TASK 5: Process Management in Linux

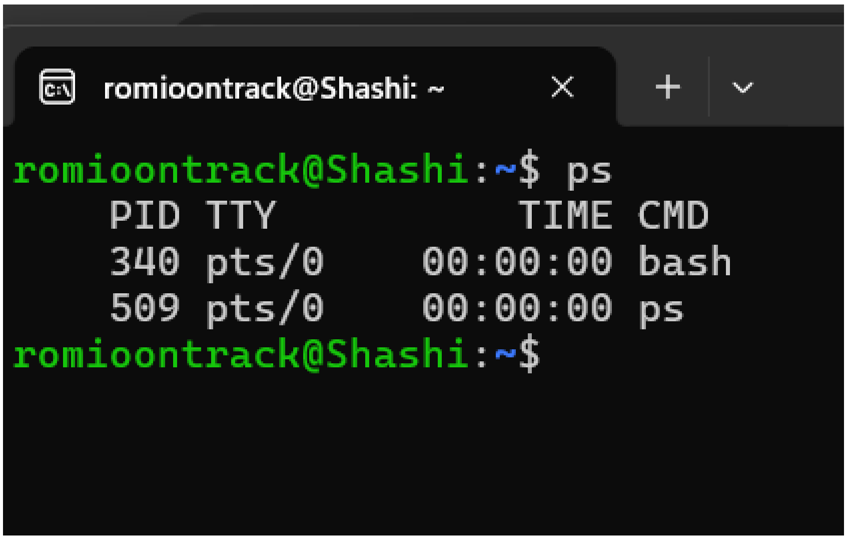
Objective

To understand Linux process management by listing, monitoring, controlling processes, and managing system services using Linux CLI tools.

Tools Used

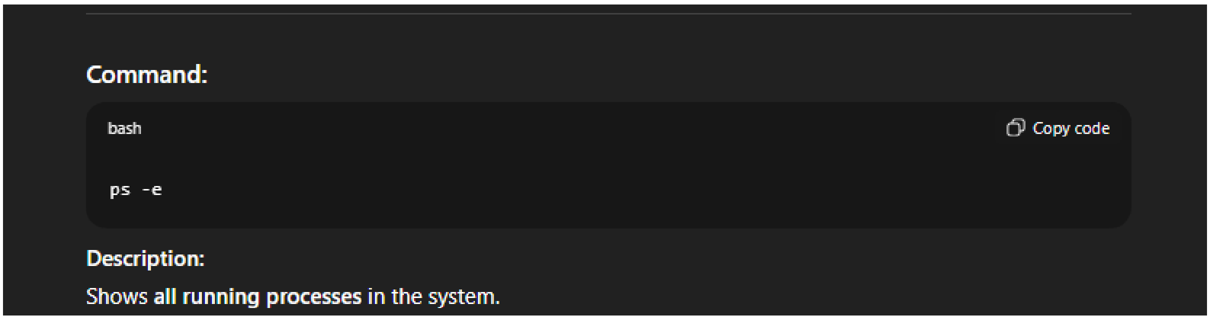
- **Primary:** Linux Command Line Interface (CLI)

1. Listing Running Processes



```
romioontrack@Shashi:~$ ps
    PID TTY          TIME CMD
    340 pts/0    00:00:00 bash
    509 pts/0    00:00:00 ps
romioontrack@Shashi:~$
```

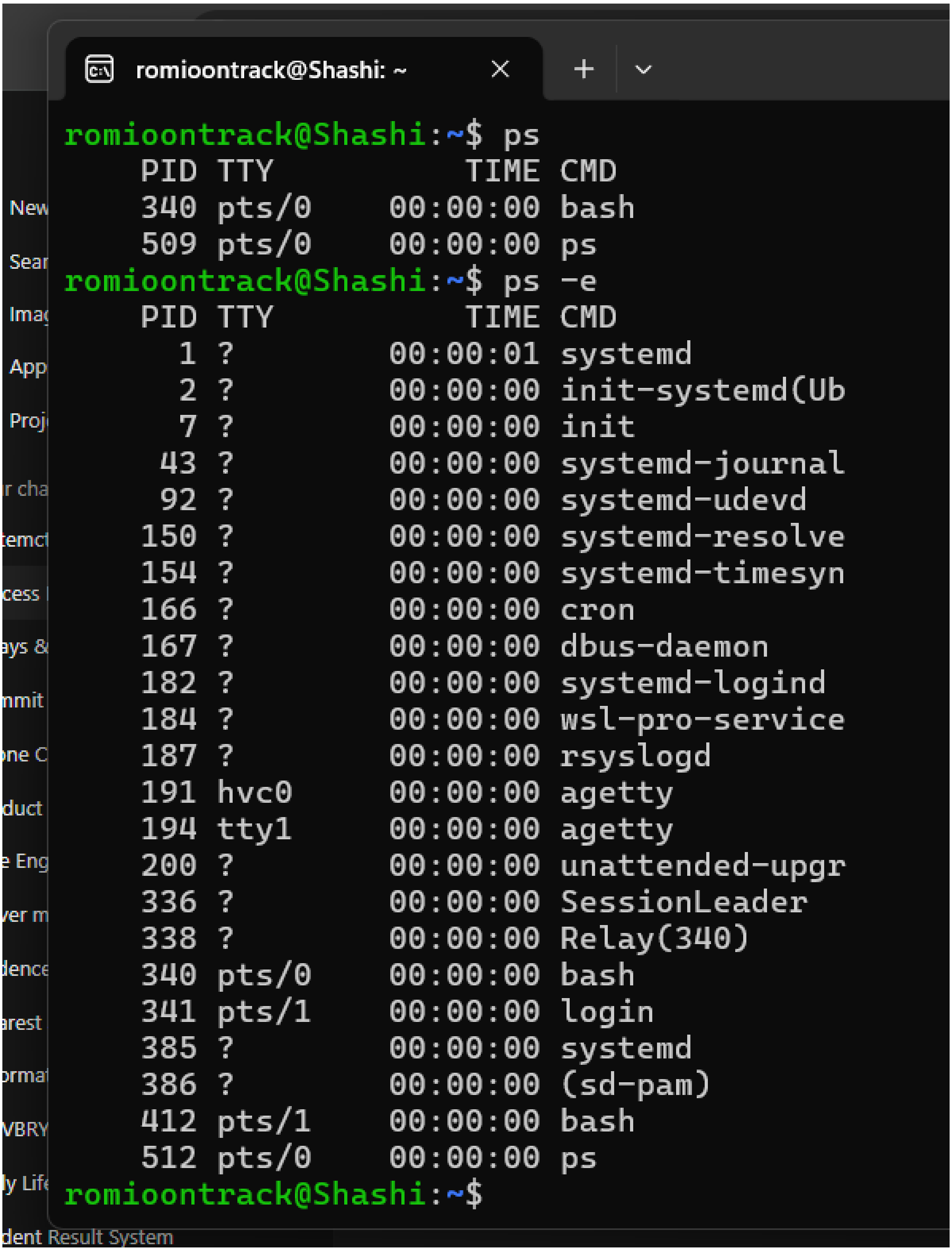
Description:
Displays processes running in the current terminal.



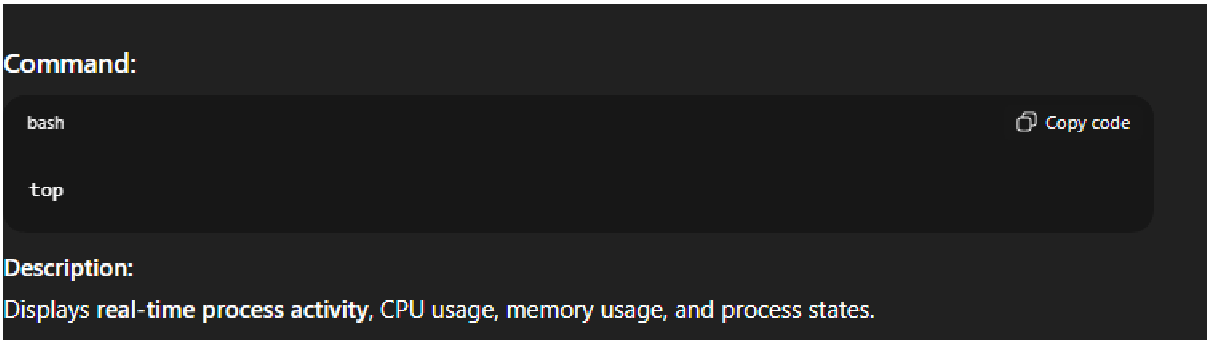
Command:

```
ps -e
```

Description:
Shows **all running processes** in the system.



```
romioontrack@Shashi:~$ ps
    PID TTY          TIME CMD
    340 pts/0    00:00:00 bash
    509 pts/0    00:00:00 ps
romioontrack@Shashi:~$ ps -e
    PID TTY          TIME CMD
      1 ?        00:00:01 systemd
      2 ?        00:00:00 init-systemd(Ub
      7 ?        00:00:00 init
     43 ?        00:00:00 systemd-journal
     92 ?        00:00:00 systemd-udevd
    150 ?        00:00:00 systemd-resolve
    154 ?        00:00:00 systemd-timesyn
    166 ?        00:00:00 cron
    167 ?        00:00:00 dbus-daemon
    182 ?        00:00:00 systemd-logind
    184 ?        00:00:00 wsl-pro-service
    187 ?        00:00:00 rsyslogd
    191 hvc0     00:00:00 agetty
    194 tty1     00:00:00 agetty
    200 ?        00:00:00 unattended-upgr
    336 ?        00:00:00 SessionLeader
    338 ?        00:00:00 Relay(340)
    340 pts/0    00:00:00 bash
    341 pts/1    00:00:00 login
    385 ?        00:00:00 systemd
    386 ?        00:00:00 (sd-pam)
    412 pts/1    00:00:00 bash
    512 pts/0    00:00:00 ps
romioontrack@Shashi:~$
```

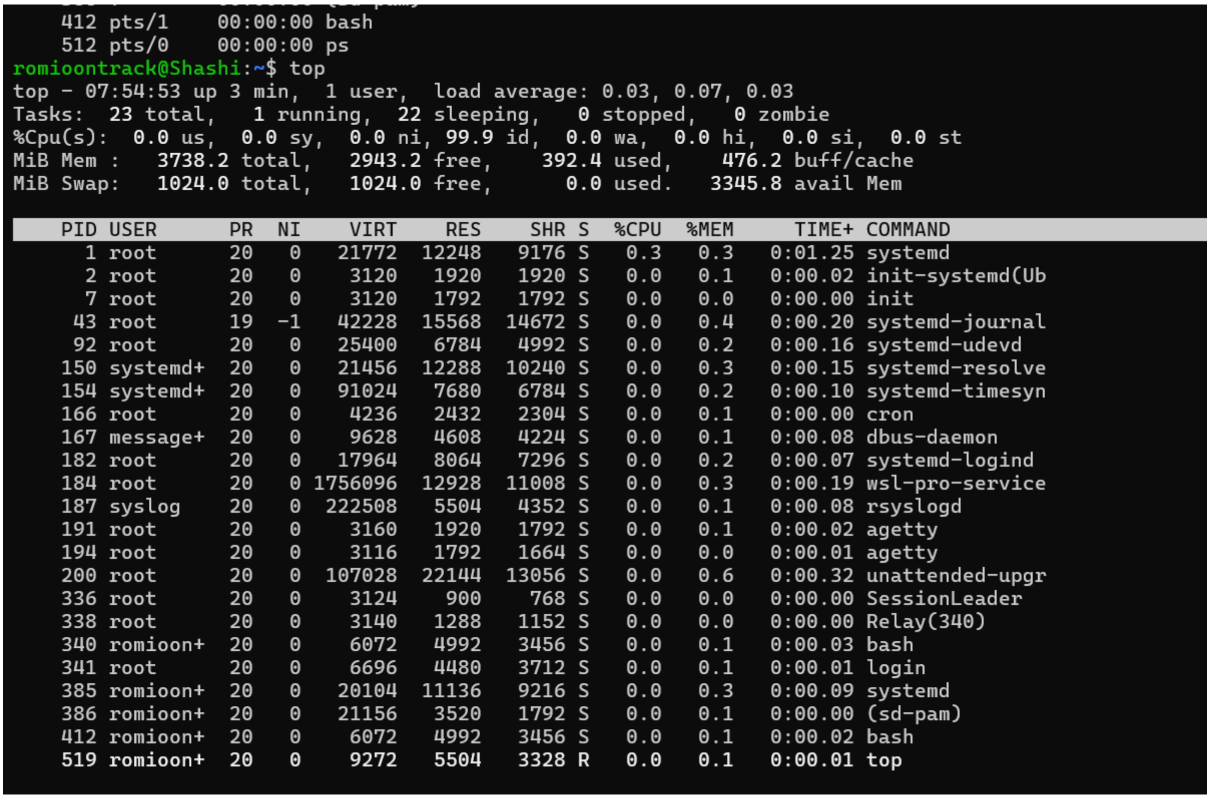


Command:

```bash
top
```

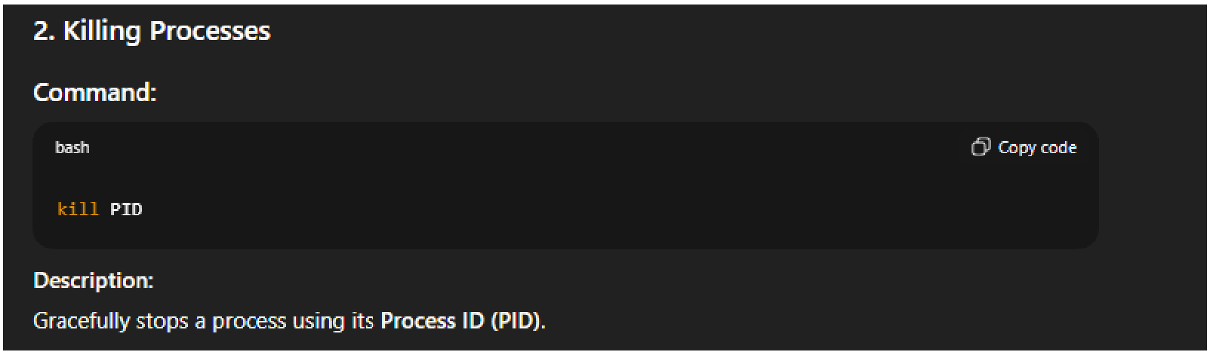
Description:

Displays **real-time process activity**, CPU usage, memory usage, and process states.



```
    412 pts/1    00:00:00 bash
    512 pts/0    00:00:00 ps
romioontrack@Shashi:~$ top
top - 07:54:53 up 3 min,  1 user,  load average: 0.03, 0.07, 0.03
Tasks:  23 total,   1 running,  22 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.0 us,  0.0 sy,  0.0 ni, 99.9 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :  3738.2 total,  2943.2 free,   392.4 used,   476.2 buff/cache
MiB Swap:  1024.0 total,  1024.0 free,     0.0 used.  3345.8 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
      1 root      20   0   21772  12248   9176 S   0.3   0.3   0:01.25 systemd
      2 root      20   0    3120   1920   1920 S   0.0   0.1   0:00.02 init-systemd(Ub
      7 root      20   0    3120   1792   1792 S   0.0   0.0   0:00.00 init
     43 root      19  -1   42228  15568  14672 S   0.0   0.4   0:00.20 systemd-journal
     92 root      20   0   25400   6784   4992 S   0.0   0.2   0:00.16 systemd-udevd
    150 systemd+  20   0   21456  12288  10240 S   0.0   0.3   0:00.15 systemd-resolve
    154 systemd+  20   0   91024   7680   6784 S   0.0   0.2   0:00.10 systemd-timesyn
    166 root      20   0    4236   2432   2304 S   0.0   0.1   0:00.00 cron
    167 message+  20   0    9628   4608   4224 S   0.0   0.1   0:00.08 dbus-daemon
    182 root      20   0   17964   8064   7296 S   0.0   0.2   0:00.07 systemd-logind
    184 root      20   0 1756096  12928  11008 S   0.0   0.3   0:00.19 wsl-pro-service
    187 syslog    20   0  222508   5504   4352 S   0.0   0.1   0:00.08 rsyslogd
    191 root      20   0    3160   1920   1792 S   0.0   0.1   0:00.02 agetty
    194 root      20   0    3116   1792   1664 S   0.0   0.0   0:00.01 agetty
    200 root      20   0  107028  22144  13056 S   0.0   0.6   0:00.32 unattended-upgr
    336 root      20   0    3124    900    768 S   0.0   0.0   0:00.00 SessionLeader
    338 root      20   0    3140   1288   1152 S   0.0   0.0   0:00.00 Relay(340)
    340 romioon+  20   0    6072   4992   3456 S   0.0   0.1   0:00.03 bash
    341 root      20   0    6696   4480   3712 S   0.0   0.1   0:00.01 login
    385 romioon+  20   0   20104  11136   9216 S   0.0   0.3   0:00.09 systemd
    386 romioon+  20   0   21156   3520   1792 S   0.0   0.1   0:00.00 (sd-pam)
    412 romioon+  20   0    6072   4992   3456 S   0.0   0.1   0:00.02 bash
    519 romioon+  20   0    9272   5504   3328 R   0.0   0.1   0:00.01 top
```



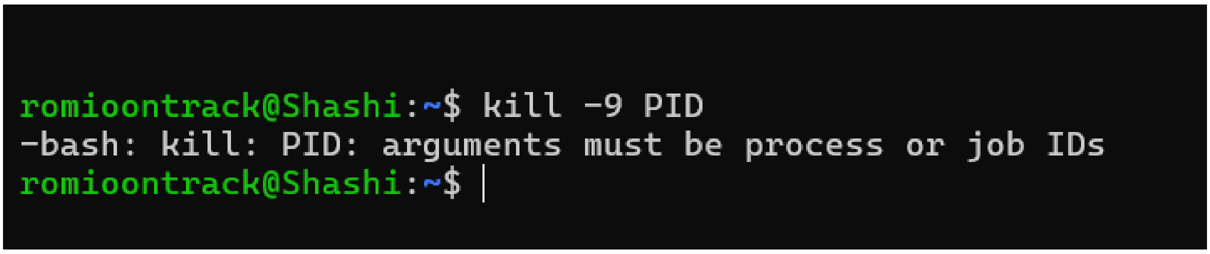
2. Killing Processes

Command:

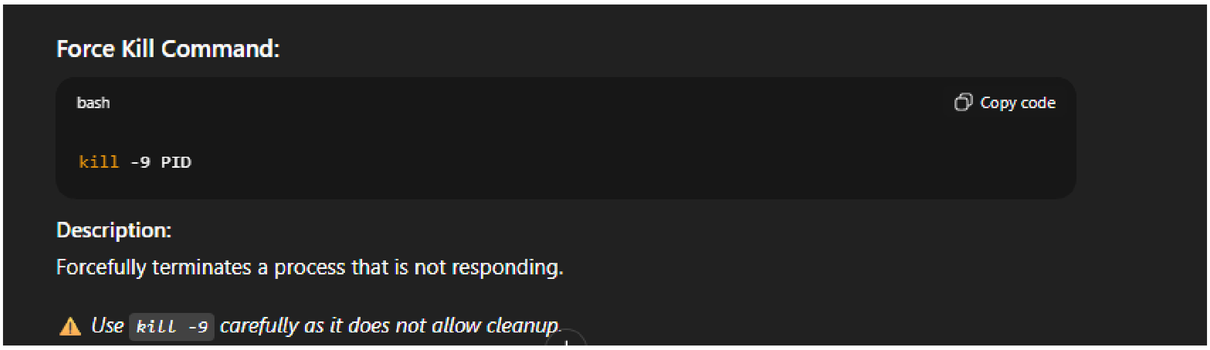
```bash
kill PID
```

Description:

Gracefully stops a process using its **Process ID (PID)**.



```
romioontrack@Shashi:~$ kill -9 PID
-bash: kill: PID: arguments must be process or job IDs
romioontrack@Shashi:~$ 
```

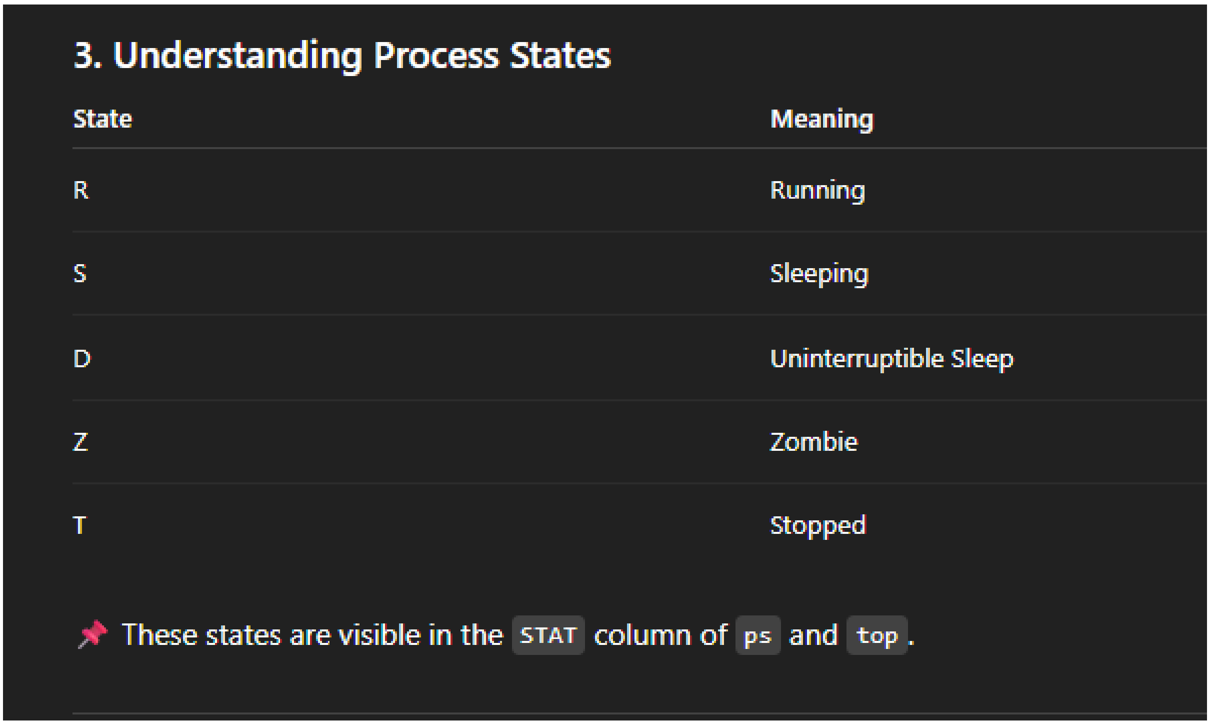


Force Kill Command:

```bash
kill -9 PID
```

Description:
Forcefully terminates a process that is not responding.

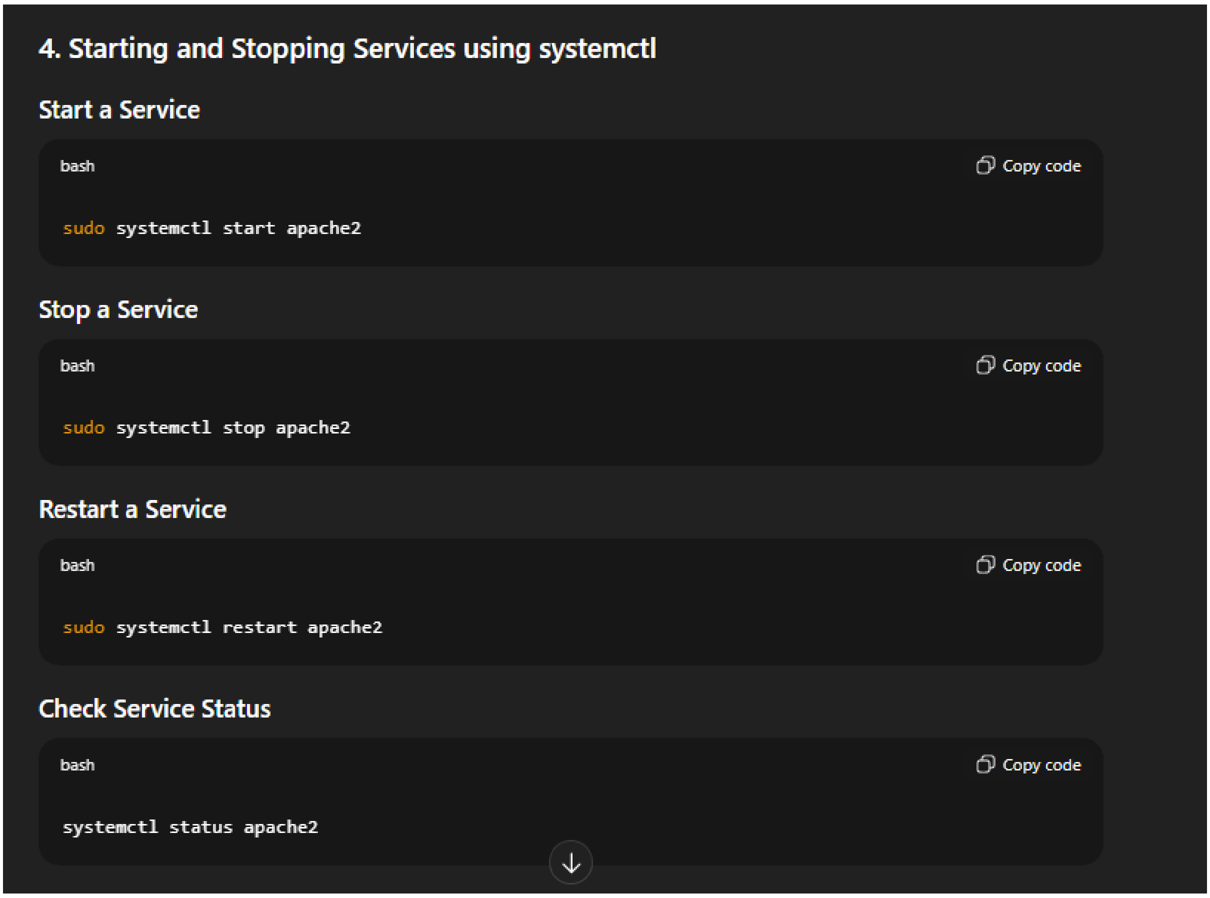
⚠️ *Use `kill -9` carefully as it does not allow cleanup.*



3. Understanding Process States

State	Meaning
R	Running
S	Sleeping
D	Uninterruptible Sleep
Z	Zombie
T	Stopped

📌 These states are visible in the `STAT` column of `ps` and `top`.



4. Starting and Stopping Services using systemctl

Start a Service

```bash
sudo systemctl start apache2
```

Stop a Service

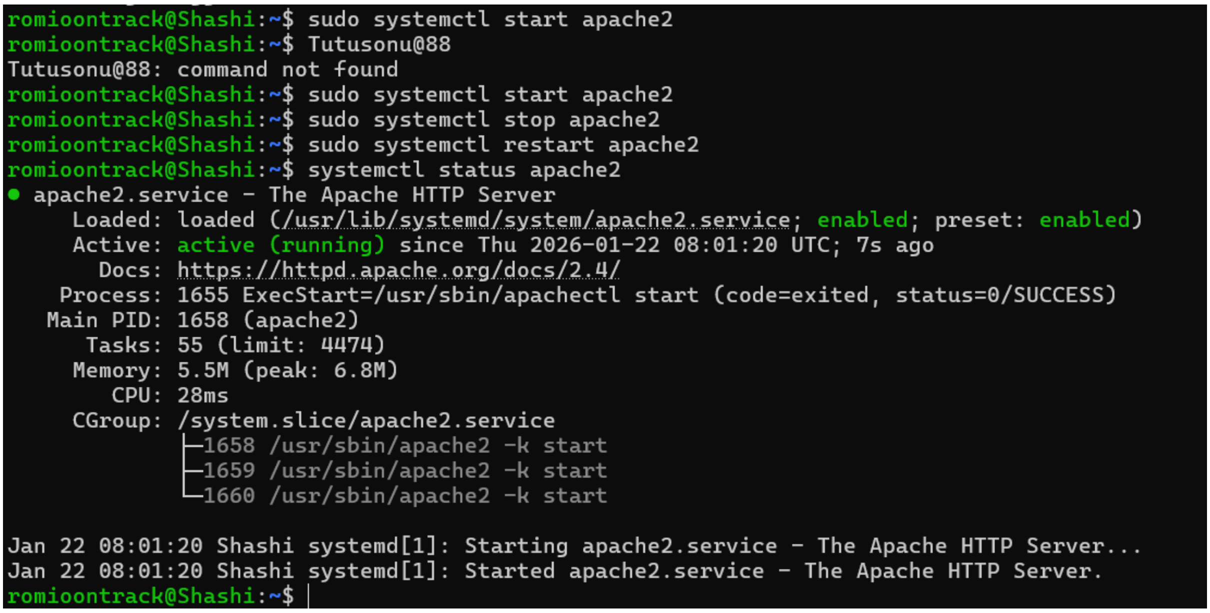
```bash
sudo systemctl stop apache2
```

Restart a Service

```bash
sudo systemctl restart apache2
```

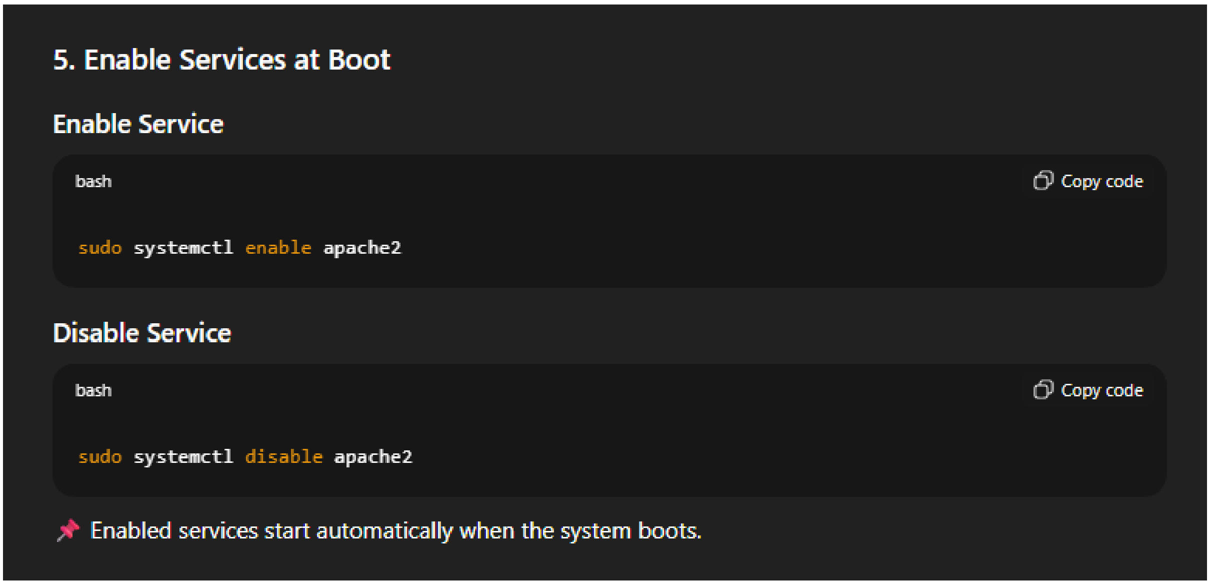
Check Service Status

```bash
systemctl status apache2
```



```
romioontrack@Shashi:~$ sudo systemctl start apache2
romioontrack@Shashi:~$ Tutusonu@88
Tutusonu@88: command not found
romioontrack@Shashi:~$ sudo systemctl start apache2
romioontrack@Shashi:~$ sudo systemctl stop apache2
romioontrack@Shashi:~$ sudo systemctl restart apache2
romioontrack@Shashi:~$ systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
     Active: active (running) since Thu 2026-01-22 08:01:20 UTC; 7s ago
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 1655 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
   Main PID: 1658 (apache2)
      Tasks: 55 (limit: 4474)
     Memory: 5.5M (peak: 6.8M)
        CPU: 28ms
     CGroup: /system.slice/apache2.service
             ├─1658 /usr/sbin/apache2 -k start
             ├─1659 /usr/sbin/apache2 -k start
             └─1660 /usr/sbin/apache2 -k start

Jan 22 08:01:20 Shashi systemd[1]: Starting apache2.service - The Apache HTTP Server...
Jan 22 08:01:20 Shashi systemd[1]: Started apache2.service - The Apache HTTP Server.
romioontrack@Shashi:~$ 
```



5. Enable Services at Boot

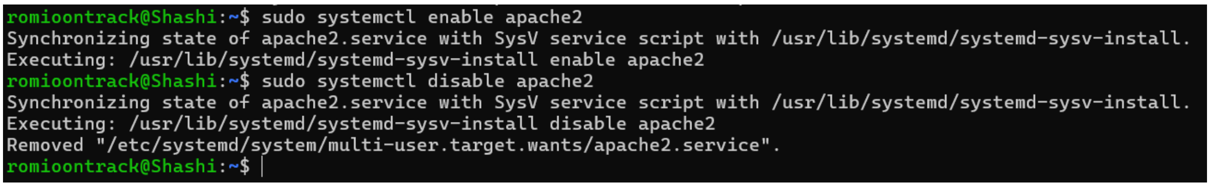
Enable Service

```bash
sudo systemctl enable apache2
```

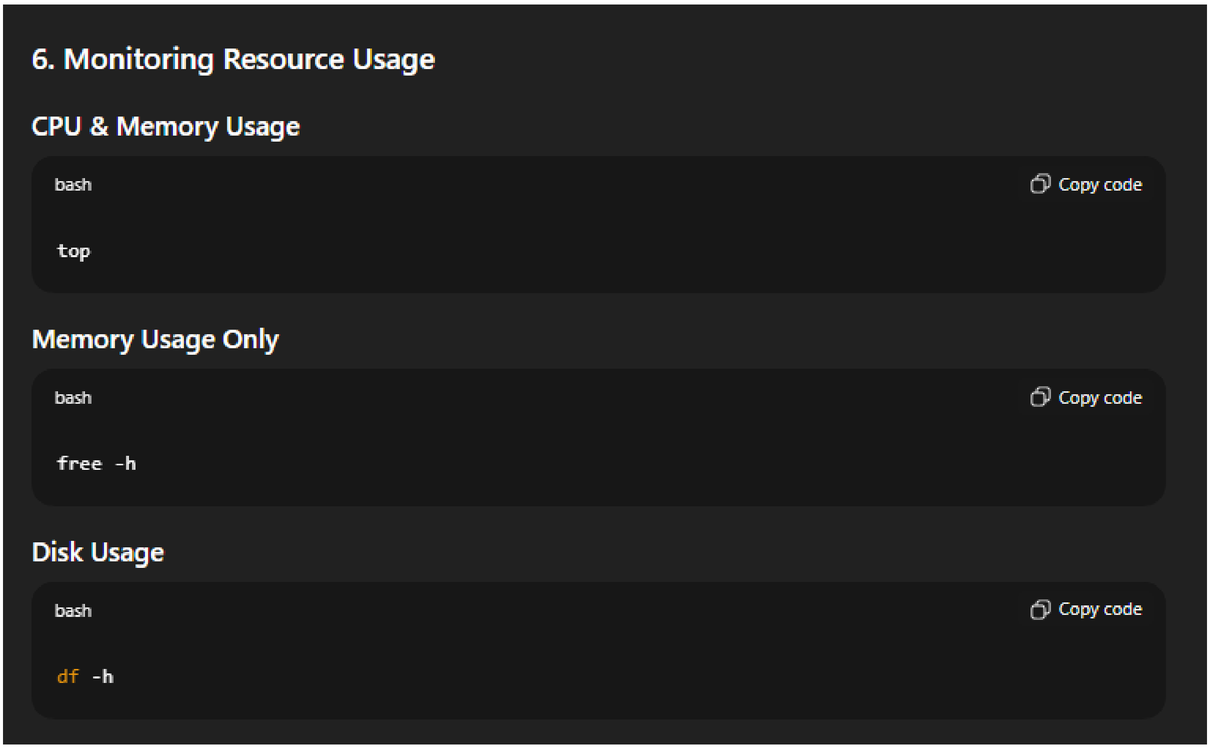
Disable Service

```bash
sudo systemctl disable apache2
```

📌 Enabled services start automatically when the system boots.



```
romioontrack@Shashi:~$ sudo systemctl enable apache2
Synchronizing state of apache2.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable apache2
romioontrack@Shashi:~$ sudo systemctl disable apache2
Synchronizing state of apache2.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install disable apache2
Removed "/etc/systemd/system/multi-user.target.wants/apache2.service".
romioontrack@Shashi:~$
```



6. Monitoring Resource Usage

CPU & Memory Usage

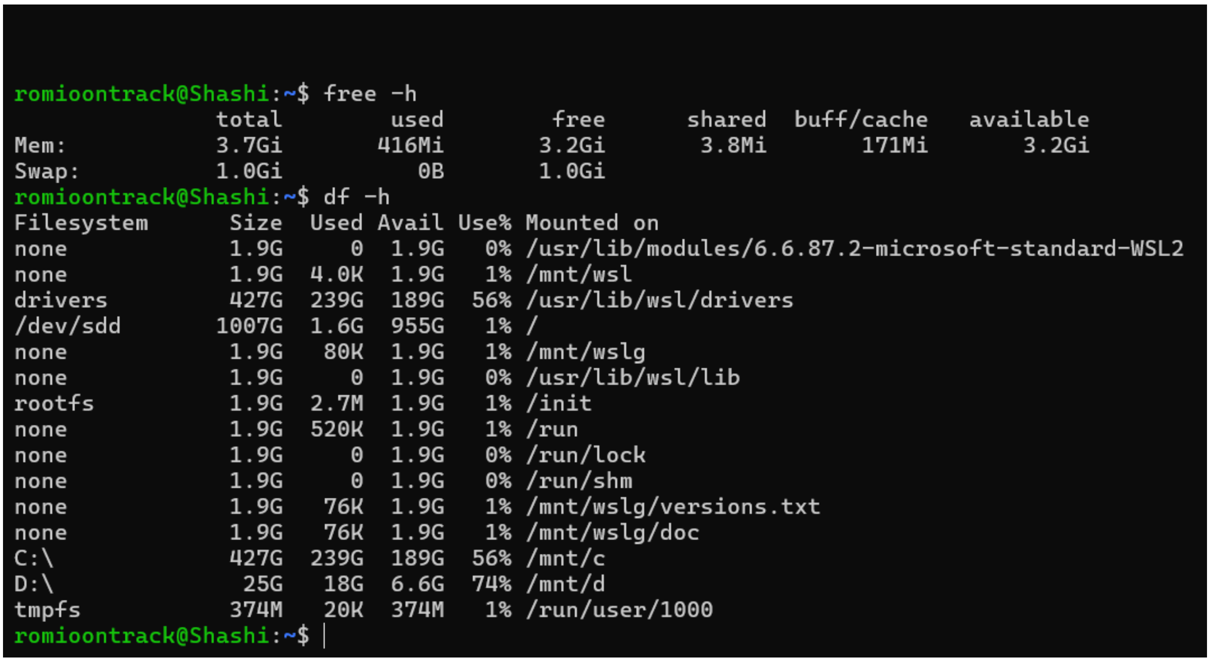
```bash
top
```

Memory Usage Only

```bash
free -h
```

Disk Usage

```bash
df -h
```



```
romioontrack@Shashi:~$ free -h
               total        used        free      shared  buff/cache   available
Mem:           3.7Gi       416Mi       3.2Gi       3.8Mi       171Mi       3.2Gi
Swap:          1.0Gi          0B       1.0Gi
romioontrack@Shashi:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
none            1.9G     0  1.9G   0% /usr/lib/modules/6.6.87.2-microsoft-standard-WSL2
none            1.9G  4.0K  1.9G   1% /mnt/wsl
drivers         427G  239G  189G  56% /usr/lib/wsl/drivers
/dev/sdd       1007G  1.6G  955G   1% /
none            1.9G   80K  1.9G   1% /mnt/wslg
none            1.9G     0  1.9G   0% /usr/lib/wsl/lib
rootfs          1.9G  2.7M  1.9G   1% /init
none            1.9G  520K  1.9G   1% /run
none            1.9G     0  1.9G   0% /run/lock
none            1.9G     0  1.9G   0% /run/shm
none            1.9G   76K  1.9G   1% /mnt/wslg/versions.txt
none            1.9G   76K  1.9G   1% /mnt/wslg/doc
C:\             427G  239G  189G  56% /mnt/c
D:\              25G   18G  6.6G  74% /mnt/d
tmpfs           374M   20K  374M   1% /run/user/1000
romioontrack@Shashi:~$ |
```

7. Observations / Findings

- Linux allows full control over running processes using CLI commands.
- top provides live monitoring of system performance.
- kill and kill -9 help manage unresponsive applications.
- systemctl is used to control background services efficiently.
- Enabling services ensures automatic startup at boot time.

- ## Conclusion
- This task helped in understanding **Linux process management**, including monitoring system performance, managing processes, and controlling system services. These skills are essential for system administration and DevOps roles.