CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

Faculty of Technology and Engineering

Chandubhai S. Patel Institute of Technology

Department of Computer Science & Engineering

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Practical 3

Academic Year	:	2023-24	Semester	:	4th
Course code	:	CSE208	Course name	:	Operating System

Perform Linux Commands for the following

Practical 3:

- **Part A: Implementing Pipes and Filters**

```
23cs070@67d52bda12a7dc36e53b2ee9:~$ ps aux | grep "[c]hrome" | awk '{print $2, $
11}' | sort -n
23cs070@67d52bda12a7dc36e53b2ee9:~$ pgrep -l chrome
23cs070@67d52bda12a7dc36e53b2ee9:~$ pgrep -a chrome
23cs070@67d52bda12a7dc36e53b2ee9:~$ ps aux | grep chrome
23cs070      706  0.0  0.0   3464  1780 pts/0    S+   15:38   0:00 grep --color=
auto chrome
23cs070@67d52bda12a7dc36e53b2ee9:~$ pgrep -l chrome
23cs070@67d52bda12a7dc36e53b2ee9:~$ pgrep -l google-chrome
```

```
23cs070@67d52bda12a7dc36e53b2ee9:~$ ps aux
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0  11204  3820 ?        Ss   15:27   0:00 /bin/bash /et
root          21  0.0  0.1  40824 28152 ?        S    15:27   0:00 /usr/bin/pyth
root          22  0.0  0.0  15424  9540 ?        S    15:27   0:00 sshd: /usr/sb
root          23  0.0  0.0  14040  4492 ?        S    15:27   0:00 su labex -c v
labex         24  0.0  0.1  40320 30572 ?        Ss   15:27   0:00 /usr/bin/perl
labex         36  5.6  0.6 792392 110600 ?       Sl   15:27   0:48 /usr/bin/Xvnc
labex         46  0.0  0.0  11204  3572 ?        S    15:27   0:00 sh -c { echo
labex         47  0.0  0.0  11204  1928 ?        S    15:27   0:00 sh -c { echo
labex         48  0.0  0.4 454068 76872 ?        Sl   15:27   0:00 xfce4-session
labex         57  0.0  0.0   8300  1984 ?        S    15:27   0:00 /usr/bin/dbus
labex         58  0.0  0.0   8512  3328 ?        Ss   15:27   0:00 /usr/bin/dbus
labex         60  0.0  0.0 309460  7580 ?        Sl   15:27   0:00 /usr/libexec/
labex         65  0.0  0.0   8424  4504 ?        S    15:27   0:00 /usr/bin/dbus
labex         69  0.0  0.0 231000  6304 ?        Sl   15:27   0:00 /usr/lib/x86_
labex         75  0.0  0.0 162748  8292 ?        Sl   15:27   0:00 /usr/libexec/
labex         80  0.0  0.0   7972  1076 ?        Ss   15:27   0:00 /usr/bin/ssh-
labex         85  0.0  0.0  11496   288 ?        Ss   15:27   0:00 /usr/bin/gpg-
labex         86  0.0  0.2 390408 39896 ?        Sl   15:27   0:00 xfwm4
labex         90  0.0  0.0 241744  8268 ?        Sl   15:27   0:00 /usr/libexec/
labex        101  0.0  0.1 227980 25024 ?        Sl   15:27   0:00 xfsettingsd
labex        104  0.0  0.1 417728 30812 ?        Sl   15:27   0:00 xfce4-panel
labex        108  0.0  0.1 340544 23364 ?        Sl   15:27   0:00 Thunar --daem
labex        113  0.0  0.4 551148 66936 ?        Sl   15:27   0:00 xfdesktop
labex        116  0.0  0.1 339652 23364 ?        Sl   15:27   0:00 /usr/lib/x86_
labex        132  0.0  0.1 262948 17428 ?        Sl   15:27   0:00 /usr/lib/x86_
labex        135  0.0  0.1 189088 17624 ?        Sl   15:27   0:00 xfce4-power-m
labex        145  0.0  0.0 159612  7196 ?        Sl   15:27   0:00 xiccd
labex        157  0.0  0.0 242280  8124 ?        Sl   15:27   0:00 /usr/libexec/
labex        227  0.0  0.2 549912 47488 ?        Sl   15:27   0:00 xfce4-termina
labex        253  0.0  0.0  14712  7032 pts/0    Ss   15:27   0:00 zsh
root         484  0.0  0.0  14456  5032 pts/0    S    15:30   0:00 su - 23cs070
23cs070      493  0.0  0.0   4620  3940 pts/0    S    15:30   0:00 -bash
23cs070      755  0.0  0.0   7056  1608 pts/0    R+   15:41   0:00 ps aux
```

❖ **Part B: Process-Oriented Commands**

- A background script (long_running_script.sh) is running, and you need to:
  - Check its process ID.

```
23cs070@67d5691d12a7dc36e53b4203:~$ ps aux | grep long_running_script.sh
23cs070      565  0.0  0.0   4488  3532 pts/0    S    19:53   0:00 /bin/bash ./l
ong_running_script.sh
```

  - Send it to the background if not already.

```
23cs070@67d5691d12a7dc36e53b4203:~$ nano long_running_script.sh
23cs070@67d5691d12a7dc36e53b4203:~$ chmod +x long_running_script.sh
23cs070@67d5691d12a7dc36e53b4203:~$ ./long_running_script.sh &
[1] 565
```

  - Bring it to the foreground for monitoring

```
23cs070@67d5691d12a7dc36e53b4203:~$ jobs
[1]+  Running                 ./long_running_script.sh &
23cs070@67d5691d12a7dc36e53b4203:~$ fg %1
./long_running_script.sh


^[^Z
[1]+  Stopped                 ./long_running_script.sh
```

- Terminate a process using its process ID (PID).

```
23cs070@67d5691d12a7dc36e53b4203:~$ kill 565
```

- Run a command (my_script.sh) that should not terminate even if the session is closed.

```
23cs070@67d5691d12a7dc36e53b4203:~$ nano my_script.sh
23cs070@67d5691d12a7dc36e53b4203:~$ chmod +x my_script.sh
23cs070@67d5691d12a7dc36e53b4203:~$ nohup ./my_script.sh &
[2] 980
23cs070@67d5691d12a7dc36e53b4203:~$ nohup: ignoring input and appending output t
o 'nohup.out'
```

- View and manage jobs running in the current session.

```
23cs070@67d5691d12a7dc36e53b4203:~$ jobs -l
[1]+   565 Stopped                 ./long_running_script.sh
[2]-   980 Running                 nohup ./my_script.sh &
```

- Run a process with lower priority to minimize its impact on system performance.

```
23cs070@67d5691d12a7dc36e53b4203:~$ nano low_priority_script.sh
23cs070@67d5691d12a7dc36e53b4203:~$ chmod +x low_priority_script.sh
23cs070@67d5691d12a7dc36e53b4203:~$ nice -n 15 ./low_priority_script.sh &
[3] 1251
23cs070@67d5691d12a7dc36e53b4203:~$ Low priority script is running...
Low priority script is running...
Low priority script is running...
Low priority script is running...
Low priority script is running...
Low priority script is running...
Low priority script is running...
```

❖ **Part C: System Monitoring**

- Monitor the current system load and uptime.

```
23cs070@67d52bda12a7dc36e53b2ee9:~$ uptime
 16:10:05 up 11 days,  4:17,  0 users,  load average: 0.56, 0.35, 0.22
```

- Display detailed information about the CPU architecture.

```
23cs070@67d52bda12a7dc36e53b2ee9:~$ lscpu
Architecture:            x86_64
  CPU op-mode(s):        32-bit, 64-bit
  Address sizes:         52 bits physical, 57 bits virtual
  Byte Order:            Little Endian
CPU(s):                  4
  On-line CPU(s) list:   0-3
Vendor ID:               GenuineIntel
  Model name:            Intel(R) Xeon(R) Platinum 8575C
    CPU family:          6
    Model:               207
    Thread(s) per core:  2
    Core(s) per socket:  2
    Socket(s):           1
    Stepping:            2
    CPU max MHz:         4000.0000
    CPU min MHz:         800.0000
    BogoMIPS:            5600.00
    Flags:               fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mc
                         a cmov pat pse36 clflush mmx fxsr sse sse2 ss ht syscal
                         l nx pdpe1gb rdtscp lm constant_tsc arch_perfmon rep_go
                         od nopl xtopology nonstop_tsc cpuid aperfmperf tsc_know
                         n_freq pni pclmulqdq monitor ssse3 fma cx16 pdcm pcid s
                         se4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdr
                         and hypervisor lahf_lm abm 3dnowprefetch cpuid_fault in
                         vpcid_single ibrs_enhanced fsgsbase tsc_adjust bmi1 hle
                          avx2 smep bmi2 erms invpcid rtm avx512f avx512dq rdsee
                         d adx smap avx512ifma clflushopt clwb avx512cd sha_ni a
                         vx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves avx512_
                         bf16 wbnoinvd ida arat hwp hwp_notify hwp_act_window hw
                         p_epp hwp_pkg_req avx512vbmi umip pku ospke waitpkg avx
                         512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bital
                         g avx512_vpopcntdq rdpid cldemote movdiri movdir64b md_
                         clear arch_capabilities
Virtualization features:
  Hypervisor vendor:     KVM
  Virtualization type:   full
Caches (sum of all):
  L1d:                   96 KiB (2 instances)
  L1i:                   64 KiB (2 instances)
  L2:                    4 MiB (2 instances)
  L3:                    320 MiB (1 instance)
NUMA:
  NUMA node(s):          1
  NUMA node0 CPU(s):     0-3
Vulnerabilities:
  Gather data sampling:  Not affected
  Itlb multihit:         Not affected
  L1tf:                  Not affected
  Mds:                   Not affected
  Meltdown:              Not affected
  Mmio stale data:       Unknown: No mitigations
  Retbleed:              Not affected
  Spec store bypass:     Vulnerable
  Spectre v1:            Mitigation; usercopy/swapgs barriers and __user pointer
                          sanitization
  Spectre v2:            Mitigation; Enhanced IBRS, RSB filling, PBRSB-eIBRS SW
                         sequence
  Srbds:                 Not affected
  Tsx async abort:       Not affected
```

- View real-time system resource usage.

```
top - 16:12:28 up 11 days,  4:19,  0 users,  load average: 0.05, 0.21, 0.18
Tasks:  33 total,   1 running,  32 sleeping,   0 stopped,   0 zombie
%Cpu(s): 10.8 us,  0.7 sy,  0.0 ni, 88.3 id,  0.1 wa,  0.0 hi,  0.1 si,  0.0 st
MiB Mem :  15728.3 total,   4482.6 free,   2518.4 used,   8727.4 buff/cache
MiB Swap:      0.0 total,      0.0 free,      0.0 used.  12846.0 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
     36 labex     20   0  792392 110648  60124 S  41.3   0.7   3:52.89 Xvnc
      1 root      20   0   11204   3820   3544 S   0.0   0.0   0:00.00 init.sh
     21 root      20   0   40824  28152  10708 S   0.0   0.2   0:00.42 supervi+
     22 root      20   0   15424   9540   7904 S   0.0   0.1   0:00.01 sshd
     23 root      20   0   14040   4492   3948 S   0.0   0.0   0:00.00 su
     24 labex     20   0   40320  30572   6516 S   0.0   0.2   0:00.36 vncserv+
     46 labex     20   0   11204   3572   3320 S   0.0   0.0   0:00.00 sh
     47 labex     20   0   11204   1928   1660 S   0.0   0.0   0:00.00 sh
     48 labex     20   0  454068  76872  61072 S   0.0   0.5   0:00.12 xfce4-s+
     57 labex     20   0    8300   1984   1528 S   0.0   0.0   0:00.00 dbus-la+
     58 labex     20   0    8512   3328   2712 S   0.0   0.0   0:00.02 dbus-da+
     60 labex     20   0  309460   7580   6916 S   0.0   0.0   0:00.00 at-spi-+
     65 labex     20   0    8424   4504   4048 S   0.0   0.0   0:00.01 dbus-da+
     69 labex     20   0  231000   6304   5488 S   0.0   0.0   0:00.02 xfconfd
     75 labex     20   0  162748   8292   7524 S   0.0   0.1   0:00.05 at-spi2+
     80 labex     20   0    7972   1076      0 S   0.0   0.0   0:00.00 ssh-age+
     85 labex     20   0   11496    288      0 S   0.0   0.0   0:00.00 gpg-age+
```