoem@rcoem-Veriton-M200-H510:/proc$ lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
Address sizes:          39 bits physical, 48 bits virtual
CPU(s):                12
On-line CPU(s) list:    0-11
Thread(s) per core:     2
Core(s) per socket:     6
Socket(s):              1
NUMA node(s):           1
Vendor ID:              GenuineIntel
CPU family:              6
Model:                  167
Model name:              11th Gen Intel(R) Core(TM) i5-11400 @
                        2.60GHz
Stepping:                1
CPU MHz:                2600.000
CPU max MHz:            4400.0000
CPU min MHz:            800.0000
BogoMIPS:                5184.00
Virtualization:          VT-x
L1d cache:              288 KiB
L1i cache:              192 KiB
L2 cache:                3 MiB
L3 cache:                12 MiB
NUMA node0 CPU(s):      0-11
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:      Not affected
Vulnerability Mds:       Not affected
Vulnerability Meltdown:  Not affected
Vulnerability Mmio stale data: Mitigation; Clear CPU buffers; SMT vulnerable
Vulnerability Retbleed:   Mitigation; Enhanced IBRS
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
```

```
Flags:                fpu vme de pse tsc msr pae mce cx8 ap
ic sep mtrr pge mca cmov pat pse36 cl
flush dts acpi mmx fxsr sse sse2 ss h
t tm pbe syscall nx pdpe1gb rdtscp lm
constant tsc art arch_perfmon pebs b
ts rep_good nopl xtopology nonstop_t
c cpuid aperfmperf tsc_known_freq pni
pclmulqdq dtes64 monitor ds_cpl vmx
est tm2 ssse3 sdbg fma cx16 xtpr pdcm
pcid sse4_1 sse4_2 x2apic movbe popc
nt tsc_deadline_timer aes xsave avx f
16c rdrand lahf_lm abm 3dnowprefetch
cpuid_fault epb invpcid_single ssbd t
brs ibpb stibp ibrs_enhanced tpr_shad
ow vmm flexpriority ept vpid ept_ad
fsgsbase tsc_adjust bmi1 avx2 smep bm
i2 erms invpcid mpx avx512f avx512dq
rdseed adx smap avx512ifma clflushopt
intel_pt avx512cd sha_ni avx512bw av
x512vl xsaveopt xsavec xgetbv1 xsaves
dtherm ida arat pln pts hwp hwp_noti
fy hwp_act_window hwp_epp hwp_pkg_req
avx512vbmi umip pku ospke avx512_vbni
i2 gfni vaes vpclmulqdq avx512_vnni a
vx512_bitalg avx512_vpopcntdq rdpid f
srmi md_clear flush_l1d arch_capabilities

rcoem@rcoem-Veriton-M200-H510:/proc$ date
Wednesday 03 May 2023 02:28:36 PM IST
rcoem@rcoem-Veriton-M200-H510:/proc$ cal
May 2023
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 31

rcoem@rcoem-Veriton-M200-H510:/proc$ who
```

```
es Terminal May 3 15:08
rcoem@rcoem-Veriton-M200-H510: /proc

rcoem@rcoem-Veriton-M200-H510:/proc$ who
rcoem      :0                2023-05-03 14:18 (:0)
rcoem@rcoem-Veriton-M200-H510:/proc$ who am i
rcoem@rcoem-Veriton-M200-H510:/proc$ cal 2023
                2023
    January      February      March
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
 1  2  3  4  5  6  7          1  2  3  4          1  2  3  4
 8  9 10 11 12 13 14    5  6  7  8  9 10 11    5  6  7  8  9 10 11
15 16 17 18 19 20 21 12 13 14 15 16 17 18 12 13 14 15 16 17 18
22 23 24 25 26 27 28 19 20 21 22 23 24 25 19 20 21 22 23 24 25
29 30 31          26 27 28          26 27 28 29 30 31

    April      May      June
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
          1          1  2  3  4  5  6          1  2  3
 2  3  4  5  6  7  8    7  8  9 10 11 12 13    4  5  6  7  8  9 10
 9 10 11 12 13 14 15 14 15 16 17 18 19 20 11 12 13 14 15 16 17
16 17 18 19 20 21 22 21 22 23 24 25 26 27 18 19 20 21 22 23 24
23 24 25 26 27 28 29 28 29 30 31          25 26 27 28 29 30
30

    July      August      September
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
          1          1  2  3  4  5          1  2
 2  3  4  5  6  7  8    6  7  8  9 10 11 12    3  4  5  6  7  8  9
 9 10 11 12 13 14 15 13 14 15 16 17 18 19 10 11 12 13 14 15 16
16 17 18 19 20 21 22 20 21 22 23 24 25 26 17 18 19 20 21 22 23
23 24 25 26 27 28 29 27 28 29 30 31          24 25 26 27 28 29 30
30 31

    October      November      December
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
 1  2  3  4  5  6  7          1  2  3  4          1  2
 8  9 10 11 12 13 14    5  6  7  8  9 10 11    3  4  5  6  7  8  9
15 16 17 18 19 20 21 12 13 14 15 16 17 18 10 11 12 13 14 15 16
22 23 24 25 26 27 28 19 20 21 22 23 24 25 17 18 19 20 21 22 23
29 30 31          26 27 28 29 30          24 25 26 27 28 29 30
```

```
es Terminal May 3 15:09
rcoem@rcoem-Veriton-M200-H510: /proc

rcoem@rcoem-Veriton-M200-H510:/proc$ man date
rcoem@rcoem-Veriton-M200-H510:/proc$ echo hello
hello
rcoem@rcoem-Veriton-M200-H510:/proc$ tty
/dev/pts/0
rcoem@rcoem-Veriton-M200-H510:/proc$ cat fork.c
cat: fork.c: No such file or directory
rcoem@rcoem-Veriton-M200-H510:/proc$ gedit hello.c &
[1] 3722
rcoem@rcoem-Veriton-M200-H510:/proc$ gcc hello.c
gcc: error: hello.c: No such file or directory
gcc: fatal error: no input files
compilation terminated.
rcoem@rcoem-Veriton-M200-H510:/proc$ grep -c processor /proc/cpuinfo
12
[1]+  Done                  gedit hello.c
rcoem@rcoem-Veriton-M200-H510:/proc$ grep 'cpu cores' /proc/cpuinfo | uniq
cpu cores      : 6
rcoem@rcoem-Veriton-M200-H510:/proc$ echo "Frequency of each processor"
Frequency of each processor
rcoem@rcoem-Veriton-M200-H510:/proc$ grep 'cpu MHz' /proc/cpuinfo
rcoem@rcoem-Veriton-M200-H510:/proc$ grep 'MemTotal' /proc/cpuinfo
rcoem@rcoem-Veriton-M200-H510:/proc$ ls
1      1567 1845 2270 3256 552 85      irq
10     158 1850 2276 3297 56 855      kallsyms
100    1582 1856 24 3299 565 858      kcore
1035   1587 1865 246 33 569 86      keys
1036   159 1871 247 3310 57 860      key-users
1037   1594 1892 25 3345 58 861      kmsg
1038   1598 19 2574 3390 6 865      kpagecgroup
1039   16 1906 2582 34 60 866      kpagecount
1040   1609 1907 259 347 601 87      kpageflags
1041   161 1908 26 350 602 873      loadavg
1042   1610 1909 260 3514 61 88      locks
1043   1614 191 261 3515 62 89      mdstat
1044   162 1913 2613 3533 63 90      meminfo
1045   1621 1915 2616 36 64 91      misc
1046   1627 1917 262 3617 66 92      modules
1047   163 1918 263 363 67 928      mount
```



```
es Terminal May 3 15:10
rcoem@rcoem-Veriton-M200-H510: /proc

151 1780 2095 2988 46 82 crypto tty
152 18 21 299 48 823 devices uptime
1539 180 2118 3 49 824 diskstats version
154 1806 213 30 5 827 dma version_signature
1545 181 2132 300 50 828 driver vmallocinfo
1546 1810 2133 3048 51 829 dynamic_debug vmstat
1548 1811 2134 305 52 831 execdomains zoneinfo
155 1815 2136 31 524 832 fb
1555 1817 2137 3106 526 838 filesystems
1556 182 2138 313 527 84 fs
156 1828 2181 314 532 840 interrupts
1561 1832 2185 3169 54 844 iomem
1563 1834 22 32 55 848 ioports

rcoem@rcoem-Veriton-M200-H510: /proc$ df -m
Filesystem      1M-blocks    Used Available Use% Mounted on
udev             3831         0      3831    0% /dev
tmpfs            774         3       772    1% /run
/dev/sda6       68338 14972     49850   24% /
tmpfs           3868         0      3868    0% /dev/shm
tmpfs            5         1         5    1% /run/lock
tmpfs           3868         0      3868    0% /sys/fs/cgroup
/dev/loop1        1         1         0 100% /snap/bare/5
/dev/loop0        56         56         0 100% /snap/core18/2714
/dev/loop2        64         64         0 100% /snap/core20/1828
/dev/loop3       219        219         0 100% /snap/gnome-3-34-1804/93
/dev/loop4        56         56         0 100% /snap/core18/2721
/dev/loop11       46         46         0 100% /snap/snap-store/599
/dev/loop10       92         92         0 100% /snap/gtk-common-themes/1535
/dev/loop6        64         64         0 100% /snap/core20/1852
/dev/loop12       46         46         0 100% /snap/snap-store/638
/dev/loop5       350        350         0 100% /snap/gnome-3-38-2004/137
/dev/loop8       219        219         0 100% /snap/gnome-3-34-1804/90
/dev/loop7       350        350         0 100% /snap/gnome-3-38-2004/140
/dev/loop9        82         82         0 100% /snap/gtk-common-themes/1534
/dev/loop13       50         50         0 100% /snap/snapd/18357
/dev/loop14       50         50         0 100% /snap/snapd/18596
/dev/sda1        96         62        35   64% /boot/efi
tmpfs            774         1       774    1% /run/user/1000

rcoem@rcoem-Veriton-M200-H510: /proc$ du -m Documents
```

```
es Terminal May 3 15:11
rcoem@rcoem-Veriton-M200-H510: /proc

rcoem@rcoem-Veriton-M200-H510: /proc$ uname -a
Linux rcoem-Veriton-M200-H510 5.15.0-69-generic #76~20.04.1-Ubuntu SMP Mon Mar 20 15:54:19 UTC 2023 x86_64 x86_64 x86_64 GNU/Linux
rcoem@rcoem-Veriton-M200-H510: /proc$ hostname
rcoem-Veriton-M200-H510
rcoem@rcoem-Veriton-M200-H510: /proc$ hostname -I
172.16.162.230
rcoem@rcoem-Veriton-M200-H510: /proc$ ping google.com
PING google.com (142.250.194.46) 56(84) bytes of data:
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=1 ttl=116 time=35.2 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=2 ttl=116 time=36.3 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=3 ttl=116 time=35.7 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=4 ttl=116 time=37.5 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=5 ttl=116 time=35.9 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=6 ttl=116 time=36.0 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=7 ttl=116 time=36.2 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=8 ttl=116 time=35.0 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=9 ttl=116 time=36.2 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=10 ttl=116 time=35.5 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=11 ttl=116 time=37.4 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=12 ttl=116 time=36.1 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=13 ttl=116 time=35.6 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=14 ttl=116 time=35.9 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=15 ttl=116 time=42.1 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=16 ttl=116 time=41.4 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=17 ttl=116 time=36.6 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=18 ttl=116 time=37.9 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=19 ttl=116 time=37.3 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=20 ttl=116 time=36.4 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=21 ttl=116 time=39.1 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=22 ttl=116 time=37.5 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=23 ttl=116 time=35.3 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=24 ttl=116 time=36.5 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=25 ttl=116 time=37.6 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=26 ttl=116 time=37.7 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=27 ttl=116 time=36.8 ms
64 bytes from del12s02-in-f14.1e100.net (142.250.194.46): icmp_seq=28 ttl=116 time=38.2 ms
^Z
[1]+  Stopped                  ping google.com
rcoem@rcoem-Veriton-M200-H510: /proc$ sudo apt install locate
```

```
es Terminal May 3 15:12
rcoem@rcoem-Veriton-M200-H510: /proc

Reading state information... Done
E: Unable to locate package plocate
rcoem@rcoem-Veriton-M200-H510:/proc$ locate hello.c

Command 'locate' not found, but can be installed with:

sudo apt install mlocate

rcoem@rcoem-Veriton-M200-H510:/proc$ sudo passwd
New password:
Retype new password:
passwd: password updated successfully
rcoem@rcoem-Veriton-M200-H510:/proc$ df -h
Filesystem      1M-blocks    Used Available Use% Mounted on
udev            3831         0    3831     0% /dev
tmpfs           774         3     772     1% /run
/dev/sda6       68338 14972    49850    24% /
tmpfs           3868         0    3868     0% /dev/shm
tmpfs           5           1         5     1% /run/lock
tmpfs           3868         0    3868     0% /sys/fs/cgroup
/dev/loop1       1           1         0 100% /snap/bare/5
/dev/loop0       56          56         0 100% /snap/core18/2714
/dev/loop2       64          64         0 100% /snap/core20/1828
/dev/loop3      219        219         0 100% /snap/gnome-3-34-1804/93
/dev/loop4       56          56         0 100% /snap/core18/2721
/dev/loop11      46          46         0 100% /snap/snap-store/599
/dev/loop10      92          92         0 100% /snap/gtk-common-themes/1535
/dev/loop6       64          64         0 100% /snap/core20/1852
/dev/loop12      46          46         0 100% /snap/snap-store/638
/dev/loop5      350        350         0 100% /snap/gnome-3-38-2004/137
/dev/loop8      219        219         0 100% /snap/gnome-3-34-1804/90
/dev/loop7      350        350         0 100% /snap/gnome-3-38-2004/140
/dev/loop9       82          82         0 100% /snap/gtk-common-themes/1534
/dev/loop13      50          50         0 100% /snap/snapd/18357
/dev/loop14      50          50         0 100% /snap/snapd/18596
/dev/sda1       96          62         35    64% /boot/efi
tmpfs           774         1     774     1% /run/user/1000
rcoem@rcoem-Veriton-M200-H510:/proc$
```

The commands and their uses-

1. date- displays or sets the date and time.
2. cal- displays a calender.
3. who- displays the user currently logged in to your Linux operating system.
4. man- displays the user manual of any command the we run on the terminal.
5. echo- to print the message on the screen.
6. tty- writes the name of terminal to standard output.
7. cat- to print the content of a file onto the standard output stream.
8. touch- to create a blank file.
9. grep- used to search a particular word or pattern related to that word from the file.
10. ls- used to list the files.
11. sudo- allows to run programs with the security privileges of another user.
12. apt- Advanced Packaging Tool
13. locate- used to find files on filesystems.
14. passwd- changes passwords for user account.
15. df- displays the amount of disk space available on the filesystem with each file name's argument.
16. du- measures the disk space occupied by files or directories.
17. uname- displays the system information such as hardware platform, system name and processor.
18. hostname- displays the set and system host name.
19. chmod- used to change the permission of a file or directory.
20. ping- helps diagnose the network connectivity between your device and a network destination.

Conclusion: I have successfully implemented basic Linux Sytem Commands and shell scripts to display the system particulars (processor, processes and memory)

