CLOUD COMPUTING LAB
BSE (V-B)

Submitted By:

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Roll No:

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Submitted To:

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LAB 06

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

Task 1 – Create Users (Jerry, Scooby)

```
musfira@ubuntu:~$ sudo passwd root
[sudo] password for musfira:
New password:
Retype new password:
passwd: password updated successfully
musfira@ubuntu:~$
```

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

```
root@ubuntu:~# exit
logout
musfira@ubuntu:~$ whoami
musfira
musfira@ubuntu:~$
```

Task 2 – Create Groups (Cartoon, Animal)

```
musfira@ubuntu:~$ sudo adduser tom
[sudo] password for musfira:
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 []: tom
        Room Number []: 1
        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' ...
musfira@ubuntu:~$
```

```
musfira:x:1000:1000:musfira:/home/musfira:/bin/bash
xrdp:x:110:111::/run/xrdp:/usr/sbin/nologin
rtkit:x:111:112:RealtimeKit,,,:/proc:/usr/sbin/nologin
dnsmasq:x:999:65534:dnsmasq:/var/lib/misc:/usr/sbin/nologin
cups-pk-helper:x:112:113:user for cups-pk-helper service,,,:/nonexistent:/usr/sb
in/nologin
lightdm:x:113:115:Light Display Manager:/var/lib/lightdm:/bin/false
whoopsie:x:114:117::/nonexistent:/bin/false
avahi:x:115:119:Avahi mDNS daemon,,,:/run/avahi-daemon:/usr/sbin/nologin
pulse:x:116:120:PulseAudio daemon,,,:/run/pulse:/usr/sbin/nologin
saned:x:117:123::/var/lib/saned:/usr/sbin/nologin
cups-browsed:x:118:113::/nonexistent:/usr/sbin/nologin
colord:x:119:124:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/no
login
tom:x:1001:1001:tom,1,,:/home/tom:/bin/bash
musfira@ubuntu:~$
```

```
tom:x:1001:
musfira@ubuntu:~$
```

```
tom:$y$j9T$f8jZwUZh9eMpMfCOBYIN11$ku3VIK7IFyCxQuDdUceLO.OJgiuoOuz3vOeWaWNKeL1:20396:0:99999:7:::
musfira@ubuntu:~$
```

Task 3 – Add Users to Groups

```
developer:x:1002:
devops:x:1003:
designer:x:1004:
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo usermod -g designer tom
musfira@ubuntu:~$ id tom
uid=1001(tom) gid=1004(designer) groups=1004(designer),100(users)
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo usermod -aG developer,devops tom
musfira@ubuntu:~$ id tom
groups tom
uid=1001(tom) gid=1004(designer) groups=1004(designer),100(users),1002(developer),1003(devops)
tom : designer users developer devops
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo usermod -G tom tom
musfira@ubuntu:~$ id tom
groups tom
uid=1001(tom) gid=1004(designer) groups=1004(designer),1001(tom)
tom : designer tom
musfira@ubuntu:~$
```

Task 4 – Delete Users and Groups

```
musfira@ubuntu:~$ sudo adduser jerry
info: Adding user `jerry' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `jerry' (1006) ...
info: Adding new user `jerry' (1006) with group `jerry (1006)' ...
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 []:
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] Y
info: Adding new user `jerry' to supplemental / extra groups `users' ...
info: Adding user `jerry' to group `users' ...
musfira@ubuntu:~$ sudo useradd scooby
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ su - Scooby
Password:
su: Authentication failure
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo passwd Scooby
New password:
Retype new password:
passwd: password updated successfully
musfira@ubuntu:~$ █
```

```
musfira@ubuntu:~$ su - Scooby
Password:
su: warning: cannot change directory to /home/Scooby: No such file or directory
$ █
```

```
$ exit
musfira@ubuntu:~$
musfira@ubuntu:~$ cat /etc/passwd | grep Scooby
ls -ld /home/Scooby
Scooby:x:1002:1005::/home/Scooby:/bin/sh
ls: cannot access '/home/Scooby': No such file or directory
musfira@ubuntu:~$ █
```

```
musfira@ubuntu:~$ sudo mkdir -p /home/Scooby
sudo chown Scooby:Scooby /home/Scooby
sudo chmod 750 /home/Scooby
ls -ld /home/Scooby
drwxr-x--- 2 Scooby Scooby 4096 Nov  5 18:22 /home/Scooby
musfira@ubuntu:~$ █
```

```
musfira@ubuntu:~$ su - Scooby
pwd
ls -la
Password:
$ █
```

```
musfira@ubuntu:~$ cat /etc/passwd | grep -E 'Jerry|Scooby'
Scooby:x:1002:1005::/home/Scooby:/bin/sh
musfira@ubuntu:~$ █
```

```
musfira@ubuntu:~$ sudo usermod -s /bin/bash Scooby
su - Scooby
Password:
Scooby@ubuntu:~$ echo $SHELL
/bin/bash
Scooby@ubuntu:~$ █
```

```
musfira@ubuntu:~$ sudo addgroup jolly
info: Selecting GID from range 1000 to 59999 ...
info: Adding group `jolly' (GID 1008) ...
musfira@ubuntu:~$ sudo groupadd anime
musfira@ubuntu:~$
musfira@ubuntu:~$ █
```

```
musfira@ubuntu:~$ cat /etc/group | grep -E 'jolly|anime'
jolly:x:1008:
anime:x:1009:
musfira@ubuntu:~$ █
```

```
musfira@ubuntu:~$ sudo delgroup jolly
info: Removing group `jolly' ...
musfira@ubuntu:~$ sudo groupdel anime
musfira@ubuntu:~$ cat /etc/group | grep -E 'jolly|anime'
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo deluser --remove-home jerry
info: Looking for files to backup/remove ...
info: Removing files ...
info: Removing crontab ...
info: Removing user `jerry' ...
musfira@ubuntu:~$ sudo userdel -r Scooby
userdel: Scooby mail spool (/var/mail/Scooby) not found
musfira@ubuntu:~$ sudo userdel -r scooby
userdel: scooby mail spool (/var/mail/scooby) not found
userdel: scooby home directory (/home/scooby) not found
musfira@ubuntu:~$ cat /etc/passwd | grep -E 'Jerry|Scooby'
musfira@ubuntu:~$
```

Task 5 – Set File Permissions

```
musfira@ubuntu:~$ 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:
passwd: password updated successfully
Changing the user information for student
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 `student' to supplemental / extra groups `users' ...
info: Adding user `student' to group `users' ...
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ su - student
Password:
student@ubuntu:~$ touch file1
student@ubuntu:~$ mkdir -p dir1
student@ubuntu:~$ touch dir1/file2
student@ubuntu:~$ ls -l
total 4
drwxrwxr-x 2 student student 4096 Nov  5 18:46 dir1
-rw-rw-r-- 1 student student    0 Nov  5 18:45 file1
student@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo ls -l /home/student/file1
-rw-rw-r-- 1 tom student 0 Nov  5 18:45 /home/student/file1
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo chgrp devops /home/student/file1
musfira@ubuntu:~$ sudo ls -l /home/student/file1
-rw-rw-r-- 1 tom devops 0 Nov  5 18:45 /home/student/file1
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ su - student
Password:
student@ubuntu:~$ ls -l
total 4
drwxrwxr-x 2 student student 4096 Nov  5 18:46 dir1
-rw-rw-r-- 1 tom     devops     0 Nov  5 18:45 file1
student@ubuntu:~$ ls -l dir1
total 0
-rw-rw-r-- 1 student student 0 Nov  5 18:46 file2
student@ubuntu:~$ ls -l /dev/null
crw-rw-rw- 1 root root 1, 3 Nov  6 16:26 /dev/null
student@ubuntu:~$ file file1 dir1 /dev/null
file1:      empty
dir1:       directory
/dev/null: character special (1/3)
student@ubuntu:~$ 
```

```
student@ubuntu:~$ exit
logout
musfira@ubuntu:~$ 
```

Task 6 – Create and Use Pipes

```
musfira@ubuntu:~$ su - student
Password:
student@ubuntu:~$ cd ~
student@ubuntu:~$ ls -l file1
-rw-rw-r-- 1 tom devops 0 Nov  5 18:45 file1
student@ubuntu:~$ 
```

```
student@ubuntu:~$ chmod -rwx file1
student@ubuntu:~$ ls -l file1
---------- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$ 
```

```
student@ubuntu:~$ chmod +r file1
student@ubuntu:~$ ls -l file1
-r--r--r-- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$ 
```

```
student@ubuntu:~$ chmod u+x file1
student@ubuntu:~$ ls -l file1
-r-xr--r-- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$ 
```

```
student@ubuntu:~$ chmod ug+w file1
student@ubuntu:~$ ls -l file1
-rwxrw-r-- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$ 
```

```
student@ubuntu:~$ chmod ugo-rwx file1
student@ubuntu:~$ ls -l file1
---------- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$ 
```

Task 7 – Create and Run a Shell Script

```
student@ubuntu:~$ su - student
cd ~
ls -l file1
Password:
student@ubuntu:~$ ls -l file1
--------- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

```
student@ubuntu:~$ chmod u=rwx,g=rwx,o=rwx file1
student@ubuntu:~$ ls -l file1
-rwxrwxrwx 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

```
student@ubuntu:~$ chmod g=rw,o=rw file1
ls -l file1
-rwxrw-rw- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

```
student@ubuntu:~$ chmod u=,g=,o= file1
ls -l file1
--------- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

Task 8 – Use Variables and Read Command

```
student@ubuntu:~$ su - student
cd ~
Password:
student@ubuntu:~$ ls -l file1
--------- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

```
student@ubuntu:~$ chmod 777 file1
ls -l file1
-rwxrwxrwx 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

```
student@ubuntu:~$ chmod 700 file1
ls -l file1
-rwx------ 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

```
student@ubuntu:~$ chmod 744 file1
ls -l file1
-rwxr--r-- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

```
student@ubuntu:~$ chmod 640 file1
ls -l file1
-rw-r----- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

```
student@ubuntu:~$ chmod 664 file1
ls -l file1
-rw-rw-r-- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

```
student@ubuntu:~$ chmod 775 file1
ls -l file1
-rwxrwxr-x 1 student student 0 Nov  5 18:45 file1
```

```
student@ubuntu:~$ chmod 750 file1
ls -l file1
-rwxr-x--- 1 student student 0 Nov  5 18:45 file1
student@ubuntu:~$
```

Task 9 – Use Command Line Arguments

```
student@ubuntu:~$ ls -lh /var/log/syslog
-rw-r----- 1 syslog adm 43K Nov  6 17:30 /var/log/syslog
student@ubuntu:~$ sudo cat /var/log/syslog | less
student@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo cat /var/log/syslog | more
[sudo] password for musfira:
2025-11-06T16:27:48.016138+00:00 ubuntu systemd[1]: rsyslog.service: Sent signal
 SIGHUP to main process 912 (rsyslogd) on client request.
2025-11-06T16:27:48.016582+00:00 ubuntu rsyslogd: [origin software="rsyslogd" sw
Version="8.2312.0" x-pid="912" x-info="https://www.rsyslog.com"] rsyslogd was HU
Ped
2025-11-06T16:27:48.120046+00:00 ubuntu systemd[1]: logrotate.service: Deactivat
ed successfully.
2025-11-06T16:27:48.120139+00:00 ubuntu systemd[1]: Finished logrotate.service -
 Rotate log files.
2025-11-06T16:27:48.297534+00:00 ubuntu systemd[1]: Started xrdp.service - xrdp
daemon.
2025-11-06T16:27:48.388032+00:00 ubuntu systemd[1]: Cannot find unit for notify
message of PID 1315, ignoring.
2025-11-06T16:27:48.582461+00:00 ubuntu snapd[857]: overlord.go:288: Acquiring s
tate lock file
2025-11-06T16:27:48.582809+00:00 ubuntu snapd[857]: overlord.go:293: Acquired st
ate lock file
```

```
musfira@ubuntu:~$ sudo grep -E 'fail|error' /var/log/syslog | head
2025-11-06T16:27:48.935817+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.935413742Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.aufs\"..." error="aufs is not supported (modprobe aufs failed: exit status 1 \"modprobe: FATAL: Module aufs not found in directory /lib/modules/6.8.0-8
6-generic\\n\"): skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:27:48.938669+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.937719114Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.blockfile\"..." error="no scratch file generator: skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:27:48.938736+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.938135195Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.btrfs\"..." error="path /var/lib/containerd/io.containerd.snapshotter.v1.btrfs (ext4) must be a btrfs filesystem to be used with the btrfs snapshotter:
 skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:27:48.938764+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.938167707Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.devmapper\"..." error="devmapper not configured: skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:26:16.540169+00:00 ubuntu containerd[1062]: time="2025-11-06T16:26:16.515913963Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.zfs\"..." error="path /var/lib/containerd/io.containerd.snapshotter.v1.zfs must be a zfs filesystem to be used with the zfs snapshotter: skip plugin" t
ype=io.containerd.snapshotter.v1
2025-11-06T16:26:16.582127+00:00 ubuntu containerd[1062]: time="2025-11-06T16:26:16.582042580Z" level=info msg="skip loading plugin \"io.containerd.tracing.p
rocessor.v1.otlp\"..." error="skip plugin: tracing endpoint not configured" type=io.containerd.tracing.processor.v1
2025-11-06T16:26:16.582154+00:00 ubuntu containerd[1062]: time="2025-11-06T16:26:16.582061247Z" level=info msg="skip loading plugin \"io.containerd.internal.
v1.tracing\"..." error="skip plugin: tracing endpoint not configured" type=io.containerd.internal.v1
2025-11-06T16:26:16.949253+00:00 ubuntu multipath: sda: failed to get sysfs uid: No such file or directory
2025-11-06T16:26:16.949371+00:00 ubuntu multipath: sda: failed to get sgio uid: No such file or directory
2025-11-06T16:26:16.984598+00:00 ubuntu multipathd[477]: sda: failed to get udev uid: No data available
```

```
2025-11-06T17:23:26.204899+00:00 ubuntu systemd[1]: Starting upower.service - Daemon for power management...
2025-11-06T17:23:26.410680+00:00 ubuntu systemd[1]: Started upower.service - Daemon for power management.
2025-11-06T17:23:26.606085+00:00 ubuntu systemd[1]: Started fwupd.service - Firmware update daemon.
2025-11-06T17:23:26.615638+00:00 ubuntu dbus-daemon[846]: [system] Activating via systemd: service name='org.freedesktop.UDi
ested by ':1.38' (uid=0 pid=2303 comm="/usr/libexec/fwupd/fwupd" label="unconfined")
2025-11-06T17:23:26.633988+00:00 ubuntu systemd[1]: Starting udisks2.service - Disk Manager...
2025-11-06T17:23:26.852751+00:00 ubuntu systemd[1]: Started udisks2.service - Disk Manager.
2025-11-06T17:23:26.958067+00:00 ubuntu systemd[1]: fwupd-refresh.service: Deactivated successfully.
2025-11-06T17:23:26.958625+00:00 ubuntu systemd[1]: Finished fwupd-refresh.service - Refresh fwupd metadata and update motd.
2025-11-06T17:30:06.839169+00:00 ubuntu systemd[1]: Starting sysstat-collect.service - system activity accounting tool...
2025-11-06T17:30:06.893100+00:00 ubuntu systemd[1]: sysstat-collect.service: Deactivated successfully.
2025-11-06T17:30:06.893939+00:00 ubuntu systemd[1]: Finished sysstat-collect.service - system activity accounting tool.
musfira@ubuntu:~$
```

```
2025-11-06T16:26:18.650353+00:00 ubuntu NetworkManager[875]: <info>  [1762446378.6483] manager: (docker0): new Bridge device (/or
/Devices/3)
2025-11-06T16:26:18.772848+00:00 ubuntu systemd-networkd[634]: docker0: Link UP
2025-11-06T16:26:21.956495+00:00 ubuntu systemd[1]: NetworkManager-dispatcher.service: Deactivated successfully.
2025-11-06T16:26:26.692980+00:00 ubuntu systemd[1815]: Listening on dirmngr.socket - GnuPG network certificate management daemon.
musfira@ubuntu:~$
```

Task 10 – Conditional Statements (if/else)

```
musfira@ubuntu:~$ su - student
cd ~
Password:
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ chmod +x setup.sh
student@ubuntu:~$ ./setup.sh
student@ubuntu:~$
```

```
student@ubuntu: ~
#!/bin/bash

~
```

```
student@ubuntu: ~
#!/bin/bash

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

~
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh
var1: Hello from Lab 6
var1: Hello from Lab 6
student@ubuntu:~$
```

```bash
student@ubuntu: ~

#!/bin/bash

# Define and show var1
var1="Hello from Lab 6"
echo "var1: $var1"
# Define and show var1
var1="Hello from Lab 6"
echo "var1: $var1"
# Save ls -l to variable and display
allFiles="$(ls -l)"
echo "allFiles (ls -l):"
echo "$allFiles"
```

```
student@ubuntu:~$ chmod +x setup.sh
student@ubuntu:~$ ./setup.sh
var1: Hello from Lab 6
var1: Hello from Lab 6
allFiles (ls -l):
total 8
drwxrwxr-x 2 student student 4096 Nov  5 18:46 dir1
-rwxr-x--- 1 student student    0 Nov  5 18:45 file1
-rwxrwxr-x 1 student student  245 Nov  6 17:59 setup.sh
student@ubuntu:~$
```

```bash
# 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

~
~
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh
var1: Hello from Lab 6
var1: Hello from Lab 6
allFiles (ls -l):
total 8
drwxrwxr-x 2 student student 4096 Nov  5 18:46 dir1
-rwxr-x--- 1 student student    0 Nov  5 18:45 file1
-rwxrwxr-x 1 student student  429 Nov  6 18:11 setup.sh
Directory dir1 exists.
student@ubuntu:~$
```

```bash
# 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
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh
var1: Hello from Lab 6
var1: Hello from Lab 6
allFiles (ls -l):
total 8
drwxrwxr-x 2 student student 4096 Nov  5 18:46 dir1
-rwxr-x--- 1 student student    0 Nov  5 18:45 file1
-rwxrwxr-x 1 student student  626 Nov  6 18:14 setup.sh
Directory dir1 exists.
file2 already exists.
student@ubuntu:~$
```

```bash
# 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"

-- INSERT --
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh
var1: Hello from Lab 6
var1: Hello from Lab 6
allFiles (ls -l):
total 8
drwxrwxr-x 2 student student 4096 Nov  5 18:46 dir1
-rwxr-x--- 1 student student    0 Nov  5 18:45 file1
-rwxrwxr-x 1 student student 1038 Nov  6 18:18 setup.sh
Directory dir1 exists.
file2 already exists.
Execute permission missing; granting to user...
Final permissions for dir1/file2:
-rwxrw-r-- 1 student student 0 Nov  5 18:46 dir1/file2
student@ubuntu:~$
```

Task 11 – Case Statement Example

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

:wq
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ chmod +x setup.sh
./setup.sh 10 Student
var1: Hello from Lab 6
var1: Hello from Lab 6
allFiles (ls -l):
total 8
drwxrwxr-x 2 student student 4096 Nov  5 18:46 dir1
-rwxr-x--- 1 student student    0 Nov  5 18:45 file1
-rwxrwxr-x 1 student student 1065 Nov  6 18:24 setup.sh
Directory dir1 exists.
file2 already exists.
Final permissions for dir1/file2:
-rwxrw-r-- 1 student student 0 Nov  5 18:46 dir1/file2
student@ubuntu:~$
```

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

if [ "$num" -eq 10 ]; then
  echo "$num is equal to 10 (-eq)."
else
  echo "$num is NOT equal to 10 (-eq)."
fi

-- INSERT --
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ chmod +x setup.sh
./setup.sh 10 Student
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh 10 Student
./setup.sh 7 Student
10 is equal to 10 (-eq).
7 is NOT equal to 10 (-eq).
student@ubuntu:~$
```

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

if [ "$num" -eq 10 ]; then
  echo "$num is equal to 10 (-eq)."
else
  echo "$num is NOT equal to 10 (-eq)."
fi

if [ "$num" -ne 10 ]; then
  echo "$num is not equal to 10 (-ne)."
else
  echo "$num is equal to 10 (-ne false)."
fi
```

-- INSERT --

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh 7 Student
./setup.sh 10 Student
7 is NOT equal to 10 (-eq).
7 is not equal to 10 (-ne).
10 is equal to 10 (-eq).
10 is equal to 10 (-ne false).
student@ubuntu:~$
```

```bash
if [ "$num" -gt 10 ]; then
  echo "$num is greater than 10 (-gt)."
else
  echo "$num is NOT greater than 10 (-gt)."
fi

~
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh 12 Student
./setup.sh 9 Student
12 is NOT equal to 10 (-eq).
12 is not equal to 10 (-ne).
12 is greater than 10 (-gt).
9 is NOT equal to 10 (-eq).
9 is not equal to 10 (-ne).
9 is NOT greater than 10 (-gt).
student@ubuntu:~$
```

```bash
if [ "$num" -lt 10 ]; then
  echo "$num is less than 10 (-lt)."
else
  echo "$num is NOT less than 10 (-lt)."
fi
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh 5 Student
./setup.sh 11 Student
5 is NOT equal to 10 (-eq).
5 is not equal to 10 (-ne).
5 is NOT greater than 10 (-gt).
5 is less than 10 (-lt).
11 is NOT equal to 10 (-eq).
11 is not equal to 10 (-ne).
11 is greater than 10 (-gt).
11 is NOT less than 10 (-lt).
student@ubuntu:~$
```

```
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

~
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh 10 Student
./setup.sh 8 Student
10 is equal to 10 (-eq).
10 is equal to 10 (-ne false).
10 is NOT greater than 10 (-gt).
10 is NOT less than 10 (-lt).
10 is greater than or equal to 10 (-ge).
8 is NOT equal to 10 (-eq).
8 is not equal to 10 (-ne).
8 is NOT greater than 10 (-gt).
8 is less than 10 (-lt).
8 is NOT greater than or equal to 10 (-ge).
student@ubuntu:~$
```

```
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

~
~
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh 10 Student
./setup.sh 12 Student
10 is equal to 10 (-eq).
10 is equal to 10 (-ne false).
10 is NOT greater than 10 (-gt).
10 is NOT less than 10 (-lt).
10 is greater than or equal to 10 (-ge).
10 is less than or equal to 10 (-le).
12 is NOT equal to 10 (-eq).
12 is not equal to 10 (-ne).
12 is greater than 10 (-gt).
12 is NOT less than 10 (-lt).
12 is greater than or equal to 10 (-ge).
12 is NOT less than or equal to 10 (-le).
student@ubuntu:~$ █
```

```bash
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

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

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$
./setup.sh 10 Student
./setup.sh 10 Test
10 is equal to 10 (-eq).
10 is equal to 10 (-ne false).
10 is NOT greater than 10 (-gt).
10 is NOT less than 10 (-lt).
10 is greater than or equal to 10 (-ge).
10 is less than or equal to 10 (-le).
Second argument equals 'Student' ( = ).
10 is equal to 10 (-eq).
10 is equal to 10 (-ne false).
10 is NOT greater than 10 (-gt).
10 is NOT less than 10 (-lt).
10 is greater than or equal to 10 (-ge).
10 is less than or equal to 10 (-le).
Second argument does NOT equal 'Student' ( = ).
student@ubuntu:~$ █
```

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

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

-- INSERT --
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh 10 Test
./setup.sh 10 Student
10 is equal to 10 (-eq).
10 is equal to 10 (-ne false).
10 is NOT greater than 10 (-gt).
10 is NOT less than 10 (-lt).
10 is greater than or equal to 10 (-ge).
10 is less than or equal to 10 (-le).
Second argument does NOT equal 'Student' ( = ).
Second argument is not equal to 'Student' ( != ).
10 is equal to 10 (-eq).
10 is equal to 10 (-ne false).
10 is NOT greater than 10 (-gt).
10 is NOT less than 10 (-lt).
10 is greater than or equal to 10 (-ge).
10 is less than or equal to 10 (-le).
Second argument equals 'Student' ( = ).
Second argument equals 'Student' ( != false).
student@ubuntu:~$
```

```
if [ -z "$str" ]; then
  echo "Second argument is empty (zero-length)."
else
  echo "Second argument is not empty."
fi

-- INSERT --
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh 10
./setup.sh 10 Student
10 is equal to 10 (-eq).
10 is equal to 10 (-ne false).
10 is NOT greater than 10 (-gt).
10 is NOT less than 10 (-lt).
10 is greater than or equal to 10 (-ge).
10 is less than or equal to 10 (-le).
Second argument does NOT equal 'Student' ( = ).
Second argument is not equal to 'Student' ( != ).
Second argument is empty (zero-length).
10 is equal to 10 (-eq).
10 is equal to 10 (-ne false).
10 is NOT greater than 10 (-gt).
10 is NOT less than 10 (-lt).
10 is greater than or equal to 10 (-ge).
10 is less than or equal to 10 (-le).
Second argument equals 'Student' ( = ).
Second argument equals 'Student' ( != false).
Second argument is not empty.
student@ubuntu:~$
```

Task 12 – For Loop Example

```
student@ubuntu: ~
#!/bin/bash
# Script to demonstrate printing all user-entered arguments using $*


~
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh
student@ubuntu:~$ █
```

```
student@ubuntu: ~
#!/bin/bash
# Script to demonstrate printing all user-entered arguments using $*

# Print all arguments using $*
echo "Printing all arguments using \$*:"
for arg in $*; do
  echo "Argument: $arg"
done
█
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ chmod +x setup.sh
student@ubuntu:~$ ./setup.sh one "two words" three
Printing all arguments using $*:
Argument: one
Argument: two
Argument: words
Argument: three
student@ubuntu:~$ █
```

Task 13 – While Loop Summation and Functions

```
student@ubuntu: ~
#!/bin/bash
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ chmod +x setup.sh
./setup.sh
student@ubuntu:~$ █
```

```bash
#!/bin/bash

# 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"
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ chmod +x setup.sh
./setup.sh
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./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
student@ubuntu:~$
```

```bash
#!/bin/bash

# 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

~
```

```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh
Now calling sum_two function:
Enter a number (or 'q' to quit): 2
Total Score: 2
Enter a number (or 'q' to quit): 4
Total Score: 6
Enter a number (or 'q' to quit): q
Function final total: 6
student@ubuntu:~$
```

```
# 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: $result"
```
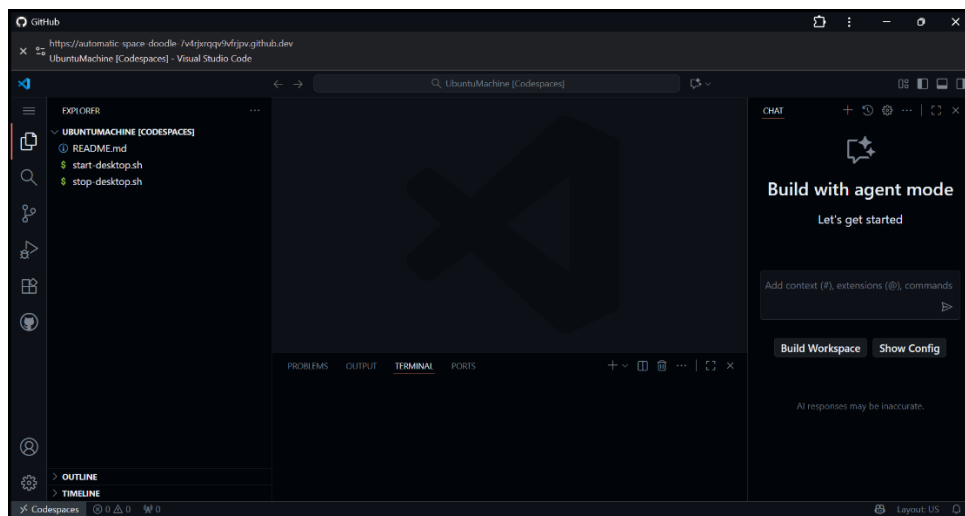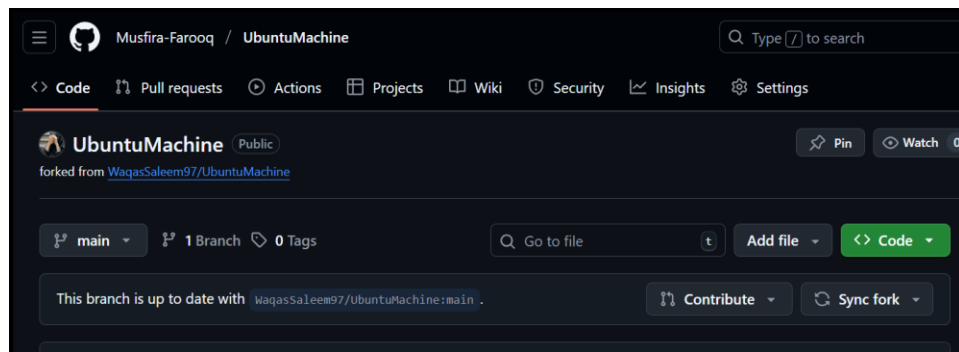
```
student@ubuntu:~$ vim setup.sh
student@ubuntu:~$ ./setup.sh
Now demonstrating sum_args function:
sum_args(3,4) returned: 7
student@ubuntu:~$
```

Task 14 – Script with Function and User Input

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**   PORTS   bash

● @Musfira-Farooq →/workspaces/UbuntuMachine (main) $ ls -l start-desktop.sh stop-desktop.sh
  -rwxrwxrwx 1 codespace root 1333 Nov 6 19:14 start-desktop.sh
  -rwxrwxrwx 1 codespace root 428 Nov 6 19:14 stop-desktop.sh
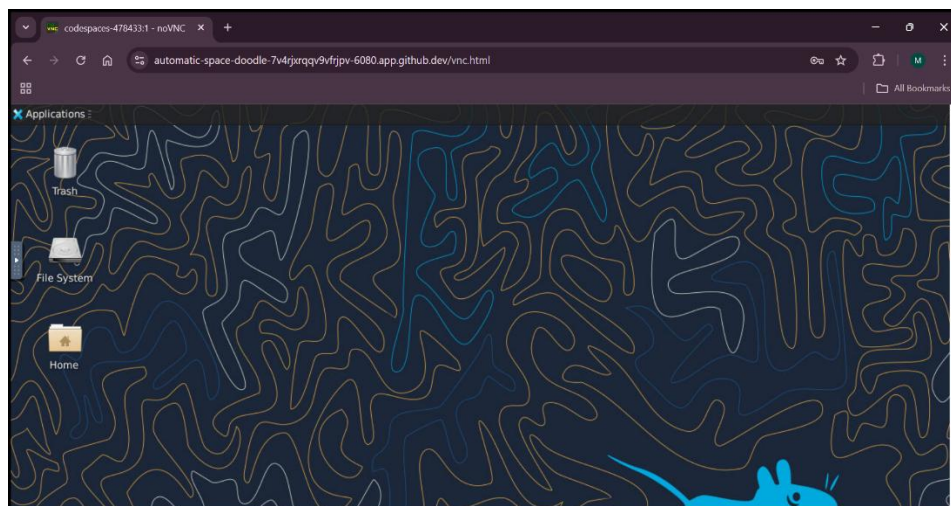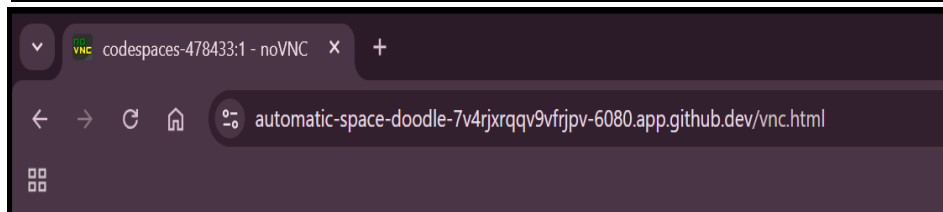○ @Musfira-Farooq →/workspaces/UbuntuMachine (main) $ ▮

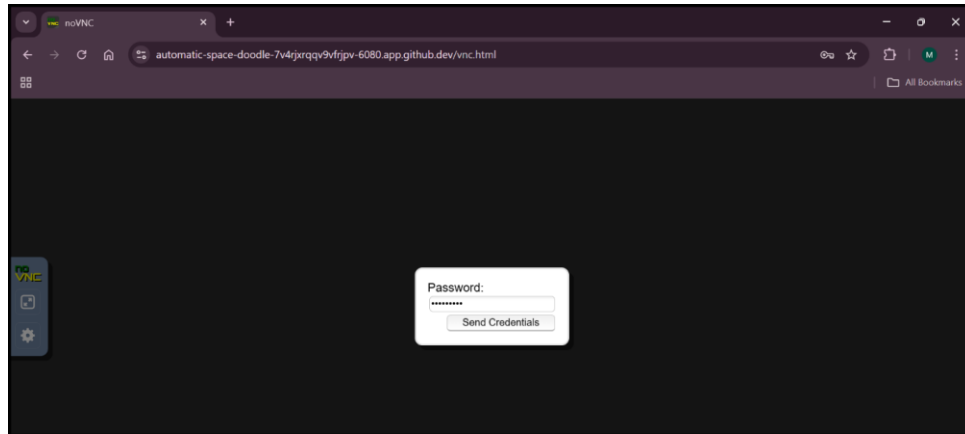PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**   PORTS 3

     http://codespaces-478433:6080/vnc.html?host=codespaces-478433&port=6080

Press Ctrl-C to exit

[✓] XFCE desktop environment is running!
🌐 Access it via the Codespaces HTTPS port (6080)
@Musfira-Farooq →/workspaces/UbuntuMachine (main) $ WebSocket server settings:
  - Listen on :6080
  - Web server. Web root: /usr/share/novnc
  - No SSL/TLS support (no cert file)
  - proxying from :6080 to localhost:5901

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   **PORTS** 3

Port	Forwarded Address	Running Process	Visibility	Origin
5900	https://automatic-s...	x11vnc -display :1 -rfbauth /home/codesp...	🔒 Private	Auto Forwarded
5901	https://automatic-s...	x11vnc -display :1 -rfbauth /home/codesp...	🔒 Private	Auto Forwarded
6080	https://automatic-s...	/usr/bin/python3 /usr/bin/websockify --we...	🔒 Private	Auto Forwarded
Add Port				

VNC codespaces-478433:1 - noVNC   ✕   +

← → C ⌂   🔒 automatic-space-doodle-7v4rjxrqqv9vfrjpv-6080.app.github.dev/vnc.html

⊞

@Musfira-Farooq →/workspaces/UbuntuMachine (main) $ ./stop-desktop.sh
06/11/2025 19:33:35 deleted 60 tile_row polling images.
[*] Stopping virtual X server (Xvfb)...
[✓] All services stopped.
xfsettingsd: Another instance took over. Leaving...

(Thunar:21438): thunar-WARNING **: 19:33:35.591: Name 'org.xfce.FileManager' lost on the message dbus.

(Thunar:21438): thunar-WARNING **: 19:33:35.591: Name 'org.freedesktop.FileManager1' lost on the message dbus.

(xfce4-panel:21433): xfce4-panel-CRITICAL **: 19:33:35.594: Name org.xfce.Panel lost on the message dbus, exiting.

** (xfce4-power-manager:21465): WARNING **: 19:33:35.607: Error: The connection is closed

** (xfce4-power-manager:21465): WARNING **: 19:33:35.609: Error: The connection is closed

@Musfira-Farooq →/workspaces/UbuntuMachine (main) $

Exam Questions

Q1 – Short Question

```
musfira@ubuntu:~$  sudo  groupadd  g1
 sudo  groupadd  g2
 sudo  groupadd  g3
 [sudo]  password  for  musfira:
 musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo usermod -g g3 examuser
 sudo usermod -aG g1,g2 examuser      # adds supp
 musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ id examuser
grep examuser /etc/group
uid=1009(examuser) gid=1008(g3) groups=1008(g3),100(users),1006(g1),1007(g2)
users:x:100:student,examuser
g1:x:1006:examuser
g2:x:1007:examuser
examuser:x:1009:
musfira@ubuntu:~$
```

Q2 – Short Question

```
musfira@ubuntu:~$ mkdir -p workspace
touch workspace/secret.txt
sudo chown examuser workspace/secret.txt
sudo chgrp g1 workspace/secret.txt
ls -l workspace/secret.txt
-rw-rw-r-- 1 examuser g1 0 Nov  6 19:43 workspace/secret.txt
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo chmod 700 workspace/secret.txt
ls -l workspace/secret.txt
-rwx------ 1 examuser g1 0 Nov  6 19:43 workspace/secret.txt
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ sudo chmod go-rwx workspace/secret.txt
ls -l workspace/secret.txt
-rw------- 1 examuser g1 0 Nov  6 19:43 workspace/secret.txt
musfira@ubuntu:~$ ls -l workspace/secret.txt
-rw------- 1 examuser g1 0 Nov  6 19:43 workspace/secret.txt
musfira@ubuntu:~$
```

Q3 – Short Question

```
musfira@ubuntu:~$ sudo grep -iE "error|fail" /var/log/syslog | head -20
2025-11-06T16:27:48.935817+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.9354137422" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.aufs\"..." error="aufs is not supported (modprobe aufs failed: exit status 1 \"modprobe: FATAL: Module aufs not found in directory /lib/modules/6.8.0-8
6-generic\\n\"): skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:27:48.938669+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.937719114Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.blockfile\"..." error="no scratch file generator: skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:27:48.938736+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.938135195Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.btrfs\"..." error="path /var/lib/containerd/io.containerd.snapshotter.v1.btrfs (ext4) must be a btrfs filesystem to be used with the btrfs snapshotter:
 skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:27:48.938764+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.938167707Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.devmapper\"..." error="devmapper not configured: skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:26:16.534281+00:00 ubuntu kernel: systemd-journald[440]: Failed to read journal file /var/log/journal/47765dbb748940228f876006f76e6b49/user-100
0.journal for rotation, trying to move it out of the way: Device or resource busy
2025-11-06T16:26:16.534298+00:00 ubuntu kernel: systemd-journald[440]: Failed to read journal file /var/log/journal/47765dbb748940228f876006f76e6b49/user-100
5.journal for rotation, trying to move it out of the way: Device or resource busy
2025-11-06T16:26:16.540169+00:00 ubuntu containerd[1062]: time="2025-11-06T16:26:16.515913963Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.zfs\"..." error="path /var/lib/containerd/io.containerd.snapshotter.v1.zfs must be a zfs filesystem to be used with the zfs snapshotter: skip plugin" t
ype=io.containerd.snapshotter.v1
2025-11-06T16:26:16.582127+00:00 ubuntu containerd[1062]: time="2025-11-06T16:26:16.582042580Z" level=info msg="skip loading plugin \"io.containerd.tracing.p
rocessor.v1.otlp\"..." error="skip plugin: tracing endpoint not configured" type=io.containerd.tracing.processor.v1
2025-11-06T16:26:16.582154+00:00 ubuntu containerd[1062]: time="2025-11-06T16:26:16.582062147Z" level=info msg="skip loading plugin \"io.containerd.internal.
v1.tracing\"..." error="skip plugin: tracing endpoint not configured" type=io.containerd.internal.v1
2025-11-06T16:26:16.949253+00:00 ubuntu multipath: sda: failed to get sysfs uid: No such file or directory
2025-11-06T16:26:16.949371+00:00 ubuntu multipath: sda: failed to get sgio uid: No such file or directory
2025-11-06T16:26:16.984598+00:00 ubuntu multipathd[477]: sda: failed to get udev uid: No data available
2025-11-06T16:26:16.984805+00:00 ubuntu multipathd[477]: sda: failed to get path uid
2025-11-06T16:26:16.984849+00:00 ubuntu multipathd[477]: uevent trigger error
2025-11-06T16:26:17.775784+00:00 ubuntu dockerd[1451]: time="2025-11-06T16:26:17.775356397Z" level=info msg="CDI directory does not exist, skipping: failed t
o monitor for changes: no such file or directory" dir=/var/run/cdi
2025-11-06T16:26:17.777028+00:00 ubuntu dockerd[1451]: time="2025-11-06T16:26:17.775586024Z" level=info msg="CDI directory does not exist, skipping: failed t
o monitor for changes: no such file or directory" dir=/etc/cdi
2025-11-06T16:26:27.002387+00:00 ubuntu multipath: sda: failed to get sysfs uid: No such file or directory
2025-11-06T16:26:27.004328+00:00 ubuntu multipath: sda: failed to get sgio uid: No such file or directory
2025-11-06T16:26:27.075538+00:00 ubuntu multipathd[477]: sda: failed to get udev uid: No data available
2025-11-06T16:26:27.076585+00:00 ubuntu multipathd[477]: sda: failed to get path uid
musfira@ubuntu:~$ ^C
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ less ~/logs/errors.txt
2025-11-06T16:27:48.935817+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.9354137422" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.aufs\"..." error="aufs is not supported (modprobe aufs failed: exit status 1 \"modprobe: FATAL: Module aufs not found in directory /lib/modules/6.8.0-8
6-generic\\n\"): skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:27:48.938669+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.937719114Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.blockfile\"..." error="no scratch file generator: skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:27:48.938736+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.938135195Z" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.btrfs\"..." error="path /var/lib/containerd/io.containerd.snapshotter.v1.btrfs (ext4) must be a btrfs filesystem to be used with the btrfs snapshotter
 skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:27:48.938764+00:00 ubuntu containerd[1062]: time="2025-11-06T16:27:48.9381677072" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.devmapper\"..." error="devmapper not configured: skip plugin" type=io.containerd.snapshotter.v1
2025-11-06T16:26:16.534281+00:00 ubuntu kernel: systemd-journald[440]: Failed to read journal file /var/log/journal/47765dbb748940228f876006f76e6b49/user-100
0.journal for rotation, trying to move it out of the way: Device or resource busy
2025-11-06T16:26:16.534298+00:00 ubuntu kernel: systemd-journald[440]: Failed to read journal file /var/log/journal/47765dbb748940228f876006f76e6b49/user-100
5.journal for rotation, trying to move it out of the way: Device or resource busy
2025-11-06T16:26:16.540169+00:00 ubuntu containerd[1062]: time="2025-11-06T16:26:16.5159139632" level=info msg="skip loading plugin \"io.containerd.snapshott
er.v1.zfs\"..." error="path /var/lib/containerd/io.containerd.snapshotter.v1.zfs must be a zfs filesystem to be used with the zfs snapshotter: skip plugin" t
ype=io.containerd.snapshotter.v1
```

```
musfira@ubuntu:~$ mkdir -p ~/logs
musfira@ubuntu:~$ sudo grep -iE "error|fail" /var/log/syslog > ~/logs/errors.txt
sudo grep -i "warning" /var/log/syslog >> ~/logs/errors.txt
musfira@ubuntu:~$ ls -l ~/logs/errors.txt
-rw-rw-r-- 1 musfira musfira 5993 Nov  6 19:52 /home/musfira/logs/errors.txt
musfira@ubuntu:~$
```

Q4 – Short Question

```bash
#!/bin/bash
# Step 1: Demonstrate a variable
var1="Hello from Q4"
echo "var1: $var1"
```

```
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ chmod +x setup.sh
musfira@ubuntu:~$ ./setup.sh
var1: Hello from Q4
musfira@ubuntu:~$
```

```bash
# Step 2: Store ls -l output in a variable and display
allFiles="$(ls -l)"
echo "All files in current directory:"
echo "$allFiles"

~
```

```
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ ./setup.sh
var1: Hello from Q4
All files in current directory:
total 96
drwxrwxr-x 3 musfira musfira  4096 Oct 20 12:00 analysis_backup
drwxrwxr-x 3 musfira musfira  4096 Oct 20 11:58 analysis_workspace
-rw-rw-r-- 1 musfira musfira   116 Oct 19 19:55 answers.md
-rw-rw-r-- 1 musfira musfira    59 Oct 25 12:15 apt_update_vs_upgrade.md
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Desktop
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Documents
drwxr-xr-x 2 musfira musfira  4096 Oct 31 16:58 Downloads
drwxrwxr-x 3 musfira musfira  4096 Oct 20 10:00 lab4
drwxrwxr-x 2 musfira musfira  4096 Oct 31 16:33 Lab5
drwxrwxr-x 2 musfira musfira  4096 Nov  6 19:52 logs
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Music
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Pictures
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Public
-rwxrwxr-x 1 musfira musfira   218 Nov  6 19:57 setup.sh
drwx------ 3 musfira musfira  4096 Oct 25 13:08 snap
-rw-rw-r-- 1 musfira musfira 17188 Nov  6 17:42 syslog_systemd.txt
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Templates
drwxrwxr-t 2 musfira musfira  4096 Oct 25 14:07 thinclient_drives
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Videos
drwxrwxr-x 2 musfira musfira  4096 Nov  6 19:43 workspace
musfira@ubuntu:~$
```

```bash
# Step 3: Check for directory and file existence
if [ ! -d "dir1" ]; then
  mkdir dir1
  echo "Created directory dir1"
fi

if [ ! -f "dir1/file2" ]; then
  touch dir1/file2
  echo "Created file dir1/file2"
fi

ls -l dir1
```

```
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ ./setup.sh
var1: Hello from Q4
All files in current directory:
total 96
drwxrwxr-x 3 musfira musfira  4096 Oct 20 12:00 analysis_backup
drwxrwxr-x 3 musfira musfira  4096 Oct 20 11:58 analysis_workspace
-rw-rw-r-- 1 musfira musfira   116 Oct 19 19:55 answers.md
-rw-rw-r-- 1 musfira musfira    59 Oct 25 12:15 apt_update_vs_upgrade.md
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Desktop
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Documents
drwxr-xr-x 2 musfira musfira  4096 Oct 31 16:58 Downloads
drwxrwxr-x 3 musfira musfira  4096 Oct 20 10:00 lab4
drwxrwxr-x 2 musfira musfira  4096 Oct 31 16:33 Lab5
drwxrwxr-x 2 musfira musfira  4096 Nov  6 19:52 logs
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Music
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Pictures
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Public
-rwxrwxr-x 1 musfira musfira   440 Nov  6 19:58 setup.sh
drwx------ 3 musfira musfira  4096 Oct 25 13:08 snap
-rw-rw-r-- 1 musfira musfira 17188 Nov  6 17:42 syslog_systemd.txt
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Templates
drwxrwxr-t 2 musfira musfira  4096 Oct 25 14:07 thinclient_drives
drwxr-xr-x 2 musfira musfira  4096 Oct 31 06:16 Videos
drwxrwxr-x 2 musfira musfira  4096 Nov  6 19:43 workspace
Created directory dir1
Created file dir1/file2
total 0
-rw-rw-r-- 1 musfira musfira 0 Nov  6 19:59 file2
musfira@ubuntu:~$
```

Q5 – Short Question

```
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ ./setup.sh
Number:
String:
musfira@ubuntu:~$ ./setup.sh 5 hello
Number: 5
String: hello
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ ./setup.sh 5 hi
./setup.sh 8 hi
./setup.sh: line 3: [: -eq: unary operator expected
num equals 5 → False
./setup.sh: line 3: [: -eq: unary operator expected
num equals 5 → False
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ ./setup.sh 2 hello
./setup.sh 6 hi
./setup.sh: line 3: [: -eq: unary operator expected
num equals 5 → False
./setup.sh: line 10: [: -ne: unary operator expected
-ne False
./setup.sh: line 11: [: -gt: unary operator expected
-gt False
./setup.sh: line 12: [: -lt: unary operator expected
-lt False
./setup.sh: line 13: [: -ge: unary operator expected
-ge False
./setup.sh: line 14: [: -le: unary operator expected
-le False
./setup.sh: line 3: [: -eq: unary operator expected
num equals 5 → False
./setup.sh: line 10: [: -ne: unary operator expected
-ne False
./setup.sh: line 11: [: -gt: unary operator expected
-gt False
./setup.sh: line 12: [: -lt: unary operator expected
-lt False
./setup.sh: line 13: [: -ge: unary operator expected
-ge False
./setup.sh: line 14: [: -le: unary operator expected
-le False
musfira@ubuntu:~$
```

```
String not equal to 'hello'
String is NOT 'world'
String is empty
./setup.sh: line 3: [: -eq: unary operator expected
num equals 5 → False
./setup.sh: line 10: [: -ne: unary operator expected
-ne False
./setup.sh: line 11: [: -gt: unary operator expected
-gt False
./setup.sh: line 12: [: -lt: unary operator expected
-lt False
./setup.sh: line 13: [: -ge: unary operator expected
-ge False
./setup.sh: line 14: [: -le: unary operator expected
-le False
String not equal to 'hello'
String is NOT 'world'
String is empty
musfira@ubuntu:~$
```

Q6– Short Question

```
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ chmod +x setup.sh
musfira@ubuntu:~$ ./setup.sh one "two words" three "four five"
Printing all arguments individually:
Argument: one
Argument: two words
Argument: three
Argument: four five
musfira@ubuntu:~$
```

```bash
#!/bin/bash
# Script to print all arguments using "$@"

echo "Printing all arguments individually:"

for arg in "$@"
do
  echo "Argument: $arg"
done
```

Q7– Short Question

```
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ ./setup.sh
sum_args(4,9) returned: 13
musfira@ubuntu:~$
```

```
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ chmod +x setup.sh
musfira@ubuntu:~$ ./setup.sh one "two words" three "four five"
Printing all arguments individually:
Argument: one
Argument: two words
Argument: three
Argument: four five
musfira@ubuntu:~$ vim setup.sh
musfira@ubuntu:~$ chmod +x setup.sh
musfira@ubuntu:~$ ./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
musfira@ubuntu:~$
```