COMP 4736 Lab 1
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1.

   a)

   Commands Entered: more /proc/cpuinfo

   Screenshot:

```
root@MHO-laptop:~# more /proc/cpuinfo
processor       : 0
vendor_id       : AuthenticAMD
cpu family      : 23
model           : 104
model name      : AMD Ryzen 7 5700U with Radeon Graphics
stepping        : 1
microcode       : 0xffffffff
cpu MHz         : 1796.569
cache size      : 512 KB
physical id     : 0
siblings        : 16
core id         : 0
cpu cores       : 8
apicid          : 0
initial apicid  : 0
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fx
sr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm constant_tsc rep_good nopl tsc_reliable nons
top_tsc cpuid extd_apicid pni pclmulqdq ssse3 fma cx16 sse4_1 sse4_2 movbe popcnt aes xsave avx f16c rdr
and hypervisor lahf_lm cmp_legacy svm cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw topoext perfct
r_core ssbd ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 rdseed adx smap clflushopt clwb sha_ni
xsaveopt xsavec xgetbv1 clzero xsaveerptr arat npt nrip_save tsc_scale vmcb_clean flushbyasid decodeassi
sts pausefilter pfthreshold v_vmsave_vmload umip rdpid
bugs            : sysret_ss_attrs null_seg spectre_v1 spectre_v2 spec_store_bypass retbleed smt_rsb srso
```

   b) 8

   c) 16

   d) 1796.569 MHz

   e) x86_64

   f) Command: more /proc/meminfo

   Answer: 7784800 kB

```
MemTotal:          7784800 kB
MemFree:           6811132 kB
MemAvailable:      6884056 kB
Buffers:               960 kB
Cached:             271732 kB
SwapCached:              0 kB
Active:              38640 kB
Inactive:           569792 kB
Active(anon):         1964 kB
Inactive(anon):     337072 kB
Active(file):        36676 kB
Inactive(file):     232720 kB
Unevictable:             0 kB
Mlocked:                 0 kB
SwapTotal:         2097152 kB
SwapFree:          2097152 kB
Dirty:                   0 kB
Writeback:               0 kB
AnonPages:          322660 kB
Mapped:             161604 kB
Shmem:                3296 kB
KReclaimable:        36560 kB
Slab:                98476 kB
SReclaimable:        36560 kB
SUnreclaim:          61916 kB
KernelStack:          5072 kB
PageTables:           4120 kB
NFS_Unstable:            0 kB
Bounce:                  0 kB
WritebackTmp:            0 kB
```

g) 6811132 kB

h) Command: more /proc/stat | grep processes

```
processes 20000
root@MHO-laptop:~# more /proc/stat | grep processes
processes 20028
root@MHO-laptop:~# more /proc/stat | grep processes
processes 20033
root@MHO-laptop:~# more /proc/stat | grep processes
processes 20038
```

i) Command: more /proc/1/status

Answer: 57035

```
root@MHO-laptop: ~
SpeculationIndirectBranch:        conditional enabled
Cpus_allowed:    ffff
Cpus_allowed_list:       0-15
Mems_allowed:    1
Mems_allowed_list:       0
voluntary_ctxt_switches:          57035
nonvoluntary_ctxt_switches:       148
root@MHO-laptop:~#
```

2.

a) Command: ps aux

Answer: PID 417

```
root         388  0.0  0.0    6124  4872 pts/1     S+   15:01   0:00 -bash
root         404  1.1  0.4   44184 37208 ?         S    15:01   0:02 python3 /snap/ubuntu-des
root         417 99.9  0.0    2644   984 pts/0     R+   15:01   2:56 ./cpu
root        1226  0.0  0.0   22100  3252 ?         S    15:04   0:00 /lib/systemd/systemd-ude
root        1227  0.0  0.0   22100  3252 ?         S    15:04   0:00 /lib/systemd/systemd-ude
root        1228  0.0  0.0   22100  3188 ?         S    15:04   0:00 /lib/systemd/systemd-ude
```

b) Command: top aux

Answer: 100% CPU; 0% Memory

```
  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
  417 root      20   0    2644    984    892 R 100.0   0.0   3:59.98 cpu
    1 root      20   0  165972  11352   8356 S   0.7   0.1   0:02.80 systemd
  404 root      20   0   44184  37528  10084 S   0.3   0.5   0:02.28 python3
 1297 root      20   0    7796   3548   2948 R   0.3   0.0   0:00.03 top
    2 root      20   0    2476   1432   1320 S   0.0   0.0   0:00.01 init-systemd(Ub
    6 root      20   0    2504    132    132 S   0.0   0.0   0:00.01 init
   38 root      19  -1   31428  11464  10476 S   0.0   0.1   0:00.16 systemd-journal
```

c) R – Running

3.

a) Command: ps

Answer: 2090

```
$ ps
    PID    PPID    PGID   WINPID  TTY      UID    STIME COMMAND
   2090    1974    2090    18524  cons0  197609 15:10:18 /c/Class/COMP 4736 OS/comp4736-repo/labs/1/cpu-print
   2146    2091    2146     6176  cons1  197609 15:10:40 /usr/bin/ps
   2091       1    2091    19984  cons1  197609 15:10:27 /usr/bin/bash
   1974       1    1974    14488  cons0  197609 15:09:29 /usr/bin/bash
```

b) Parent PID: 1974, Parent PID of 1974: 1

c) Command: ls -l /proc/983/fd

Answer: Standard input and error is pointing to /dev/pts/0, which is the terminal.

Standard out is redirected to /tmp/tmp.txt

```
root@MHO-laptop:~# ls -l /proc/983/fd
total 0
lrwx------ 1 root root 64 Sep 26 15:27 0 -> /dev/pts/0
l-wx------ 1 root root 64 Sep 26 15:27 1 -> /tmp/tmp.txt
lrwx------ 1 root root 64 Sep 26 15:27 2 -> /dev/pts/0
```

d) Command: ls -l /proc/5697/fd

ls -l /proc/5696/fd

Answer: stdout of cpu-print is being redirected to pipe 107004; stdin of grep is pointing to the same pipe.

```
root@MHO-laptop:~# ls -l /proc/5697/fd
total 0
lr-x------ 1 root root 64 Sep 27 03:10 0 -> 'pipe:[107004]'
lrwx------ 1 root root 64 Sep 27 03:10 1 -> /dev/pts/2
lrwx------ 1 root root 64 Sep 27 03:10 2 -> /dev/pts/2
root@MHO-laptop:~# ps
    PID TTY          TIME CMD
   5466 pts/2    00:00:00 bash
   5696 pts/2    00:00:00 cpu-print
   5697 pts/2    00:00:00 grep
   6140 pts/2    00:00:00 ps
root@MHO-laptop:~# ls -l /proc/5696/fd
total 0
lrwx------ 1 root root 64 Sep 27 03:11 0 -> /dev/pts/2
l-wx------ 1 root root 64 Sep 27 03:11 1 -> 'pipe:[107004]'
lrwx------ 1 root root 64 Sep 27 03:11 2 -> /dev/pts/2
```

e) command: type cd ls history ps

answer: cd and history are built in; ls and ps are executables

```
root@MHO-laptop:~# type cd ls history ps
cd is a shell builtin
ls is aliased to 'ls --color=auto'
history is a shell builtin
ps is hashed (/usr/bin/ps)
root@MHO-laptop:~#
```