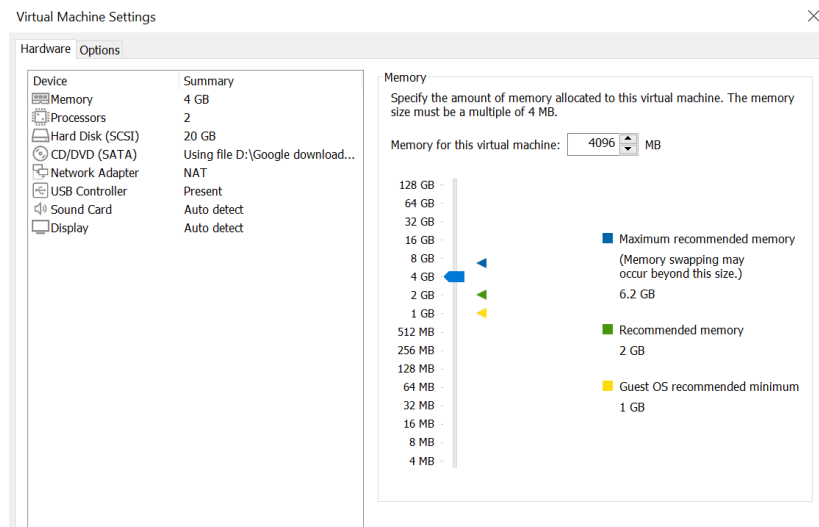Name: Maira Malik

Reg.no: 2023-BSE-040

Subject: Cloud Computing

Lab # 04

Task 1: Verify VM resources in VMware

Task 2: Start VM and log in (use your preferred host terminal method only)

1.

2.

Task 3: Filesystem exploration — root tree and dotfil

1.
```
                valid_lft forever preferred_lft forever
maira040@ubuntu64:~$ ls -la /
total 1994844
drwxr-xr-x  23 root root        4096 Sep 26 16:29 .
drwxr-xr-x  23 root root        4096 Sep 26 16:29 ..
lrwxrwxrwx   1 root root           7 Apr 22  2024 bin -> usr/bin
drwxr-xr-x   2 root root        4096 Feb 26  2024 bin.usr-is-merged
drwxr-xr-x   4 root root        4096 Sep 26 16:29 boot
dr-xr-xr-x   2 root root        4096 Aug  5 23:53 cdrom
drwxr-xr-x  20 root root        4140 Oct 23 13:02 dev
drwxr-xr-x 108 root root        4096 Sep 26 16:32 etc
drwxr-xr-x   3 root root        4096 Sep 26 16:32 home
lrwxrwxrwx   1 root root           7 Apr 22  2024 lib -> usr/lib
lrwxrwxrwx   1 root root           9 Apr 22  2024 lib64 -> usr/lib64
drwxr-xr-x   2 root root        4096 Feb 26  2024 lib.usr-is-merged
drwx------   2 root root       16384 Sep 26 16:27 lost+found
drwxr-xr-x   2 root root        4096 Aug  5 16:54 media
drwxr-xr-x   2 root root        4096 Aug  5 16:54 mnt
drwxr-xr-x   2 root root        4096 Aug  5 16:54 opt
dr-xr-xr-x 277 root root           0 Oct 23 13:02 proc
drwx------   3 root root        4096 Aug  5 17:02 root
drwxr-xr-x  28 root root         840 Oct 23 13:08 run
lrwxrwxrwx   1 root root           8 Apr 22  2024 sbin -> usr/sbin
drwxr-xr-x   2 root root        4096 Dec 11  2024 sbin.usr-is-merged
drwxr-xr-x   2 root root        4096 Sep 26 16:32 snap
drwxr-xr-x   2 root root        4096 Aug  5 16:54 srv
-rw-------   1 root root  2042626048 Sep 26 16:29 swap.img
dr-xr-xr-x  13 root root           0 Oct 23 13:02 sys
drwxrwxrwt  13 root root        4096 Oct 23 13:02 tmp
drwxr-xr-x  12 root root        4096 Aug  5 16:54 usr
drwxr-xr-x  13 root root        4096 Sep 26 16:32 var
maira040@ubuntu64:~$
```

2.
```
maira040@ubuntu64:~$ ls -la /bin
lrwxrwxrwx 1 root root 7 Apr 22  2024 /bin -> usr/bin
```

3.
```
maira040@ubuntu64:~$ ls -la /sbin
lrwxrwxrwx 1 root root 8 Apr 22  2024 /sbin -> usr/sbin
maira040@ubuntu64:~$
```

4.
```
lrwxrwxrwx 1 root root 8 Apr 22  2024 /sbin -> usr/sb
maira040@ubuntu64:~$ ls -la /usr
total 96
drwxr-xr-x  12 root root  4096 Aug  5 16:54 .
drwxr-xr-x  23 root root  4096 Sep 26 16:29 ..
drwxr-xr-x   2 root root 36864 Sep 26 16:37 bin
drwxr-xr-x   2 root root  4096 Apr 22  2024 games
drwxr-xr-x  33 root root  4096 Sep 26 16:28 include
drwxr-xr-x  78 root root  4096 Sep 26 16:29 lib
drwxr-xr-x   2 root root  4096 Aug  5 17:01 lib64
drwxr-xr-x  11 root root  4096 Sep 26 16:29 libexec
drwxr-xr-x  10 root root  4096 Aug  5 16:54 local
drwxr-xr-x   2 root root 20480 Sep 26 16:37 sbin
drwxr-xr-x 124 root root  4096 Sep 26 16:29 share
drwxr-xr-x   4 root root  4096 Sep 26 16:29 src
maira040@ubuntu64:~$
```

5.
```
drwxr-xr-x   2 root root  4096 Sep 26 16:29
maira040@ubuntu64:~$ ls -la /opt
total 8
drwxr-xr-x  2 root root 4096 Aug  5 16:54 .
drwxr-xr-x 23 root root 4096 Sep 26 16:29 ..
maira040@ubuntu64:~$
```

6.

```
drwxr-xr-x  2 root root      4096 Aug  5 17:14 sensors.d
-rw-r--r--  1 root root     12813 Mar 27  2021 services
drwxr-xr-x  2 root root      4096 Aug  5 17:02 sgml
-rw-r-----  1 root shadow     970 Sep 26 16:32 shadow
-rw-r-----  1 root shadow     970 Sep 26 16:32 shadow-
-rw-r--r--  1 root root       148 Aug  5 17:14 shells
drwxr-xr-x  2 root root      4096 Aug  5 16:55 skel
drwxr-xr-x  6 root root      4096 Aug  5 17:14 sos
drwxr-xr-x  4 root root      4096 Sep 26 16:32 ssh
drwxr-xr-x  4 root root      4096 Aug  5 17:02 ssl
-rw-r--r--  1 root root        22 Sep 26 16:32 subgid
-rw-r--r--  1 root root         0 Aug  5 16:54 subgid-
-rw-r--r--  1 root root        22 Sep 26 16:32 subuid
-rw-r--r--  1 root root         0 Aug  5 16:54 subuid-
-rw-r--r--  1 root root      4343 Jun 25 12:42 sudo.conf
-r--r-----  1 root root      1800 Jan 29  2024 sudoers
drwxr-xr-x  2 root root      4096 Aug  5 17:02 sudoers.d
-rw-r--r--  1 root root      9804 Jun 25 12:42 sudo_logsrvd.conf
drwxr-xr-x  2 root root      4096 Aug  5 17:14 supercat
-rw-r--r--  1 root root      2209 Mar 24  2024 sysctl.conf
drwxr-xr-x  2 root root      4096 Aug  5 17:02 sysctl.d
drwxr-xr-x  2 root root      4096 Aug  5 17:14 sysstat
drwxr-xr-x  6 root root      4096 Aug  5 16:49 systemd
drwxr-xr-x  2 root root      4096 Aug  5 17:00 terminfo
drwxr-xr-x  2 root root      4096 Sep 26 16:29 thermald
-rw-r--r--  1 root root         8 Aug  5 17:02 timezone
drwxr-xr-x  2 root root      4096 Aug  5 17:14 tmpfiles.d
drwxr-xr-x  2 root root      4096 Aug  5 17:14 ubuntu-advantage
-rw-r--r--  1 root root      1260 Jan 27  2023 ucf.conf
drwxr-xr-x  4 root root      4096 Aug  5 17:02 udev
drwxr-xr-x  2 root root      4096 Aug  5 17:14 udisks2
drwxr-xr-x  3 root root      4096 Aug  5 17:14 ufw
-rw-r--r--  1 root root       208 Aug  5 16:54 .updated
drwxr-xr-x  3 root root      4096 Aug  5 17:02 update-manager
drwxr-xr-x  2 root root      4096 Aug  5 17:14 update-motd.d
drwxr-xr-x  2 root root      4096 Aug  5 17:14 update-notifier
drwxr-xr-x  2 root root      4096 Sep 26 16:29 UPower
-rw-r--r--  1 root root      1523 Aug  5 17:14 usb_modeswitch.conf
drwxr-xr-x  2 root root      4096 Aug  5 17:14 usb_modeswitch.d
lrwxrwxrwx  1 root root        16 Aug  5 17:02 vconsole.conf -> default/keyboard
drwxr-xr-x  2 root root      4096 Aug  5 17:14 vim
drwxr-xr-x  4 root root      4096 Aug  5 17:14 vmware-tools
lrwxrwxrwx  1 root root        23 Feb 26  2024 vtrgb -> /etc/alternatives/vtrgb
-rw-r--r--  1 root root      4942 Aug  5 17:14 wgetrc
drwxr-xr-x  4 root root      4096 Aug  5 17:02 X11
-rw-r--r--  1 root root       681 Apr  8  2024 xattr.conf
drwxr-xr-x  4 root root      4096 Aug  5 17:02 xdg
drwxr-xr-x  2 root root      4096 Aug  5 17:02 xml
-rw-r--r--  1 root root       460 Aug  5 17:14 zsh_command_not_found
maira040@ubuntu64:~$
```

7.

```
crw-rw----  1 root     dialout   4,  92 Oct 23 13:02 ttyS28
crw-rw----  1 root     dialout   4,  93 Oct 23 13:02 ttyS29
crw-rw----  1 root     dialout   4,  67 Oct 23 13:02 ttyS3
crw-rw----  1 root     dialout   4,  94 Oct 23 13:02 ttyS30
crw-rw----  1 root     dialout   4,  95 Oct 23 13:02 ttyS31
crw-rw----  1 root     dialout   4,  68 Oct 23 13:02 ttyS4
crw-rw----  1 root     dialout   4,  69 Oct 23 13:02 ttyS5
crw-rw----  1 root     dialout   4,  70 Oct 23 13:02 ttyS6
crw-rw----  1 root     dialout   4,  71 Oct 23 13:02 ttyS7
crw-rw----  1 root     dialout   4,  72 Oct 23 13:02 ttyS8
crw-rw----  1 root     dialout   4,  73 Oct 23 13:02 ttyS9
drwxr-xr-x  2 root     root         60 Oct 23 13:02 ubuntu-vg
crw-rw----  1 root     kvm      10, 124 Oct 23 13:02 udmabuf
crw-------  1 root     root     10, 239 Oct 23 13:02 uhid
crw-------  1 root     root     10, 223 Oct 23 13:02 uinput
crw-rw-rw-  1 root     root      1,   9 Oct 23 13:02 urandom
crw-------  1 root     root     10, 126 Oct 23 13:02 userfaultfd
crw-------  1 root     root     10, 240 Oct 23 13:02 userio
crw-rw----  1 root     tty       7,   0 Oct 23 13:02 vcs
crw-rw----  1 root     tty       7,   1 Oct 23 13:02 vcs1
crw-rw----  1 root     tty       7,   2 Oct 23 13:02 vcs2
crw-rw----  1 root     tty       7,   3 Oct 23 13:02 vcs3
crw-rw----  1 root     tty       7,   4 Oct 23 13:02 vcs4
crw-rw----  1 root     tty       7,   5 Oct 23 13:02 vcs5
crw-rw----  1 root     tty       7,   6 Oct 23 13:02 vcs6
crw-rw----  1 root     tty       7, 128 Oct 23 13:02 vcsa
crw-rw----  1 root     tty       7, 129 Oct 23 13:02 vcsa1
crw-rw----  1 root     tty       7, 130 Oct 23 13:02 vcsa2
crw-rw----  1 root     tty       7, 131 Oct 23 13:02 vcsa3
```

8.

```
crw-------  1 root     root     10, 249 Oct 23 13:02 zfs
maira040@ubuntu64:~$ ls -la /var
total 56
drwxr-xr-x 13 root root       4096 Sep 26 16:32 .
drwxr-xr-x 23 root root       4096 Sep 26 16:29 ..
drwxr-xr-x  2 root root       4096 Oct 23 12:48 backups
drwxr-xr-x 14 root root       4096 Sep 26 16:33 cache
drwxrwsrwt  2 root root       4096 Aug  5 17:02 crash
drwxr-xr-x 44 root root       4096 Sep 26 16:32 lib
drwxrwsr-x  2 root staff      4096 Apr 22  2024 local
lrwxrwxrwx  1 root root          9 Aug  5 16:54 lock -> /run/lock
drwxrwxr-x 10 root syslog     4096 Oct 23 13:02 log
drwxrwsr-x  2 root mail       4096 Aug  5 16:54 mail
drwxr-xr-x  2 root root       4096 Aug  5 16:54 opt
lrwxrwxrwx  1 root root          4 Aug  5 16:54 run -> /run
drwxr-xr-x  2 root root       4096 May 21 15:46 snap
drwxr-xr-x  4 root root       4096 Aug  5 17:14 spool
drwxrwxrwt  7 root root       4096 Oct 23 13:02 tmp
-rw-r--r--  1 root root        208 Aug  5 16:54 .updated
maira040@ubuntu64:~$
```

9.
```
maira040@ubuntu64:~$ ls -la /tmp
total 52
drwxrwxrwt 13 root root 4096 Oct 23 13:02 .
drwxr-xr-x 23 root root 4096 Sep 26 16:29 ..
drwxrwxrwt  2 root root 4096 Oct 23 13:02 .font-unix
drwxrwxrwt  2 root root 4096 Oct 23 13:02 .ICE-unix
drwx------  2 root root 4096 Oct 23 13:02 snap-private-tmp
drwx------  3 root root 4096 Oct 23 13:02 systemd-private-7dc88141aa7d49a2a5c729f00e042737-ModemManager.service-2f82MQ
drwx------  3 root root 4096 Oct 23 13:02 systemd-private-7dc88141aa7d49a2a5c729f00e042737-polkit.service-270tXh
drwx------  3 root root 4096 Oct 23 13:02 systemd-private-7dc88141aa7d49a2a5c729f00e042737-systemd-logind.service-8uSJrx
drwx------  3 root root 4096 Oct 23 13:02 systemd-private-7dc88141aa7d49a2a5c729f00e042737-systemd-resolved.service-VCCHs8
drwx------  3 root root 4096 Oct 23 13:02 systemd-private-7dc88141aa7d49a2a5c729f00e042737-systemd-timesyncd.service-Nx1w4t
drwx------  2 root root 4096 Oct 23 13:02 vmware-root_751-429055992a
drwxrwxrwt  2 root root 4096 Oct 23 13:02 .X11-unix
drwxrwxrwt  2 root root 4096 Oct 23 13:02 .XIM-unix
maira040@ubuntu64:~$
```

10.
```
maira040@ubuntu64:~$ ls -la ~
total 36
drwxr-x--- 5 maira040 maira040 4096 Oct 23 13:22 .
drwxr-xr-x 3 root     root     4096 Sep 26 16:32 ..
-rw-rw-r-- 1 maira040 maira040  271 Oct 23 13:22 answers.md
-rw-r--r-- 1 maira040 maira040  220 Mar 31  2024 .bash_logout
-rw-r--r-- 1 maira040 maira040 3771 Mar 31  2024 .bashrc
drwx------ 2 maira040 maira040 4096 Sep 26 16:33 .cache
drwxrwxr-x 3 maira040 maira040 4096 Oct 23 13:17 .local
-rw-r--r-- 1 maira040 maira040  807 Mar 31  2024 .profile
drwx------ 2 maira040 maira040 4096 Sep 26 16:32 .ssh
-rw-r--r-- 1 maira040 maira040    0 Sep 26 16:37 .sudo_as_admin_successful
maira040@ubuntu64:~$
```

11.
```
maira040@ubuntu64:~$ cat answers.md

In linux, /bin holds essential system commands, /usr/bin contains most user-installed programs, and /usr/local/bin stores manually installed software. This sepe
ration keeps system tools, package-managed apps, and user-added programs organized and safe from overwriting.
maira040@ubuntu64:~$ _
```

Task 4: Essential CLI tasks — navigation and file operations

1.
```
maira040@ubuntu64:~$ mkdir -p ~lab4/workspace/python_project
maira040@ubuntu64:~$
```

2.
```
maira040@ubuntu64:~$ cd ~/lab4/workspace/python_project
maira040@ubuntu64:~/lab4/workspace/python_project$ _
```

3.
```
maira040@ubuntu64:~/lab4/workspace/python_project$ pwd
/home/maira040/lab4/workspace/python_project
maira040@ubuntu64:~/lab4/workspace/python_project$
```

4.
```
  GNU nano 7.2
Lab 4 README
```

5.
```
  ▶ Ubuntu64  ✕
  GNU nano 7.2
print ("hello Lab4")
```

6.

```
  GNU nano 7.2
ENV=lab4_
```

7.

```
maira040@ubuntu64:~/lab4/workspace/python_project$ ls -la
total 20
drwxrwxr-x 2 maira040 maira040 4096 Oct 23 13:46 .
drwxrwxr-x 3 maira040 maira040 4096 Oct 23 13:39 ..
-rw-rw-r-- 1 maira040 maira040    9 Oct 23 13:45 .env
-rw-rw-r-- 1 maira040 maira040   21 Oct 23 13:44 main.py
-rw-rw-r-- 1 maira040 maira040   13 Oct 23 13:42 README.md
maira040@ubuntu64:~/lab4/workspace/python_project$ _
```

8.

```
-rw-rw-r-- 1 maira040 maira040   13 Oct 23 13:42 README.md
maira040@ubuntu64:~/lab4/workspace/python_project$ cp README.md README.copy.md
maira040@ubuntu64:~/lab4/workspace/python_project$
```

9.

```
maira040@ubuntu64:~/lab4/workspace/python_project$ cp README.md README.copy.md
maira040@ubuntu64:~/lab4/workspace/python_project$ mv README.copy.md README.dev.md
maira040@ubuntu64:~/lab4/workspace/python_project$
```

10.

```
maira040@ubuntu64:~/lab4/workspace/python_project$ rm README.dev.md
maira040@ubuntu64:~/lab4/workspace/python_project$
```

11.

```
maira040@ubuntu64:~/lab4/workspace/python_project$ mkdir -p ~/lab4/workspace/java_app
maira040@ubuntu64:~/lab4/workspace/python_project$ _
```

12.

```
maira040@ubuntu64:~/lab4/workspace/python_project$ cp -r ~/lab4/workspace/python_project ~/lab4/workspace/java_app_copy
maira040@ubuntu64:~/lab4/workspace/python_project$
```

13.

```
maira040@ubuntu64:~/lab4/workspace/python_project$ cp -r ~/lab4/workspace/pyth
maira040@ubuntu64:~/lab4/workspace/python_project$ ls -la ~/lab4/workspace
total 20
drwxrwxr-x 5 maira040 maira040 4096 Oct 23 13:51 .
drwxrwxr-x 3 maira040 maira040 4096 Oct 23 13:39 ..
drwxrwxr-x 2 maira040 maira040 4096 Oct 23 13:50 java_app
drwxrwxr-x 2 maira040 maira040 4096 Oct 23 13:51 java_app_copy
drwxrwxr-x 2 maira040 maira040 4096 Oct 23 13:48 python_project
maira040@ubuntu64:~/lab4/workspace/python_project$ _
```

14.

```
 2  ls -la /bin
 3  ls -la /bin
 4  ls -la /sbin
 5  ls -la /usr
 6  ls -la /opt
 7  ls -la /etc
 8  ls -la /dev
 9  ls -la /var
10  ls -la /tmp
11  ls -la ~
12  nano ~/answers.md
13  cat answers.md
14  ls -la /
15  ls -la /bin
16  ls -la /sbin
17  ls -la /usr
18  ls -la /opt
19  ls -la /etc
20  ls -la /dev
21  ls -la /var
22  ls -la /tmp
23  ls -la /
24  ls -la /
25  ls -la /bin
26  ls -la /sbin
27  ls -la /usr
28  ls -la /opt
29  ls -la /etc
30  ls -la /dev
31  ls -la /var
32  ls -la /tmp
33  ls -la ~
34  cat answers.md
35  mkdir -p ~/lab4/workspace/python_project
36  cd ~/lab4/workspace/python_project
37  mkdir -p ~/lab4/workspace/python_project
38  cd ~/lab4/workspace/python_project
39  pwd
40  nano README.md
41  nano main.py
42  nano .env
43  ls -la
44  cp README.md README.copy.md
45  mv README.copy.md README.dev.md
46  rm README.dev.md
47  mkdir -p ~/lab4/workspace/java_app
48  cp -r ~/lab4/workspace/python_project ~/lab4/workspace/java_app_copy
49  ls -la ~/lab4/workspace
50  history
maira040@ubuntu64:~/lab4/workspace/python_project$ _
```

Task 5: System info, resources & processes:

1.
```
maira040@ubuntu64:~/lab4/workspace/python_project$ uname -a
Linux ubuntu64 6.8.0-71-generic #71-Ubuntu SMP PREEMPT_DYNAMIC Tue Jul 22 16:52:38 UTC 2025 x86_64 x86_64 x86_64 GNU/Linux
maira040@ubuntu64:~/lab4/workspace/python_project$
```

2.
```
apicid          : 0
initial apicid  : 0
fpu             : yes
fpu_exception   : yes
cpuid level     : 22
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ss syscall nx pdp
 arch_perfmon nopl xtopology tsc_reliable nonstop_tsc cpuid tsc_known_freq pni pclmulqdq vmx ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
 timer aes xsave avx f16c rdrand hypervisor lahf_lm abm 3dnowprefetch pti ssbd ibrs ibpb stibp tpr_shadow ept vpid ept_ad fsgsbase tsc_
 invpcid rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 xsaves arat vnmi md_clear flush_l1d arch_capabilities
vmx flags       : vnmi invvpid ept_x_only ept_ad tsc_offset vtpr mtf ept vpid unrestricted_guest ple ept_mode_based_exec
bugs            : cpu_meltdown spectre_v1 spectre_v2 spec_store_bypass l1tf mds swapgs itlb_multihit srbds mmio_stale_data retbleed g
bogomips        : 3792.00
clflush size    : 64
cache_alignment : 64
address sizes   : 45 bits physical, 48 bits virtual
power management:

processor       : 1
vendor_id       : GenuineIntel
cpu family      : 6
model           : 142
model name      : Intel(R) Core(TM) i5-8350U CPU @ 1.70GHz
stepping        : 10
microcode       : 0xb4
cpu MHz         : 1896.001
cache size      : 6144 KB
physical id     : 2
siblings        : 1
core id         : 0
cpu cores       : 1
apicid          : 2
initial apicid  : 2
fpu             : yes
fpu_exception   : yes
cpuid level     : 22
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ss syscall nx pdp
 arch_perfmon nopl xtopology tsc_reliable nonstop_tsc cpuid tsc_known_freq pni pclmulqdq vmx ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
 timer aes xsave avx f16c rdrand hypervisor lahf_lm abm 3dnowprefetch pti ssbd ibrs ibpb stibp tpr_shadow ept vpid ept_ad fsgsbase tsc_
 invpcid rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 xsaves arat vnmi md_clear flush_l1d arch_capabilities
vmx flags       : vnmi invvpid ept_x_only ept_ad tsc_offset vtpr mtf ept vpid unrestricted_guest ple ept_mode_based_exec
bugs            : cpu_meltdown spectre_v1 spectre_v2 spec_store_bypass l1tf mds swapgs itlb_multihit srbds mmio_stale_data retbleed g
bogomips        : 3792.00
clflush size    : 64
cache_alignment : 64
address sizes   : 45 bits physical, 48 bits virtual
power management:

maira040@ubuntu64:~$
```

3.
```
maira040@ubuntu64:~$ free -h
               total        used        free      shared  buff/cache   available
Mem:           3.8Gi       501Mi       3.2Gi       1.5Mi       335Mi       3.3Gi
Swap:          1.9Gi          0B       1.9Gi
maira040@ubuntu64:~$
```

4.
```
maira040@ubuntu64:~$ df -h
Filesystem                        Size  Used Avail Use% Mounted on
tmpfs                             387M  1.5M  386M   1% /run
/dev/mapper/ubuntu--vg-ubuntu--lv 9.8G  4.5G  4.8G  49% /
tmpfs                             1.9G     0  1.9G   0% /dev/shm
tmpfs                             5.0M     0  5.0M   0% /run/lock
/dev/sda2                         1.8G  100M  1.6G   7% /boot
tmpfs                             387M   12K  387M   1% /run/user/1000
maira040@ubuntu64:~$
```

5.
```
maira040@ubuntu64:~$ cat /etc/os-release
PRETTY_NAME="Ubuntu 24.04.3 LTS"
NAME="Ubuntu"
VERSION_ID="24.04"
VERSION="24.04.3 LTS (Noble Numbat)"
VERSION_CODENAME=noble
ID=ubuntu
ID_LIKE=debian
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
UBUNTU_CODENAME=noble
LOGO=ubuntu-logo
maira040@ubuntu64:~$
```

6.

```
|root          604  0.0  0.0      0      0 ?      I<   13:02  0:00 [kworker/R-ext4-]
 systemd+      645  0.0  0.2  19008   9472 ?      Ss   13:02  0:00 /usr/lib/systemd/systemd-n
 systemd+      660  0.0  0.3  21580  12800 ?      Ss   13:02  0:00 /usr/lib/systemd/systemd-r
 systemd+      667  0.0  0.1  91024   7808 ?      Ssl  13:02  0:00 /usr/lib/systemd/systemd-t
 root          731  0.0  0.0      0      0 ?      I<   13:02  0:00 [kworker/R-cfg80]
 root          750  0.0  0.3  53464  12032 ?      Ss   13:02  0:00 /usr/bin/VGAuthService
 root          751  0.2  0.2 242132   9216 ?      Ssl  13:02  0:07 /usr/bin/vmtoolsd
 root          765  0.0  0.0      0      0 ?      S    13:02  0:00 [irq/57-vmw_vmci]
 root          766  0.0  0.0      0      0 ?      S    13:02  0:00 [irq/58-vmw_vmci]
 root          767  0.0  0.0      0      0 ?      S    13:02  0:00 [irq/59-vmw_vmci]
 message+      803  0.0  0.1   9808   5376 ?      Ss   13:02  0:00 @dbus-daemon --system --ad
 polkitd       820  0.0  0.1 308164   7808 ?      Ssl  13:02  0:00 /usr/lib/polkit-1/polkitd
 root          827  0.0  0.2  18144   8704 ?      Ss   13:02  0:00 /usr/lib/systemd/systemd-l
 root          830  0.0  0.3 468988  13440 ?      Ssl  13:02  0:00 /usr/libexec/udisks2/udisk
 root          852  0.0  0.5 109660  23040 ?      Ssl  13:02  0:00 /usr/bin/python3 /usr/shar
 syslog        856  0.0  0.1 222508   6016 ?      Ssl  13:02  0:00 /usr/sbin/rsyslogd -n -iNO
 root          872  0.0  0.3 392092  12800 ?      Ssl  13:02  0:00 /usr/sbin/ModemManager
 root          899  0.0  0.0      0      0 ?      S    13:02  0:00 [irq/16-vmwgfx]
 root          901  0.0  0.0      0      0 ?      I<   13:02  0:00 [kworker/R-ttm]
 root         1005  0.0  0.0   6824   2688 ?      Ss   13:02  0:00 /usr/sbin/cron -f -P
 root         1063  0.0  0.1   6948   4736 tty1   Ss   13:02  0:00 /bin/login -p --
```

Task 6: Users and account verification (no sudo group change)

1.

```
maira040@ubuntu64:~$ sudo adduser lab4user
[sudo] password for maira040:
info: Adding user `lab4user' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `lab4user' (1001) ...
info: Adding new user `lab4user' (1001) with group `lab4user (1001)' ...
info: Creating home directory `/home/lab4user' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for lab4user
Enter the new value, or press ENTER for the default
        Full Name []: lab4user
        Room Number []: 2
        Work Phone []: 0300
        Home Phone []: 0316
        Other []: 0400
Is the information correct? [Y/n] y
info: Adding new user `lab4user' to supplemental / extra groups `users' ...
info: Adding user `lab4user' to group `users' ...
maira040@ubuntu64:~$
```

2.

```
info: Adding user `lab4user' to group `users' ...
maira040@ubuntu64:~$ getent passwd lab4user
lab4user:x:1001:1001:lab4user,2,0300,0316,0400:/home/lab4user:/bin/bash
```

3.

```
maira040@ubuntu64:~$ su - lab4user
Password:
lab4user@ubuntu64:~$
```

4.

```
lab4user@ubuntu64:~$ sudo whoami
[sudo] password for lab4user:
lab4user is not in the sudoers file.
lab4user@ubuntu64:~$
```

5.

```
    maira040@ubuntu64:~$
```

6.

```
maira040@ubuntu64:~$ sudo deluser --remove-home lab4user
info: Looking for files to backup/remove ...
info: Removing files ...
info: Removing crontab ...
info: Removing user `lab4user' ...
maira040@ubuntu64:~$
```

Task 7: Create a small demo script using an editor and run it

1.

```
  GNU nano 7.2
#!/bin/bash
echo "Lab 4 demo: current user is $(whoami)"
echo "Current time: $(date)"
uptime
free -h
```

2.

```
maira040@ubuntu64:~$ chmod +x ~/lab4/workspace/run-demo.sh
maira040@ubuntu64:~$
```

3.

```
maira040@ubuntu64:~$ ~/lab4/workspace/run-demo.sh
Lab 4 demo: current user is maira040
Current time: Thu Oct 23 02:18:26 PM UTC 2025
 14:18:26 up  1:16,  2 users,  load average: 0.00, 0.00, 0.00
               total        used        free      shared  buff/cache   available
Mem:           3.8Gi       491Mi       3.2Gi       1.5Mi       348Mi       3.3Gi
Swap:          1.9Gi          0B       1.9Gi
maira040@ubuntu64:~$
```

Exam Evaluation Questions:

Question 1:

1.

```
Microsoft Windows [Version 10.0.19045.6216]
(c) Microsoft Corporation. All rights reserved.

C:\Users\BOSS>ssh maira040@192.168.238.129
maira040@192.168.238.129's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-71-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

 System information as of Thu Oct 23 01:08:32 PM UTC 2025

  System load:  0.0                Processes:             214
  Usage of /:   45.4% of 9.75GB    Users logged in:       1
  Memory usage: 8%                 IPv4 address for ens33: 192.168.238.129
  Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Fri Sep 26 16:43:32 2025 from 192.168.238.1
maira040@ubuntu64:~$
```

2.

```
maira040@ubuntu64:~$ whoami
maira040
maira040@ubuntu64:~$ pwd
/home/maira040
maira040@ubuntu64:~$
```

3.

```
Ubuntu 24.04.3 LTS ubuntu64 tty1

ubuntu64 login: maira040
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-71-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

 System information as of Thu Oct 23 01:04:11 PM UTC 2025

  System load:  0.08              Processes:             245
  Usage of /:   45.3% of 9.75GB   Users logged in:       0
  Memory usage: 7%                IPv4 address for ens33: 192.168.238.129
  Swap usage:   0%


Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update

maira040@ubuntu64:~$
```

Question 2:

1.

```
              valid_lft forever preferred_lft forever
maira040@ubuntu64:~$ ls -la /
total 1994844
drwxr-xr-x   23 root root        4096 Sep 26 16:29 .
drwxr-xr-x   23 root root        4096 Sep 26 16:29 ..
lrwxrwxrwx    1 root root           7 Apr 22  2024 bin -> usr/bin
drwxr-xr-x    2 root root        4096 Feb 26  2024 bin.usr-is-merged
drwxr-xr-x    4 root root        4096 Sep 26 16:29 boot
dr-xr-xr-x    2 root root        4096 Aug  5 23:53 cdrom
drwxr-xr-x   20 root root        4140 Oct 23 13:02 dev
drwxr-xr-x  108 root root        4096 Sep 26 16:32 etc
drwxr-xr-x    3 root root        4096 Sep 26 16:32 home
lrwxrwxrwx    1 root root           7 Apr 22  2024 lib -> usr/lib
lrwxrwxrwx    1 root root           9 Apr 22  2024 lib64 -> usr/lib64
drwxr-xr-x    2 root root        4096 Feb 26  2024 lib.usr-is-merged
drwx------    2 root root       16384 Sep 26 16:27 lost+found
drwxr-xr-x    2 root root        4096 Aug  5 16:54 media
drwxr-xr-x    2 root root        4096 Aug  5 16:54 mnt
drwxr-xr-x    2 root root        4096 Aug  5 16:54 opt
dr-xr-xr-x  277 root root           0 Oct 23 13:02 proc
drwx------    3 root root        4096 Aug  5 17:02 root
drwxr-xr-x   28 root root         840 Oct 23 13:08 run
lrwxrwxrwx    1 root root           8 Apr 22  2024 sbin -> usr/sbin
drwxr-xr-x    2 root root        4096 Dec 11  2024 sbin.usr-is-merged
drwxr-xr-x    2 root root        4096 Sep 26 16:32 snap
drwxr-xr-x    2 root root        4096 Aug  5 16:54 srv
-rw-------    1 root root  2042626048 Sep 26 16:29 swap.img
dr-xr-xr-x   13 root root           0 Oct 23 13:02 sys
drwxrwxrwt   13 root root        4096 Oct 23 13:02 tmp
drwxr-xr-x   12 root root        4096 Aug  5 16:54 usr
drwxr-xr-x   13 root root        4096 Sep 26 16:32 var
maira040@ubuntu64:~$
```

2.

```
maira040@ubuntu64:~$ cat /etc/os-release
PRETTY_NAME="Ubuntu 24.04.3 LTS"
NAME="Ubuntu"
VERSION_ID="24.04"
VERSION="24.04.3 LTS (Noble Numbat)"
VERSION_CODENAME=noble
ID=ubuntu
ID_LIKE=debian
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
UBUNTU_CODENAME=noble
LOGO=ubuntu-logo
maira040@ubuntu64:~$
```

3.

```
maira040@ubuntu64:~$ ls -a ~
.    ..    answers.md    .bash_logout    .bashrc    .cache    '~lab4'    lab4    .local    .profile    .ssh
maira040@ubuntu64:~$
```

4.

```
maira040@ubuntu64:~$ cat answers.md

In linux, /bin holds essential system commands, /usr/bin contains most user-installed programs, and /usr/local/bin stores manually installed software. This sepe
ration keeps system tools, package-managed apps, and user-added programs organized and safe from overwriting.
maira040@ubuntu64:~$ _
```

Question 3:

1.

```
maira040@ubuntu64:~/lab4/workspace/python_project$ uname -a
Linux ubuntu64 6.8.0-71-generic #71-Ubuntu SMP PREEMPT_DYNAMIC Tue Jul 22 16:52:38 UTC 2025 x86_64 x86_64 x86_64 GNU/Linux
maira040@ubuntu64:~/lab4/workspace/python_project$
```

2.

```
apicid          : 0
initial apicid  : 0
fpu             : yes
fpu_exception   : yes
cpuid level     : 22
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ss syscall nx pdpe
 arch_perfmon nopl xtopology tsc_reliable nonstop_tsc cpuid tsc_known_freq pni pclmulqdq vmx ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
 timer aes xsave avx f16c rdrand hypervisor lahf_lm abm 3dnowprefetch pti ssbd ibrs ibpb stibp tpr_shadow ept vpid ept_ad fsgsbase tsc_
 invpcid rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 xsaves arat vnmi md_clear flush_l1d arch_capabilities
vmx flags        : vnmi invvpid ept_x_only ept_ad tsc_offset vtpr mtf ept vpid unrestricted_guest ple ept_mode_based_exec
bugs             : cpu_meltdown spectre_v1 spectre_v2 spec_store_bypass l1tf mds swapgs itlb_multihit srbds mmio_stale_data retbleed g
bogomips         : 3792.00
clflush size     : 64
cache_alignment  : 64
address sizes    : 45 bits physical, 48 bits virtual
power management:

processor        : 1
vendor_id        : GenuineIntel
cpu family       : 6
model            : 142
model name       : Intel(R) Core(TM) i5-8350U CPU @ 1.70GHz
stepping         : 10
microcode        : 0xb4
cpu MHz          : 1896.001
cache size       : 6144 KB
physical id      : 2
siblings         : 1
core id          : 0
cpu cores        : 1
apicid           : 2
initial apicid   : 2
fpu              : yes
fpu_exception    : yes
cpuid level      : 22
wp               : yes
flags            : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ss syscall nx pdpe
 arch_perfmon nopl xtopology tsc_reliable nonstop_tsc cpuid tsc_known_freq pni pclmulqdq vmx ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
 timer aes xsave avx f16c rdrand hypervisor lahf_lm abm 3dnowprefetch pti ssbd ibrs ibpb stibp tpr_shadow ept vpid ept_ad fsgsbase tsc_
 invpcid rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 xsaves arat vnmi md_clear flush_l1d arch_capabilities
vmx flags        : vnmi invvpid ept_x_only ept_ad tsc_offset vtpr mtf ept vpid unrestricted_guest ple ept_mode_based_exec
bugs             : cpu_meltdown spectre_v1 spectre_v2 spec_store_bypass l1tf mds swapgs itlb_multihit srbds mmio_stale_data retbleed g
bogomips         : 3792.00
clflush size     : 64
cache_alignment  : 64
address sizes    : 45 bits physical, 48 bits virtual
power management:

maira040@ubuntu64:~$ _
```

3.

```
root       604  0.0  0.0      0     0 ?        I<   13:02   0:00 [kworker/R-ext4-]
systemd+   645  0.0  0.2  19008  9472 ?        Ss   13:02   0:00 /usr/lib/systemd/systemd-n
systemd+   660  0.0  0.3  21580 12800 ?        Ssl  13:02   0:00 /usr/lib/systemd/systemd-n
systemd+   667  0.0  0.1  91024  7808 ?        Ssl  13:02   0:00 /usr/lib/systemd/systemd-t
root       731  0.0  0.0      0     0 ?        I<   13:02   0:00 [kworker/R-cfg80]
root       750  0.0  0.3  53464 12032 ?        Ss   13:02   0:00 /usr/bin/VGAuthService
root       751  0.2  0.2 242132  9216 ?        Ssl  13:02   0:07 /usr/bin/vmtoolsd
root       765  0.0  0.0      0     0 ?        S    13:02   0:00 [irq/57-vmw_vmci]
root       766  0.0  0.0      0     0 ?        S    13:02   0:00 [irq/58-vmw_vmci]
root       767  0.0  0.0      0     0 ?        S    13:02   0:00 [irq/59-vmw_vmci]
message+   803  0.0  0.1   9808  5376 ?        Ss   13:02   0:00 @dbus-daemon --system --ad
polkitd    820  0.0  0.1 308164  7808 ?        Ssl  13:02   0:00 /usr/lib/polkit-1/polkitd
root       827  0.0  0.2  18144  8704 ?        Ss   13:02   0:00 /usr/lib/systemd/systemd-l
root       830  0.0  0.3 468988 13440 ?        Ssl  13:02   0:00 /usr/libexec/udisks2/udisk
root       852  0.0  0.5 109660 23040 ?        Ssl  13:02   0:00 /usr/bin/python3 /usr/shar
syslog     856  0.0  0.1 222508  6016 ?        Ssl  13:02   0:00 /usr/sbin/rsyslogd -n -iNO
root       872  0.0  0.3 392092 12800 ?        Ssl  13:02   0:00 /usr/sbin/ModemManager
root       899  0.0  0.0      0     0 ?        S    13:02   0:00 [irq/16-vmwgfx]
root       901  0.0  0.0      0     0 ?        I<   13:02   0:00 [kworker/R-ttm]
root      1005  0.0  0.0   6824  2688 ?        Ss   13:02   0:00 /usr/sbin/cron -f -P
root      1063  0.0  0.1   6948  4736 tty1     Ss   13:02   0:00 /bin/login -p --
```

Question 4:

1.

```
maira040@ubuntu64:~$ sudo adduser lab4user
[sudo] password for maira040:
info: Adding user `lab4user' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `lab4user' (1001) ...
info: Adding new user `lab4user' (1001) with group `lab4user (1001)' ...
info: Creating home directory `/home/lab4user' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for lab4user
Enter the new value, or press ENTER for the default
        Full Name []: lab4user
        Room Number []: 2
        Work Phone []: 0300
        Home Phone []: 0316
        Other []: 0400
Is the information correct? [Y/n] y
info: Adding new user `lab4user' to supplemental / extra groups `users' ...
info: Adding user `lab4user' to group `users' ...
maira040@ubuntu64:~$
```

2.
```
info: Huuing user  lab4user  to group  users  ...
maira040@ubuntu64:~$ getent passwd lab4user
lab4user:x:1001:1001:lab4user,2,0300,0316,0400:/home/lab4user:/bin/bash
maira040@ubuntu64:~$
```

3.
```
Try 'su --help' for more information.
maira040@ubuntu64:~$ su - lab4user
Password:
lab4user@ubuntu64:~$ _
```

4.
```
lab4user@ubuntu64:~$ sudo whoami
[sudo] password for lab4user:
lab4user is not in the sudoers file.
lab4user@ubuntu64:~$
```

5.
```
    maira040@ubuntu64:~$
```

6.
```
maira040@ubuntu64:~$ sudo deluser --remove-home lab4user
info: Looking for files to backup/remove ...
info: Removing files ...
info: Removing crontab ...
info: Removing user `lab4user' ...
maira040@ubuntu64:~$
```