1.

```
siddarth@Siddarth:~$ mkdir -p ~/SysOpsLab/Exercises/SessionA
siddarth@Siddarth:~$ cd ~/SysOpsLab/Exercises/SessionA
```

```
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ touch alpha.txt beta.txt gamma.txt
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ tree ~/SysOpsLab
/home/siddarth/SysOpsLab
└── Exercises
    └── SessionA
        ├── alpha.txt
        ├── beta.txt
        └── gamma.txt

3 directories, 3 files
```

```
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ ls
alpha.txt  beta.txt  gamma.txt
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ mv alpha.txt  ~/SysOpsLab/Archives/
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ mv alpha.txt  ~/SysOpsLab/Archives/
mv: cannot stat 'alpha.txt': No such file or directory
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ cd ~/SysOpsLab/Archives
siddarth@Siddarth:~/SysOpsLab/Archives$ tree ~/SysOpsLab
/home/siddarth/SysOpsLab
├── Archives
│   └── alpha.txt
└── Exercises
    └── SessionA
        ├── beta.txt
        └── gamma.txt

4 directories, 3 files
```

```
siddarth@Siddarth:~$ pwd
/home/siddarth
siddarth@Siddarth:~$ cd ~/SysOpsLab/Exercises/SessionA
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ ls
beta.txt  gamma.txt
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ cp beta.txt ~/SysOpsLab
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ tree ~/SysOpsLab
/home/siddarth/SysOpsLab
├── Archives
│   └── alpha.txt
├── Exercises
│   └── SessionA
│       ├── beta.txt
│       └── gamma.txt
└── beta.txt

4 directories, 4 files
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ mv gamma.txt delta.txt
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$ tree ~/SysOpsLab
/home/siddarth/SysOpsLab
├── Archives
│   └── alpha.txt
├── Exercises
│   └── SessionA
│       ├── beta.txt
│       └── delta.txt
└── beta.txt

4 directories, 4 files
siddarth@Siddarth:~/SysOpsLab/Exercises/SessionA$
```

2.

```
siddarth@Siddarth:~/SysOps                    ×    +    ∨

siddarth@Siddarth:~$ cd ~/SysOpsLab/
siddarth@Siddarth:~/SysOpsLab$ touch private_log.txt
siddarth@Siddarth:~/SysOpsLab$ chmod 600 private_log.txt
siddarth@Siddarth:~/SysOpsLab$ ls -l
total 8
drwxr-xr-x 2 siddarth siddarth 4096 Dec  1 07:56 Archives
drwxr-xr-x 3 siddarth siddarth 4096 Dec  1 07:33 Exercises
-rw-r--r-- 1 siddarth siddarth    0 Dec  1 08:00 beta.txt
-rw------- 1 siddarth siddarth    0 Dec  1 09:37 private_log.txt
siddarth@Siddarth:~/SysOpsLab$
```

3.

```
siddarth@Siddarth:~/SysOpsLab$ pwd
/home/siddarth/SysOpsLab
siddarth@Siddarth:~/SysOpsLab$ who
siddarth pts/1        2025-12-01 09:37
siddarth@Siddarth:~/SysOpsLab$ uptime
 09:47:44 up 10 min,  1 user,  load average: 0.00, 0.01, 0.00
siddarth@Siddarth:~/SysOpsLab$ top
top - 09:49:17 up 12 min,  1 user,  load average: 0.03, 0.02, 0.00
MiB Mem :   7754.2 total,   7246.4 free,    509.3 used,    148.8 buff/cache
MiB Swap:   2048.0 total,   2048.0 free,      0.0 used.   7244.9 avail Mem

    PID USER       PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
      1 root       20   0   21868  12216   9144 S   0.0   0.2   0:01.23 systemd
      2 root       20   0    3072   1920   1792 S   0.0   0.0   0:00.02 init-systemd(Ub
      6 root       20   0    3088   1920   1920 S   0.0   0.0   0:00.01 init
     58 root       19  -1   66748  16696  15800 S   0.0   0.2   0:00.28 systemd-journal
    108 root       20   0   25272   6400   4864 S   0.0   0.1   0:00.35 systemd-udevd
    120 systemd+   20   0   21456  12288  10368 S   0.0   0.2   0:00.22 systemd-resolve
    124 systemd+   20   0   91024   7296   6528 S   0.0   0.1   0:00.14 systemd-timesyn
    192 root       20   0    4236   2432   2304 S   0.0   0.0   0:00.02 cron
    193 message+   20   0    9540   4992   4480 S   0.0   0.1   0:00.09 dbus-daemon
    203 root       20   0   17968   8448   7552 S   0.0   0.1   0:00.14 systemd-logind
    221 root       20   0    3160   1920   1792 S   0.0   0.0   0:00.01 agetty
    224 syslog     20   0  222508   5504   4480 S   0.0   0.1   0:00.12 rsyslogd
    227 root       20   0    3116   1792   1664 S   0.0   0.0   0:00.01 agetty
    233 root       20   0  107024  22400  13056 S   0.0   0.3   0:00.23 unattended-upgr
    337 root       20   0    6692   4352   3712 S   0.0   0.1   0:00.02 login
    383 siddarth   20   0   20304  11264   9216 S   0.0   0.1   0:00.23 systemd
    384 siddarth   20   0   21156   3520   1792 S   0.0   0.0   0:00.00 (sd-pam)
    405 siddarth   20   0    6072   4992   3456 S   0.0   0.1   0:00.05 bash
    474 root       20   0    3076   1032    896 S   0.0   0.0   0:00.00 SessionLeader
    476 root       20   0    3092   1164   1024 S   0.0   0.0   0:00.02 Relay(479)
    479 siddarth   20   0    6072   5248   3584 S   0.0   0.1   0:00.07 bash
    540 siddarth   20   0    9264   5504   3328 R   0.0   0.1   0:00.06 top
```

```
siddarth@Siddarth:~/SysOpsLab$ df -Th
Filesystem      Type      Size  Used Avail Use% Mounted on
none            overlay   3.8G     0  3.8G   0% /usr/lib/modules/6.6.87.2-microsoft-standard-WSL2
none            tmpfs     3.8G  4.0K  3.8G   1% /mnt/wsl
drivers         9p        927G  331G  596G  36% /usr/lib/wsl/drivers
/dev/sdd        ext4     1007G  1.7G  954G   1% /
none            tmpfs     3.8G   76K  3.8G   1% /mnt/wslg
none            overlay   3.8G     0  3.8G   0% /usr/lib/wsl/lib
rootfs          rootfs    3.8G  2.7M  3.8G   1% /init
none            tmpfs     3.8G  536K  3.8G   1% /run
none            tmpfs     3.8G     0  3.8G   0% /run/lock
none            tmpfs     3.8G     0  3.8G   0% /run/shm
none            overlay   3.8G   76K  3.8G   1% /mnt/wslg/versions.txt
none            overlay   3.8G   76K  3.8G   1% /mnt/wslg/doc
C:\             9p        927G  331G  596G  36% /mnt/c
tmpfs           tmpfs     776M   20K  776M   1% /run/user/1000
siddarth@Siddarth:~/SysOpsLab$ uname -r
6.6.87.2-microsoft-standard-WSL2
```

4.

```
siddarth@Siddarth:~$ sudo useradd analyst1
[sudo] password for siddarth:
siddarth@Siddarth:~$ sudo groupadd datateam
```

```
siddarth@Siddarth:~$ sudo usermod -a -G datateam analyst1
siddarth@Siddarth:~$ sudo mkdir /datahub
siddarth@Siddarth:~$ sudo chgrp datateam /datahub
siddarth@Siddarth:~$ sudo chmod 770 /datahub
siddarth@Siddarth:~$ sudo chmod g+s /datahub
siddarth@Siddarth:~$ ls -ld
drwxr-x--- 5 siddarth siddarth 4096 Dec  1 09:48 .
siddarth@Siddarth:~$ ls -ld /datahub
drwxrws--- 2 root datateam 4096 Dec  1 10:31 /datahub
siddarth@Siddarth:~$
```

5.

```
siddarth@Siddarth:~$ mkdir ~/secure_vault
siddarth@Siddarth:~$ ls
SysOpsLab  secure_vault
siddarth@Siddarth:~$ chmod 700 ~/secure_vault
siddarth@Siddarth:~$ sudo apt install auditd -y
[sudo] password for siddarth:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libdrm-nouveau2 libdrm-radeon1 libgl1-amber-dri libglapi-mesa libllvm17t64 libxcb-dri2-0
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libauparse0t64
Suggested packages:
  audispd-plugins
The following NEW packages will be installed:
  auditd libauparse0t64
0 upgraded, 2 newly installed, 0 to remove and 2 not upgraded.
Need to get 274 kB of archives.
After this operation, 893 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libauparse0t64 amd64 1:3.1.2-2.1build1.1 [58.9 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 auditd amd64 1:3.1.2-2.1build1.1 [215 kB]
Fetched 274 kB in 5s (58.9 kB/s)
Selecting previously unselected package libauparse0t64:amd64.
(Reading database ... 40940 files and directories currently installed.)
Preparing to unpack .../libauparse0t64_1%3a3.1.2-2.1build1.1_amd64.deb ...
Adding 'diversion of /lib/x86_64-linux-gnu/libauparse.so.0 to /lib/x86_64-linux-gnu/libauparse.so.0.usr-is-merged by libauparse0t64'
Adding 'diversion of /lib/x86_64-linux-gnu/libauparse.so.0.0.0 to /lib/x86_64-linux-gnu/libauparse.so.0.0.0.usr-is-merged by libauparse0t64'
Unpacking libauparse0t64:amd64 (1:3.1.2-2.1build1.1) ...
Selecting previously unselected package auditd.
Preparing to unpack .../auditd_1%3a3.1.2-2.1build1.1_amd64.deb ...
Unpacking auditd (1:3.1.2-2.1build1.1) ...
Setting up libauparse0t64:amd64 (1:3.1.2-2.1build1.1) ...
Setting up auditd (1:3.1.2-2.1build1.1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/auditd.service → /usr/lib/systemd/system/auditd.service.
Could not execute systemctl:  at /usr/bin/deb-systemd-invoke line 148.
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
siddarth@Siddarth:~$ sudo systemctl enable auditd
Synchronizing state of auditd.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
```

auditd not supported by WSL so I cannot run the auditd codes and its giving the below errors but the scripts should work on full Ubuntu if I dual boot or run it on vm

```
siddarth@Siddarth:~$ sudo systemctl enable auditd
Synchronizing state of auditd.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable auditd
siddarth@Siddarth:~$  auditctl -l
You must be root to run this program.
siddarth@Siddarth:~$ auditctl  -w  /secure_vault/
You must be root to run this program.
siddarth@Siddarth:~$ sudo auditctl  -w  /secure_vault/
Error sending status request (Operation not permitted)
Error sending add rule data request (Operation not permitted)
There was an error while processing parameters
siddarth@Siddarth:~$ sudo auditctl -w ~/secure_vault -p rwxa -k vaultwatch
Error sending status request (Operation not permitted)
Error sending add rule data request (Operation not permitted)
There was an error while processing parameters
siddarth@Siddarth:~$
```

6.

```
siddarth@Siddarth:~$ ping -c 10 google.com
PING google.com (172.217.24.110) 56(84) bytes of data.
64 bytes from hkg12s33-in-f14.1e100.net (172.217.24.110): icmp_seq=1 ttl=113 time=61.0 ms
64 bytes from hkg12s33-in-f14.1e100.net (172.217.24.110): icmp_seq=2 ttl=113 time=75.7 ms
64 bytes from hkg12s33-in-f14.1e100.net (172.217.24.110): icmp_seq=3 ttl=113 time=60.1 ms
64 bytes from hkg12s33-in-f14.1e100.net (172.217.24.110): icmp_seq=4 ttl=113 time=92.3 ms
64 bytes from hkg12s33-in-f14.1e100.net (172.217.24.110): icmp_seq=5 ttl=113 time=81.0 ms
64 bytes from hkg12s33-in-f14.1e100.net (172.217.24.110): icmp_seq=6 ttl=113 time=76.6 ms
64 bytes from hkg12s33-in-f14.1e100.net (172.217.24.110): icmp_seq=7 ttl=113 time=89.1 ms
64 bytes from hkg12s33-in-f14.1e100.net (172.217.24.110): icmp_seq=8 ttl=113 time=94.5 ms
64 bytes from hkg12s33-in-f14.1e100.net (172.217.24.110): icmp_seq=9 ttl=113 time=154 ms
64 bytes from hkg12s33-in-f14.1e100.net (172.217.24.110): icmp_seq=10 ttl=113 time=150 ms

--- google.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9045ms
rtt min/avg/max/mdev = 60.088/93.414/153.581/31.299 ms
siddarth@Siddarth:~$ ls -l
total 8
drwxr-xr-x 4 siddarth siddarth 4096 Dec  1 09:37 SysOpsLab
drwx------ 2 siddarth siddarth 4096 Dec  1 12:32 secure_vault
siddarth@Siddarth:~$ ping -c 10 google.com > netcheck.txt
```

```
siddarth@Siddarth:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet 10.255.255.254/32 brd 10.255.255.254 scope global lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:4e:0c:ae brd ff:ff:ff:ff:ff:ff
    inet 172.30.151.180/20 brd 172.30.159.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe4e:cae/64 scope link
       valid_lft forever preferred_lft forever
siddarth@Siddarth:~$ ip route
default via 172.30.144.1 dev eth0 proto kernel
172.30.144.0/20 dev eth0 proto kernel scope link src 172.30.151.180
```

```
siddarth@Siddarth:~$ dig google.com

; <<>> DiG 9.18.39-0ubuntu0.24.04.2-Ubuntu <<>> google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 10229
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1280
;; QUESTION SECTION:
;google.com.                    IN      A

;; ANSWER SECTION:
google.com.            71       IN      A       172.217.24.110

;; Query time: 67 msec
;; SERVER: 10.255.255.254#53(10.255.255.254) (UDP)
;; WHEN: Mon Dec 01 13:02:30 UTC 2025
;; MSG SIZE  rcvd: 55

siddarth@Siddarth:~$ ss -tuln
Netid     State      Recv-Q     Send-Q          Local Address:Port        Peer Address:Port        Process
udp       UNCONN     0          0               127.0.0.1:323             0.0.0.0:*
udp       UNCONN     0          0               127.0.0.54:53             0.0.0.0:*
udp       UNCONN     0          0               127.0.0.53%lo:53          0.0.0.0:*
udp       UNCONN     0          0               10.255.255.254:53         0.0.0.0:*
udp       UNCONN     0          0               [::1]:323                 [::]:*
tcp       LISTEN     0          4096            127.0.0.54:53             0.0.0.0:*
tcp       LISTEN     0          4096            127.0.0.53%lo:53          0.0.0.0:*
tcp       LISTEN     0          1000            10.255.255.254:53         0.0.0.0:*
```

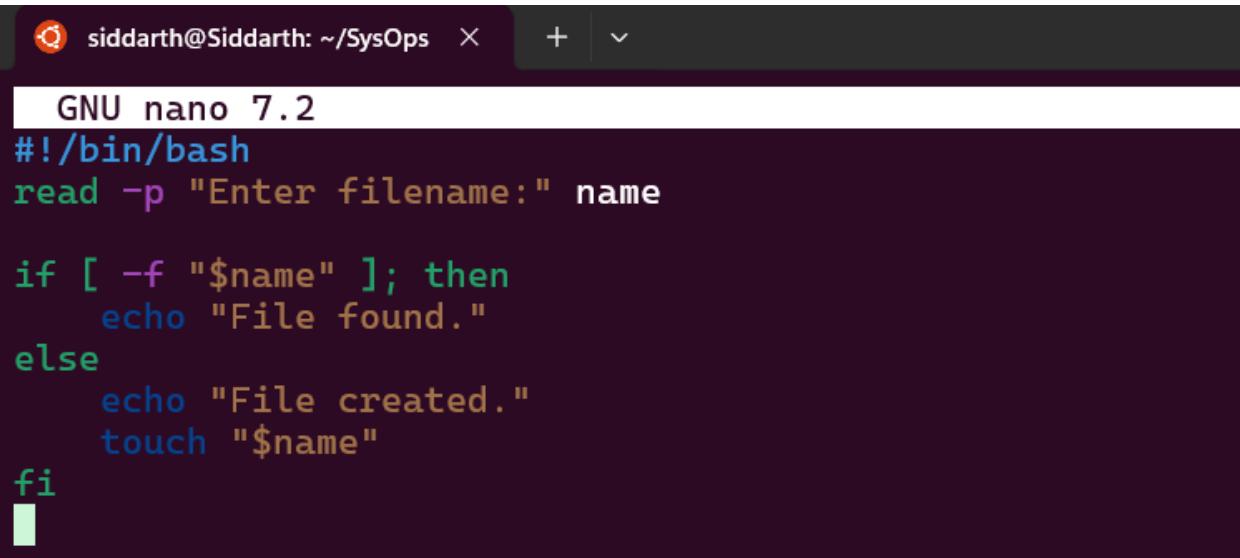**For bonus, use nmap to detect open ports and then >open_ports.txt**

```
siddarth@Siddarth:~$ nmap -sT localhost
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-12-01 13:08 UTC
Nmap scan report for localhost (127.0.0.1)
Host is up (0.000098s latency).
All 1000 scanned ports on localhost (127.0.0.1) are in ignored states.
Not shown: 1000 closed tcp ports (conn-refused)

Nmap done: 1 IP address (1 host up) scanned in 0.05 seconds
siddarth@Siddarth:~$ nmap -sn 192.168.1.0/24
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-12-01 13:08 UTC
Nmap done: 256 IP addresses (0 hosts up) scanned in 104.37 seconds
```

7.

```
siddarth@Siddarth:~$ cd ~/SysOpsLab
siddarth@Siddarth:~/SysOpsLab$ nano file_inspector.sh
siddarth@Siddarth:~/SysOpsLab$ ls
Archives  Exercises  beta.txt  file_inspector.sh  private_log.txt
siddarth@Siddarth:~/SysOpsLab$ nano file_inspector.sh
siddarth@Siddarth:~/SysOpsLab$ ls -l file_inspector.sh
-rw-r--r-- 1 siddarth siddarth 142 Dec  1 13:40 file_inspector.sh
siddarth@Siddarth:~/SysOpsLab$ chmod +x file_inspector.sh
```

```
siddarth@Siddarth:~/SysOpsLab$ ls
Archives  Exercises  beta.txt  file_inspector.sh  private_log.txt
siddarth@Siddarth:~/SysOpsLab$ ./file_inspector.sh
Enter filename:test.txt
File created.
siddarth@Siddarth:~/SysOpsLab$ ls
Archives  Exercises  beta.txt  file_inspector.sh  private_log.txt  test.txt
siddarth@Siddarth:~/SysOpsLab$ ./file_inspector.sh
Enter filename:beta.txt
File found.
```

siddarth@Siddarth: ~/SysOps ✕ + ∨

```bash
  GNU nano 7.2
#!/bin/bash
read -p "Enter filename:" name

if [ -f "$name" ]; then
    echo "File found."
else
    echo "File created."
    touch "$name"
fi
```
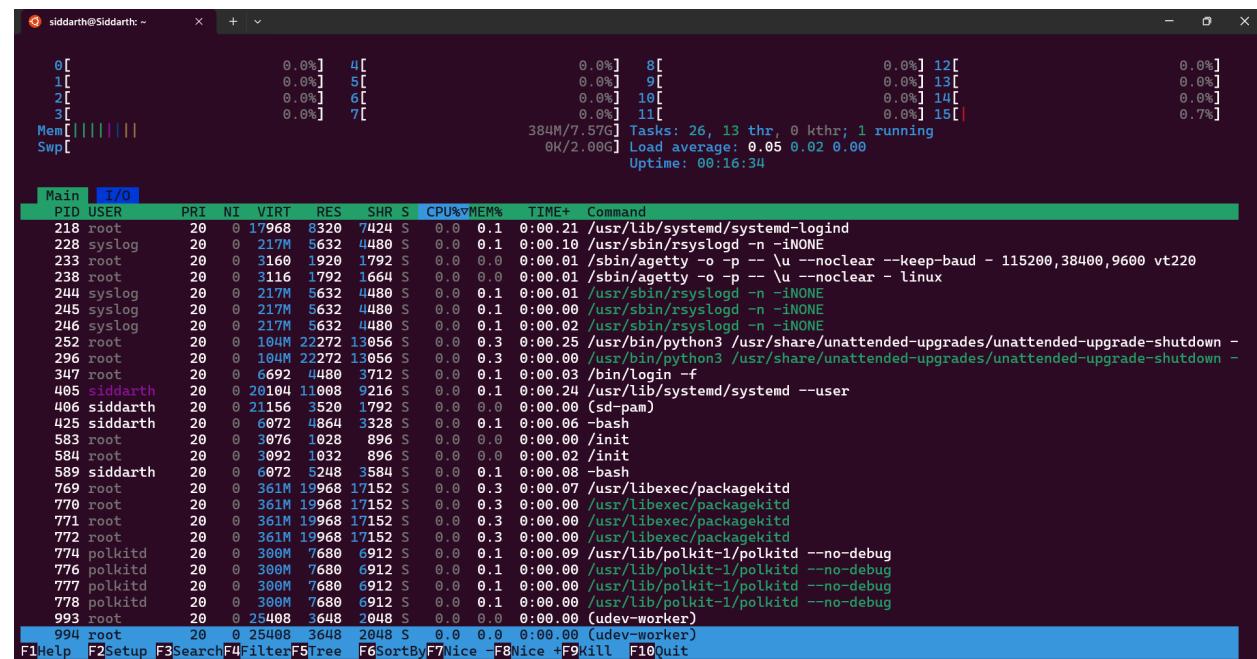
8.

```
siddarth@Siddarth:~$ nano resource_tracker.sh
siddarth@Siddarth:~$ nano resource_tracker.sh
siddarth@Siddarth:~$ chmod +x resource_tracker.sh
siddarth@Siddarth:~$ ./resource_tracker.sh
siddarth@Siddarth:~$ cat resource_tracker.sh
#!/bin/bash
LOGFILE="$HOME/SysOpsLab/system_status.log"

echo "System Status Report" >> "$LOGFILE"
uptime >> "$LOGFILE"
df -Th >> "$LOGFILE"
ps aux | head -5 >> "$LOGFILE"
siddarth@Siddarth:~$ ls
SysOpsLab   netcheck.txt   resource_tracker.sh   secure_vault
siddarth@Siddarth:~$ cd ~/SysOpsLab
siddarth@Siddarth:~/SysOpsLab$ ls
Archives   Exercises   beta.txt   file_inspector.sh   private_log.txt   system_status.log   test.txt
siddarth@Siddarth:~/SysOpsLab$ cat system_status.log
System Status Report
 16:18:22 up 8 min,  1 user,  load average: 0.00, 0.00, 0.00
Filesystem      Type     Size   Used Avail Use% Mounted on
none            overlay  3.8G      0  3.8G   0% /usr/lib/modules/6.6.87.2-microsoft-standard-WSL2
none            tmpfs    3.8G   4.0K  3.8G   1% /mnt/wsl
drivers         9p       927G   328G  599G  36% /usr/lib/wsl/drivers
/dev/sdd        ext4     1007G  1.8G  954G   1% /
none            tmpfs    3.8G    76K  3.8G   1% /mnt/wslg
none            overlay  3.8G      0  3.8G   0% /usr/lib/wsl/lib
rootfs          rootfs   3.8G   2.7M  3.8G   1% /init
none            tmpfs    3.8G   540K  3.8G   1% /run
none            tmpfs    3.8G      0  3.8G   0% /run/lock
none            tmpfs    3.8G      0  3.8G   0% /run/shm
none            overlay  3.8G    76K  3.8G   1% /mnt/wslg/versions.txt
none            overlay  3.8G    76K  3.8G   1% /mnt/wslg/doc
C:\             9p       927G   328G  599G  36% /mnt/c
tmpfs           tmpfs    776M    20K  776M   1% /run/user/1000
USER        PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root          1  0.3  0.1  21788 12340 ?        Ss   16:09   0:01 /sbin/init
root          2  0.0  0.0   3072  1664 ?        Sl   16:09   0:00 /init
root          6  0.0  0.0   3088  1920 ?        Sl   16:09   0:00 plan9 --control-socket 7 --log-level 4 --server-fd 8 --pipe-fd 10 --log-truncate
root         55  0.0  0.2  66812 18548 ?        S<s  16:09   0:00 /usr/lib/systemd/systemd-journald
```
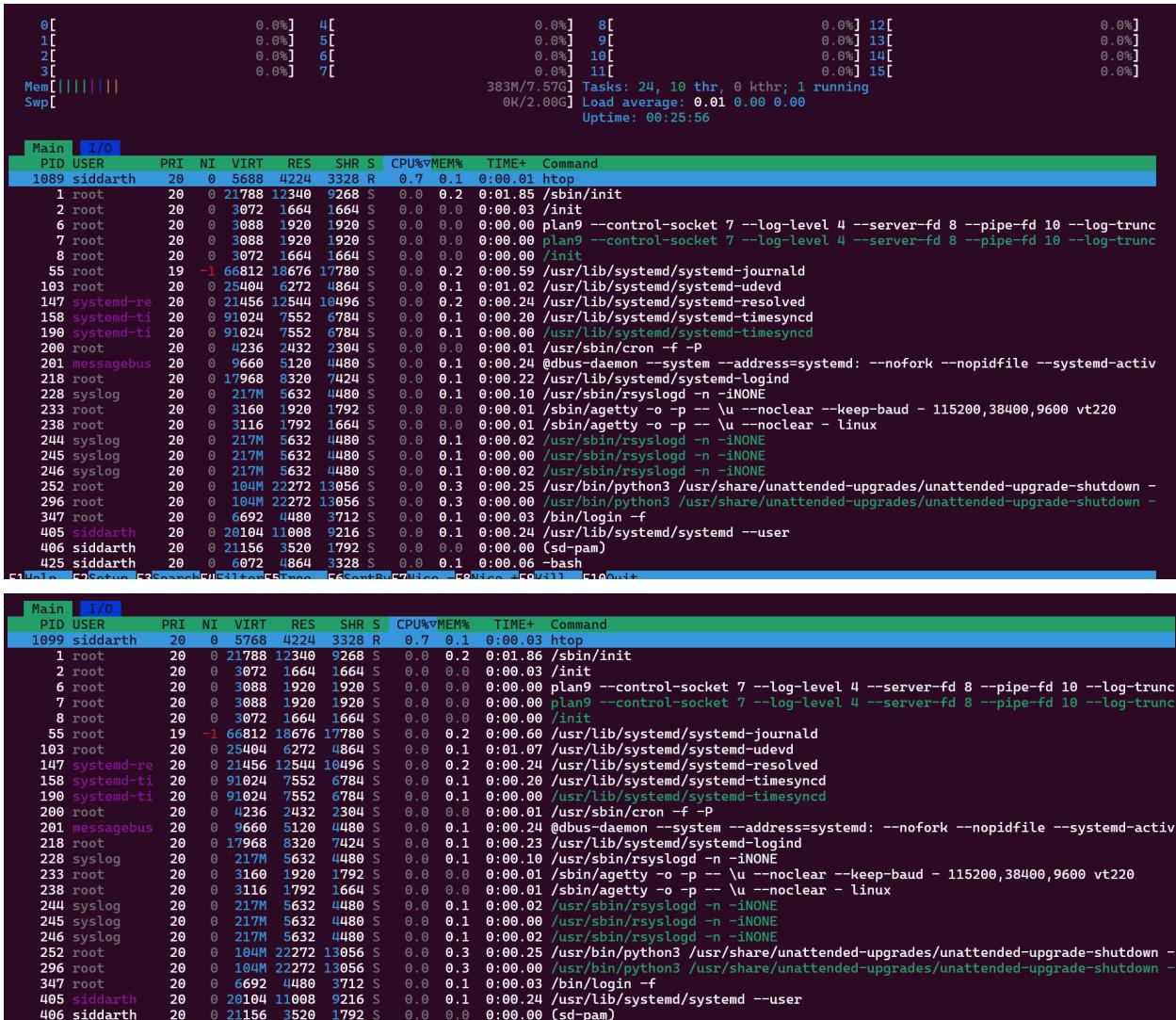
9.

```
siddarth@Siddarth:~$ sudo apt update
[sudo] password for siddarth:
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Fetched 126 kB in 2s (68.5 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
2 packages can be upgraded. Run 'apt list --upgradable' to see them.
siddarth@Siddarth:~$ sudo apt upgrade -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages were automatically installed and are no longer required:
  libdrm-nouveau2 libdrm-radeon1 libgl1-amber-dri libglapi-mesa libllvm17t64 libxcb-dri2-0
Use 'sudo apt autoremove' to remove them.
The following packages have been kept back:
  libgl1-amber-dri libglapi-mesa
0 upgraded, 0 newly installed, 0 to remove and 2 not upgraded.
siddarth@Siddarth:~$ sudo apt install htop -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
htop is already the newest version (3.3.0-4build1).
The following packages were automatically installed and are no longer required:
  libdrm-nouveau2 libdrm-radeon1 libgl1-amber-dri libglapi-mesa libllvm17t64 libxcb-dri2-0
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 2 not upgraded.
siddarth@Siddarth:~$ htop
```

```
  siddarth@Siddarth: ~                                             —   □   ✕

  0[                    0.0%]  4[              0.0%]  8[                0.0%] 12[                   0.0%]
  1[                    0.0%]  5[              0.0%]  9[                0.0%] 13[                   0.0%]
  2[                    0.0%]  6[              0.0%] 10[                0.0%] 14[                   0.0%]
  3[                    0.0%]  7[              0.0%] 11[                0.0%] 15[|                  0.7%]
  Mem[||||||||                                   384M/7.57G] Tasks: 26, 13 thr, 0 kthr; 1 running
  Swp[                                              0K/2.00G] Load average: 0.05 0.02 0.00
                                                              Uptime: 00:16:34

  Main  I/O
    PID USER      PRI  NI  VIRT   RES   SHR S  CPU%▽MEM%   TIME+  Command
    218 root       20   0 17968  8320  7424 S   0.0  0.1  0:00.21 /usr/lib/systemd/systemd-logind
    228 syslog     20   0  217M  5632  4480 S   0.0  0.1  0:00.10 /usr/sbin/rsyslogd -n -iNONE
    233 root       20   0  3160  1920  1792 S   0.0  0.0  0:00.01 /sbin/agetty -o -p -- \u --noclear --keep-baud - 115200,38400,9600 vt220
    238 root       20   0  3116  1792  1664 S   0.0  0.0  0:00.01 /sbin/agetty -o -p -- \u --noclear - linux
    244 syslog     20   0  217M  5632  4480 S   0.0  0.1  0:00.01 /usr/sbin/rsyslogd -n -iNONE
    245 syslog     20   0  217M  5632  4480 S   0.0  0.1  0:00.00 /usr/sbin/rsyslogd -n -iNONE
    246 syslog     20   0  217M  5632  4480 S   0.0  0.1  0:00.02 /usr/sbin/rsyslogd -n -iNONE
    252 root       20   0  104M 22272 13056 S   0.0  0.3  0:00.25 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown -
    296 root       20   0  104M 22272 13056 S   0.0  0.3  0:00.00 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown -
    347 root       20   0  6692  4480  3712 S   0.0  0.1  0:00.03 /bin/login -f
    405 siddarth   20   0 20104 11008  9216 S   0.0  0.1  0:00.24 /usr/lib/systemd/systemd --user
    406 siddarth   20   0 21156  3520  1792 S   0.0  0.0  0:00.00 (sd-pam)
    425 siddarth   20   0  6072  4864  3328 S   0.0  0.1  0:00.06 -bash
    583 root       20   0  3076  1028   896 S   0.0  0.0  0:00.00 /init
    584 root       20   0  3092  1032   896 S   0.0  0.0  0:00.02 /init
    589 siddarth   20   0  6072  5248  3584 S   0.0  0.1  0:00.08 -bash
    769 root       20   0  361M 19968 17152 S   0.0  0.3  0:00.07 /usr/libexec/packagekitd
    770 root       20   0  361M 19968 17152 S   0.0  0.3  0:00.00 /usr/libexec/packagekitd
    771 root       20   0  361M 19968 17152 S   0.0  0.3  0:00.00 /usr/libexec/packagekitd
    772 root       20   0  361M 19968 17152 S   0.0  0.3  0:00.00 /usr/libexec/packagekitd
    774 polkitd    20   0  300M  7680  6912 S   0.0  0.1  0:00.09 /usr/lib/polkit-1/polkitd --no-debug
    776 polkitd    20   0  300M  7680  6912 S   0.0  0.1  0:00.00 /usr/lib/polkit-1/polkitd --no-debug
    777 polkitd    20   0  300M  7680  6912 S   0.0  0.1  0:00.00 /usr/lib/polkit-1/polkitd --no-debug
    778 polkitd    20   0  300M  7680  6912 S   0.0  0.1  0:00.00 /usr/lib/polkit-1/polkitd --no-debug
    993 root       20   0 25408  3648  2048 S   0.0  0.0  0:00.00 (udev-worker)
    994 root       20   0 25408  3648  2048 S   0.0  0.0  0:00.00 (udev-worker)
  F1Help  F2Setup F3Search F4Filter F5Tree  F6SortBy F7Nice - F8Nice + F9Kill  F10Quit
```

```
siddarth@Siddarth:~/SysOpsLab$ dpkg -l|grep htop > pkg_list.txt
siddarth@Siddarth:~/SysOpsLab$ ls
Archives  Exercises  beta.txt  file_inspector.sh  pkg_list.txt  private_log.txt  system_status.log  test.txt
siddarth@Siddarth:~/SysOpsLab$ cat pkg_list.txt
ii  htop                    3.3.0-4build1                    amd64        interactive processes viewer
siddarth@Siddarth:~/SysOpsLab$
```

10.

The process can be killed in htop itself or the given prompt can be given
Sudo kill 255

11.
Installling:

```
siddarth@Siddarth:~$ sudo apt install apache2 -y
[sudo] password for siddarth:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libdrm-nouveau2 libdrm-radeon1 libgl1-amber-dri libglapi-mesa libllvm17t64 libxcb-dri2-0
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1t64 libaprutil1-dbd-sqlite3 libaprutil1-ldap libaprutil1t64
  ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser ufw
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr1t64 libaprutil1-dbd-sqlite3 libaprutil1-ldap
  libaprutil1t64 ssl-cert
0 upgraded, 9 newly installed, 0 to remove and 2 not upgraded.
Need to get 1920 kB of archives.
After this operation, 7518 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libapr1t64 amd64 1.7.2-3.1ubuntu0.1 [108 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble/main amd64 libaprutil1t64 amd64 1.6.3-1.1ubuntu7 [91.9 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble/main amd64 libaprutil1-dbd-sqlite3 amd64 1.6.3-1.1ubuntu7 [11.2 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble/main amd64 libaprutil1-ldap amd64 1.6.3-1.1ubuntu7 [9116 B]
Get:5 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 apache2-bin amd64 2.4.58-1ubuntu8.8 [1331 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 apache2-data all 2.4.58-1ubuntu8.8 [163 kB]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 apache2-utils amd64 2.4.58-1ubuntu8.8 [97.7 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 apache2 amd64 2.4.58-1ubuntu8.8 [90.2 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble/main amd64 ssl-cert all 1.1.2ubuntu1 [17.8 kB]
Fetched 1920 kB in 4s (493 kB/s)
Preconfiguring packages ...
Selecting previously unselected package libapr1t64:amd64.
(Reading database ... 41985 files and directories currently installed.)
Preparing to unpack .../0-libapr1t64_1.7.2-3.1ubuntu0.1_amd64.deb ...
Unpacking libapr1t64:amd64 (1.7.2-3.1ubuntu0.1) ...
Selecting previously unselected package libaprutil1t64:amd64.
Preparing to unpack .../1-libaprutil1t64_1.6.3-1.1ubuntu7_amd64.deb ...
Unpacking libaprutil1t64:amd64 (1.6.3-1.1ubuntu7) ...
Selecting previously unselected package libaprutil1-dbd-sqlite3:amd64
```

Checking localhost:

Starting and Enabling Apache:

```
siddarth@Siddarth:~$ sudo systemctl start apache2
siddarth@Siddarth:~$ 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
siddarth@Siddarth:~$
```

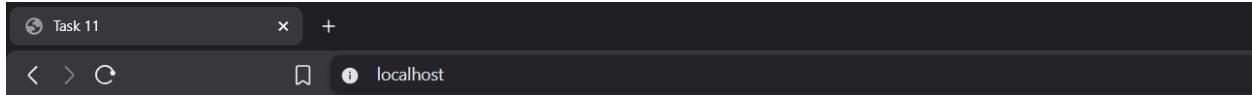**Enter sudo nano /var/www/html/index.html and change the code:**

```
siddarth@Siddarth: ~                      ×    +    ∨

  GNU nano 7.2
<html>
<head>
    <title>Task 11</title>
</head>
<body>
    <h1>Welcome to my modified Apache Web Server!</h1>
</body>
</html>
```

Restart web server:
sudo systemctl restart apache2

Open local host again to view the changes:

```
Task 11                    ×    +
<   >   C              localhost
```

Welcome to my modified Apache Web Server!

12.

```
siddarth@Siddarth:~$ mkdir -p ~/Backups
siddarth@Siddarth:~$ ls
Backups  SysOpsLab  netcheck.txt  resource_tracker.sh  secure_vault
```

```
siddarth@Siddarth:~$ cd ~/Backups
siddarth@Siddarth:~/Backups$ nano daily_backup.sh
siddarth@Siddarth:~/Backups$ chmod +x daily_backup.sh
siddarth@Siddarth:~/Backups$ cat daily_backup.sh
source="$HOME/SysOpsLab"
dest="$HOME/Backups"
timestamp=$(date +%Y%m%d_%H%M)    # space after date is important
backupfile="$dest/backup_${timestamp}.tar.gz"
tar -czf "$backupfile" "$source"
echo "Backup created: $backupfile"
siddarth@Siddarth:~/Backups$ nano daily_backup.sh
siddarth@Siddarth:~/Backups$ chmod +x daily_backup.sh
siddarth@Siddarth:~/Backups$ cat daily_backup.sh
source="$HOME/SysOpsLab"
dest="$HOME/Backups"
timestamp=$(date +%Y%m%d_%H%M)
backupfile="$dest/backup_${timestamp}.tar.gz"
tar -czf "$backupfile" "$source"
echo "Backup created: $backupfile"
siddarth@Siddarth:~/Backups$ ls
daily_backup.sh
siddarth@Siddarth:~/Backups$ ./daily_backup.sh
tar: Removing leading `/' from member names
Backup created: /home/siddarth/Backups/backup_20251201_1724.tar.gz
siddarth@Siddarth:~/Backups$
```

13.

```
siddarth@Siddarth:~$ cd ~/SysOpsLab
siddarth@Siddarth:~/SysOpsLab$ ls
Archives  Exercises  beta.txt  file_inspector.sh  pkg_list.txt  private_log.txt  system_status.log  test.txt
siddarth@Siddarth:~/SysOpsLab$
siddarth@Siddarth:~/SysOpsLab$ echo "Hi my name is Siddarth" > beta.txt
siddarth@Siddarth:~/SysOpsLab$ cat pkg_list.txt
ii  htop                      3.3.0-4build1                         amd64        interactive processes v
iewer
siddarth@Siddarth:~/SysOpsLab$ echo "hello I am in 2nd year" >> pkg_list.txt
siddarth@Siddarth:~/SysOpsLab$ cat pkg_list.txt
ii  htop                      3.3.0-4build1                         amd64        interactive processes v
iewer
hello I am in 2nd year
siddarth@Siddarth:~/SysOpsLab$ grep "hello" *.txt
pkg_list.txt:hello I am in 2nd year
siddarth@Siddarth:~/SysOpsLab$ grep "siddarth" *.txt
siddarth@Siddarth:~/SysOpsLab$ grep "hi" *.txt
siddarth@Siddarth:~/SysOpsLab$ grep "Hi" *.txt
beta.txt:Hi my name is Siddarth
siddarth@Siddarth:~/SysOpsLab$
```

```
siddarth@Siddarth:~/SysOpsLab$ echo "hi bye" >> pkg_list.txt
siddarth@Siddarth:~/SysOpsLab$ echo "hi bye" >> beta.txt
siddarth@Siddarth:~/SysOpsLab$ grep "hi" *.txt
beta.txt:hi bye
pkg_list.txt:hi bye
siddarth@Siddarth:~/SysOpsLab$ sed -i 's/hi/Hello/g' *.txt
siddarth@Siddarth:~/SysOpsLab$
siddarth@Siddarth:~/SysOpsLab$ cat pkg_list.txt
ii  htop                      3.3.0-4build1                         amd64        interactive processes v
iewer
hello I am in 2nd year
Hello bye
siddarth@Siddarth:~/SysOpsLab$ cat beta.txt
Hi my name is Siddarth
Hello bye
```

```
siddarth@Siddarth:~/SysOpsLab$ echo "1 apple 10" >> data.txt
siddarth@Siddarth:~/SysOpsLab$ echo "2 banana 20" >> data.txt
siddarth@Siddarth:~/SysOpsLab$ ls
Archives    beta.txt  file_inspector.sh  private_log.txt    test.txt
Exercises   data.txt  pkg_list.txt       system_status.log
siddarth@Siddarth:~/SysOpsLab$ cat data.txt
1 apple 10
2 banana 20
siddarth@Siddarth:~/SysOpsLab$ awk '{print $2}' data.txt
apple
banana
```