

CLOUD COMPUTING LAB

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LAB #06

Task 1 – Switch to root with su - and back to a normal user

- task1_set_root_password.png

```
maria06@maria076:~$ su -
Password:
root@maria076:~# whoami
root
root@maria076:~# id
uid=0(root) gid=0(root) groups=0(root)
```

- task1_su_root.png

```
root@maria076:~# exit
logout
maria06@maria076:~$ whoami
maria06
```

- task1_exit_to_user.png

```
maria06@maria076:~$ whoami
maria06
maria06@maria076:~$ sudo adduser tom
info: Adding user `tom' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `tom' (1001) ...
info: Adding new user `tom' (1001) with group `tom (1001)' ...
info: Creating home directory `/home/tom' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for tom
Enter the new value, or press ENTER for the default
  Full Name []: maria abdul malik
   Room Number []: 12
   Work Phone []: 03490014290
   Home Phone []: 03490014290
    Other []: 0000000000
Is the information correct? [Y/n] y
info: Adding new user `tom' to supplemental / extra groups `users' ...
info: Adding user `tom' to group `users' ...
```

Task 2 – Create user tom and verify in passwd/group/shadow

- task2_adduser_tom.png

```
maria06:x:1000:1000:maria abdul malik:/home/maria06:/bin/bash
sshd:x:109:65534::/run/sshd:/usr/sbin/nologin
tom:x:1001:1001:maria abdul malik,12,03490014290,03490014290,0000000000:/home/tom:/bin/bash
```

- task2_verify_passwd.png

```
lxd:x:101:maria06
messagebus:x:102:
systemd-resolve:x:992:
_ssh:x:103:
polkitd:x:991:
crontab:x:990:
syslog:x:104:
uidd:x:105:
rdma:x:106:
tcpdump:x:107:
tss:x:108:
landscape:x:109:
fwupd-refresh:x:989:
maria06:x:1000:
tom:x:1001:
```

- task2_verify_group.png

```
polkitd:!*:20305::::::
syslog:!*:20305::::::
uidd:!*:20305::::::
tcpdump:!*:20305::::::
tss:!*:20305::::::
landscape:!*:20305::::::
fwupd-refresh:!*:20305::::::
usbmux:!*:20372::::::
maria06:$6$kJ/jtp2RB40hmZGg$w5EkXxfTBP2Pdm
sshd:!*:20378::::::
tom:$u$i9T$pgc75h9Gi/peRdAu0eN0A0$u_+PMu/
```

- task2_verify_shadow.png

```
lxd:x:101:maria06
messagebus:x:102:
systemd-resolve:x:992:
_ssh:x:103:
polkitd:x:991:
crontab:x:990:
syslog:x:104:
uidd:x:105:
rdma:x:106:
tcpdump:x:107:
tss:x:108:
landscape:x:109:
fwupd-refresh:x:989:
maria06:x:1000:
tom:x:1001:
developer:x:1002:
devops:x:1003:
designer:x:1004:
```

Task 3 – Create groups; change tom's primary and secondary groups

- task3_groupadd.png

```
developer:x:1002:  
devops:x:1003:  
designer:x:1004:
```

- task3_change_primary_group.png

```
primary group designer does not exist  
safa@safa056:~$ sudo usermod -g designer tom  
safa@safa056:~$ id tom  
uid=1001(tom) gid=1004(designer) groups=1004(designer),100(users)  
safa@safa056:~$
```

- task3_add_secondary_groups.png

```
maria06@maria076:~$ sudo usermod -aG developer,devops tom  
maria06@maria076:~$ id tom  
uid=1001(tom) gid=1001(tom) groups=1001(tom),100(users),1002(developer),1003(devops)  
maria06@maria076:~$ groups tom  
tom : tom users developer devops
```

- task3_reset_secondary_groups.png

```
maria06@maria076:~$ sudo usermod -G tom tom  
maria06@maria076:~$ id tom  
uid=1001(tom) gid=1001(tom) groups=1001(tom)  
maria06@maria076:~$ groups tom  
tom : tom
```

Task 4 – Create/delete users (Jerry, Scooby) and groups (jolly, anime)

- task4_add_users.png

```

maria06@maria076:~$ sudo adduser scooby
info: Adding user `scooby' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `scooby' (1007) ...
info: Adding new user `scooby' (1007) with group `scooby (1007)' ...
info: Creating home directory `/home/scooby' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for scooby
Enter the new value, or press ENTER for the default
  Full Name []: maria abdul malik
  Room Number []: 00
  Work Phone []: 0000000000000000
  Home Phone []: 0000000000000000
  Other []: 0000000000000000
Is the information correct? [Y/n] y
info: Adding new user `scooby' to supplemental / extra groups `users' ...
info: Adding user `scooby' to group `users' ...

```

```

maria06@maria076:~$ sudo adduser jerry
info: Adding user `jerry' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `jerry' (1008) ...
info: Adding new user `jerry' (1008) with group `jerry (1008)' ...
info: Creating home directory `/home/jerry' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for jerry
Enter the new value, or press ENTER for the default
  Full Name []: maria abdul malik
  Room Number []: 0000000000000000
  Work Phone []: 00000000000000000000
  Home Phone []: 000000000000000000
  Other []: 000000000000000000
chfn: fields too long
fatal: `/bin/chfn jerry' returned error code 1. Exiting.

```

- **task4_scooby_su_auth_failure.png**

```

maria06@maria076:~$ su - Scooby
Password:
su: Authentication failure

```

- **task4_set_password_scooby.png**

```

maria06@maria076:~$ sudo passwd Scooby
New password:
Retype new password:
passwd: password updated successfully

```

- **task4_scooby_su_no_home.png**

```

maria06@maria076:~$ su - Scooby
Password:
su: warning: cannot change directory to /home/Scooby: No such file or directory

```

- **task4_scooby_no_home.png**

```

maria06:x:1000:1000:maria abdul malik:/home/maria06:/bin/bash
sshd:x:109:65534::/run/sshd:/usr/sbin/nologin
tom:x:1001:1001:maria abdul malik,12,03490014290,03490014290,0000000000:/home/t
Scooby:x:1002:1005::/home/Scooby:/bin/sh
Jerry:x:1003:1006::/home/Jerry:/bin/sh
scooby:x:1007:1007:maria abdul malik,00,00000000000000,000000000000,00000000
jerry:x:1008:1008::/home/jerry:/bin/bash

```

- **task4_scooby_create_home.png**

```

maria06@maria076:~$ sudo mkdir -p /home/Scooby
maria06@maria076:~$ sudo Chown Scooby:Scooby /home/Scooby
sudo: Chown: command not found
maria06@maria076:~$ sudo chmod 750 /home/Scooby
maria06@maria076:~$ ls -ld /home/Scooby
drwxr-x--- 2 root root 4096 Nov  7 13:46 /home/Scooby

```

- **task4_scooby_login_success.png**

```

maria06@maria076:~$ pwd
/home/maria06
maria06@maria076:~$ ls -la
total 44
drwxr-x--- 6 maria06 maria06 4096 Oct 17 09:50 .
drwxr-xr-x 7 root root 4096 Nov  7 13:46 ..
-rw-rw-r-- 1 maria06 maria06 103 Oct 17 06:23 answer.md
-rw----- 1 maria06 maria06 143 Oct 17 09:50 .bash_history
-rw-r--r-- 1 maria06 maria06 220 Mar 31 2024 .bash_logout
-rw-r--r-- 1 maria06 maria06 3771 Mar 31 2024 .bashrc
drwx----- 2 maria06 maria06 4096 Oct 11 06:29 .cache
drwxrwxr-x 3 maria06 maria06 4096 Oct 17 06:27 lab4
drwxrwxr-x 3 maria06 maria06 4096 Oct 17 06:16 .local
-rw-r--r-- 1 maria06 maria06 807 Mar 31 2024 .profile
drwx----- 2 maria06 maria06 4096 Oct 17 03:26 .ssh
-rw-r--r-- 1 maria06 maria06  0 Oct 11 07:01 .sudo_as_admin_successful

```

- **task4_verify_users.png**

```

maria06:x:1000:1000:maria abdul malik:/home/maria06:/bin/bash
sshd:x:109:65534::/run/sshd:/usr/sbin/nologin
tom:x:1001:1001:maria abdul malik,12,03490014290,03490014290,000000
Scooby:x:1002:1005::/home/Scooby:/bin/sh
Jerry:x:1003:1006::/home/Jerry:/bin/sh
scooby:x:1007:1007:maria abdul malik,00,00000000000000,000000000000
jerry:x:1008:1008::/home/jerry:/bin/bash

```

- **task4_shell_switching.png**

```

maria06:x:1000:1000:maria abdul malik:/home/maria06:/bin/bash
sshd:x:109:65534::/run/sshd:/usr/sbin/nologin
tom:x:1001:1001:maria abdul malik,12,03490014290,03490014290,000000
Scooby:x:1002:1005::/home/Scooby:/bin/sh
Jerry:x:1003:1006::/home/Jerry:/bin/sh
scooby:x:1007:1007:maria abdul malik,00,00000000000000,000000000000
jerry:x:1008:1008::/home/jerry:/bin/bash

```

- **task4_add_groups.png**

```

maria06:x:1000:
tom:x:1001:tom
developer:x:1002:
devops:x:1003:
designer:x:1004:
Scooby:x:1005:
Jerry:x:1006:
scooby:x:1007:
jerry:x:1008:
jolly:x:1009:
anime:x:1010:

```

- task4_delete_groups & users.png

```

maria06@maria076:~$ sudo delgroup jolly
info: Removing group `jolly' ...
maria06@maria076:~$ sudo groupdel anime
maria06@maria076:~$ cat /etc/gtoup
cat: /etc/gtoup: No such file or directory
maria06@maria076:~$ sudo deluser --remove-home Jerry
fatal: The user `Jerry' does not exist.
maria06@maria076:~$ sudo -r Scooby
usage: sudo -h | -K | -k | -V
usage: sudo -v [-ABkNnS] [-g group] [-h host] [-p prompt] [-u user]
usage: sudo -l [-ABkNnS] [-g group] [-h host] [-p prompt] [-U user]
[-u user] [command [arg ...]]
usage: sudo [-ABbEHKnPS] [-r role] [-t type] [-C num] [-D directory]
[-g group] [-h host] [-p prompt] [-R directory] [-T timeout]
[-u user] [VAR=value] [-i | -s] [command [arg ...]]
usage: sudo -e [-ABkNnS] [-r role] [-t type] [-C num] [-D directory]
[-g group] [-h host] [-p prompt] [-R directory] [-T timeout]
[-u user] file ...
maria06@maria076:~$ cat /etc/passwd
cat: /etc/passwd: No such file or directory

```

Task 5 – Create user Student; create files; set owner/group; identify file types

- task5_create_student.png

```

maria06@maria076:~$ sudo adduser student
[sudo] password for maria06:
Sorry, try again.
[sudo] password for maria06:
info: Adding user `student' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `student' (1009) ...
info: Adding new user `student' (1009) with group `student (1009)' ...
info: Creating home directory `/home/student' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for student
Enter the new value, or press ENTER for the default
  Full Name []: student 011
    Room Number []: 12
    Work Phone []: 0987
    Home Phone []: 6758494
      Other []: 000000
Is the information correct? [Y/n] y
info: Adding new user `student' to supplemental / extra groups `users' ...
info: Adding user `student' to group `users' ...

```

- task5_create_files.png

```

maria06@maria076:~$ su - Student
su: user Student does not exist or the user entry does not exist
maria06@maria076:~$ touch file1
maria06@maria076:~$ mkdir -p dir1
maria06@maria076:~$ touch dir1/file2
maria06@maria076:~$ ls -l
total 12
-rw-rw-r-- 1 maria06 maria06 103 Oct 17 06:23 answer.md
drwxrwxr-x 2 maria06 maria06 4096 Nov  7 14:18 dir1
-rw-rw-r-- 1 maria06 maria06   0 Nov  7 14:18 file1
drwxrwxr-x 3 maria06 maria06 4096 Oct 17 06:27 lab4

```

- task5_chown& chgrp_file1.png

```

maria06@maria076:~$ sudo chown tom file1
maria06@maria076:~$ ls -l file1
-rw-rw-r-- 1 tom maria06 0 Nov  7 14:18 file1
maria06@maria076:~$ sudo chgrp devops file1
maria06@maria076:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  7 14:18 file1

```

- task5_file_types.png

```

maria06@maria076:~$ ls -l
total 12
-rw-rw-r-- 1 maria06 maria06 103 Oct 17 06:23 answer.md
drwxrwxr-x 2 maria06 maria06 4096 Nov  7 14:18 dir1
-rw-rw-r-- 1 tom devops 0 Nov  7 14:18 file1
drwxrwxr-x 3 maria06 maria06 4096 Oct 17 06:27 lab4
maria06@maria076:~$ ls -l dir1
total 0
-rw-rw-r-- 1 maria06 maria06 0 Nov  7 14:18 file2
maria06@maria076:~$ ls -l /dev/null
crw-rw-rw- 1 root root 1, 3 Nov  7 11:36 /dev/null
maria06@maria076:~$ file file1 dir1 /dev/null
file1:      empty
dir1:       directory
/dev/null:  character special (1/3)

```

Task 6 – Change permissions using symbolic mode

- task6_su_student.png

```

maria06@maria076:~$ su - student
Password:

```

```

maria06@maria076:~$ cd ~
maria06@maria076:~$ ls -l file1
-rw-rw-r-- 1 maria06 maria06 0 Nov  7 15:09 file1

```

- task6_chmod_remove_rwx.png

```

maria06@maria076:~$ chmod -rwx file1
maria06@maria076:~$ ls -l file1
----- 1 maria06 maria06 0 Nov  7 15:09 file1

```

- task6_chmod_add_r.png

```
maria06@maria076:~$ chmod +r file1
maria06@maria076:~$ ls -l file1
-r--r--r-- 1 maria06 maria06 0 Nov  7 15:09 file1
```

- task6_chmod_u_plus_x.png

```
maria06@maria076:~$ chmod u+x file1
maria06@maria076:~$ ls -l file1
-r-xr--r-- 1 maria06 maria06 0 Nov  7 15:09 file1
maria06@maria076:~$
```

- task6_chmod_u_plus_w.png

```
maria06@maria076:~$ chmod ug+w file1
maria06@maria076:~$ ls -l file1
-rwxrw-r-- 1 maria06 maria06 0 Nov  7 15:09 file1
```

- task6_chmod_ugo_minus_rwx.png

```
maria06@maria076:~$ chmod ugo-rwx file1
maria06@maria076:~$ ls -l file1
----- 1 maria06 maria06 0 Nov  7 15:09 file1
```

Task 7 – Change permissions using “set” symbolic form (u= g= o=)

- task7_student_context.png

```
maria06@maria076:~$ su - student
Password:
```

- task7_chmod_set_all_rwx.png

```
maria06@maria076:~$ chmod u=rwx,g=rwx,o=rwx file1
maria06@maria076:~$ ls -l file1
-rwxrwxrwx 1 maria06 maria06 0 Nov  7 15:09 file1
```

- task7_remove_exec_go.png

```
maria06@maria076:~$ chmod g=rw,o=rw file1
maria06@maria076:~$ ls -l file1
-rwxrw-rw- 1 maria06 maria06 0 Nov  7 15:09 file1
```

- task7_remove_all_perms.png


```
maria06@maria076:~$ chmod u=g,o= file1
maria06@maria076:~$ ls -l file1
----- 1 maria06 maria06 0 Nov  7 15:09 file1
```

Task 8 – Change permissions using numeric (octal) mode

- task8_student_context.png

```
student@maria076:~$ su - student
Password:
student@maria076:~$ cd ~
student@maria076:~$ ls -l file1
-rw-rw-r-- 1 student student 0 Nov  8 05:30 file1
```

- task8_chmod_777.png

```
student@maria076:~$ chmod 777 file1
student@maria076:~$ ls -l file1
-rwxrwxrwx 1 student student 0 Nov  8 05:30 file1
```

- task8_chmod_700.png

```
student@maria076:~$ chmod 700 file1
student@maria076:~$ ls -l file1
-rwx----- 1 student student 0 Nov  8 05:30 file1
```

- task8_chmod_744.png

```
student@maria076:~$ chmod 744 file1
student@maria076:~$ ls -l file1
-rwxr--r-- 1 student student 0 Nov  8 05:30 file1
```

- task8_chmod_640.png

```
student@maria076:~$ chmod 640 file1
student@maria076:~$ ls -l file1
-rw-r----- 1 student student 0 Nov  8 05:30 file1
```

- task8_chmod_664.png

```
student@maria076:~$ chmod 664 file1
student@maria076:~$ ls -l file1
-rw-rw-r-- 1 student student 0 Nov  8 05:30 file1
```

- task8_chmod_775.png

```
student@maria076:~$ chmod 775 file1
student@maria076:~$ ls -l file1
-rwxrwxr-x 1 student student 0 Nov  8 05:30 file1
```

- task8_chmod_750.png

```
student@maria076:~$ chmod 750 file1
student@maria076:~$ ls -l file1
-rwxr-x--- 1 student student 0 Nov  8 05:30 file1
```

Task 9 – Practice pipes, pagers, grep, and redirects with /var/log/syslog

- task9_grep_less.png

```
2025-11-07T11:28:11.066951+00:00 maria076 apt.systemd.daily[28721]: pid = os.fork()
2025-11-07T11:28:11.910120+00:00 maria076 multipathd[27973]: sda: triggering change event to reinitialize
2025-11-07T11:28:11.946889+00:00 maria076 multipath: sda: failed to get sysfs uid: No such file or directory
2025-11-07T11:28:11.947064+00:00 maria076 multipath: sda: failed to get sgio uid: No such file or directory
2025-11-07T11:28:11.978273+00:00 maria076 multipathd[27973]: sda: failed to get sysfs uid: No such file or directory
2025-11-07T11:28:11.978382+00:00 maria076 multipathd[27973]: sda: failed to get sgio uid: No such file or directory
2025-11-07T11:28:11.978440+00:00 maria076 multipathd[27973]: sda: failed to get path uid
2025-11-07T11:28:11.978481+00:00 maria076 multipathd[27973]: uevent trigger error
2025-11-07T11:28:17.651731+00:00 maria076 apt.systemd.daily[28721]: /usr/bin/unattended-upgrade:567: DeprecationWarn
of fork() may lead to deadlocks in the child.
2025-11-07T11:28:17.652258+00:00 maria076 apt.systemd.daily[28721]: pid = os.fork()
2025-11-07T11:28:21.917952+00:00 maria076 multipathd[27973]: sda: not initialized after 3 udev retriggers
2025-11-07T11:28:22.922313+00:00 maria076 multipathd[27973]: sda: add missing path
2025-11-07T11:28:22.926576+00:00 maria076 multipathd[27973]: sda: failed to get sysfs uid: No such file or directory
```

- task9_grep_more.png

```
k (ConditionFileIsExecutable=/usr/bin/ovs-vsctl).
2025-11-07T11:27:55.709516+00:00 maria076 systemd[1]: logrotate.service: Deactivated successfully.
2025-11-07T11:27:55.711227+00:00 maria076 systemd[1]: Finished logrotate.service - Rotate log files.
2025-11-07T11:27:55.775277+00:00 maria076 fwupd[28455]: 11:27:55.774 FuMain fwupd 1.9.31 ready for requests (locale en_US.UTF-8)
2025-11-07T11:27:55.778158+00:00 maria076 dbus-daemon[768]: [system] Successfully activated service 'org.freedesktop.fwupd'
2025-11-07T11:27:55.779674+00:00 maria076 systemd[1]: Started fwupd.service - Firmware update daemon.
2025-11-07T11:27:55.869496+00:00 maria076 fwupdmgr[28352]: Updating lvfs
2025-11-07T11:27:55.887195+00:00 maria076 systemd[1]: fwupd-refresh.service: Main process exited, code=exited, status=1/FAILURE
2025-11-07T11:27:55.887677+00:00 maria076 systemd[1]: fwupd-refresh.service: Failed with result 'exit-code'.
2025-11-07T11:27:55.888304+00:00 maria076 systemd[1]: Failed to start fwupd-refresh.service - Refresh fwupd metadata and update motd.
2025-11-07T11:27:56.103209+00:00 maria076 kernel: e1000: ens33 NIC Link is Up 1000 Mbps Full
Duplex, Flow Control: None
2025-11-07T11:27:56.109036+00:00 maria076 systemd-networkd[28337]: ens33: Gained carrier
2025-11-07T11:27:57.176870+00:00 maria076 systemd-networkd[28337]: ens33: DHCPv4 address 192.168.153.130/24, gateway 192.168.153.2 acquired from
2025-11-07T11:27:57.187327+00:00 maria076 systemd-timesyncd[17729]: Network configuration changed, trying to establish connection.
--More--
```

- task9_grep_head.png

```

maria06@maria076:~$ sudo grep -E 'fail|error' /var/log/syslog | head
2025-11-07T11:28:01.951579+00:00 maria076 multipath: sda: failed to get sysfs uid: No such file or directory
2025-11-07T11:28:01.951927+00:00 maria076 multipath: sda: failed to get sgio uid: No such file or directory
2025-11-07T11:28:01.985298+00:00 maria076 multipathd[27973]: sda: failed to get udev uid: No data available
2025-11-07T11:28:01.985445+00:00 maria076 multipathd[27973]: sda: failed to get path uid
2025-11-07T11:28:01.985511+00:00 maria076 multipathd[27973]: uevent trigger error
2025-11-07T11:28:11.946889+00:00 maria076 multipath: sda: failed to get sysfs uid: No such file or directory
2025-11-07T11:28:11.947064+00:00 maria076 multipath: sda: failed to get sgio uid: No such file or directory
2025-11-07T11:28:11.978273+00:00 maria076 multipathd[27973]: sda: failed to get sysfs uid: No such file or directory
2025-11-07T11:28:11.978382+00:00 maria076 multipathd[27973]: sda: failed to get sgio uid: No such file or directory
2025-11-07T11:28:11.978440+00:00 maria076 multipathd[27973]: sda: failed to get path uid

```

- task9_redirect_overwrite.png

```

maria06@maria076:~$ sudo grep -i systemd /var/log/syslog > ~/syslog_systemd.txt

```

- task9_redirect_append.png

```

maria06@maria076:~$ sudo grep -i network /var/log/syslog >> ~/syslog_systemd.txt
maria06@maria076:~$ cat ~/syslog_systemd.txt
2025-11-07T11:27:55.659799+00:00 maria076 systemd[1]: netplan-ovs-cleanup.service - OpenVSwitch configuration for cleanup was skipped because of an unmet condition check (ConditionFileIsExecutable=/usr/bin/ovs-vsctl).
2025-11-07T11:27:55.709516+00:00 maria076 systemd[1]: logrotate.service: Deactivated successfully.
2025-11-07T11:27:55.712274+00:00 maria076 systemd[1]: Finished logrotate.service - Rotate log files.
2025-11-07T11:27:55.779674+00:00 maria076 systemd[1]: Started fwupd.service - Firmware update daemon.
2025-11-07T11:27:55.887195+00:00 maria076 systemd[1]: fwupd-refresh.service: Main process exited, code=exited, status=1/FAILURE
2025-11-07T11:27:55.887677+00:00 maria076 systemd[1]: fwupd-refresh.service: Failed with result 'exit-code'.
2025-11-07T11:27:55.888304+00:00 maria076 systemd[1]: Failed to start fwupd-refresh.service - Refresh fwupd metadata and update motd.
2025-11-07T11:27:56.109036+00:00 maria076 systemd-networkd[28337]: ens33: Gained carrier
2025-11-07T11:27:57.176870+00:00 maria076 systemd-networkd[28337]: ens33: DHCPv4 address 192.168.153.130/24, gateway 192.168.153.2 acquired from 192.168.153.254
2025-11-07T11:27:57.187327+00:00 maria076 systemd-timesyncd[17729]: Network configuration changed, trying to establish connection.
2025-11-07T11:27:57.388428+00:00 maria076 systemd-timesyncd[17729]: Contacted time server 185.125.190.56:123 (ntp.ubuntu.com).
2025-11-07T11:27:58.082636+00:00 maria076 systemd-networkd[28337]: ens33: Gained IPv6LL
2025-11-07T11:28:02.283499+00:00 maria076 apt.systemd.daily[28721]: /usr/bin/unattended-upgrade:567: DeprecationWarning: This process (pid=28721) is multi-threaded, use of fork() may lead to deadlocks in the child.
2025-11-07T11:28:02.284449+00:00 maria076 apt.systemd.daily[28721]: pid = os.fork()
2025-11-07T11:28:11.066683+00:00 maria076 apt.systemd.daily[28721]: /usr/bin/unattended-upgrade:567: DeprecationWarning: This process (pid=28721) is multi-threaded, use of fork() may lead to deadlocks in the child.
2025-11-07T11:28:11.066951+00:00 maria076 apt.systemd.daily[28721]: pid = os.fork()
2025-11-07T11:28:17.651731+00:00 maria076 apt.systemd.daily[28721]: /usr/bin/unattended-upgrade:567: DeprecationWarning: This process (pid=28721) is multi-threaded, use of fork() may lead to deadlocks in the child.
2025-11-07T11:28:17.652258+00:00 maria076 apt.systemd.daily[28721]: pid = os.fork()
2025-11-07T11:28:31.147521+00:00 maria076 apt.systemd.daily[28721]: /usr/bin/unattended-upgrade:567: DeprecationWarning: This process (pid=28721) is multi-threaded, use of fork() may lead to deadlocks in the child.

```

Task 10 – Script setup.sh – variables, command substitution, file/dir checks, permissions (use vim)

- task10_b1_vim.png

```

maria06@maria076:~$ vim
#!/bin/bash
~

```

- task10_b1_run.png

```

maria06@maria076:~$ chmod +x setup.sh
maria06@maria076:~$ ./setup.sh
maria06@maria076:~$ _

```

- task10_b2_vim.png

```
CA maria06@maria076: ~  
#!/bin/bash  
var1="hello from lab 6"  
echo "var1: $var1"  
~  
~
```

- task10_b2_run.png

```
maria06@maria076:~$ ./setup.sh  
var1: hello from lab 6  
maria06@maria076:~$
```

- task10_b3_vim.png

```
CA maria06@maria076: ~  
# Save ls -l to variable and display  
allFiles="$(ls -l)"  
echo "allFiles (ls -l):"  
echo "$allFiles"  
~
```

- task10_b3_run.png

```
maria06@maria076:~$ maria06@maria076:~$ ./setup.sh  
allFiles (ls -l):  
total 116  
-rw-rw-r-- 1 maria06 maria06 103 Oct 17 06:23 answer.md  
drwxrwxr-x 2 maria06 maria06 4096 Nov 7 14:18 dir1  
-rwxrwxrwx 1 maria06 maria06 0 Nov 7 15:09 file1  
drwxrwxr-x 3 maria06 maria06 4096 Oct 17 06:27 lab4  
-rwxrwxr-x 1 maria06 maria06 101 Nov 8 08:33 setup.sh  
-rw-rw-r-- 1 maria06 maria06 99620 Nov 8 06:34 syslog_systemd.txt
```

- task10_b4_vim.png

```
CA maria06@maria076: ~  
# Directory check  
if [ -d "dir1" ]; then  
    echo "Directory dir1 exists."  
else  
    echo "Directory dir1 does not exist. Creating..."  
    mkdir -p "dir1"  
    echo "Directory dir1 created."  
fi
```

- task10_b4_run.png

```
maria06@maria076:~$ maria06@maria076:~$ ./setup.sh  
Directory dir1 exists.  
maria06@maria076:~$
```

- task10_b5_vim.png

```

C:\V\ maria06@maria076: ~
# File check
if [ -f "dir1/file2" ]; then
    echo "file2 already exists."
else
    echo "file2 does not exist. Creating..."
    touch "dir1/file2"
    chmod a-rwx "dir1/file2"
    echo "file2 created."
fi

```

- task10_b5_run.png

```

maria06@maria076:~$ ./setup.sh
file2 already exists.

```

- task10_b6_vim.png

```

C:\V\ maria06@maria076: ~
Permission checks for dir1/file2 (user permissions)
f="dir1/file2"
if [ ! -r "$f" ]; then
    echo "Read permission missing; granting to user..."
    chmod u+r "$f"
fi
if [ ! -w "$f" ]; then
    echo "Write permission missing; granting to user..."
    chmod u+w "$f"
fi
if [ ! -x "$f" ]; then
    echo "Execute permission missing; granting to user..."
    chmod u+x "$f"
fi
echo "Final permissions for $f:"
ls -l "$f"

```

- task10_b6_run.png

```

maria06@maria076:~$ ./setup.sh
Execute permission missing; granting to user...
Final permissions for dir1/file2:
-rwxrw-r-- 1 maria06 maria06 0 Nov  7 14:18 dir1/file2
maria06@maria076:~$

```

Task 11 – Script setup.sh – argument comparisons (eq, ne, gt, lt, ge, le) and string checks

- task11_b0_vim.png

```
maria06@maria076: ~
```

```
#!/bin/bash
```

```
num=$1
```

```
str=$2
```

```
~
```

- task11_b0_run.png

```
@maria076:~$ maria06@maria076:~$ chmod +x setup.sh
```

```
@maria076:~$ ./setup.sh 10 Student
```

```
@maria076:~$
```

- task11_b1_vim.png

```
maria06@maria076: ~
```

```
if [ "$num" -eq 10 ]; then
```

```
    echo "$num is equal to 10 (-eq)."
```

```
else
```

```
    echo "$num is NOT equal to 10 (-eq)."
```

```
fi
```

```
~
```

- task11_b1_run.png

```
maria06@maria076:~$ ./setup.sh 10 Student
```

```
./setup.sh: line 1: [: : integer expression expected  
is NOT equal to 10 (-eq).
```

```
maria06@maria076:~$ ./setup.sh 7 Student
```

```
./setup.sh: line 1: [: : integer expression expected  
is NOT equal to 10 (-eq).
```

```
maria06@maria076:~$
```

- task11_b2_vim.png

```
maria06@maria076: ~
```

```
if [ "$num" -ne 10 ]; then
```

```
    echo "$num is not equal to 10 (-ne)."
```

```
else
```

```
    echo "$num is equal to 10 (-ne false)."
```

```
fi
```

```
~
```

- task11_b2_run.png

```
maria06@maria076:~$ ./setup.sh 7 Student
```

```
./setup.sh: line 1: [: : integer expression expected  
is equal to 10 (-ne false).
```

```
maria06@maria076:~$ ./setup.sh 10 Student
```

```
./setup.sh: line 1: [: : integer expression expected  
is equal to 10 (-ne false).
```

```
maria06@maria076:~$
```

- task11_b3_vim.png

```
maria06@maria076: ~  
if [ "$num" -gt 10 ]; then  
    echo "$num is greater than 10 (-gt)."  
else  
    echo "$num is NOT greater than 10 (-gt)."  
fi
```

- task11_b3_run.png

```
maria06@maria076:~$ ./setup.sh 12 Student  
./setup.sh: line 1: [: : integer expression expected  
is NOT greater than 10 (-gt).  
maria06@maria076:~$ ./setup.sh 9 Student  
./setup.sh: line 1: [: : integer expression expected  
is NOT greater than 10 (-gt).  
maria06@maria076:~$
```

- task11_b4_vim.png

```
maria06@maria076: ~  
if [ "$num" -lt 10 ]; then  
    echo "$num is less than 10 (-lt)."  
else  
    echo "$num is NOT less than 10 (-lt)."  
fi
```

- task11_b4_run.png

```
maria06@maria076:~$ ./setup.sh 5 Student  
./setup.sh: line 1: [: : integer expression expected  
is NOT less than 10 (-lt).  
maria06@maria076:~$ ./setup.sh 11 Student  
./setup.sh: line 1: [: : integer expression expected  
is NOT less than 10 (-lt).  
maria06@maria076:~$
```

- task11_b5_vim.png

```
maria06@maria076: ~  
if [ "$num" -ge 10 ]; then  
    echo "$num is greater than or equal to 10 (-ge)."  
else  
    echo "$num is NOT greater than or equal to 10 (-ge)."  
fi
```

- task11_b5_run.png

```
maria06@maria076:~$ ./setup.sh 10 Student
./setup.sh: line 1: [: : integer expression expected
is NOT greater than or equal to 10 (-ge).
maria06@maria076:~$ ./setup.sh 8 Student
./setup.sh: line 1: [: : integer expression expected
is NOT greater than or equal to 10 (-ge).
maria06@maria076:~$
```

- task11_b6_vim.png

```
#!/bin/bash
num=$1
str=$2
if [ "$num" -le 10 ]; then
    echo "$num is less than or equal to 10 (-le)."
```

- task11_b7_vim.png

```
#!/bin/bash
num=$1
str=$2
if [ "$str" = "Student" ]; then
    echo "Second argument equals 'Student' ( = )."
```

- task11_b8_vim.png

```
#!/bin/bash
num=$1
str=$2
if [ "$str" != "Student" ]; then
    echo "Second argument is not equal to 'Student' ( != )."
```

- task11_b8_run.png

```
# saru@saru050:~$ ./setup.sh 10 Test
ent is not equal to 'Student' ( != ).
~$ ./setup.sh 10 Student
ent equals 'Student' ( != false).
```


- task11_b9_vim.png

```
#!/bin/bash
num=$1
str=$2
if [ -z "$str" ]; then
    echo "Second argument is empty (zero-length)."
else
    echo "Second argument is not empty."
fi
```

- task11_b9_run.png

```
vim: setopt sh
./setup.sh 10 Student
is not empty.
./setup.sh 10
is empty (zero-length).
```

Task 12 – Script setup.sh – print all arguments with a for loop

- task12_b2_vim.png

```
## Script to demonstrate printing all user-entered arguments
# Print all arguments using $*
echo "Printing all arguments using \${*}:"
for arg in $*; do
    echo "Argument: $arg"
done
```

- task12_b2_run.png

```
Printing all arguments using ${*}:
Argument: one
Argument: two
Argument: words
Argument: three
```

Task 13 – Script setup.sh – while loop summation and functions

- task13_b1_vim.png

```
#!/bin/bash
```

- task13_b1_run.png

```
~$ ./setup.sh
~$ _
```

- task13_b2_vim.png

```
# While-loop summation (interactive)
sum=0
while true; do
  read -p "Enter a number (or 'q' to quit): " input
  if [ "$input" = "q" ]; then
    break
  fi

  sum=$((sum + input))
  echo "Total Score: $sum"
done
echo "Final total: $sum"
```

- task13_b2_run.png

```
Enter a number (or 'q' to quit): 5
Total Score: 5
Enter a number (or 'q' to quit): 7
Total Score: 12
Enter a number (or 'q' to quit): q
Final total: 12
```

- task13_b3_vim.png

```
# Function to accumulate scores interactively
sum_two() {
  sum=0
  while true; do
    read -p "Enter a number (or 'q' to quit): " input
    if [ "$input" = "q" ]; then
      break
    fi

    sum=$((sum + input))
    echo "Total Score: $sum"
  done
  echo "Function final total: $sum"
}

# Demonstrate the function
echo "Now calling sum_two function:"
sum_two
```

- task13_b3_run.png

```

Now calling sum_two function:
Enter a number (or 'q' to quit): 3
Total Score: 3
Enter a number (or 'q' to quit): 4
Total Score: 7
Enter a number (or 'q' to quit): q
Function final total: 7

```

- task13_b4_vim.png

```

# function that sums two arguments and returns the result
sum_args() {
    a=$1
    b=$2
    return=$((a + b))
}

# Demonstrate sum_args function
echo "Now demonstrating sum_args function:"
sum_args 3 4
result=$?
echo "sum_args(3,4) returned: $result"

```

- task13_b4_run.png

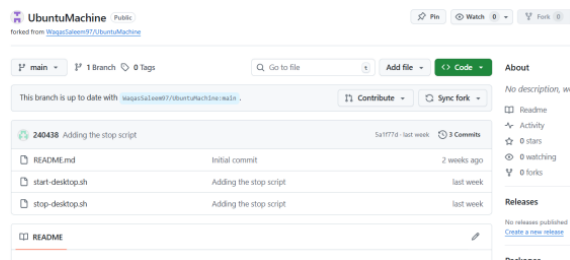
```

Now demonstrating sum_args function:
sum_args(3,4) returned: 7

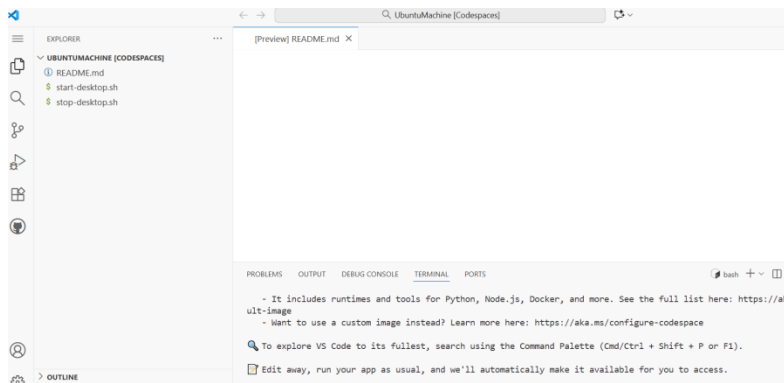
```

Task 14 – Codespaces GUI — fork repo, run start-desktop.sh, open VNC, stop GUI

- task14_fork.png



- task14_codespace_launch.png



- task14_start_script_ls.png

```
-rwxrwxrwx 1 codespace root 1333 Nov  6 09:36 start-desktop.sh
-rwxrwxrwx 1 codespace root  428 Nov  6 09:36 stop-desktop.sh
```

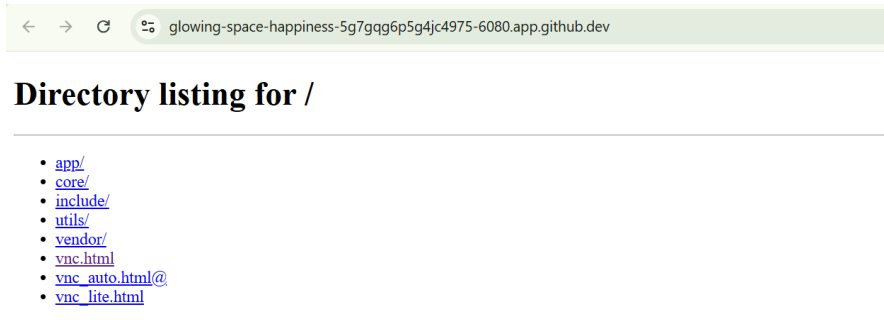
- task14_start_run.png

```
79 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
xfce4 is already the newest version (4.18).
xfce4-goodies is already the newest version (4.18.2build1).
x11vnc is already the newest version (0.9.16-10).
xvfb is already the newest version (2:21.1.12-1ubuntu1.5).
novnc is already the newest version (1:1.3.0-2).
websockify is already the newest version (0.10.0+dfsg1-5build2).
dbus-x11 is already the newest version (1.14.10-4ubuntu4.1).
x11-xserver-utils is already the newest version (7.7+10build2).
0 upgraded, 0 newly installed, 0 to remove and 79 not upgraded.
[✓] XFCE desktop environment is running!
🌐 Access it via the Codespaces HTTPS port (6080)
```

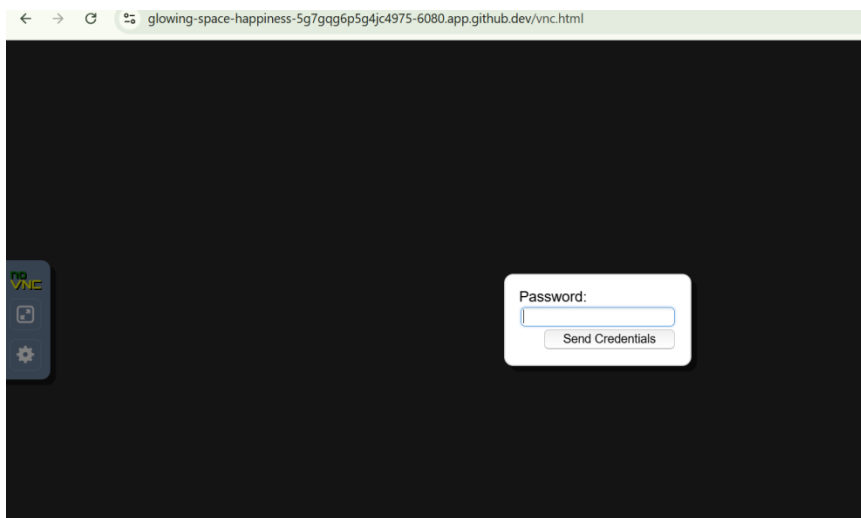
- task14_ports_view.png

Port	Forwarded Address	Running Process	Visibility	Origin
5900	https://glowing-spa...	x11vnc -display :1 -rfbauth /home/codespac...	🌐 Public	Auto Forwarded
5901	https://glowing-spa...	x11vnc -display :1 -rfbauth /home/codespac...	🔒 Private	Auto Forwarded
6080	https://glowing-spa...	/usr/bin/python3 /usr/bin/websockify --web...	🔒 Private	Auto Forwarded
Add Port				

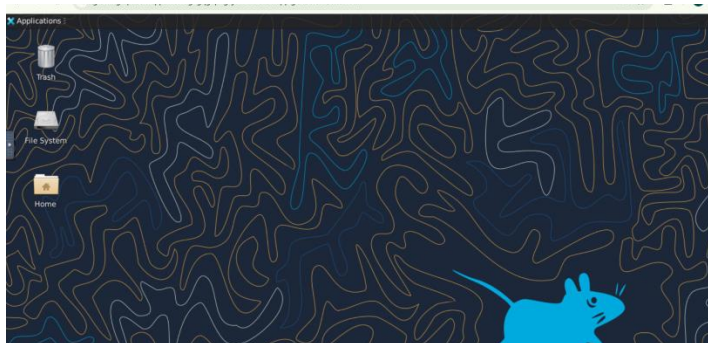
- task14_vnc_url.png



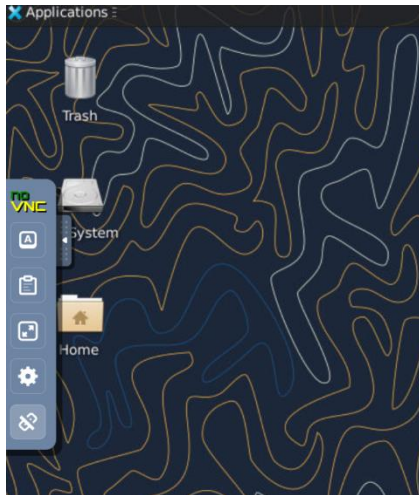
- task14_vnc_password_prompt.png



- task14_vnc_desktop.png



- task14_vnc_connect.png



- task14_stop_run.png

```
[*] Stopping noVNC server...  
  
Terminating WebSockets proxy (21483)  
[*] Stopping x11vnc server...  
In exit  
Terminating child 23304  
Process Process-34:  
caught signal: 15  
[*] Stopping XFCE desktop session...
```