

Assignment 2

- a) Use the 'ps' command to perform the following operations:
 - a. Display the process status of the current shell.
 - b. Display the process status of all the running processes.
 - c. Display the process status of all the running processes in a full format.
 - d. Display the process status of all the running processes except session leader.
 - e. View all the running processes.
- b) Open the Firefox browser. Now using the 'htop' program, display the following:
 - a. The PID(s) of the Firefox process / processes.
 - b. The owner of the process / processes.
 - c. Virtual memory being consumed by the process / processes.
 - d. The percentage of the processor time used by the process / processes.
 - e. The percentage of physical RAM used by the process / processes.
 - f. The name of the command that started the process / processes.
- c) Kill a specific process by using its PID.
- d) Kill all the processes in the system.
- e) Open the Firefox browser. Observe and state the following using appropriate commands:
 - a. Parent process
 - b. Child process / processes
 - c. PID of the associated processes
 - d. PPID of the associated processes
 - e. TID of the associated processes
 - f. Kill a child process
 - g. Kill the parent process
- f) Using CAT command, write a program in Python to get a list of all the running processes.
- g) Using CAT command, write a program in C to get the system and process information.

a.

```
[nixos@nixos:~]$ pwd
/home/nixos

[nixos@nixos:~]$ ps
  PID TTY          TIME CMD
 3370 pts/0      00:00:00 bash
 3399 pts/0      00:00:00 ps

[nixos@nixos:~]$
```

a)

```
[nixos@nixos:~]$ ps -e
  PID TTY          TIME CMD
    1 ?           00:00:01 systemd
    2 ?           00:00:00 kthreadd
    3 ?           00:00:00 pool_workqueue_release
    4 ?           00:00:00 kworker/R-kvfree_rcu_reclaim
    5 ?           00:00:00 kworker/R-rcu_gp
    6 ?           00:00:00 kworker/R-sync_wq
    7 ?           00:00:00 kworker/R-slub_flushwq
    8 ?           00:00:00 kworker/R-netns
   10 ?           00:00:00 kworker/0:0H-events_highpri
```

b)

```
[nixos@nixos:~]$ ps -ef
UID          PID    PPID  C STIME TTY          TIME CMD
root           1        0  0 07:01 ?           00:00:01 /run/current-system/systemd/
root           2        0  0 07:01 ?           00:00:00 [kthreadd]
root           3        2  0 07:01 ?           00:00:00 [pool_workqueue_release]
root           4        2  0 07:01 ?           00:00:00 [kworker/R-kvfree_rcu_reclai
root           5        2  0 07:01 ?           00:00:00 [kworker/R-rcu_gp]
root           6        2  0 07:01 ?           00:00:00 [kworker/R-sync_wq]
root           7        2  0 07:01 ?           00:00:00 [kworker/R-slub_flushwq]
root           8        2  0 07:01 ?           00:00:00 [kworker/R-netns]
root          10        2  0 07:01 ?           00:00:00 [kworker/0:0H-events_highpri
```

c)

```
[nixos@nixos:~]$ ps -d
  PID TTY          TIME CMD
    2 ?           00:00:00 kthreadd
    3 ?           00:00:00 pool_workqueue_release
    4 ?           00:00:00 kworker/R-kvfree_rcu_reclaim
    5 ?           00:00:00 kworker/R-rcu_gp
    6 ?           00:00:00 kworker/R-sync_wq
    7 ?           00:00:00 kworker/R-slub_flushwq
    8 ?           00:00:00 kworker/R-netns
   10 ?           00:00:00 kworker/0:0H-events_highpri
   11 ?           00:00:00 kworker/0:1-events
```

d)

e)

```
[nixos@nixos:~]$ ps -elf
F S UID          PID     PPID  C  PRI  NI ADDR SZ WCHAN  STIME TTY          TIME CMD
4 S root           1         0  0   80   0 -   5918 -          07:01 ?           00:00:01 /run/current-s
1 S root           2         0  0   80   0 -       0 -          07:01 ?           00:00:00 [kthreadd]
1 S root           3         2  0   80   0 -       0 -          07:01 ?           00:00:00 [pool_workqueu
1 I root           4         2  0   60  -20 -       0 -          07:01 ?           00:00:00 [kworker/R-kvf
1 I root           5         2  0   60  -20 -       0 -          07:01 ?           00:00:00 [kworker/R-rcu
1 I root           6         2  0   60  -20 -       0 -          07:01 ?           00:00:00 [kworker/R-syn
```

a)

b.

htop system monitor output:

```

0[|||||] 4.6% Tasks: 105, 514 thr, 76 kthr; 1 running
1[|||||] 4.0% Load average: 0.04 0.13 0.15
Mem[|||||] 1.62G/3.83G Uptime: 00:17:34
Swp[|||||] 0K/0K

Main I/O
PID USER    PRI  NI  VIRT   RES   SHR  S  CPU% MEM%  TIME+  Command
3609 nixos     20    0  228M  5600  3696  R   2.6  0.1  0:00.15 htop
3362 nixos     20    0 1841M  254M  133M  S   2.0  6.5  0:12.42 /nix/store/76rqjrmz38psr73yqdn06g9k656gh3w
1217 nixos     5  -15 4134M  395M    0  S   0.7 10.1  0:02.59 /nix/store/hzvf1v31dlc54f5nqdschkiz75c0q4ba
1219 nixos     20    0 4134M  395M    0  S   0.7 10.1  0:27.61 /nix/store/hzvf1v31dlc54f5nqdschkiz75c0q4ba
1220 nixos     20    0 4134M  395M    0  S   0.7 10.1  0:29.62 /nix/store/hzvf1v31dlc54f5nqdschkiz75c0q4ba
3022 nixos     20    0 2990M  265M  104M  S   0.7  6.8  0:06.77 /nix/store/ckhdna8chlal2bgylkghvxdaknnbd1y
3075 nixos     20    0 2990M  265M    0  S   0.7  6.8  0:00.85 /nix/store/ckhdna8chlal2bgylkghvxdaknnbd1y
3385 nixos     20    0 1841M  254M    0  S   0.7  6.5  0:02.09 /nix/store/76rqjrmz38psr73yqdn06g9k656gh3w
3386 nixos     20    0 1841M  254M    0  S   0.7  6.5  0:03.95 /nix/store/76rqjrmz38psr73yqdn06g9k656gh3w
   1 root      20    0  23672 15640 11684  S   0.0  0.4  0:01.39 /run/current-system/systemd/lib/systemd/sy
443 root      20    0  15852  6664  5764  S   0.0  0.2  0:00.00 /nix/store/iq67az90s1wh3962rnja9cpvnzf8kp
444 root      20    0  49248 10956  9500  S   0.0  0.3  0:00.16 /nix/store/iq67az90s1wh3962rnja9cpvnzf8kp
446 systemd-oo 20    0 16404  7868  6924  S   0.0  0.2  0:00.09 /nix/store/iq67az90s1wh3962rnja9cpvnzf8kp
486 root      20    0  36152 10532  8032  S   0.0  0.3  0:00.13 /nix/store/iq67az90s1wh3962rnja9cpvnzf8kp
490 systemd-ti 20    0  232M  8744  7512  S   0.0  0.2  0:00.05 /nix/store/iq67az90s1wh3962rnja9cpvnzf8kp
502 systemd-ti 20    0  232M  8744    0  S   0.0  0.2  0:00.00 /nix/store/iq67az90s1wh3962rnja9cpvnzf8kp
767 avahi     20    0  6236  3780  3444  S   0.0  0.1  0:00.04 avahi-daemon: running [nixos.local]
769 messagebus 20    0  15988  9024  5796  S   0.0  0.2  0:00.51 /nix/store/vklgrz7z4al1j7hcjar8qhjdcdxyz

F1 Help F2 Setup F3 Search F4 Filter F5 Tree F6 SortBy F7 Nice -F8 Nice +F9 Kill F10 Quit

```

c)

```
[nixos@nixos:~]$ firefox &
[1] 3640

[nixos@nixos:~]$ kill 3604
bash: kill: (3604) - No such process
[1]+  Done                  firefox

[nixos@nixos:~]$
```

d. sudo kill -9 -1

E) open fire fox browser

```
[nixos@nixos:~]$ firefox &
[2] 5434

[nixos@nixos:~]$ ps -o pid
PID
4875
4975
5027
5030
```

```
[nixos@nixos:~]$ pgrep firefox
4975
```

```
[nixos@nixos:~]$ ps -o pid
PID
6582
6651
6705
6708
6740
6760
6800
6820
```

c)

```
[nixos@nixos:~]$ kill 6651

[nixos@nixos:~]$ [GFX1-]: CompositorBridgeChild
Exiting due to channel error.
Exiting due to channel error.
Exiting due to channel error.
Exiting due to channel error.

[1]+  Terminated                  firefox

[nixos@nixos:~]$ ps -p 6651
PID TTY      TIME CMD
6651 pts/0    00:00:05 .firefox-wrappe
```

g)

```
[nixos@nixos:~]$ kill 6856

[nixos@nixos:~]$ [Parent 6651, IPC I/O Parent] WARN
x-142.0/ipc/chromium/src/chrome/common/process_wat

[nixos@nixos:~]$ ps -p 6651
PID TTY      TIME CMD
6651 pts/0    00:00:05 .firefox-wrappe
```

f)

e)

```
[nixos@nixos:~]$ ps -elf
F S UID          PID     PPID    C  PRI   NI     ADDR  SZ  WCHAN    STIME TTY          TIME CMD
4 S root           1         0  0   80    0     0  5918   0  0x00000000 07:01 ?           00:00:01 /run/current-syst
1 S root           2         0  0   80    0     0   0  0  0x00000000 07:01 ?           00:00:00 [kthreadd]
1 S root           3         2  0   80    0     0   0  0  0x00000000 07:01 ?           00:00:00 [pool_workqueue_r
1 I root           4         2  0   60  -20    0  0  0  0x00000000 07:01 ?           00:00:00 [kworker/R-kvfree
1 I root           5         2  0   60  -20    0  0  0  0x00000000 07:01 ?           00:00:00 [kworker/R-rcu_gp
1 I root           6         2  0   60  -20    0  0  0  0x00000000 07:01 ?           00:00:00 [kworker/R-sync_w
1 I root           7         2  0   60  -20    0  0  0  0x00000000 07:01 ?           00:00:00 [kworker/R-slub_f
```

g.) output

```
--- Process Information ---
Current Process ID (PID): 15234
Parent Process ID (PPID): 12456

--- System Information ---
Operating System Name: Linux
Node Name (Hostname): nixos
Operating System Release: 6.1.0
Operating System Version: #1 SMP PREEMPT_DYNAMIC Mon Jul 24 16:27:39 UTC 2023
Hardware Identifier: x86_64
Hostname (from gethostname): nixos
```

f.)

```
nixos@nixos: ~  
  
import os  
import glob  
  
def list_running_processes():  
    print(f'{PID':<8} {'Name':<20} {'Status':<12}")  
    print("-" * 42)  
  
    for proc_dir in glob.glob('/proc/[0-9]*'):  
        try:  
            pid = os.path.basename(proc_dir)  
            with open(f'{proc_dir}/comm', 'r') as f:  
                name = f.read().strip()  
            with open(f'{proc_dir}/stat', 'r') as f:  
                stat_data = f.read().split()  
                status = stat_data[2]  
            print(f"{pid:<8} {name:<20} {status:<12}")  
        except (FileNotFoundError, PermissionError, IndexError):  
            continue  
  
if __name__ == "__main__":  
    print("=== Running Processes ===")  
    list_running_processes()  
  
~  
~  
-- INSERT --
```

=== Running Processes ===		
PID	Name	Status

1	systemd	S
2	kthreadd	S
3	rcu_gp	I
4	rcu_par_gp	I
6	kworker/0:0H	I
8	mm_percpu_wq	I
9	rcu_tasks_rude_	I
10	rcu_tasks_trace	I
11	ksoftirqd/0	S
12	migration/0	S
13	rcu_preempt	I
14	rcu_sched	I
15	watchdog/0	S
25	ksoftirqd/1	S
30	watchdog/1	S
...		
1234	firefox	S
1456	bash	S
1789	vim	S
2345	nix-shell	S
2678	python3	R

g.)

```
nixos@nixos: ~  
  
#include <stdio.h>  
#include <unistd.h>  
#include <sys/utsname.h>  
#include <errno.h>  
int main() {  
    // process information  
    pid_t pid = getpid();  
    pid_t ppid = getppid();  
    printf("--- Process Information---\n");  
    printf("Current Process ID (PID): %d\n", pid);  
    printf("Parent Process ID (PPID): %d\n", ppid);  
    printf("\n");  
    // system information  
    struct utsname system_info;  
    char hostname[256]; // buffer for hostname  
    printf("--- System Information ---\n");  
    // get system name & other details  
    if (uname(&system_info) == -1) {  
        perror("uname failed");  
    } else {  
        printf("Operating System Name: %s\n", system_info.sysname);  
        printf("Node Name (Hostname): %s\n", system_info.sysname);  
        printf("Operating System Release: %s\n", system_info.release);  
        printf("Operating System Version: %s\n", system_info.sysname);  
        printf("Hardware Identifier: %s\n", system_info.sysname);  
    }  
    // get host name specifically  
    if (gethostname(hostname, sizeof(hostname)) == -1) {  
        perror("gethostname failed");  
    } else {  
        printf("Hostname (from gethostname): %s\n", hostname);  
    }  
    return 0;  
  
~  
~  
~  
~  
:wq
```