



Fatima Jinnah Women University

Opening Portals of Excellence Through Higher Education

CLOUD COMPUTING LAB 6

Linux Users, Groups, Permissions, Pipes, and Bash Scripting

Submitted to: Engr. Waqas Saleem

Engr. Muhammad Shahzad

Submitted by: Maham Saleem

Registration no.: 2023-BSE-035

Task 1: Create Private GitHub Repository

task1_set_root_password.png

```
maham123@maham123:~$ sudo passwd root
[sudo] password for maham123:
Sorry, try again.
[sudo] password for maham123:
New password:
Retype new password:
passwd: password updated successfully
maham123@maham123:~$ _
```

task1_su_root.png

```
maham123@maham123:~$ su -
Password:
root@maham123:~# whoami
root
root@maham123:~# id
uid=0(root) gid=0(root) groups=0(root)
root@maham123:~# _
```

task1_exit_to_user.png

```
uid=0(root) gid=0(root) groups=0(root)
root@maham123:~# exit
logout
maham123@maham123:~$ whoami
maham123
maham123@maham123:~$ _
```

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

task2_adduser_tom.png

```
maham123@maham123:~$ 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 []:
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []:
Is the information correct? [Y/n] y
info: Adding new user `tom' to supplemental / extra groups `users' ...
info: Adding user `tom' to group `users' ...
maham123@maham123:~$
```

task2_verify_passwd.png

```
sshd:x:109:65534:/:run/sshd:/usr/sbin/nologin
maham123:x:1000:1000:Maham:/home/maham123:/bin/bash
rtkit:x:110:110:RealtimeKit,,,:/proc:/usr/sbin/nologin
dnsmasq:x:999:65534:dnsmasq:/var/lib/misc:/usr/sbin/nologin
lightdm:x:111:112:Light Display Manager:/var/lib/lightdm:/bin/false
whoopsie:x:112:114:/:nonexistent:/bin/false
avahi:x:113:118:Avahi mDNS daemon,,,:/run/avahi-daemon:/usr/sbin/nologin
saned:x:114:119:/:var/lib/saned:/usr/sbin/nologin
colord:x:115:120:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
cups-pk-helper:x:116:121:user for cups-pk-helper service,,,:/nonexistent:/usr/sbin/nologin
pulse:x:117:122:PulseAudio daemon,,,:/run/pulse:/usr/sbin/nologin
cups-browsed:x:118:121:/:nonexistent:/usr/sbin/nologin
xrdp:x:119:124:/:run/xrdp:/usr/sbin/nologin
_flatpak:x:120:125:Flatpak system-wide installation helper,,,:/nonexistent:/usr/sbin/nologin
tom:x:1001:1001:,,,:/home/tom:/bin/bash
maham123@maham123:~$
maham123@maham123:~$
```

task2_verify_group.png

```
netdev:x:115:  
bluetooth:x:116:  
scanner:x:117:saned  
avahi:x:118:  
saned:x:119:  
colord:x:120:  
lpadmin:x:121:  
pulse:x:122:  
pulse-access:x:123:  
xrdp:x:124:  
_flatpak:x:125:  
tom:x:1001:  
maham123@maham123:~$
```

task2_verify_shadow.png

```
sshd:!:20364::::::  
maham123:$6$cYqPuG9CJIxXkPYq$xYB0QsPFPaQpWqqNE7oBjlgEEETJKRNpiA6Kvv0Yqj04whhCZJkEHMSyxG70Bji  
rtkit:!:20385::::::  
dnsmasq:!:20385::::::  
lightdm:!:20385::::::  
whoopsie:!:20385::::::  
avahi:!:20385::::::  
saned:!:20385::::::  
colord:!:20385::::::  
cups-pk-helper:!:20385::::::  
pulse:!:20385::::::  
cups-browsed:!:20385::::::  
xrdp:!:20385::::::  
_flatpak:!:20392::::::  
tom:$y$j9T$iYkd2g.C65mcXtVev1aCq0$pJ7tPhpsfD71qWlVgSllWfnIPuIRrzCmaEwon/FUzm9:20395:0:99999:  
maham123@maham123:~$
```

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

task3_groupadd.png

```
scanner:x:117:saned  
avahi:x:118:  
saned:x:119:  
colord:x:120:  
lpadmin:x:121:  
pulse:x:122:  
pulse-access:x:123:  
xrdp:x:124:  
_flatpak:x:125:  
tom:x:1001:  
developer:x:1002:  
devops:x:1003:  
designer:x:1004:  
maham123@maham123:~$
```

task3_change_primary_group.png

```
maham123@maham123:~$ sudo usermod -g designer tom

maham123@maham123:~$ sudo usermod -g designer tom

usermod: no changes
maham123@maham123:~$ id tom
uid=1001(tom) gid=1004(designer) groups=1004(designer),100(users)
maham123@maham123:~$
maham123@maham123:~$
```

task3_add_secondary_groups.png

```
maham123@maham123:~$ sudo usermod -aG developer,devops tom

maham123@maham123:~$ id tom
uid=1001(tom) gid=1004(designer) groups=1004(designer),100(users),1002(developer),1003(devops)
maham123@maham123:~$ groups tom
tom : designer users developer devops
maham123@maham123:~$
```

task3_reset_secondary_groups.png

```
maham123@maham123:~$ sudo usermod -G tom tom

maham123@maham123:~$ id tom
uid=1001(tom) gid=1004(designer) groups=1004(designer),1001(tom)
maham123@maham123:~$ groups tom
tom : designer tom
maham123@maham123:~$
```

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

task4_add_users.png

```
tom : designer tom
maham123@maham123:~$ sudo adduser Jerry
[sudo] password for maham123:
err: Please enter a username matching the regular expression
      configured via the NAME_REGEX configuration variable. Use the
      '--allow-bad-names' option to relax this check or reconfigure
      NAME_REGEX in configuration.
maham123@maham123:~$ sudo useradd Scooby
maham123@maham123:~$
```

task4_scooby_su_auth_failure.png

```
maham123@maham123:~$ su - Scooby
Password:
mahsu: Authentication failure
maham123@maham123:~$
```

task4_set_password_scooby.png

```
maham123@maham123:~$ sudo passwd Scooby

New password:
Retype new password:
passwd: password updated successfully
maham123@maham123:~$
```

task4_scooby_su_no_home.png

```
passwd: password updated successfully
maham123@maham123:~$ su - Scooby

Password:
su: Authentication failure
maham123@maham123:~$
```

task4_scooby_no_home.png

```
caps-browser:x:118:121:./nonexistent:/usr/sbin/nologin
xrdp:x:119:124:./run/xrdp:/usr/sbin/nologin
_flatpak:x:120:125:Flatpak system-wide installation helper,,,:/nonexistent:/usr/sbin/nologin
tom:x:1001:1004:,,,:/home/tom:/bin/bash
Scooby:x:1002:1005:./home/Scooby:/bin/sh
maham123@maham123:~$ ls -ld /home/Scooby
ls: cannot access '/home/Scooby': No such file or directory
maham123@maham123:~$
```

task4_scooby_create_home.png

```
ls: cannot access '/home/Scooby': No such file or directory
maham123@maham123:~$ sudo mkdir -p /home/Scooby
[sudo] password for maham123:
maham123@maham123:~$ sudo chown Scooby:Scooby /home/Scooby
maham123@maham123:~$ sudo chmod 750 /home/Scooby
maham123@maham123:~$ ls -ld /home/Scooby
drwxr-x--- 2 Scooby Scooby 4096 Nov  3 18:31 /home/Scooby
maham123@maham123:~$
```


task4_scooby_login_success.png

```
maham123@maham123:~$ su - Scooby
Password:
$ pwd
/home/Scooby
$ ls -la
total 12
drwxr-x--- 3 Scooby Scooby 4096 Nov  3 18:34 .
drwxr-xr-x 5 root   root   4096 Nov  3 18:31 ..
drwx----- 2 Scooby Scooby 4096 Nov  3 18:34 .cache
$ ^[S
```

task4_verify_users.png

```
saned:x:114:119:/:var/lib/saned:/usr/sbin/nologin
colord:x:115:120:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
cups-pk-helper:x:116:121:user for cups-pk-helper service,,,:/nonexistent:/usr/sbin/nologin
pulse:x:117:122:PulseAudio daemon,,,:/run/pulse:/usr/sbin/nologin
cups-browsed:x:118:121:/:/nonexistent:/usr/sbin/nologin
xrdp:x:119:124:/:run/xrdp:/usr/sbin/nologin
_flatpak:x:120:125:Flatpak system-wide installation helper,,,:/nonexistent:/usr/sbin/nologin
tom:x:1001:1004:,,,:/home/tom:/bin/bash
Scooby:x:1002:1005:/:home/Scooby:/bin/sh
maham123@maham123:~$
```

task4_shell_switching.png

```
tom:x:1001:1004:,,,:/home/tom:/bin/bash
Scooby:x:1002:1005:/:home/Scooby:/bin/sh
maham123@maham123:~$ sudo usermod -s /bin/bash Scooby
maham123@maham123:~$ su - Scooby
Password:
Scooby@maham123:~$
```

task4_add_groups.png

```
Command not found
maham123@maham123:~$ sudo addgroup jolly
info: Selecting GID from range 1000 to 59999 ...
info: Adding group `jolly' (GID 1006) ...
maham123@maham123:~$ sudo groupadd anime
maham123@maham123:~$
```

task4_verify_groups.png

```
_flatpak:x:125:  
tom:x:1001:tom  
developer:x:1002:  
devops:x:1003:  
designer:x:1004:  
Scooby:x:1005:  
jolly:x:1006:  
anime:x:1007:  
maham123@maham123:~$  
maham123@maham123:~$
```

task4_delete_groups.png

```
pulse:x:122:  
pulse-access:x:123:  
xrdp:x:124:  
_flatpak:x:125:  
tom:x:1001:tom  
developer:x:1002:  
devops:x:1003:  
designer:x:1004:  
Scooby:x:1005:  
maham123@maham123:~$
```

task4_delete_users.png

```
saned:x:114:119:/:var/lib/saned:/usr/sbin/nologin  
colord:x:115:120:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin  
cups-pk-helper:x:116:121:user for cups-pk-helper service,,,:/nonexistent:/usr/sbin/nologin  
pulse:x:117:122:PulseAudio daemon,,,:/run/pulse:/usr/sbin/nologin  
cups-browsed:x:118:121:/:nonexistent:/usr/sbin/nologin  
xrdp:x:119:124:/:run/xrdp:/usr/sbin/nologin  
_flatpak:x:120:125:Flatpak system-wide installation helper,,,:/nonexistent:/usr/sbin/nologin  
tom:x:1001:1004:,,,:/home/tom:/bin/bash  
maham123@maham123:~$
```

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

task5_create_student.png

```
..._group in configuration.  
maham123@maham123:~$ sudo adduser student  
  
info: Adding user `student' ...  
info: Selecting UID/GID from range 1000 to 59999 ...  
info: Adding new group `student' (1005) ...  
info: Adding new user `student' (1005) with group `student (1005)' ...  
info: Creating home directory `/home/student' ...  
info: Copying files from `/etc/skel' ...  
New password:  
Retype new password:  
No password has been supplied.  
New password:
```


task5_create_files.png

```
maham123@maham123:~$ su - student
Password:
su: Authentication failure
maham123@maham123:~$ touch file1
maham123@maham123:~$ mkdir -p dir1
maham123@maham123:~$ touch dir1/file2
maham123@maham123:~$ ls -l
total 52
-rw-rw-r-- 1 maham123 maham123 488 Oct 24 08:50 apt_update_vs_upgrade.md
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Desktop
drwxrwxr-x 2 maham123 maham123 4096 Nov  3 18:58 dir1
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Documents
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Downloads
-rw-rw-r-- 1 maham123 maham123  0 Nov  3 18:58 file1
drwxrwxr-x 2 maham123 maham123 4096 Nov  1 12:32 Lab5
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Music
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Pictures
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Public
drwx----- 3 maham123 maham123 4096 Oct 24 08:55 snap
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Templates
drwxrwxr-t 2 maham123 maham123 4096 Oct 24 09:15 thinclient_drives
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Videos
maham123@maham123:~$
```

task5_chown_file1.png

```
maham123@maham123:~$ sudo chown tom file1
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom maham123 0 Nov  3 18:58 file1
maham123@maham123:~$
```

task5_chgrp_file1.png

```
maham123@maham123:~$ sudo chgrp devops file1
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$
```

task5_file_types.png

```

maham123@maham123:~$ ls -l
total 52
-rw-rw-r-- 1 maham123 maham123 488 Oct 24 08:50 apt_update_vs_upgrade.md
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Desktop
drwxrwxr-x 2 maham123 maham123 4096 Nov  3 18:58 dir1
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Documents
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Downloads
-rw-rw-r-- 1 tom      devops    0 Nov  3 18:58 file1
drwxrwxr-x 2 maham123 maham123 4096 Nov  1 12:32 Lab5
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Music
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Pictures
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Public
drwx----- 3 maham123 maham123 4096 Oct 24 08:55 snap
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Templates
drwxrwxr-t 2 maham123 maham123 4096 Oct 24 09:15 thinclient_drives
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Videos
maham123@maham123:~$ ls -l dir1
total 0
-rw-rw-r-- 1 maham123 maham123 0 Nov  3 18:58 file2
maham123@maham123:~$ ls -l /dev/null
crw-rw-rw- 1 root root 1, 3 Nov  3 09:53 /dev/null
maham123@maham123:~$ file file1 dir1 /dev/null
file1:      empty
dir1:       directory
/dev/null:  character special (1/3)
maham123@maham123:~$ _
```

task5_exit_student.png

```

*** System restart required ***
maham123@maham123:~$ _
```

Task 6 – Change permissions using symbolic mode

task6_su_student.png

```

maham123@maham123:~$ su - student
Password:
su: Authentication failure
maham123@maham123:~$ cd ~
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ _
```

task6_chmod_remove_rwx.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod -rwx file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$
```

task6_chmod_add_r.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod +r file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$
```

task6_chmod_u_plus_x.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod u+x file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ _
```

task6_chmod_ug_plus_w.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod ug+w file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ _
```

task6_chmod_ugo_minus_rwx.png

```

maham123@maham123:~$ chmod ugo-rwx file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$
```

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

task7_student_context.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ su - student
Password:
su: Authentication failure
maham123@maham123:~$ cd ~
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$
```

task7_chmod_set_all_rwx.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod u=rwx,g=rwx,o=rwx file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ _
```

task7_remove_exec_go.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod g=rw,o=rw file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ _
```

task7_remove_all_perms.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod u=,g=,o= file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$
```

Task 8 – Change permissions using numeric (octal) mode

task8_student_context.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ su - student
Password:
su: Authentication failure
maham123@maham123:~$ cd ~
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$
```

task8_chmod_777.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod 777 file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$
```

task8_chmod_700.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod 700 file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
```

task8_chmod_744.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod 744 file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
```

task8_chmod_640.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod 640 file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
```

task8_chmod_664.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod 664 file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
```

task8_chmod_775.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
maham123@maham123:~$ chmod 775 file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
```


ask8_chmod_750.png

```
-rw-rw-r-- 1 tom devops 0 Nov  3 18:50 file1
maham123@maham123:~$ chmod 750 file1
chmod: changing permissions of 'file1': Operation not permitted
maham123@maham123:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  3 18:58 file1
```

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

task9_grep_less.png

```
02:01.0': not supported by any plugin
2025-10-31T18:10:02.839937+00:00 maham123 systemd[1]: dmesg.service: Deactivated successfully.
2025-10-31T18:10:03.541010+00:00 maham123 xrdp[1419]: [INFO ] starting xrdp with pid 1419
2025-10-31T18:10:03.541900+00:00 maham123 xrdp[1419]: [INFO ] address [0.0.0.0] port [3389] m
2025-10-31T18:10:03.543300+00:00 maham123 xrdp[1419]: [INFO ] listening to port 3389 on 0.0.0.
2025-10-31T18:10:03.545040+00:00 maham123 xrdp[1419]: [INFO ] xrdp_listen_pp done
2025-10-31T18:10:04.996430+00:00 maham123 multipathd[478]: sda: triggering change event to rei
2025-10-31T18:10:05.047287+00:00 maham123 multipath: sda: failed to get sysfs uid: No such fil
2025-10-31T18:10:05.047491+00:00 maham123 multipath: sda: failed to get sgio uid: No such file
maham123@maham123:~$
```

task9_grep_more.png

```
2025-10-31T18:10:02.596099+00:00 maham123 systemd[1]: Starting systemd-update-utmp-runlevel.service: De
2025-10-31T18:10:02.596257+00:00 maham123 systemd[1]: Finished systemd-update-utmp-runlevel.se
2025-10-31T18:10:02.598509+00:00 maham123 systemd[1]: Startup finished in 5.328s (kernel) + 8.
2025-10-31T18:10:02.829106+00:00 maham123 ModemManager[1196]: <msg> [base-manager] couldn't ch
02:01.0': not supported by any plugin
2025-10-31T18:10:02.839937+00:00 maham123 systemd[1]: dmesg.service: Deactivated successfully.
2025-10-31T18:10:03.541010+00:00 maham123 xrdp[1419]: [INFO ] starting xrdp with pid 1419
2025-10-31T18:10:03.541900+00:00 maham123 xrdp[1419]: [INFO ] address [0.0.0.0] port [3389] m
2025-10-31T18:10:03.543300+00:00 maham123 xrdp[1419]: [INFO ] listening to port 3389 on 0.0.0.
2025-10-31T18:10:03.545040+00:00 maham123 xrdp[1419]: [INFO ] xrdp_listen_pp done
2025-10-31T18:10:04.996430+00:00 maham123 multipathd[478]: sda: triggering change event to rei
2025-10-31T18:10:05.047287+00:00 maham123 multipath: sda: failed to get sysfs uid: No such fil
2025-10-31T18:10:05.047491+00:00 maham123 multipath: sda: failed to get sgio uid: No such file
--More--
```

task9_grep_head.png

```
2025-10-31T18:10:05.067091+00:00 maham123 multipathd[478]: sda: failed to get udev uid: No dat
2025-10-31T18:10:05.067216+00:00 maham123 multipathd[478]: sda: failed to get path uid
2025-10-31T18:10:05.067229+00:00 maham123 multipathd[478]: uevent trigger error
2025-10-31T18:10:15.081083+00:00 maham123 multipath: sda: failed to get sysfs uid: No such fil
2025-10-31T18:10:15.081164+00:00 maham123 multipath: sda: failed to get sgio uid: No such file
2025-10-31T18:10:15.096259+00:00 maham123 multipathd[478]: sda: failed to get udev uid: No dat
2025-10-31T18:10:15.096301+00:00 maham123 multipathd[478]: sda: failed to get path uid
2025-10-31T18:10:15.096313+00:00 maham123 multipathd[478]: uevent trigger error
maham123@maham123:~$
```

task9_redirect_overwrite.png

```
2025-10-31T18:10:15.096313+00:00 maham123 multipathd[478]: uevent trigger error
maham123@maham123:~$ sudo grep -i systemd /var/log/syslog > ~/syslog_systemd.txt
maham123@maham123:~$
```


task9_redirect_append.png

```
2025-11-03T18:21:40.378575+00:00 maham123 systemd-timesyncd[677]: Network configuration change
2025-11-03T18:21:40.382896+00:00 maham123 systemd-networkd[652]: ens33: DHCPv4 address 192.168
2025-11-03T18:21:40.384764+00:00 maham123 systemd-timesyncd[677]: Network configuration change
2025-11-03T18:28:48.145817+00:00 maham123 systemd[1541]: Closed dirmngr.socket - GnuPG network
2025-11-03T18:29:02.846181+00:00 maham123 systemd[9389]: Listening on dirmngr.socket - GnuPG r
2025-11-03T18:36:40.299491+00:00 maham123 systemd-timesyncd[677]: Network configuration change
2025-11-03T18:51:39.863220+00:00 maham123 systemd-timesyncd[677]: Network configuration change
2025-11-03T19:04:19.828865+00:00 maham123 systemd[9389]: Closed dirmngr.socket - GnuPG network
2025-11-03T19:04:24.416126+00:00 maham123 systemd[9732]: Listening on dirmngr.socket - GnuPG r
2025-11-03T19:06:40.021334+00:00 maham123 systemd-timesyncd[677]: Network configuration change
2025-11-04T09:30:47.623518+00:00 maham123 NetworkManager[1153]: <info> [1762248647.6219] audi
on="Already awake"
2025-11-04T09:32:51.090699+00:00 maham123 systemd-timesyncd[677]: Network configuration change
maham123@maham123:~$
```

task9_journalctl_alternative.png

```
Oct 03 06:37:41 maham123 kernel: Incomplete global flushes, disabling FCID
Oct 03 06:37:41 maham123 kernel: RAMDISK: [mem 0x2f5b9000-0x33ad3fff]
Oct 03 06:37:41 maham123 kernel: ACPI: Early table checksum verification disabled
Oct 03 06:37:41 maham123 kernel: ACPI: RSDP 0x000000000000F6A00 000024 (v02 PTLTD )
Oct 03 06:37:41 maham123 kernel: ACPI: XSDT 0x0000000007FEE965B 00005C (v01 INTEL 440BX 060
Oct 03 06:37:41 maham123 kernel: ACPI: FACP 0x0000000007FEFEE73 0000F4 (v04 INTEL 440BX 060
Oct 03 06:37:41 maham123 kernel: ACPI: DSDT 0x0000000007FEEAD55 01411E (v01 PTLTD Custom 060
Oct 03 06:37:41 maham123 kernel: ACPI: FACS 0x0000000007FEFFFC0 000040
maham123@maham123:~$ sudo journalctl -u systemd | grep -i error > ~/journal_errors.txt
maham123@maham123:~$
maham123@maham123:~$
```

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

task10_b1_run.png

```
"setup.sh" [New] 0L, 0B written
maham123@maham123:~$ chmod +x setup.sh
maham123@maham123:~$ ./setup.sh
maham123@maham123:~$
```

task10_b1_vim.png

```
E486: Pattern not found: bin
```

task10_b2_vim.png

```
# Define and show var1  
  
var1="Hello from Lab 6  
echo "var1: $var1"
```

task10_b2_run.png

```
"setup.sh" 7L, 69B written  
maham123@maham123:~$ ./setup.sh  
var1: Hello from Lab 6  
maham123@maham123:~$
```

task10_b3_run.png

```
"setup.sh" 12L, 128B written  
maham123@maham123:~$ ./setup.sh  
allFiles (ls -l):  
total 224  
-rw-rw-r-- 1 maham123 maham123 488 Oct 24 08:50 apt_update_vs_upgrade.md  
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Desktop  
drwxrwxr-x 2 maham123 maham123 4096 Nov 3 18:58 dir1  
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Documents  
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Downloads  
-rw-rw-r-- 1 tom devops 0 Nov 3 18:58 file1  
-rw-rw-r-- 1 maham123 maham123 0 Nov 4 09:49 journal_errors.txt  
drwxrwxr-x 2 maham123 maham123 4096 Nov 1 12:32 Lab5  
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Music  
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Pictures  
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Public  
-rwxrwxr-x 1 maham123 maham123 128 Nov 4 10:10 setup.sh  
drwx----- 3 maham123 maham123 4096 Oct 24 08:55 snap  
-rw-rw-r-- 1 maham123 maham123 171455 Nov 4 09:47 syslog_systemd.txt  
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Templates  
drwxrwxr-t 2 maham123 maham123 4096 Oct 24 09:15 thinclient_drives  
drwxr-xr-x 2 maham123 maham123 4096 Oct 24 09:15 Videos  
maham123@maham123:~$  
maham123@maham123:~$
```

task10_b3_vim.png

```
# Save ls -l to variable and display
allFiles="$(ls -l)"
echo "allFiles (ls -l):"
echo "$allFiles"
```

task10_b4_vim.png

```
#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

```
"setup.sh" 17L, 210B written
maham123@maham123:~$ ./setup.sh
Directory dir1 exists.
maham123@maham123:~$
```

task10_b5_vim.png

```
# 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

```
"setup.sh" 17L, 224B written
maham123@maham123:~$ ./setup.sh

file2 already exists.
maham123@maham123:~$
maham123@maham123:~$ _
```

task10_b6_vim.png

```
# 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 "$1" ]; then
    echo "Execute permission missing; granting to user..."
    chmod u+x "$1"
fi

echo "Final permissions for $1:"
ls -l "$1"
```

ask10_b6_run.png

```
"setup.sh" 35L, 515B written
maham123@maham123:~$ ./setup.sh
Execute permission missing; granting to user...
Final permissions for dir1/file2:
-rwxrw-r-- 1 maham123 maham123 0 Nov  3 18:58 dir1/file2
maham123@maham123:~$
maham123@maham123:~$
```

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

task11_b0_vim.png

```
#!/bin/bash
num=$1
str=$2
_
```

task11_b0_run.png

```
"setup.sh" 21L, 44B written
maham123@maham123:~$ hmod +x setup.sh
Command 'hmod' not found, did you mean:
  command 'mod' from deb monodoc-base (6.8.0.105+dfsg-3.2)
  command 'jmod' from deb openjdk-17-jdk-headless (17.0.16+8~us1-0ubuntu1~24.04.1)
  command 'jmod' from deb openjdk-21-jdk-headless (21.0.8+9~us1-0ubuntu1~24.04.1)
  command 'jmod' from deb openjdk-18-jdk-headless (18.0.2+9-2~22.04)
  command 'jmod' from deb openjdk-19-jdk-headless (19.0.2+7-0ubuntu3~22.04)
  command 'jmod' from deb openjdk-11-jdk-headless (11.0.28+6-1ubuntu1~24.04.1)
  command 'jmod' from deb openjdk-25-jdk-headless (25+36-1~24.04.2)
  command 'qmod' from deb gridengine-client (8.1.9+dfsg-10build1)
  command 'kmod' from deb kmod (29-1ubuntu1)
  command 'chmod' from deb coreutils (8.32-4.1ubuntu1.2)
Try: sudo apt install <deb name>
maham123@maham123:~$ ./setup.sh 10 student
maham123@maham123:~$ _
```

task11_b1_vim.png

```
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

```
"setup.sh" 29L, 139B written
maham123@maham123:~$ ./setup.sh 10 student
./setup.sh: line 2: [: : integer expression expected
is NOT equal to 10 (-eq).
maham123@maham123:~$ ./setup.sh 7 student
./setup.sh: line 2: [: : integer expression expected
is NOT equal to 10 (-eq).
maham123@maham123:~$ _
```


task11_b2_vim.png

```
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

```
"setup.sh" 32L, 148B written
maham123@maham123:~$ ./setup.sh 7 student
./setup.sh: line 4: [: : integer expression expected
is equal to 10 (-ne false).
maham123@maham123:~$ ./setup.sh 10 student
./setup.sh: line 4: [: : integer expression expected
is equal to 10 (-ne false).
maham123@maham123:~$
```

task11_b3_vim.png

```
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

```
"setup.sh" 35L, 155B written
maham123@maham123:~$ ./setup.sh 12 student
./setup.sh: line 8: [: : integer expression expected
is NOT greater than 10 (-gt).
maham123@maham123:~$ ./setup.sh 9 student
./setup.sh: line 8: [: : integer expression expected
is NOT greater than 10 (-gt).
maham123@maham123:~$
```

task11_b4_vim.png

```
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

```
"setup.sh" 38L, 150B written
maham123@maham123:~$ ./setup.sh 5 student
./setup.sh: line 8: [: : integer expression expected
is NOT less than 10 (-lt).
maham123@maham123:~$ ./setup.sh 11 student
./setup.sh: line 8: [: : integer expression expected
is NOT less than 10 (-lt).
maham123@maham123:~$ _
```

task11_b5_vim.png

```
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

```
"setup.sh" 41L, 183B written
maham123@maham123:~$ ./setup.sh 10 student
./setup.sh: line 12: [: : integer expression expected
is NOT greater than or equal to 10 (-ge).
maham123@maham123:~$ ./setup.sh 8 student
./setup.sh: line 12: [: : integer expression expected
is NOT greater than or equal to 10 (-ge).
maham123@maham123:~$
```

task11_b6_vim.png

```
if [ "$num" -le 10 ]; then
    echo "$num is less than or equal to 10 (-le)."
else
    echo "$num is NOT less than or equal to 10 (-le)."
fi
```

task11_b6_run.png

```
"setup.sh" 44L, 180B written
maham123@maham123:~$ ./setup.sh 10 student
./setup.sh: line 8: [: : integer expression expected
is NOT less than or equal to 10 (-le).
maham123@maham123:~$ ./setup.sh 12 student
./setup.sh: line 8: [: : integer expression expected
is NOT less than or equal to 10 (-le).
maham123@maham123:~$
```

task11_b7_vim.png

```
if [ "$str" = "Student" ]; then
    echo "Second argument equals 'Student' ( = )."
else
    echo "Second argument does NOT equal 'Student' ( = )."
fi_
```

task11_b7_run.png

```
"setup.sh" 47L, 194B written
maham123@maham123:~$ ./setup.sh 10 Student
Second argument does NOT equal 'Student' ( = ).
maham123@maham123:~$ ./setup.sh 10 student
Second argument does NOT equal 'Student' ( = ).
maham123@maham123:~$ ./setup.sh 10 Test
Second argument does NOT equal 'Student' ( = ).
maham123@maham123:~$ _
```

task11_b8_vim.png

```
if [ "$str" != "Student" ]; then
    echo "Second argument is not equal to 'Student' ( != )."
else
    echo "Second argument equals 'Student' ( != false)."
```

task11_b8_run.png

```
"setup.sh" 49L, 203B written
maham123@maham123:~$ ./setup.sh 10 Test
Second argument is not equal to 'Student' ( != ).
maham123@maham123:~$ ./setup.sh 10 Student
Second argument is not equal to 'Student' ( != ).
maham123@maham123:~$
```

ask11_b9_vim.png

```
if [ -z "$str" ]; then
    echo "Second argument is empty (zero-length)."
```

task11_b9_run.png

```
"setup.sh" 52L, 170B written
maham123@maham123:~$ ./setup.sh 10
Second argument is empty (zero-length).
maham123@maham123:~$ ./setup.sh 10 Student
Second argument is empty (zero-length).
maham123@maham123:~$
```

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

task12_b1_vim.png

```
#!/bin/bash
#Script to demonstrate printing all user-entered arguments using $*
```

task12_b1_run.png

```

"setup.sh" 42L, 120B written
maham123@maham123:~$ _
```

task12_b2_vim.png

```
# Print all arguments using $*
echo "Printing all arguments using \${*}:"
for arg in ${*}; do
    echo "Argument: $arg"
donein/bash
```

task12_b2_run.png

```
"setup.sh" 49L, 178B written
maham123@maham123:~$ chmod +x setup.sh
maham123@maham123:~$ ./setup.sh one "two words" three
Printing all arguments using $*:
./setup.sh: line 50: syntax error: unexpected end of file
maham123@maham123:~$
```

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

task13_b1_vim.png

```
#!/bin/bash_
```

task13_b1_run.png

```
"setup.sh" 45L, 60B written
maham123@maham123:~$ chmod +x setup.sh
maham123@maham123:~$ ./setup.sh
maham123@maham123:~$
```

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

```
"setup.sh" 66L, 335B written
maham123@maham123:~$ ./setup.sh
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
maham123@maham123:~$ _
```

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

```
"setup.sh" 88L, 551B written
maham123@maham123:~$ ./setup.sh
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
maham123@maham123:~$
```

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

```
"setup.sh" 83L, 393B written
maham123@maham123:~$ chmod +x setup.sh
maham123@maham123:~$ ./setup.sh
./setup.sh: line 25: Demonstrate: command not found
Now demonstrating sum_args function:
sum_args(3,4) returned: 7
maham123@maham123:~$
```

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

task14_codespace_launch.png

Create a new fork

A *fork* is a copy of a repository. Forking a repository allows you to freely experiment with changes without affecting the original project. [View existing forks](#).

Required fields are marked with an asterisk (*).

Owner *
MahamSaleem123 / Repository name *
UbuntuMachine
✔ UbuntuMachine is available.

By default, forks are named the same as their upstream repository. You can customize the name to distinguish it further.

Description

task14_codespace_launch.png

```
PROBLEMS OUTPUT TERMINAL PORTS
Welcome to Codespaces! You are on our default image.
- It includes runtimes and tools for Python, Node.js, Docker, and more. See the full list here: https://aka.ms/ghc
s-default-image
- Want to use a custom image instead? Learn more here: https://aka.ms/configure-codespace

To explore VS Code to its fullest, search using the Command Palette (Cmd/Ctrl + Shift + P or F1).

Edit away, run your app as usual, and we'll automatically make it available for you to access.

@MahamSaleem123 → /workspaces/UbuntuMachine (main) $
```

task14_start_script_ls.png

```
● @MahamSaleem123 → /workspaces/UbuntuMachine (main) $ ls -l start-desktop.sh s
top-desktop.sh
-rwxrwxrwx 1 codespace root 1333 Nov  6 18:57 start-desktop.sh
-rwxrwxrwx 1 codespace root  428 Nov  6 18:57 stop-desktop.sh
○ @MahamSaleem123 → /workspaces/UbuntuMachine (main) $
```

Package configuration

Configuring keyboard-configuration

The layout of keyboards varies per country, with some countries having multiple common layouts. Please select the country of origin for the keyboard of this computer.

Country of origin for the keyboard:

↑(-)

Bulgarian
Burmese
Chinese
Croatian
Czech
Danish
Dari
Dhivehi
Dutch
Dzongkha
English (Australia)
English (Cameroon)
English (Ghana)
English (New Zealand)
English (Nigeria)
English (South Africa)
English (UK)
English (US)

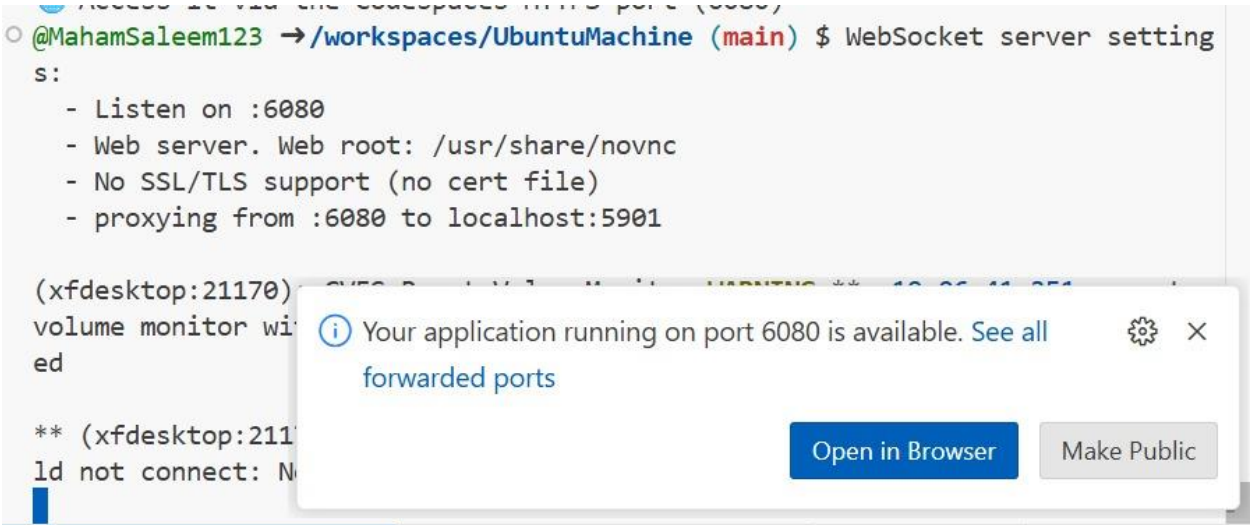
↓(+)

35%

< OK >

<Cancel>

task14_start_run.png



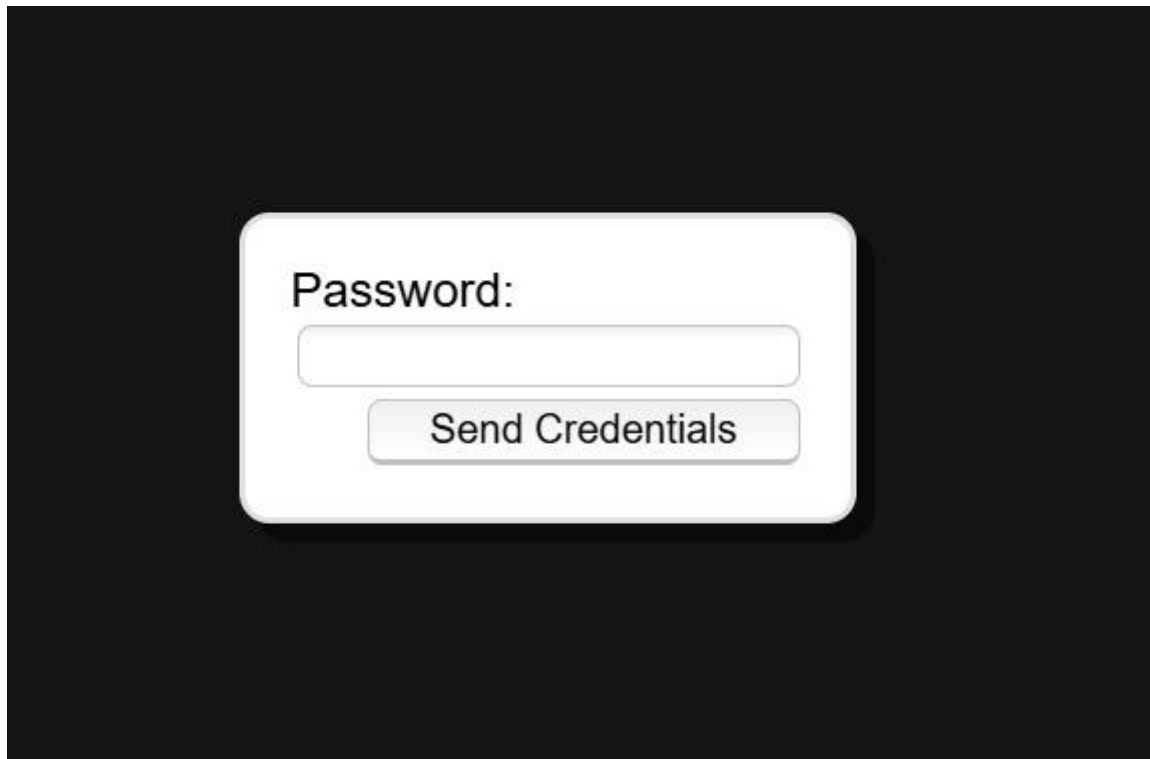
task14_ports_view.png

Port	Forwarded Address	Running Process	Visibility	Origin
5900	https://legendar...	x11vnc -display :1 -rfbauth /home/codespace/.vnc/passw...	Private	Auto Forwarded
5901	https://legendary-space-co...	x11vnc -display :1 -rfbauth /home/codespace/.vnc/passw...	Private	Auto Forwarded
6080	https://legendary-space-co...	/usr/bin/python3 /usr/bin/websocketify --web /usr/share/n...	Public	Auto Forwarded
Add Port				

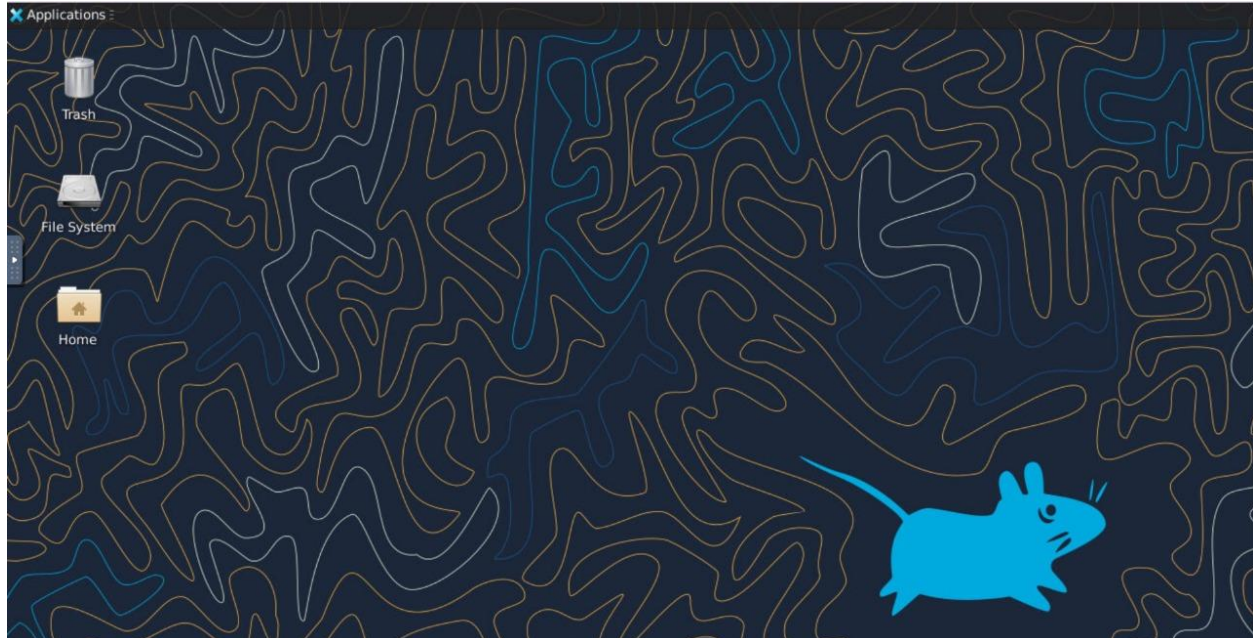
task14_vnc_url.png



task14_vnc_password_prompt.png



task14_vnc_desktop.png



task14_vnc_connect.png



task14_stop_run.png

```
● @MahamSaleem123 → /workspaces/UbuntuMachine (main) $ ./stop-desktop.sh
[*] Stopping noVNC server...

Terminating WebSockets proxy (21317)
[*] Stopping x11vnc server...
In exit
caught signal: 15
06/11/2025 19:16:06 [*] Stopping XFCE desktop session...
deleted 60 tile_row polling images.
[*] Stopping virtual X server (Xvfb)...
```