

UNIVERSITY OF
MAURITIUS

Faculty of Information, Communication, and Digital Technologies

Course: IC318 – BSc (Hons) Computer Science

Module: Practical Training-ICDT 1200

Title: Practical Training Portfolio

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Date: 25th June 2024

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Acknowledgement

The practical training, being the seventh module of semester 2, has indeed provided an insightful experience throughout the 5 days of training. During this journey, we were able to grasp several concepts of hardware and software, and eventually putting them into practice. Hence, I would like to express my sincere gratitude to my lecturer, Mr Appavoo Paramasiven, who ensured the smooth continuity of our training and guiding us at every step of each activity. I would also extend my appreciation to my friends, who always tried to help me whenever I encountered a problem. I also appreciated the teamwork and how we completed each task by having fun and supporting each other.

Introduction

The practical training lasted for 5 days. During these days, we explored multiple concepts and applied it. Our lecturer, Mr Appavoo asked us to take screenshots at every step of our tasks. This portfolio is summary of all the learning objectives of each day, along with the screenshots and photos taken to prove that we actually completed the tasks.

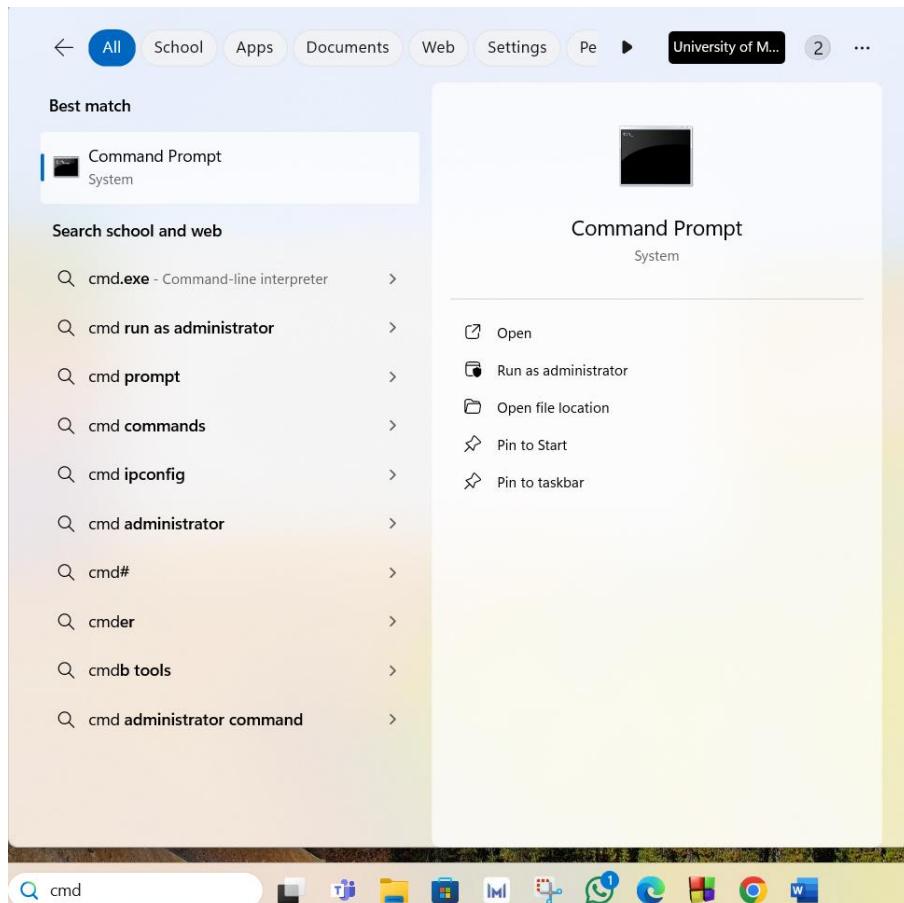
Day 1

Learning objectives

- Opening command prompt and writing basic commands.
- Opening BIOS and memory testing
- Using virtual machine(VMWare)
- Installing windows and linux on VMWare
- Partitioning
- Rufus(Bootable USB)

Command prompt

1. Opening command prompt by typing cmd in search bar.



2. Viewing all folders in directory "C:\Users\user1"

```

[1] Command Prompt
Microsoft Windows [Version 10.0-19045-1470]
(c) Microsoft Corporation. All rights reserved.

C:\Users\sluser1\dir
Volume in Drive C has no label.
Volume Serial Number is B8EC-F091

Directory of C:\Users\sluser1\

04/05/2023 02:01 PM <DIR> .
04/05/2023 02:01 PM <DIR> ..
07/04/2017 01:53 AM <DIR> AndroidStudio2.3
08/23/2019 09:06 AM <DIR> .config
08/23/2019 01:06 PM <DIR> 126_defaults-0.1.0.ini
08/23/2019 01:06 PM <DIR> .edict
08/13/2017 02:57 PM <DIR> 10_mimulator_console_auth_token
11/24/2022 07:22 AM <DIR> .gimp-2.8
08/31/2017 03:42 PM <DIR> .gradle
08/23/2019 09:06 AM <DIR> .idea
08/23/2019 09:06 AM <DIR> .ipython
08/23/2019 09:06 AM <DIR> .matplotlib
08/23/2019 09:06 AM <DIR> .ssh
07/04/2017 11:58 PM <DIR> .usb
07/04/2017 11:44 PM <DIR> .oracle_jre_usage
02/27/2024 01:34 PM <DIR> .p2
04/05/2023 09:51 AM <DIR> 340 Objects
01/23/2023 09:53 AM <DIR> .PyCharmE2018.3
09/19/2019 07:57 AM <DIR> 8,736 .Rhistory
11/27/2023 09:52 AM <DIR> .spyder-py3
08/23/2017 03:52 PM <DIR> .thumbnails
10/05/2020 02:22 PM <DIR> .thumbnails
07/05/2017 02:04 AM <DIR> .tooling
08/09/2019 09:51 AM <DIR> VirtualBox
07/04/2017 11:55 PM <DIR> 1,279 .xmlcopyeditor
10/17/2023 09:51 AM <DIR> 30 Objects
09/13/2021 10:17 AM <DIR> .AndroidStudio
08/16/2019 11:46 AM <DIR> Anaconda3
01/14/2019 10:16 AM <DIR> AndroidStudioProjects
04/08/2019 11:30 AM <DIR> Cisco Packet Tracer 7.1
04/08/2019 11:30 AM <DIR> Cisco Packet Tracer 7.2.1
10/17/2023 09:51 AM <DIR> Contacts
02/27/2024 01:40 PM <DIR> Desktop
10/17/2023 09:51 AM <DIR> Downloads
09/13/2021 10:17 AM <DIR> 2,724 .dircache.txt
10/17/2023 10:46 AM <DIR> Documents
11/27/2023 10:30 AM <DIR> Downloads
07/05/2017 01:45 AM <DIR> eclipse-workspace
02/06/2019 12:46 PM <DIR> eclipse-workspace
10/17/2023 09:51 AM <DIR> Favorites
09/13/2021 10:22 AM <DIR> 10,317,272 .hidden.info.txt
09/13/2021 10:22 AM <DIR> .hidden.info
07/05/2017 01:45 AM <DIR> op_admin
07/05/2017 01:41 AM <DIR> op_models
07/05/2017 01:41 AM <DIR> op_reports
11/05/2023 09:51 AM <DIR> Pictures
11/06/2023 06:27 AM <DIR> Saved Games
10/17/2023 09:51 AM <DIR> Searches
11/27/2023 10:20 AM <DIR> Videos
09/10/2021 01:29 PM <DIR> VirtualBox VMs

Windows PowerShell - sluser1 - 6/17/2024 5:57 AM

```

3. Help command to view available commands.

```

[1] Command Prompt
01/17/2023 09:51 AM <DIR> Searches
11/17/2023 10:20 AM <DIR> Videos
09/16/2023 01:29 PM <DIR> VirtualBox VMs
07/04/2017 11:53 AM <DIR> .wefiles
    File(s) 26,330,493 bytes
        47 Dir(s) 347,736,419,440 bytes free

C:\Users\sluser1\help
For more information on a specific command, type HELP command-name.

ASSOC Displays on modifies file extension associations.
ATTRIB Displays or changes file attributes.
BRENTRY Sets or removes entries in the boot entry list.
BCEDIT Sets properties in boot database to control boot loading.
EACLS Displays on modifies access control lists (ACLs) of files.
CALL Calls one batch program from another.
CD Displays the current working directory or sets the current directory.
CHCP Displays on sets the active code page number.
CHDIR Displays the name of or changes the current directory.
CHKDSK Checks disk for errors and repairs a disk.
CHKNTFS Displays on modifies the checking of disk at boot time.
CLS Clears the screen.
CMD Starts a new instance of the Windows command interpreter.
COLOR Sets the default console foreground and background colors.
COMP Compares the contents of two files or sets of files.
COMPACT Displays or alters the compression of files on NTFS partitions.
CONVERT Converts NTFS volumes to FAT. You cannot convert the current drive.
COPY Copies one or more files to another location.
DATE Displays on sets the date.
DIR Displays a list of files and subdirectories in a directory.
DISKPART Displays or configures Disk Partition properties.
DOSKEY Edits command lines, recalls Windows commands, and creates macros.
DRIVERQUERY Displays current device driver status and properties.
ECHO Displays messages, or turns command echoing on or off.
ENDLOCAL Ends localization of environment changes in a batch file.
ERASE Deletes one or more files.
EXIT Quits the CMD.EXE program (command interpreter).
FC Compares two files or sets of files, and displays the differences between them.
FIND Searches for a text string in a file or files.
FINDSTR Searches for strings in files.
FOR Runs a command once for each file in a set of files.
FORMAT Formats a disk for use with Windows.
FSUTIL Displays or configures the file system properties.
FTYPE Displays or modifies file types used in file extension associations.
GOTO Directs the Windows command interpreter to a labeled line in a batch program.
GPRESULT Displays Group Policy information for machine or user.
GRATABLF Enables windows to display extended character set in graphics mode.
HELP Provides help information for Windows commands.
TCACLS Displays, modify, backup, or restore ACLs for files and directories.
IF Performs conditional processing in batch programs.
LABEL Creates, changes, or deletes the volume label of a disk.
MD Creates a directory.
MKDIR Creates a directory.
MKLINK Creates junction links and Hard Links.
MOUD Configures a system device.
MORE Displays output one screen at a time.

Windows PowerShell - sluser1 - 6/17/2024 5:57 AM

```

4. ? command to display list of files and directories.

```

C:\ Command Prompt
DIR [/S/P/F] [Volume] [FileSpec] [/A[:attributes]] [/E] [/L] [/N]
[/O[:sortorder]] [/P] [/Q] [/R] [/S] [/T[:timefield]] [/W] [/X] [/V]

[drive:]|[path]|filename] Specifies drive, directory, and/or files to list.

/A      Display files with specified attributes.
       H Directories          R Read-only files
       H Hidden files         A Files ready for archiving
       S System files         I Not content indexed files
       L Large files          O Offline files
       P Prefix meaning not
       /B Uses bare format (no heading information or summary).
       /C Display the thousand separator in file sizes. This is the
       default if you type a comma instead of a period.
       /D Same as wide but files are list sorted by column.
       /I Uses lowercase.
       /M New long listing format where filenames are on the far right.
       /O List files in sorted order.
       N By name (alphabetic)  S By size (smallest first)
       G By extension (alphabetic) D By date/time (oldest first)
       C By creation time     E By modification time to reverse order
       /P Pauses after each screenful of information.
       /Q Display the owner of the file.
       /R Recursively lists all subdirectories of the file.
       /S Displays files in specified directory and all subdirectories.
       /T Controls which time field displayed or used for sorting.
           C Creation
           M Modification
           W Last written
       /M Uses wide list format.
       /X This displays the short names generated for non-8dot3 file
       names. The format is that of /U with the short name inserted
       before the long name. If no short name is present, blanks are
       displayed in its place.
       /Y Displays four-digit years.

Switches may be preset in the DIRCMD environment variable. Override
preset switches by prefixing any switch with - (hyphen)--for example, /-W.

C:\Users\user1\dir\/
Volume in drive C has no label.
Volume Serial Number is 88E1-F991

Directory of C:\Users\user1

04/05/2024  02:01 PM    <DIR>        .
04/05/2024  02:01 PM    <DIR>        ..
07/05/2017  01:53 AM    <DIR>        .andcodestudio2.3
08/05/2019  01:06 PM    <DIR>        config
08/23/2019  01:06 PM    126 defaults-0.1.0.ini
02/20/2018  02:13 PM    <DIR>        .eclipse

```

5. Dir/L to display all directories in lowercase letters.

```

C:\ Command Prompt
/L      displayed in lowercase
/Y      displays four-digit years

Switches may be preset in the DIRCMD environment variable. Override
preset switches by prefixing any switch with - (hyphen)--for example, /-W.

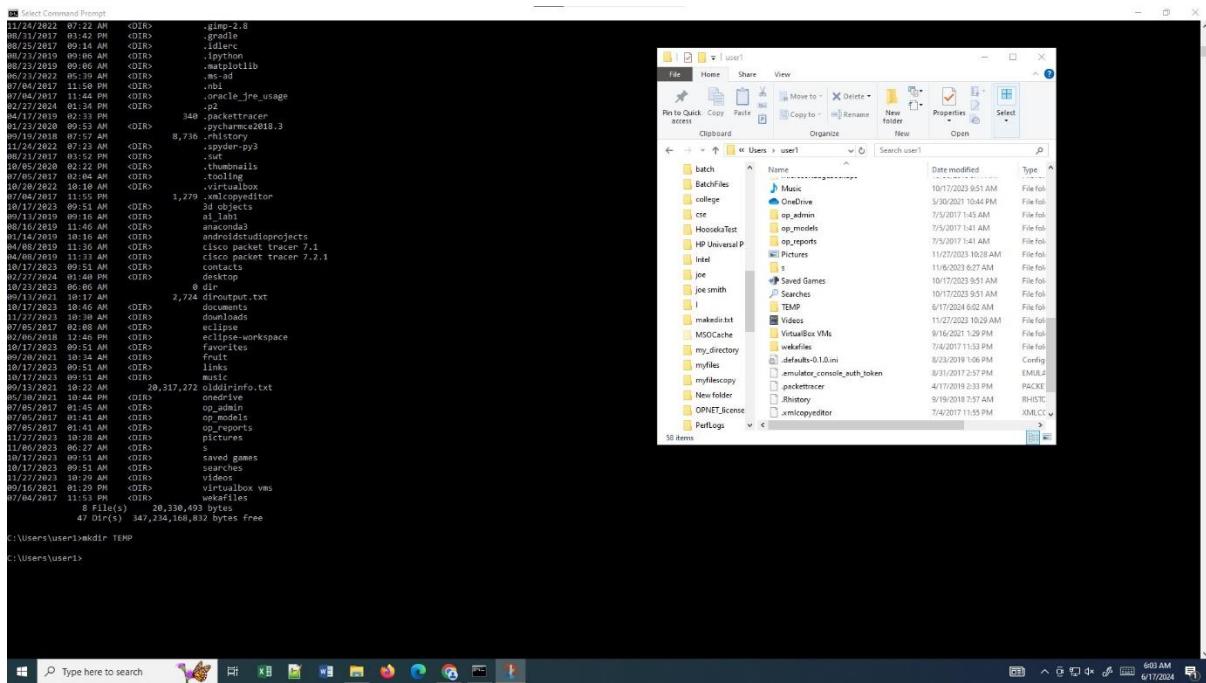
C:\Users\user1\dir\/
Volume in drive C has no label.
Volume Serial Number is 88E1-F991

Directory of C:\Users\user1

04/05/2024  02:01 PM    <DIR>        .
04/05/2024  02:01 PM    <DIR>        ..
07/05/2017  01:53 AM    <DIR>        .andcodestudio2.3
08/05/2019  01:06 PM    <DIR>        config
08/23/2019  01:06 PM    126 defaults-0.1.0.ini
02/20/2018  02:13 PM    <DIR>        .eclipse
09/05/2019  02:13 PM    <DIR>        16 .eclipselink_console_auth_token
11/24/2022  07:22 AM    <DIR>        .git
08/31/2017  03:42 PM    <DIR>        .gradle
08/05/2019  09:14 AM    <DIR>        .idb
08/05/2019  09:14 AM    <DIR>        .ipython
08/23/2019  09:06 AM    <DIR>        .matplotlib
06/23/2022  05:39 AM    <DIR>        .ms-ad
07/04/2019  01:34 PM    <DIR>        .net
07/04/2017  11:44 AM    <DIR>        .oracle_jre_usage
02/27/2022  01:34 PM    <DIR>        .p2
04/17/2019  02:33 PM    <DIR>        340 .packettracer
11/13/2023  09:51 AM    <DIR>        .pycache
09/10/2019  07:57 AM    8,736 .rhistory
11/24/2022  07:23 AM    <DIR>        .spyder-py3
08/05/2019  09:16 AM    <DIR>        .temp
18/05/2023  02:22 PM    <DIR>        .thumbnails
07/05/2017  02:04 AM    <DIR>        .tooling
10/20/2022  10:10 AM    <DIR>        .virtualbox
10/17/2023  09:51 AM    <DIR>        1,279 .wixprojoutput
10/17/2023  09:51 AM    <DIR>        id_objects
09/13/2019  09:16 AM    <DIR>        ai_lab
08/05/2019  09:16 AM    <DIR>        anaconda
01/14/2019  10:16 AM    <DIR>        andcodestudioprojects
04/08/2019  11:36 AM    <DIR>        cisco packet tracer 7.1
04/08/2019  11:33 AM    <DIR>        cisco packet tracer 7.2.1
04/08/2019  11:33 AM    <DIR>        cisco packet tracer 7.2.2
02/27/2024  01:49 PM    <DIR>        desktop
10/3/2023  06:06 AM    <DIR>        0 dir
10/17/2023  10:22 AM    <DIR>        2,774 diroutput.txt
18/05/2023  10:46 AM    <DIR>        documents
11/27/2023  10:30 AM    <DIR>        downloads
07/05/2017  02:08 AM    <DIR>        eclipse
02/27/2023  10:22 AM    <DIR>        my workspace
10/17/2023  09:51 AM    <DIR>        favorites
09/20/2023  10:34 AM    <DIR>        fruit
10/17/2023  09:51 AM    <DIR>        links
10/17/2023  09:51 AM    <DIR>        music
09/11/2023  10:22 AM    <DIR>        20,317,272 olddirinfo.txt
05/30/2023  10:44 PM    <DIR>        onedrive
07/05/2017  01:41 AM    <DIR>        op_models
07/05/2017  01:41 AM    <DIR>        op_reports
10/27/2023  10:28 PM    <DIR>        pictures
13/05/2023  09:51 AM    <DIR>        s
10/17/2023  09:51 AM    <DIR>        saved games

```

6. Create folder “TEMP” using mkdir command.



7. Change directory to TEMP using cd and dir to view files in TEMP.

```

07/05/2017  01:41 AM    <DIR>      op_models
07/05/2017  01:41 AM    <DIR>      op_reports
11/27/2023  10:28 AM    <DIR>      pictures
11/06/2023  06:27 AM    <DIR>      s
10/17/2023  09:51 AM    <DIR>      saved_games
10/17/2023  09:51 AM    <DIR>      searches
11/27/2023  10:29 AM    <DIR>      videos
09/16/2021  01:29 PM    <DIR>      virtualbox_vms
07/04/2017  11:53 PM    <DIR>      wekafiles
     8 File(s)   20,330,493 bytes
    47 Dir(s)  347,234,168,832 bytes free

C:\Users\user1>mkdir TEMP

C:\Users\user1>cd TEMP

C:\Users\user1\TEMP>dir
 Volume in drive C has no label.
 Volume Serial Number is B8EC-F991

 Directory of C:\Users\user1\TEMP

06/17/2024  06:02 AM    <DIR>      .
06/17/2024  06:02 AM    <DIR>      ..
          0 File(s)   0 bytes
          2 Dir(s)  347,238,223,872 bytes free

C:\Users\user1\TEMP>

```

ca Command Prompt

```
Directory of C:\Users\user1\TEMP

06/17/2024  06:02 AM    <DIR>      .
06/17/2024  06:02 AM    <DIR>      ..
          0 File(s)           0 bytes
          2 Dir(s)  347,238,223,872 bytes free

C:\Users\user1\TEMP>cd ..

C:\Users\user1>mkdir TEMP2

C:\Users\user1>dir
Volume in drive C has no label.
Volume Serial Number is B8EC-F991

Directory of C:\Users\user1

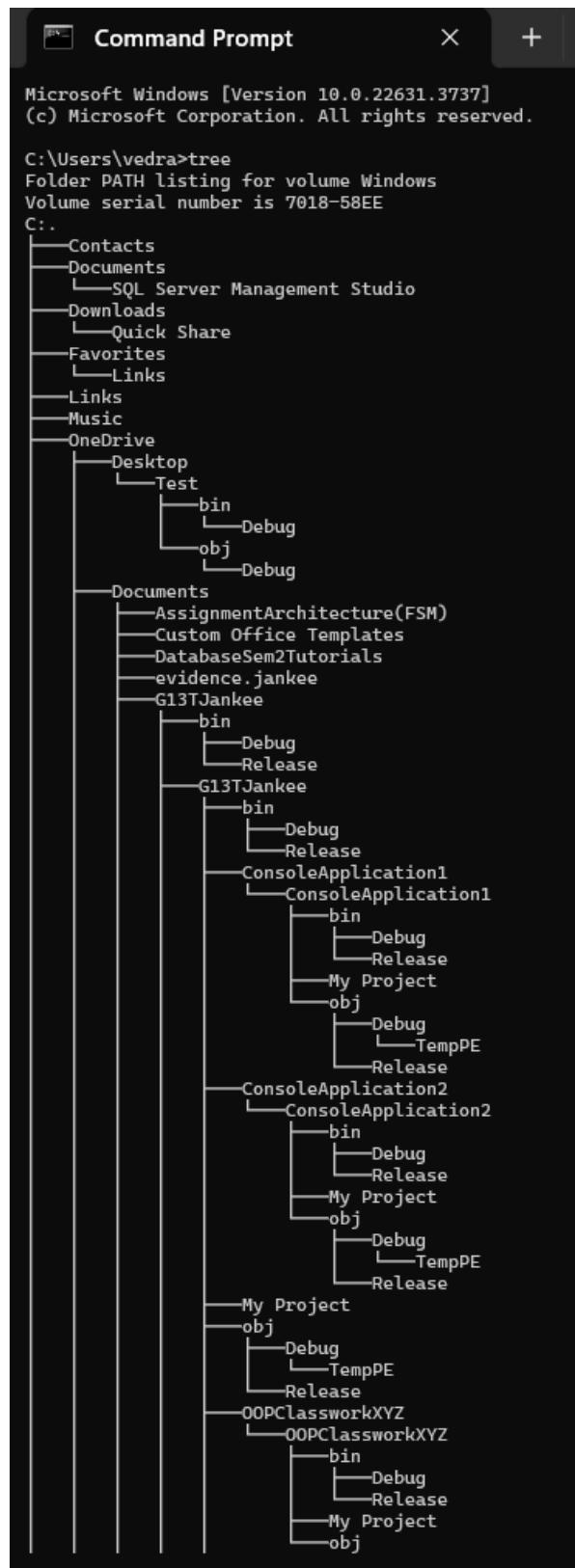
06/17/2024  10:09 AM    <DIR>      .
06/17/2024  10:09 AM    <DIR>      ..
07/05/2017  01:53 AM    <DIR>      .AndroidStudio2.3
08/23/2019  09:06 AM    <DIR>      .config
08/23/2019  01:06 PM    <DIR>      126 .defaults-0.1.0.ini
02/20/2018  02:13 PM    <DIR>      .eclipse
08/31/2017  02:57 PM    <DIR>      16 .emulator_console_auth_token
11/24/2022  07:22 AM    <DIR>      .gimp-2.8
08/31/2017  03:42 PM    <DIR>      .gradle
08/25/2017  09:14 AM    <DIR>      .idlerc
08/23/2019  09:06 AM    <DIR>      .ipython
08/23/2019  09:06 AM    <DIR>      .matplotlib
06/23/2022  05:39 AM    <DIR>      .ms-ad
07/04/2017  11:50 PM    <DIR>      .nbi
07/04/2017  11:44 PM    <DIR>      .oracle_jre_usage
02/27/2024  01:34 PM    <DIR>      .p2
04/17/2019  02:33 PM    <DIR>      340 .packettracer
01/23/2020  09:53 AM    <DIR>      .PyCharmCE2018.3
09/19/2018  07:57 AM    <DIR>      8,736 .Rhistory
11/24/2022  07:23 AM    <DIR>      .spyder-py3
08/21/2017  03:52 PM    <DIR>      .swt
10/05/2020  02:22 PM    <DIR>      .thumbnails
07/05/2017  02:04 AM    <DIR>      .tooling
10/20/2022  10:10 AM    <DIR>      .VirtualBox
07/04/2017  11:55 PM    <DIR>      1,279 .xmlcopyeditor
10/17/2023  09:51 AM    <DIR>      3D Objects
09/13/2019  09:16 AM    <DIR>      ai_lab1
08/16/2019  11:46 AM    <DIR>      Anaconda3
01/14/2019  10:16 AM    <DIR>      AndroidStudioProjects
04/08/2019  11:36 AM    <DIR>      Cisco Packet Tracer 7.1
04/08/2019  11:33 AM    <DIR>      Cisco Packet Tracer 7.2.1
10/17/2023  09:51 AM    <DIR>      Contacts
02/27/2024  01:40 PM    <DIR>      Desktop
10/23/2023  06:06 AM    <DIR>      0 dir
09/13/2021  10:17 AM    <DIR>      2,724 diroutput.txt
10/17/2023  10:46 AM    <DIR>      Documents
06/17/2024  05:57 AM    <DIR>      Downloads
07/05/2017  02:08 AM    <DIR>      eclipse
02/06/2018  12:46 PM    <DIR>      eclipse-workspace
10/17/2023  09:51 AM    <DIR>      Favorites
09/20/2021  10:34 AM    <DIR>      fruit
10/17/2023  09:51 AM    <DIR>      Links
10/17/2023  09:51 AM    <DIR>      Music
09/13/2021  10:22 AM    <DIR>      20,317,272 olddirinfo.txt
05/30/2021  10:44 PM    <DIR>      OneDrive
07/05/2017  01:45 AM    <DIR>      op_admin
```



Type here to search



8. Display directories and subdirectories in a tree format.

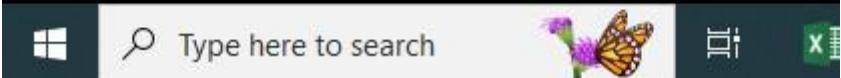


```
Microsoft Windows [Version 10.0.22631.3737]
(c) Microsoft Corporation. All rights reserved.

C:\Users\vedra>tree
Folder PATH listing for volume Windows
Volume serial number is 7018-58EE
C:.
    +-- Contacts
    +-- Documents
        +-- SQL Server Management Studio
    +-- Downloads
        +-- Quick Share
    +-- Favorites
        +-- Links
    +-- Links
    +-- Music
    +-- OneDrive
        +-- Desktop
            +-- Test
                +-- bin
                    +-- Debug
                    +-- obj
                        +-- Debug
        +-- Documents
            +-- AssignmentArchitecture(FSM)
            +-- Custom Office Templates
            +-- DatabaseSem2Tutorials
            +-- evidence.jankee
            +-- G13TJankee
                +-- bin
                    +-- Debug
                    +-- Release
                +-- G13TJankee
                    +-- bin
                        +-- Debug
                        +-- Release
                    +-- ConsoleApplication1
                        +-- ConsoleApplication1
                            +-- bin
                                +-- Debug
                                +-- Release
                            +-- My Project
                            +-- obj
                                +-- Debug
                                    +-- TempPE
                                +-- Release
                            +-- ConsoleApplication2
                                +-- ConsoleApplication2
                                    +-- bin
                                        +-- Debug
                                        +-- Release
                                    +-- My Project
                                    +-- obj
                                        +-- Debug
                                            +-- TempPE
                                        +-- Release
                                +-- My Project
                                +-- obj
                                    +-- Debug
                                        +-- TempPE
                                    +-- Release
                            +-- OOPClassworkXYZ
                                +-- OOPClassworkXYZ
                                    +-- bin
                                        +-- Debug
                                        +-- Release
                                    +-- My Project
                                    +-- obj
    +-- OneDrive
```

9. Echo command to output a message.

```
C:\Users\user1\TEMP>echo "this is a test"  
"this is a test"  
  
C:\Users\user1\TEMP>
```



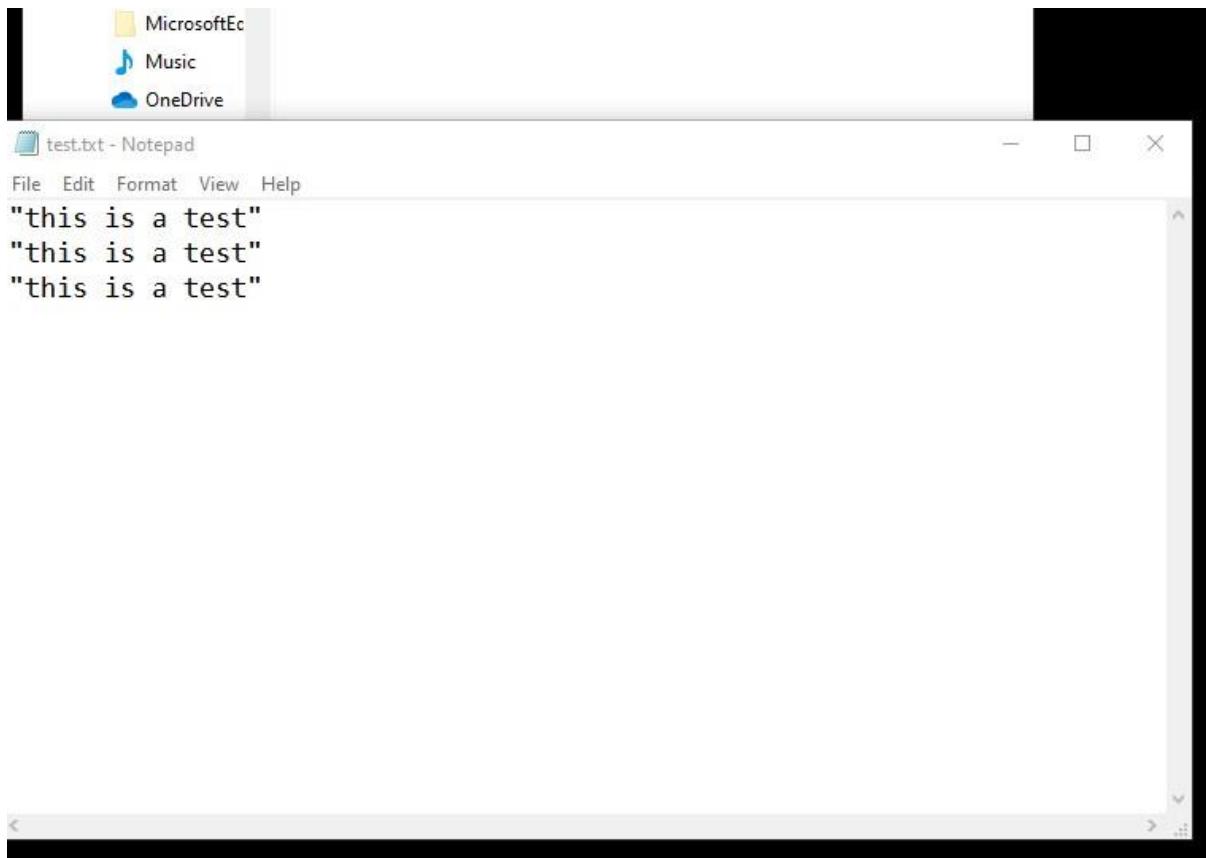
10. Insert the message in a textfile(notepad).

```
C:\Users\user1\TEMP>echo "this is a test" >> test.txt  
  
C:\Users\user1\TEMP>
```



```
C:\Users\user1\TEMP>echo "this is a test"  
"this is a test"  
  
C:\Users\user1\TEMP>echo "this is a test" >> test.txt  
  
C:\Users\user1\TEMP>echo "this is a test" >> test.txt  
  
C:\Users\user1\TEMP>echo "this is a test" >> test.txt  
  
C:\Users\user1\TEMP>
```





11. To get help on how to copy, command COPY/? is used.

```
C:\Users\user1\TEMP>echo "this is a test" >> test.txt
C:\Users\user1\TEMP>COPY?/?
Copies one or more files to another location.

COPY [/D] [/V] [/N] [/Y | /-Y] [/Z] [/L] [/A | /B] source [/A | /B]
[+ source [/A | /B] [+ ...]] [destination [/A | /B]]

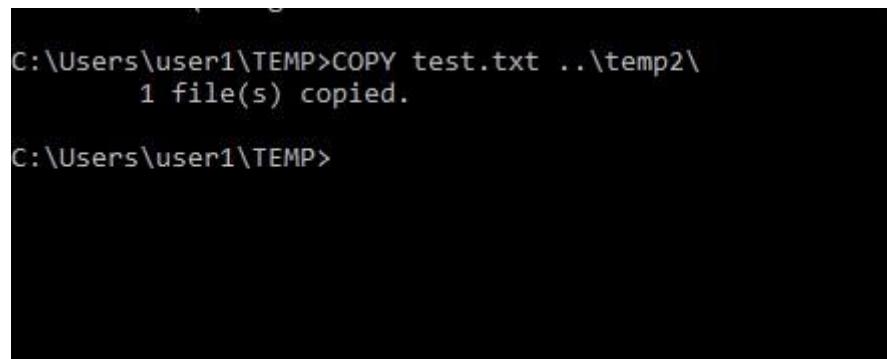
source      Specifies the file or files to be copied.
/A          Indicates an ASCII text file.
/B          Indicates a binary file.
/D          Allow the destination file to be created decrypted
destination  Specifies the directory and/or filename for the new file(s).
/V          Verifies that new files are written correctly.
/N          Uses short filename, if available, when copying a file with a
           non-8dot3 name.
/Y          Suppresses prompting to confirm you want to overwrite an
           existing destination file.
/-Y         Causes prompting to confirm you want to overwrite an
           existing destination file.
/Z          Copies networked files in restartable mode.
/L          If the source is a symbolic link, copy the link to the target
           instead of the actual file the source link points to.

The switch /Y may be preset in the COPYCMD environment variable.
This may be overridden with /-Y on the command line. Default is
to prompt on overwrites unless COPY command is being executed from
within a batch script.

To append files, specify a single file for destination, but multiple files
for source (using wildcards or file1+file2+file3 format).

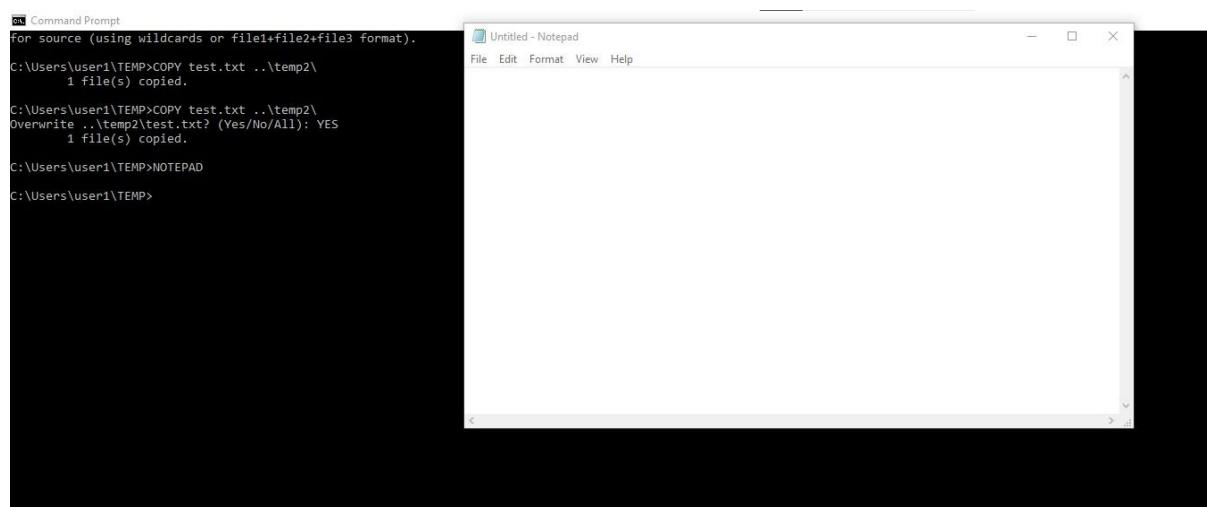
C:\Users\user1\TEMP>
```

12. Test.txt copied to temp2 folder.

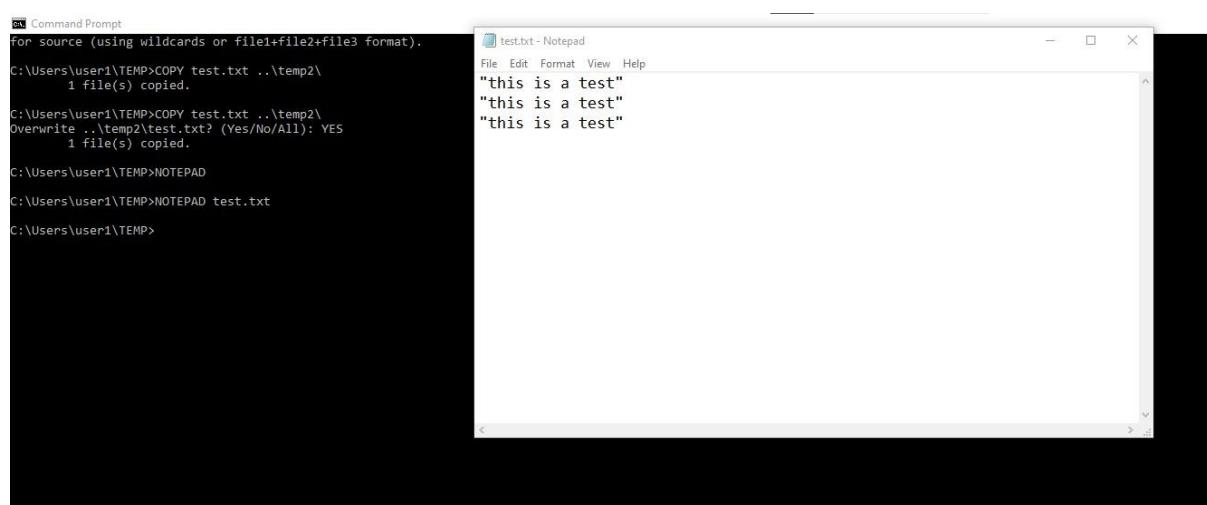


```
C:\Users\user1\TEMP>COPY test.txt ..\temp2\  
1 file(s) copied.  
C:\Users\user1\TEMP>
```

13. Open notepad.



14. Open textfile test.txt.

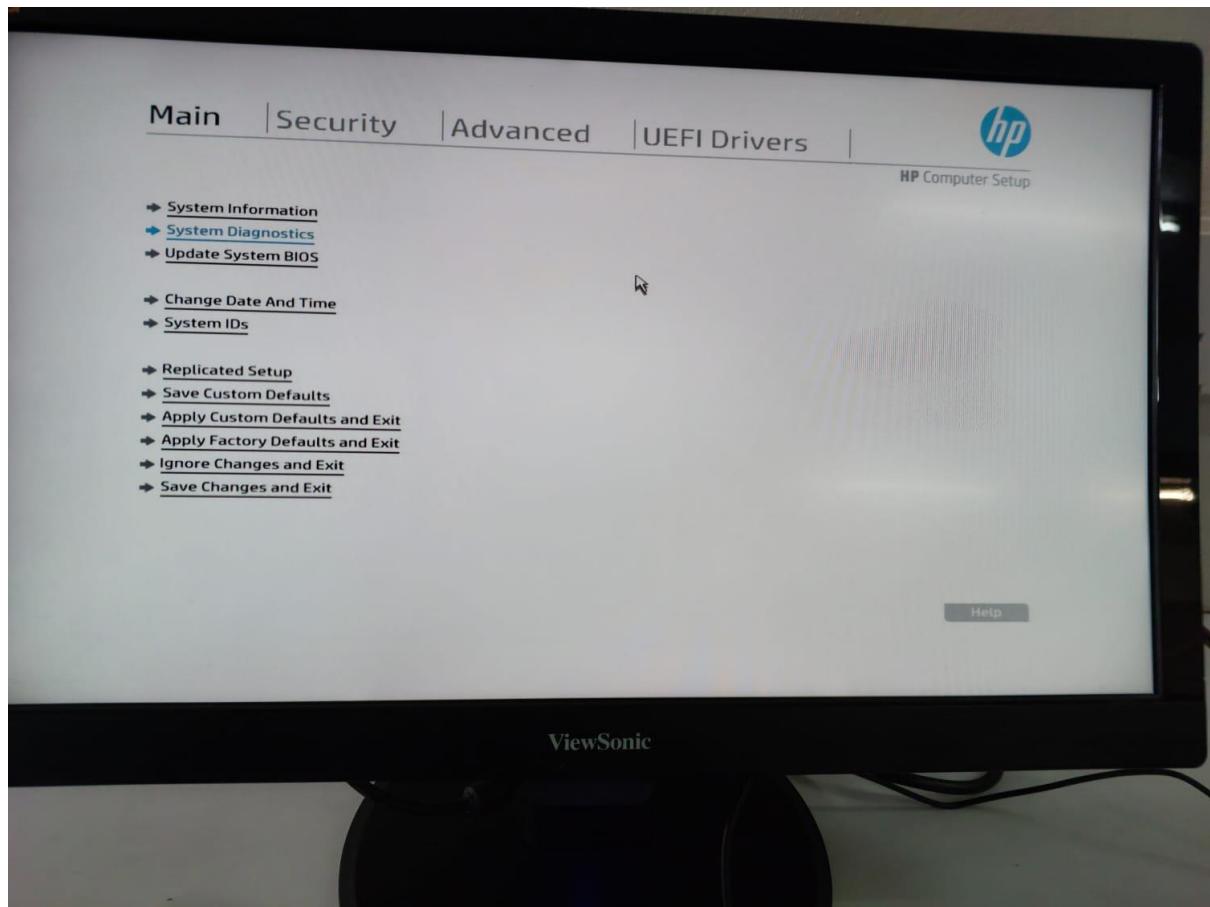


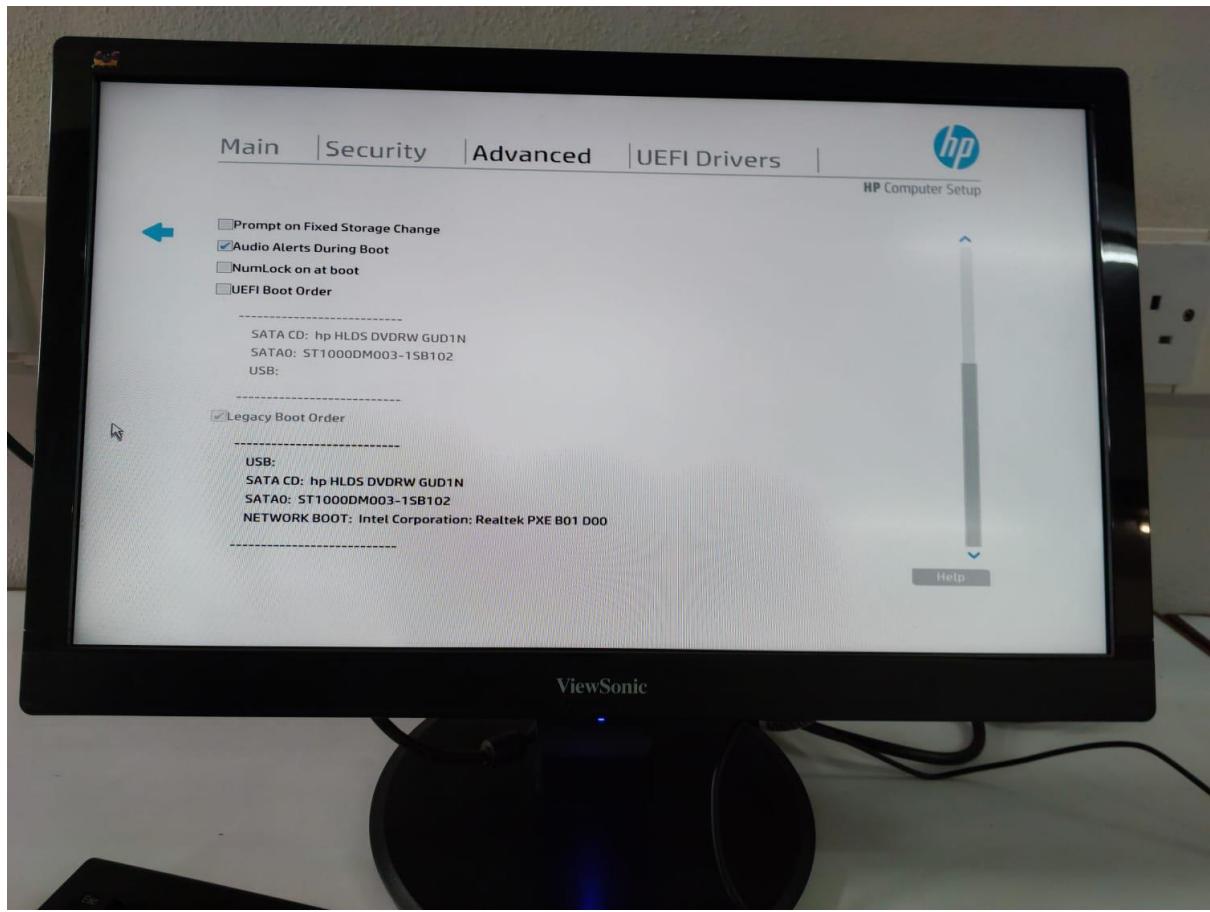
15. Delete duplicate textfile found in different directories without changing directory.(Specify path)

```
C:\Users\user1\TEMP>DEL "C:\Users\user1\TEMP\test.txt" "C:\Users\user1\TEMP2\test.txt"  
C:\Users\user1\TEMP>
```

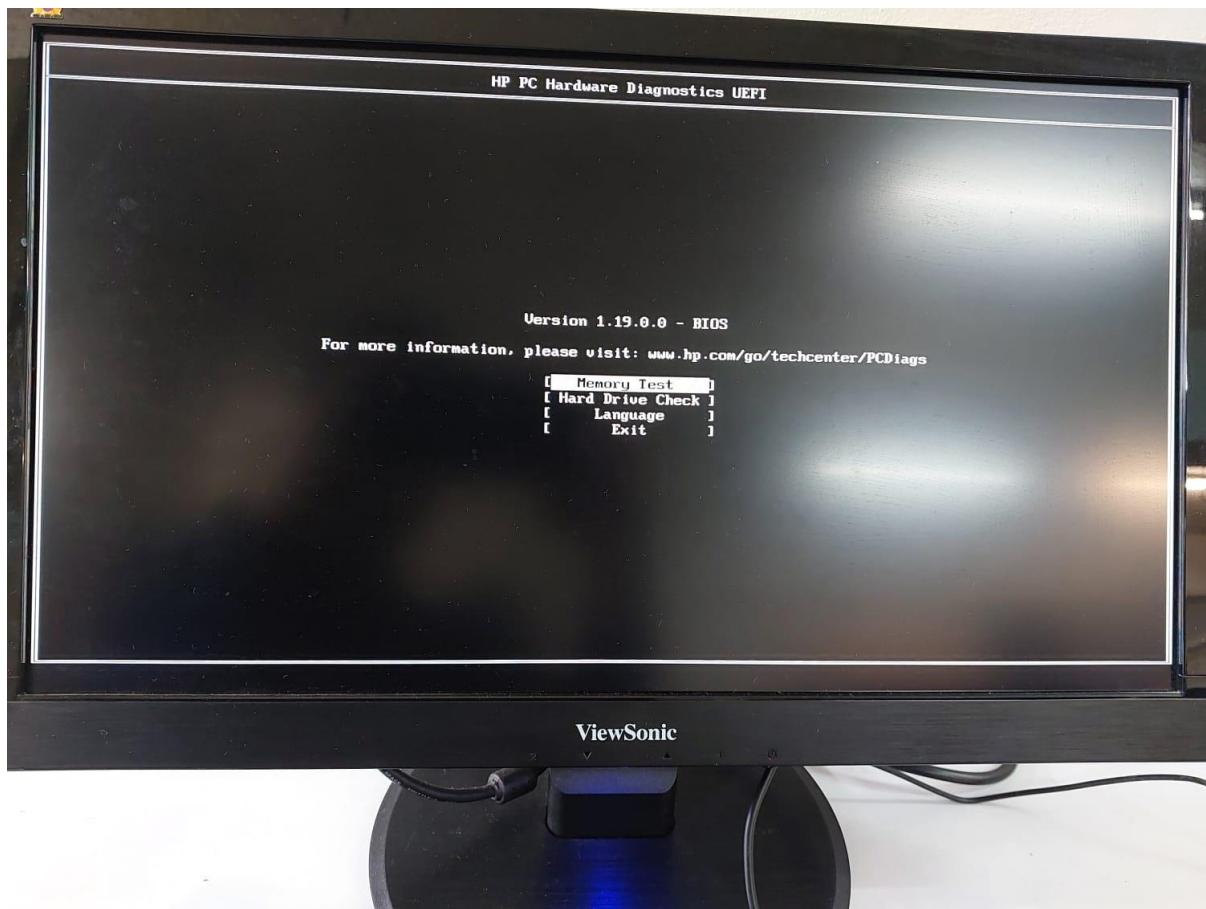
BIOS

1. Restart the PC and continuously press F10 on the keyboard, at least 1 one time per second. After the GRUB appears, press ESC to open BIOS.

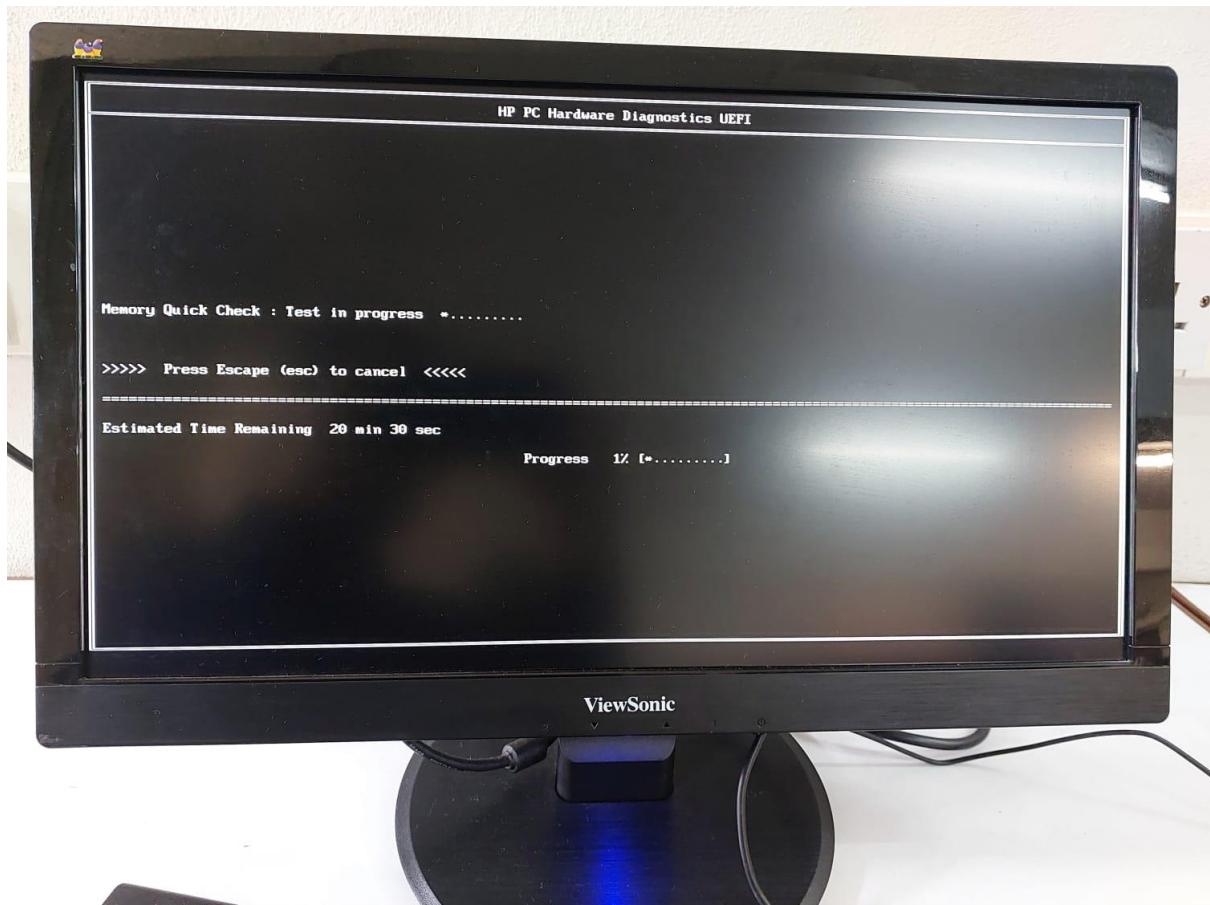




2. Click on system diagnostics to view what can be tested.

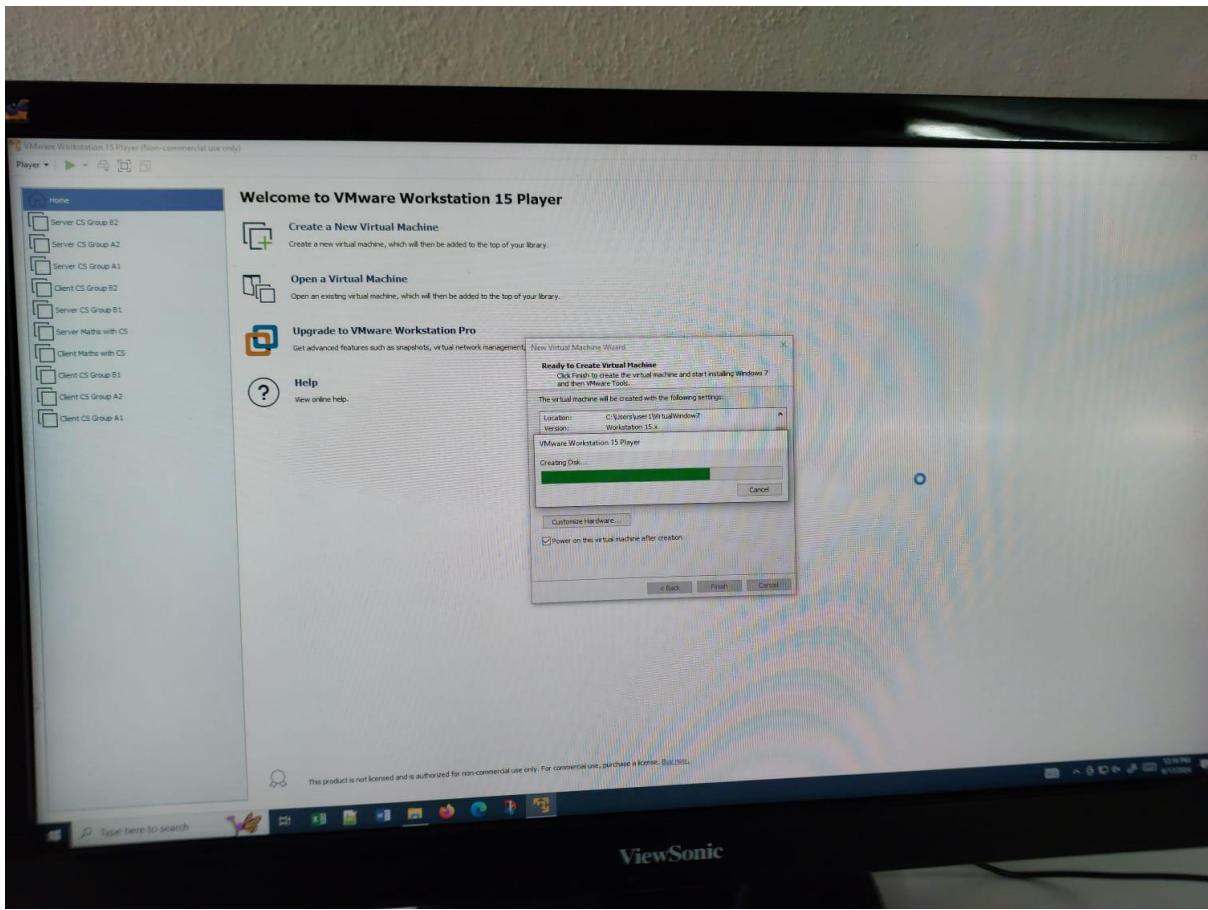


3. Click on memory testing to check the memory.

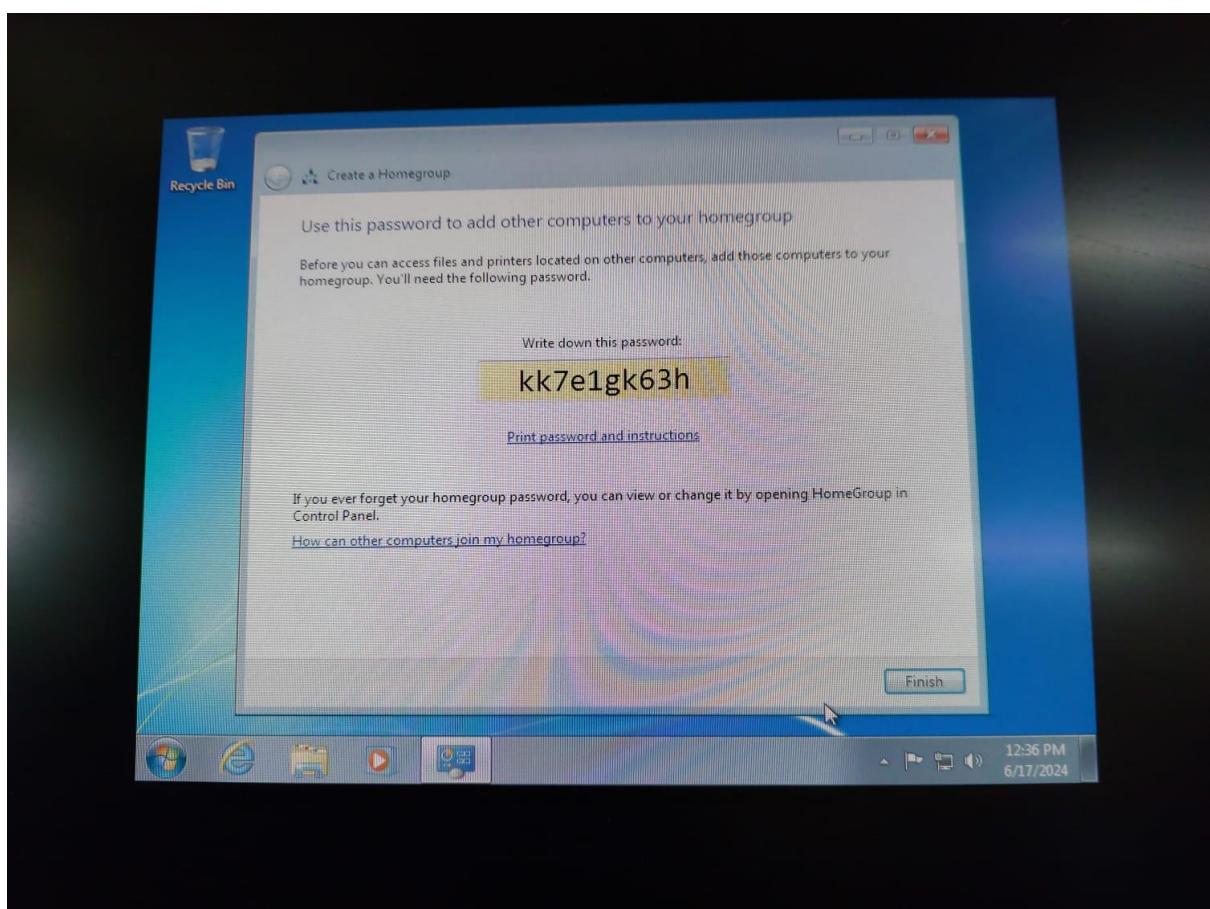
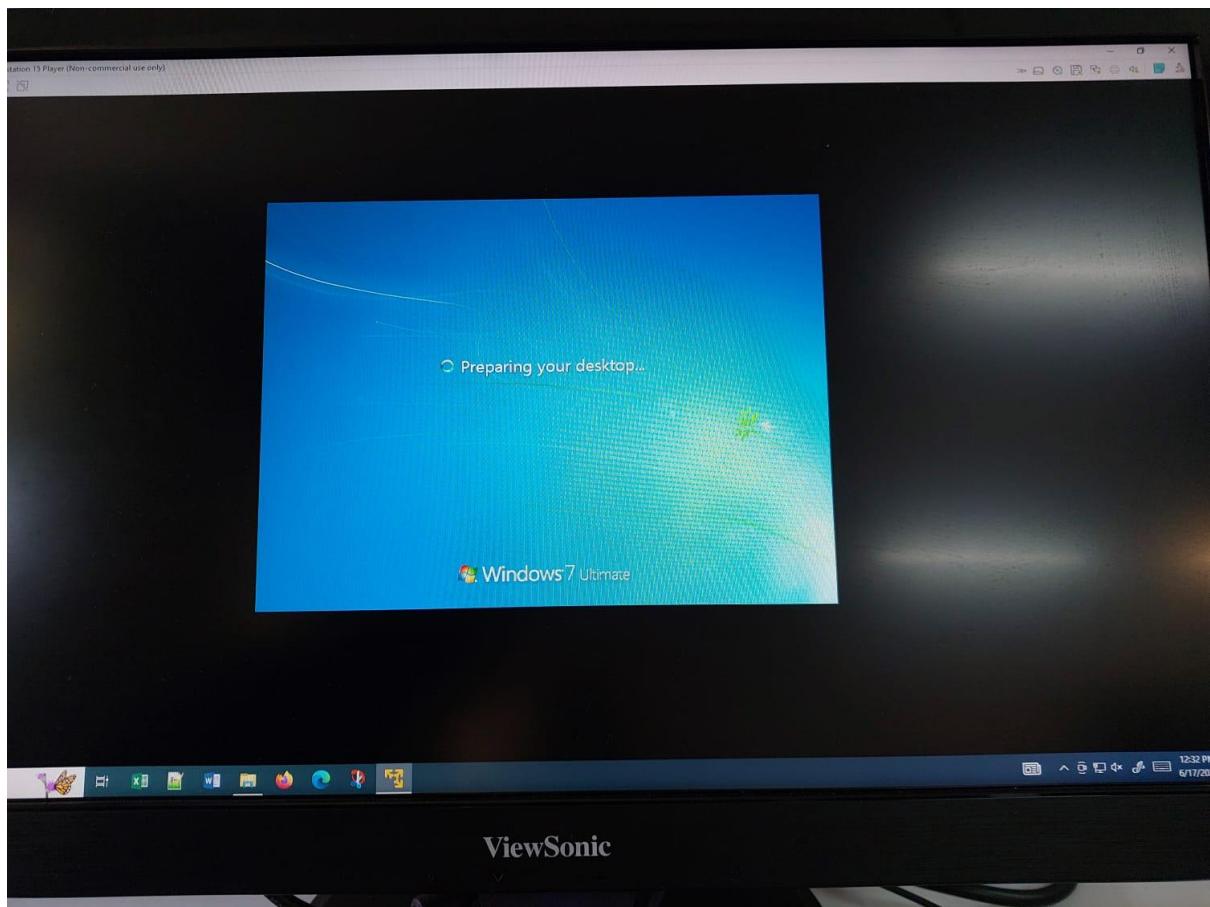


VMWare (Virtual machine)

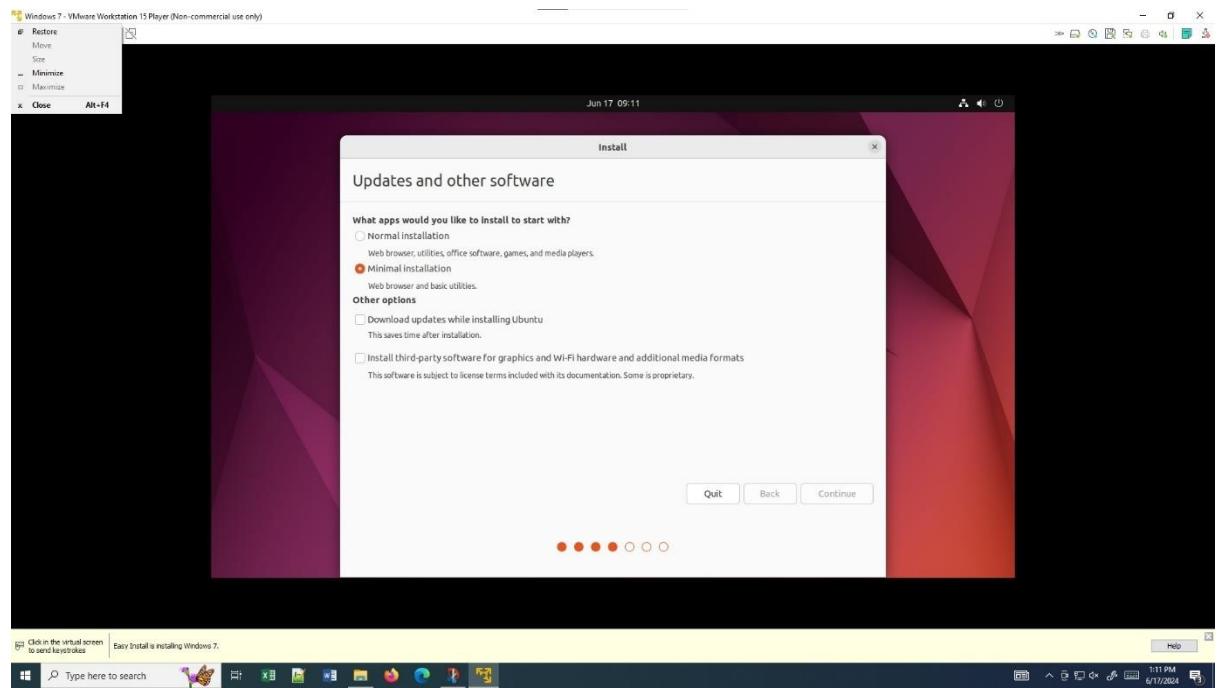
1. Click on create a new virtual machine and upload the windows file that we downloaded.



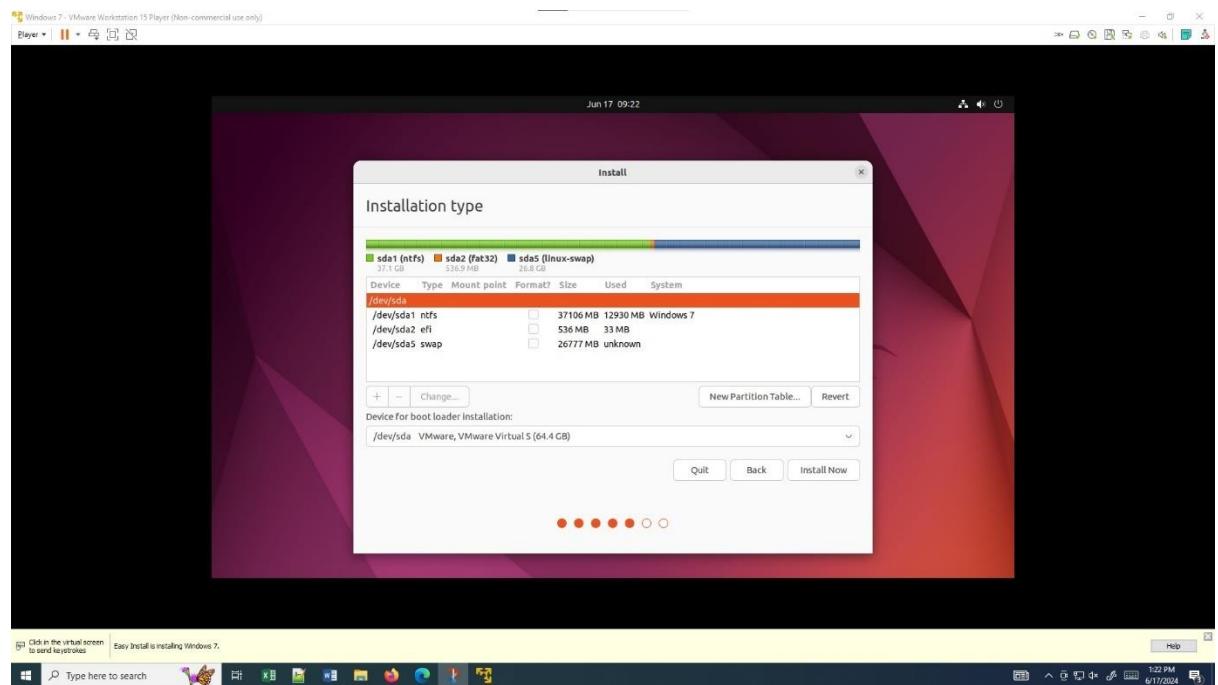
2. Windows is installing.

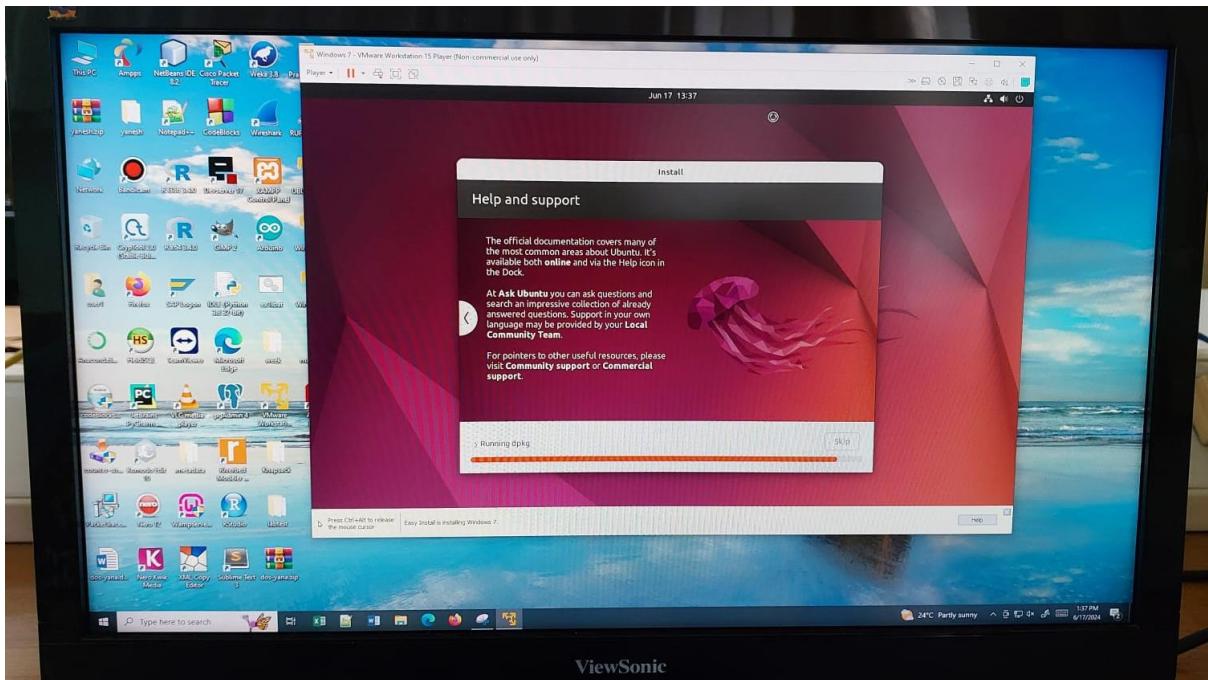


3. Steps to install linux on the virtual machine: Click player>manage>cd/dvd sata>upload ubuntu iso on host pc>restart>press del continuously>click on install ubuntu>follow steps till install.



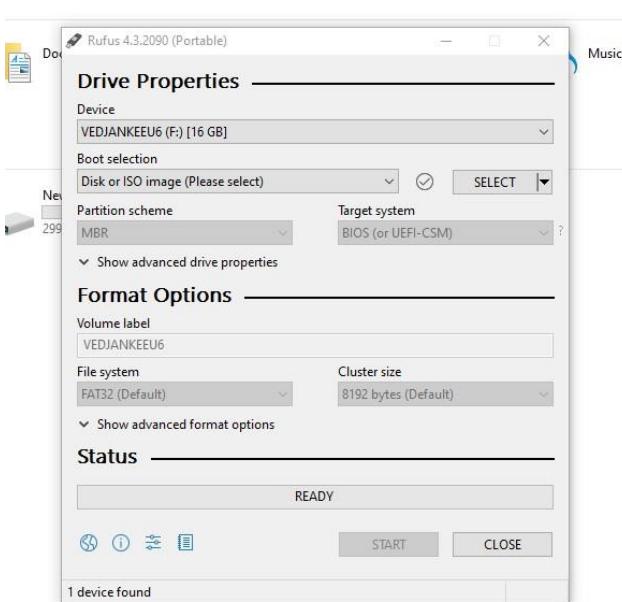
4. Create partitioning when installing.(Note: I reported a hardware error to Mr Appavoo and advised me to use another PC)



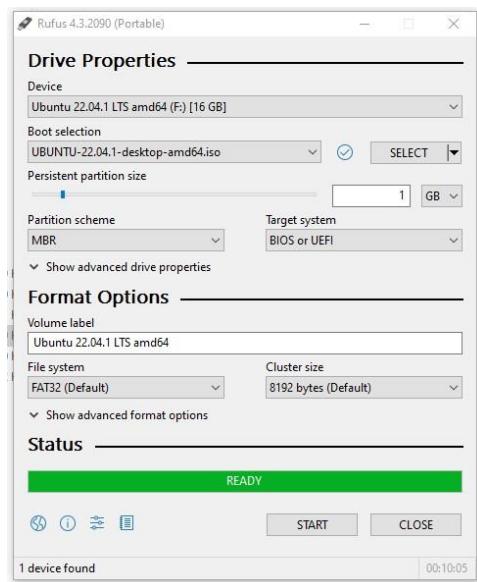
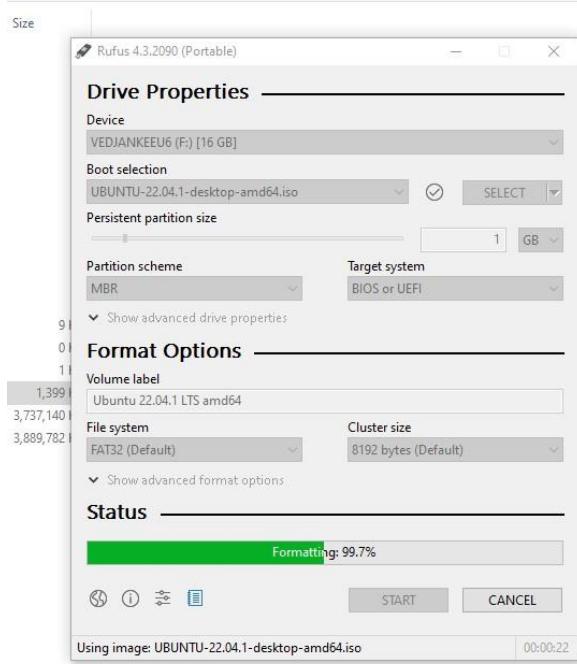


Rufus

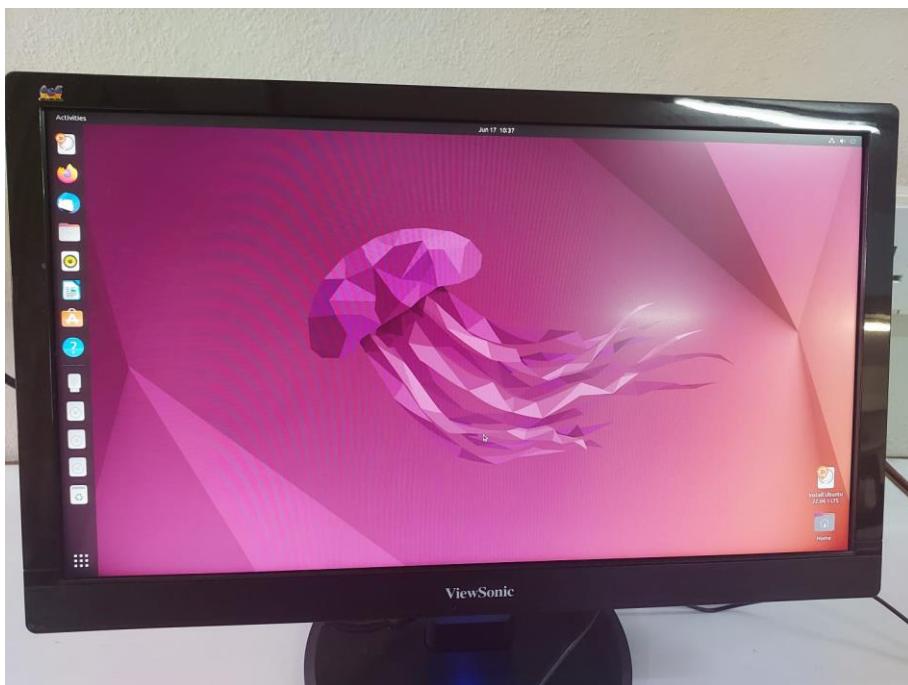
1. Click on RUFUS file and execute it. (Note:Click on UEFI Boot Order in BIOS before switching to Ubuntu)



2. Upload the ubuntu file and click start.

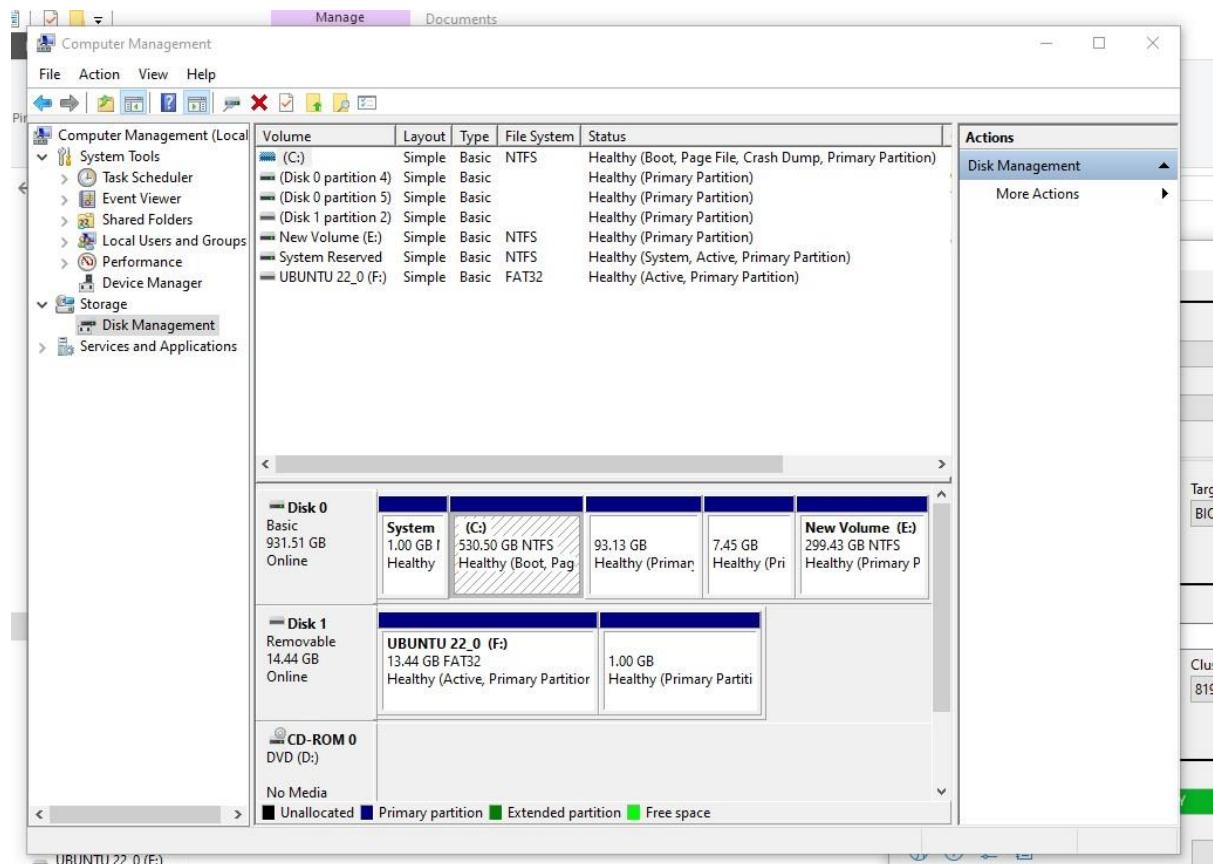


3. Do not click start. Restart PC and click del button rapidly. Click on install or try ubuntu.

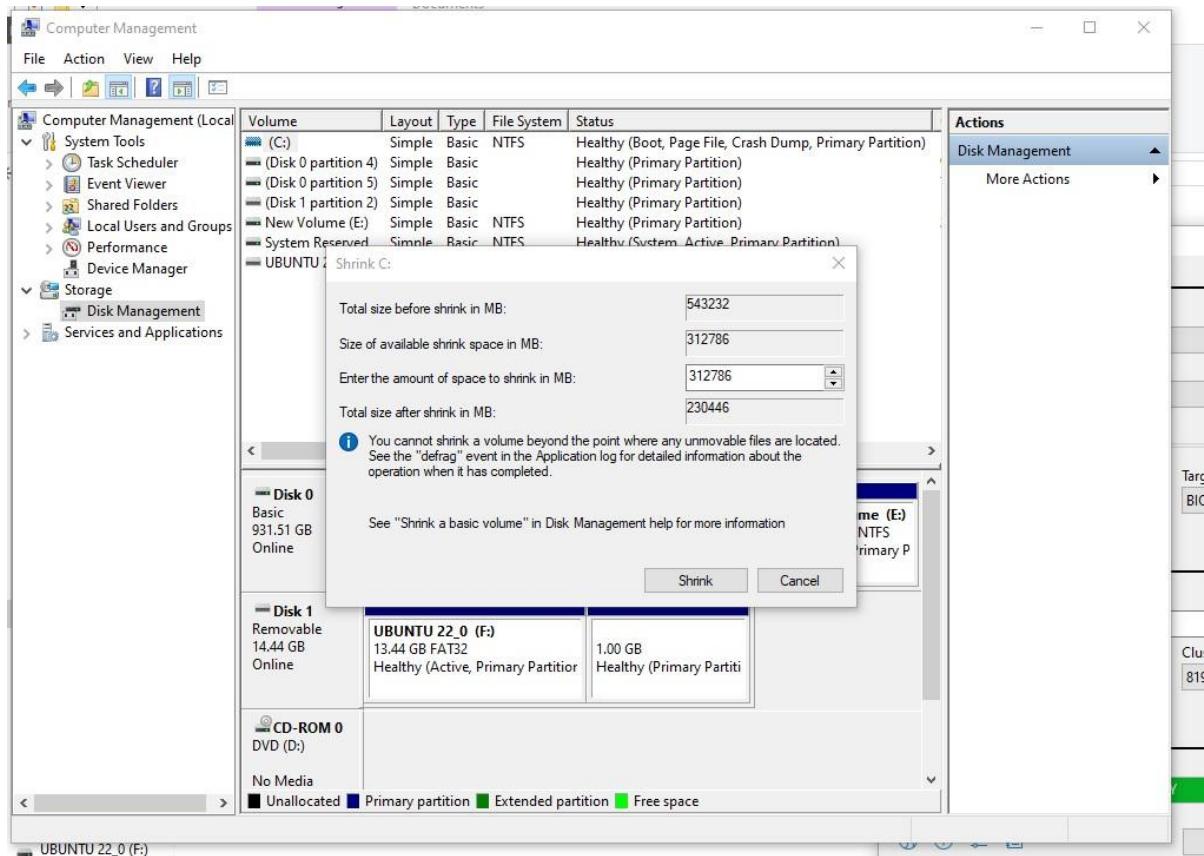


Partitioning

1. Open computer management and then disk management.



2. Right click and click on shrink to view amount of memory that can be shrunk.



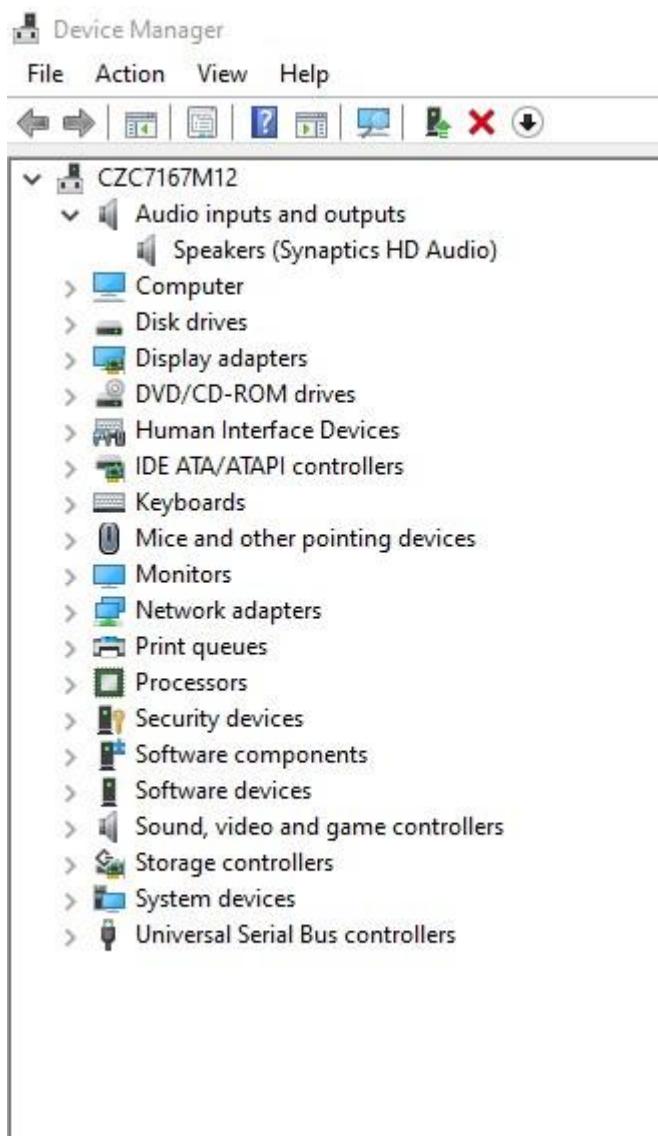
Day 2

Learning objectives

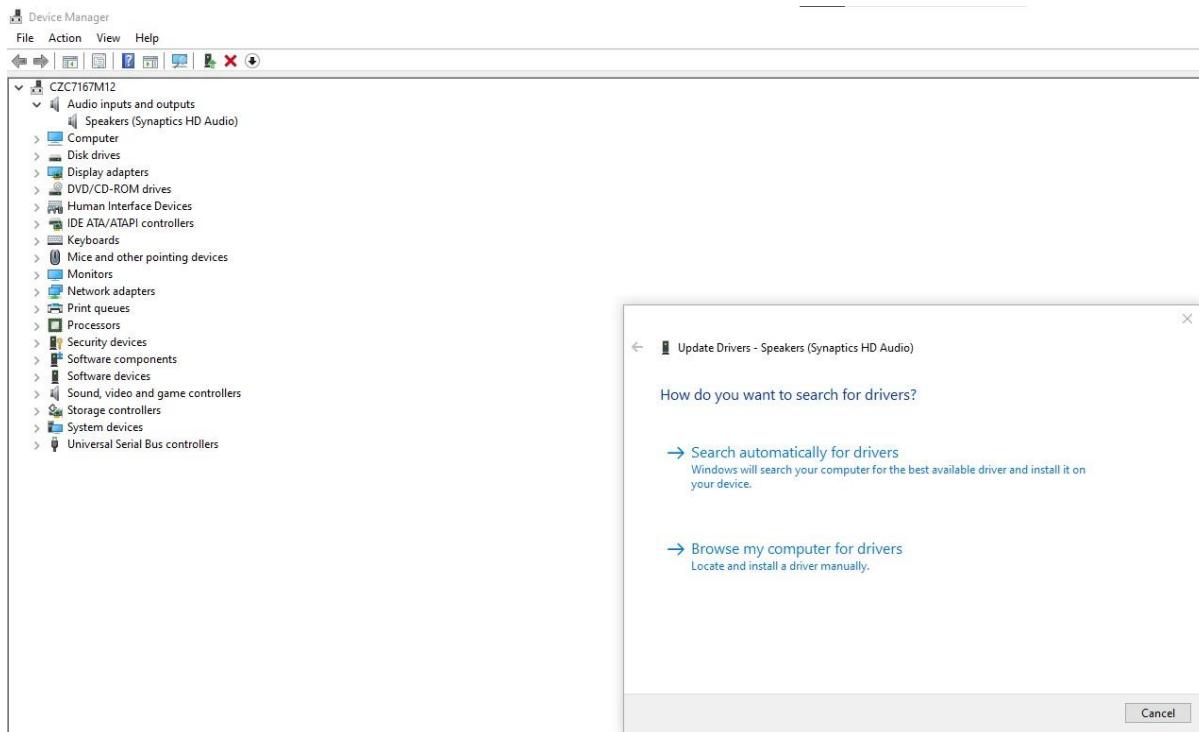
- Update hardware drivers
- Use of terminal in ubuntu
- Changing permission of a file
- Accessing a server (login to vara.hopto.org)
- Uploading a photo to the server

Update hardware driver

1. Open device manager.

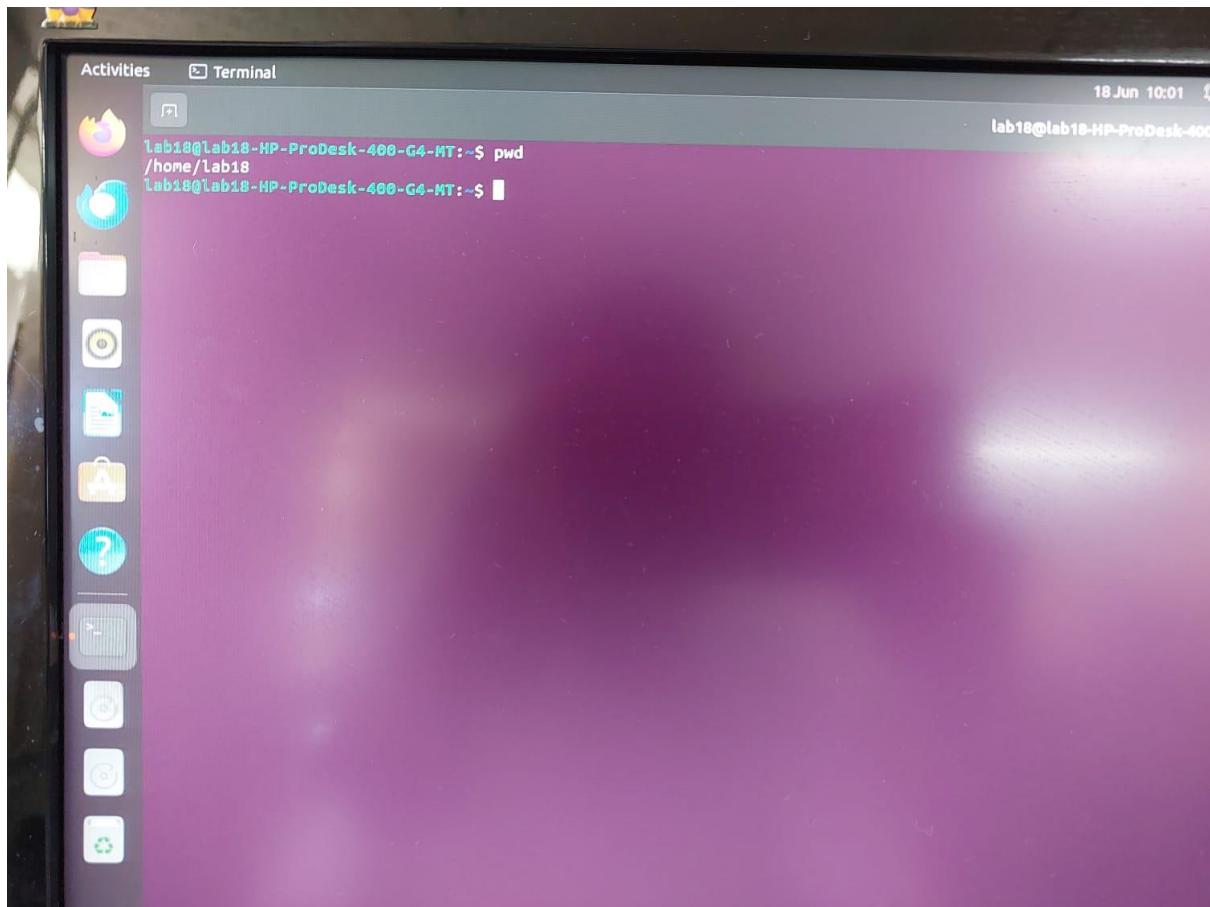


2. Click on audio inputs and right click on speakers. Click on update driver.



Ubuntu terminal

1. Open terminal. Pwd command is used to display the directory we are currently in.

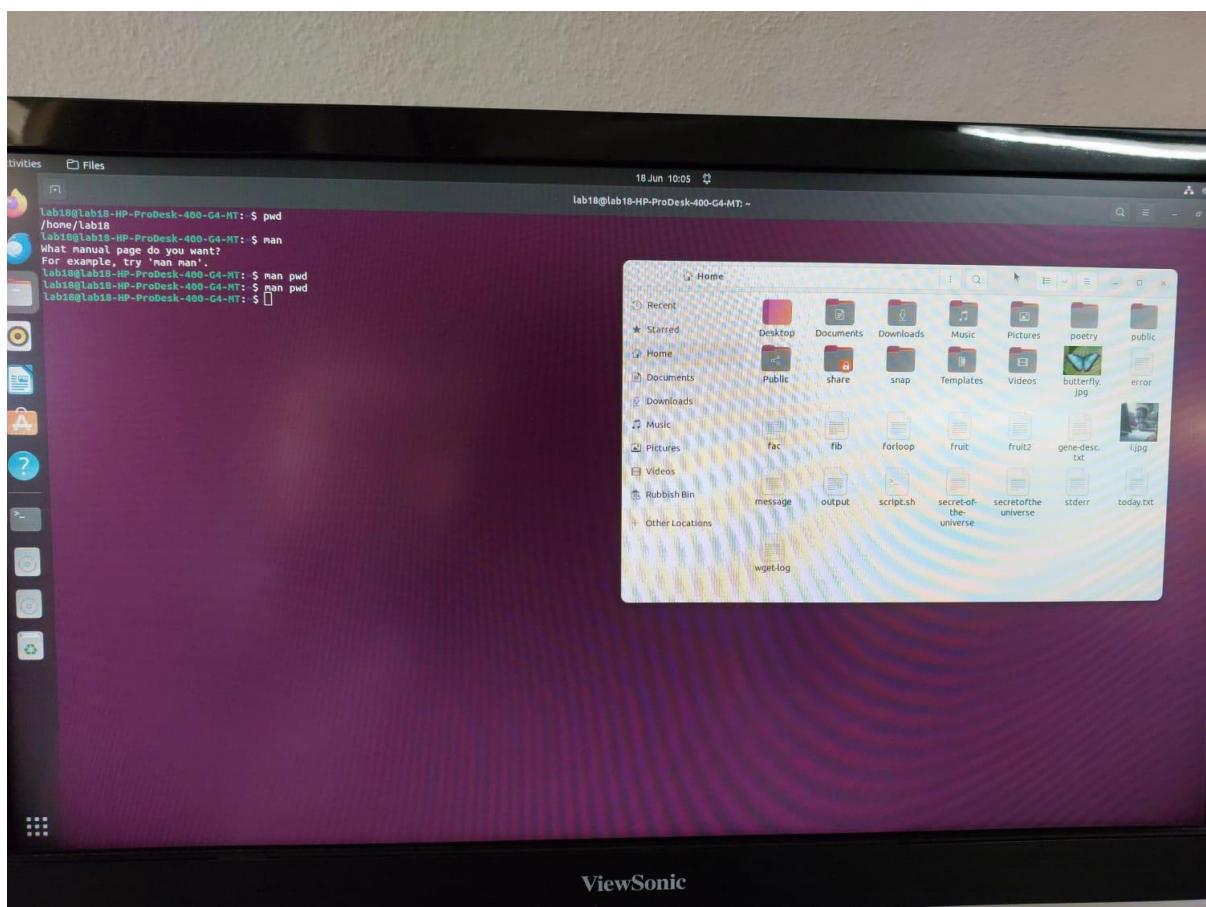
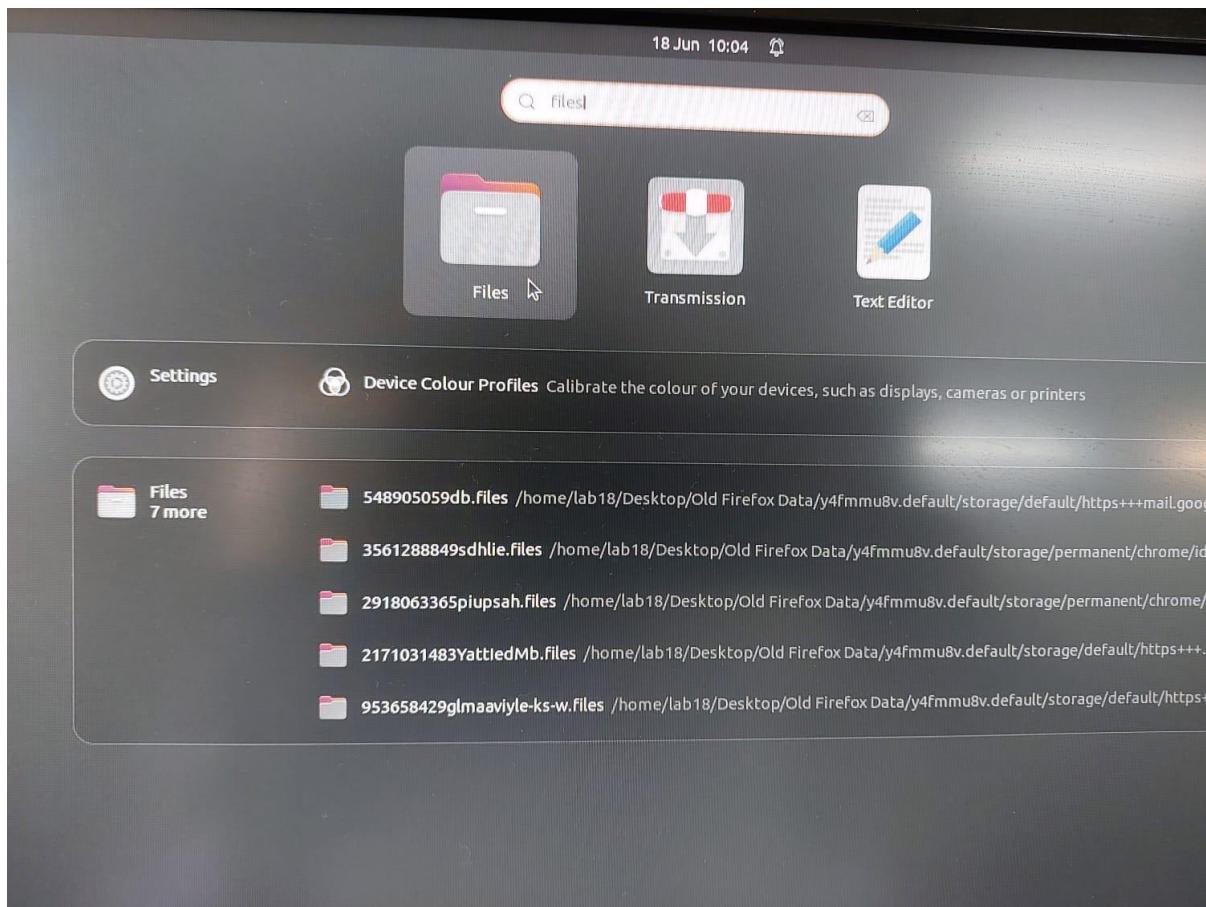


2. Man pwd command used to display manual.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window displays the man page for the 'pwd' command. The man page includes sections for NAME, SYNOPSIS, DESCRIPTION, AUTHOR, REPORTING BUGS, COPYRIGHT, and SEE ALSO. It also notes the version (GNU coreutils 8.32) and date (February 2022). The terminal window has a dark background with light-colored text. The desktop interface includes a dock with icons for various applications like a file manager, terminal, and browser. The status bar at the top shows the date and time (18 Jun 10:02) and the user's name (lab18@lab18-HP-ProDesk-400-G4-MT). The title bar of the terminal window says 'PWD(1)'.

3. Go to files



4. Ls command to list all files and directories in directory lab18.



5. Man ls to display types of listing possible.

The screenshot shows a Linux desktop environment with a terminal window open. The terminal title is "ls(1)". The content of the terminal is the man page for the "ls" command, which provides detailed information about its options and usage. The terminal window is titled "Terminal" and is located in the "Activities" dock. The desktop background is a purple gradient.

```
18 Jun 10:07 lab18@lab18-HP-ProDesk-400-G4-MT: ~ User Commands

NAME
    ls - list directory contents

SYNOPSIS
    ls [OPTION]... [FILE]...

DESCRIPTION
    List information about the FILEs (the current directory by default). Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.
    Mandatory arguments to long options are mandatory for short options too.

    -a, --all
        do not ignore entries starting with .

    -A, --almost-all
        do not list implied . and ..

    --author
        with -l, print the author of each file

    -b, --escape
        print C-style escapes for nongraphic characters

    --block-size=SIZE
        with -l, scale sizes by SIZE when printing them; e.g., '-block-size=M'; see SIZE format below

    -B, --ignore-backups
        do not list implied entries ending with ~

    -c
        with -lt: sort by, and show, ctime (time of last modification of file status information); with -l: show ctime and sort by name; otherwise: sort by

    -C
        list entries by columns

    --color[=WHEN]
        colorize the output; WHEN can be 'always' (default if omitted), 'auto', or 'never'; more info below

    -d, --directory
        list directories themselves, not their contents

    -D, --dired
        generate output designed for Emacs' dired mode

    -f
        do not sort, enable -aU, disable -ls --color

    -F, --classify
        append indicator (one of */>@!) to entries

    --file-type
        likewise, except do not append '*'

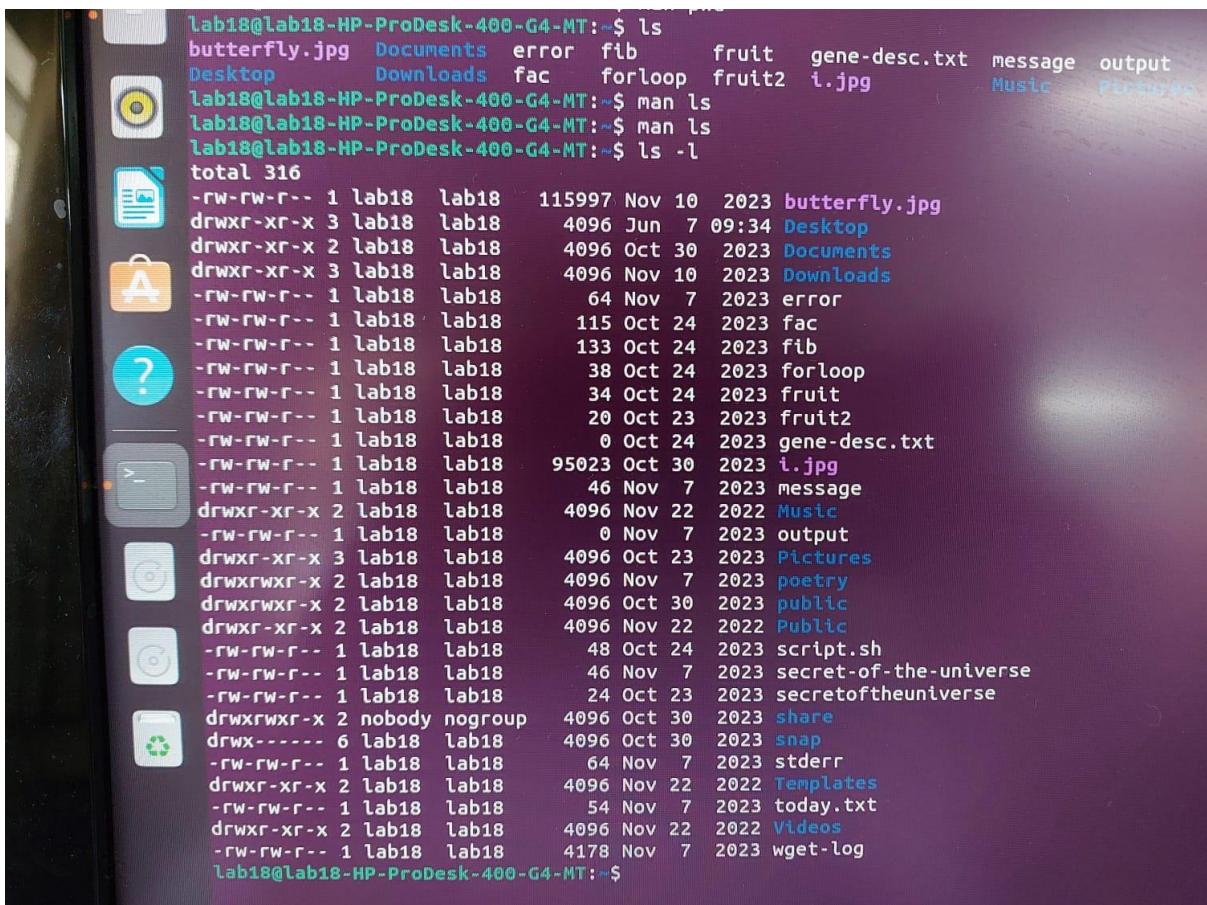
    --format=WORD
        across -x, commas -m, horizontal -x, long -l, single-column -1, verbose -l, vertical -c

Manual page ls(1) line 1 (press h for help or q to quit)
```

6. **ls -l**(When you type `ls -l`, instead of just listing the names of files and directories, it provides additional information about each item in the specified directory.)

For example, try 'man man'.

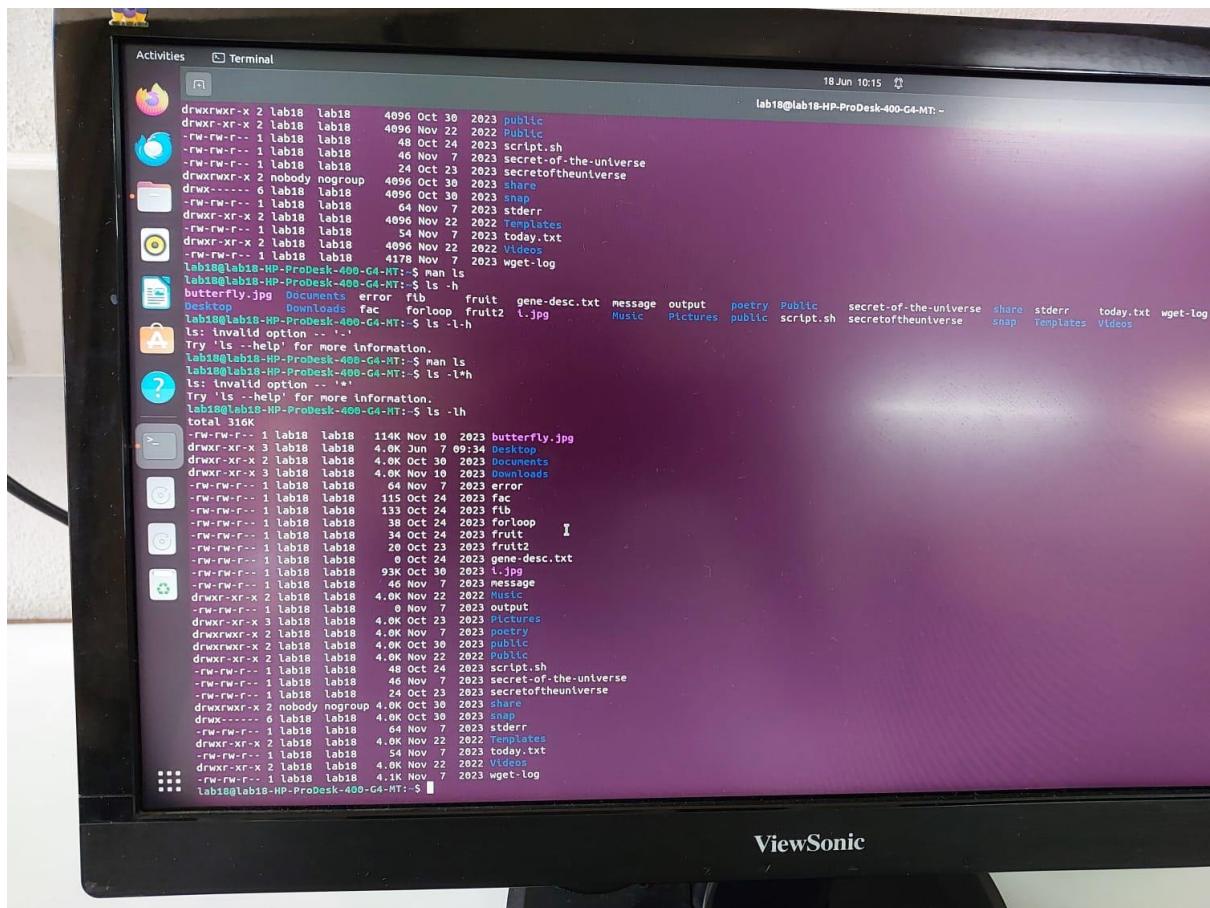
```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ man pwd
lab18@lab18-HP-ProDesk-400-G4-MT:~$ man pwd
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls
butterfly.jpg  Documents  error  fib      fruit  gene-desc.txt
Desktop        Downloads  fac     forloop  fruit2 i.jpg
lab18@lab18-HP-ProDesk-400-G4-MT:~$ man ls
lab18@lab18-HP-ProDesk-400-G4-MT:~$ man ls
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls -l
```



The screenshot shows a Linux desktop environment with a terminal window open. The terminal displays the following command-line session:

```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls
butterfly.jpg  Documents  error  fib      fruit  gene-desc.txt  message  output
Desktop        Downloads  fac     forloop  fruit2 i.jpg       Music    Pictures
lab18@lab18-HP-ProDesk-400-G4-MT:~$ man ls
lab18@lab18-HP-ProDesk-400-G4-MT:~$ man ls
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls -l
total 316
-rw-rw-r-- 1 lab18 lab18 115997 Nov 10 2023 butterfly.jpg
drwxr-xr-x 3 lab18 lab18 4096 Jun  7 09:34 Desktop
drwxr-xr-x 2 lab18 lab18 4096 Oct 30 2023 Documents
drwxr-xr-x 3 lab18 lab18 4096 Nov 10 2023 Downloads
-rw-rw-r-- 1 lab18 lab18 64 Nov  7 2023 error
-rw-rw-r-- 1 lab18 lab18 115 Oct 24 2023 fac
-rw-rw-r-- 1 lab18 lab18 133 Oct 24 2023 fib
-rw-rw-r-- 1 lab18 lab18 38 Oct 24 2023 forloop
-rw-rw-r-- 1 lab18 lab18 34 Oct 24 2023 fruit
-rw-rw-r-- 1 lab18 lab18 20 Oct 23 2023 fruit2
-rw-rw-r-- 1 lab18 lab18 0 Oct 24 2023 gene-desc.txt
-rw-rw-r-- 1 lab18 lab18 95023 Oct 30 2023 i.jpg
-rw-rw-r-- 1 lab18 lab18 46 Nov  7 2023 message
drwxr-xr-x 2 lab18 lab18 4096 Nov 22 2022 Music
-rw-rw-r-- 1 lab18 lab18 0 Nov  7 2023 output
drwxr-xr-x 3 lab18 lab18 4096 Oct 23 2023 Pictures
drwxrwxr-x 2 lab18 lab18 4096 Nov  7 2023 poetry
drwxrwxr-x 2 lab18 lab18 4096 Oct 30 2023 public
drwxr-xr-x 2 lab18 lab18 4096 Nov 22 2022 Public
-rw-rw-r-- 1 lab18 lab18 48 Oct 24 2023 script.sh
-rw-rw-r-- 1 lab18 lab18 46 Nov  7 2023 secret-of-the-universe
-rw-rw-r-- 1 lab18 lab18 24 Oct 23 2023 secretoftheuniverse
drwxrwxr-x 2 nobody nogroup 4096 Oct 30 2023 share
drwx----- 6 lab18 lab18 4096 Oct 30 2023 snap
-rw-rw-r-- 1 lab18 lab18 64 Nov  7 2023 stderr
drwxr-xr-x 2 lab18 lab18 4096 Nov 22 2022 Templates
-rw-rw-r-- 1 lab18 lab18 54 Nov  7 2023 today.txt
drwxr-xr-x 2 lab18 lab18 4096 Nov 22 2022 Videos
-rw-rw-r-- 1 lab18 lab18 4178 Nov  7 2023 wget-log
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

7. Ls -lh(Provides more info about how many bytes are each files)



```
18 Jun 10:15 lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls -lh
drwxrwxr-x 2 lab18 lab18 4096 Oct 30 2023 public
drwxr-xr-x 2 lab18 lab18 4096 Nov 22 2022 Public
-rw-r--r-- 1 lab18 lab18 48 Oct 24 2023 script.sh
-rw-r--r-- 1 lab18 lab18 46 Nov 7 2023 secret-of-the-universe
drwxrwxr-x 2 nobody nogroup 4096 Oct 30 2023 share
drwxr-xr-x 2 lab18 lab18 64 Nov 7 2023 stderr
drwxr-xr-x 2 lab18 lab18 4096 Nov 22 2022 Templates
drwxr-xr-x 2 lab18 lab18 54 Nov 7 2023 today.txt
drwxr-xr-x 1 lab18 lab18 4096 Nov 22 2022 Videos
drwxr-xr-x 1 lab18 lab18 4178 Nov 7 2023 wget-log
lab18@lab18-HP-ProDesk-400-G4-MT:~$ man ls
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls -h
butterfly.jpg Documents error fibr fruit gene-desc.txt message output poetry Public secret-of-the-universe share stderr Templates today.txt wget-log
Desktop Downloads forloop fruit2 l.jpg Music Pictures public script.sh secretoftheuniverse snap Templates Videos
ls: Invalid option -- 'h'
Try 'ls --help' for more information.
lab18@lab18-HP-ProDesk-400-G4-MT:~$ man ls
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls -l
ls: invalid option -- 'l'
Try 'ls --help' for more information.
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls -lh
total 316
-rw-rw-r-- 1 lab18 lab18 114K Nov 10 2023 butterfly.jpg
drwxr-xr-x 3 lab18 lab18 4.0K Jun 7 09:34 Desktop
drwxr-xr-x 3 lab18 lab18 4.0K Oct 30 2023 Documents
drwxr-xr-x 3 lab18 lab18 4.0K Oct 10 2023 Downloads
-rw-rw-r-- 1 lab18 lab18 64 Nov 7 2023 error
-rw-rw-r-- 1 lab18 lab18 115 Oct 24 2023 fac
-rw-rw-r-- 1 lab18 lab18 133 Oct 24 2023 fibr
-rw-rw-r-- 1 lab18 lab18 38 Oct 24 2023 forloop
-rw-rw-r-- 1 lab18 lab18 34 Oct 24 2023 fruit
-rw-rw-r-- 1 lab18 lab18 28 Oct 23 2023 fruit2
-rw-rw-r-- 1 lab18 lab18 6 Oct 24 2023 gene-desc.txt
-rw-rw-r-- 1 lab18 lab18 507K Oct 30 2023 jpg
-rw-rw-r-- 1 lab18 lab18 46 Nov 7 2023 message
drwxr-xr-x 2 lab18 lab18 4.0K Nov 22 2022 Music
-rw-rw-r-- 1 lab18 lab18 0 Nov 7 2023 output
drwxr-xr-x 3 lab18 lab18 4.0K Oct 23 2023 Pictures
drwxrwxr-x 2 lab18 lab18 4.0K Nov 7 2023 poetry
drwxrwxr-x 2 lab18 lab18 4.0K Oct 30 2023 public
drwxr-xr-x 2 lab18 lab18 4.0K Oct 22 2023 private
drwxr-xr-x 2 lab18 lab18 48 Oct 24 2023 script.sh
-rw-rw-r-- 1 lab18 lab18 46 Nov 7 2023 secret-of-the-universe
-rw-rw-r-- 1 lab18 lab18 24 Oct 23 2023 secretoftheuniverse
drwxrwxr-x 2 nobody nogroup 4.0K Oct 30 2023 share
drwxr-xr-x 6 lab18 lab18 4.0K Oct 30 2023 snap
drwxr-xr-x 2 lab18 lab18 4096 Nov 22 2022 Templates
drwxr-xr-x 1 lab18 lab18 54 Nov 7 2023 today.txt
drwxr-xr-x 2 lab18 lab18 4.0K Nov 22 2022 Videos
drwxr-xr-x 1 lab18 lab18 4.1K Nov 7 2023 wget-log
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

8. Ls -lhR(Lists directories in a recursive manner)

Activities Terminal lab18

```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls -lhR
.:
total 316K
-rw-rw-r-- 1 lab18 lab18 114K Nov 10 2023 butterfly.jpg
drwxr-xr-x 3 lab18 lab18 4.0K Jun 7 09:34 Desktop
drwxr-xr-x 2 lab18 lab18 4.0K Oct 30 2023 Documents
drwxr-xr-x 3 lab18 lab18 4.0K Nov 10 2023 Downloads
-rw-rw-r-- 1 lab18 lab18 64 Nov 7 2023 error
-rw-rw-r-- 1 lab18 lab18 115 Oct 24 2023 fac
-rw-rw-r-- 1 lab18 lab18 133 Oct 24 2023 filb
-rw-rw-r-- 1 lab18 lab18 38 Oct 24 2023 forloop
-rw-rw-r-- 1 lab18 lab18 34 Oct 24 2023 fruit
-rw-rw-r-- 1 lab18 lab18 20 Oct 23 2023 fruit2
-rw-rw-r-- 1 lab18 lab18 0 Oct 24 2023 gene-desc.txt
-rw-rw-r-- 1 lab18 lab18 93K Oct 30 2023 i.jpg
-rw-rw-r-- 1 lab18 lab18 46 Nov 7 2023 message
drwxr-xr-x 2 lab18 lab18 4.0K Nov 22 2022 Music
-rw-rw-r-- 1 lab18 lab18 0 Nov 7 2023 output
drwxr-xr-x 3 lab18 lab18 4.0K Oct 23 2023 Pictures
drwxrwxr-x 2 lab18 lab18 4.0K Nov 7 2023 poetry
drwxrwxr-x 2 lab18 lab18 4.0K Oct 30 2023 public
drwxr-xr-x 2 lab18 lab18 4.0K Nov 22 2022 Public
-rw-rw-r-- 1 lab18 lab18 48 Oct 24 2023 script.sh
-rw-rw-r-- 1 lab18 lab18 46 Nov 7 2023 secret-of-the-universe
-rw-rw-r-- 1 lab18 lab18 24 Oct 23 2023 secretoftheuniverse
drwxrwxr-x 2 nobody nogroup 4.0K Oct 30 2023 share
drwx----- 6 lab18 lab18 4.0K Oct 30 2023 snap
-rw-rw-r-- 1 lab18 lab18 64 Nov 7 2023 stderr
drwxr-xr-x 2 lab18 lab18 4.0K Nov 22 2022 Templates
-rw-rw-r-- 1 lab18 lab18 54 Nov 7 2023 today.txt
drwxr-xr-x 2 lab18 lab18 4.0K Nov 22 2022 Videos
-rw-rw-r-- 1 lab18 lab18 4.1K Nov 7 2023 wget-log

./Desktop:
total 4.0K
drwx----- 3 lab18 lab18 4.0K Jun 7 09:34 'Old Firefox Data'

'./Desktop/Old Firefox Data':
total 4.0K
drwx----- 15 lab18 lab18 4.0K Jun 7 09:34 y4fmmu8v.default

'./Desktop/Old Firefox Data/y4fmmu8v.default':
total 13M
-rw-rw-r-- 1 lab18 lab18 2.0K Jun 7 09:34 activity-stream.discovery_stream.json
-rw-rw-r-- 1 lab18 lab18 114K Jun 7 09:34 addons.json
-rw-rw-r-- 1 lab18 lab18 32K Jun 7 09:34 addonStartup.json.lz4
-rw-rw-r-- 1 lab18 lab18 5.1K Jun 7 09:34 AlternateServices.bin
drwxr-xr-x 2 lab18 lab18 4.0K Jun 7 09:34 bookmarkbackups
-rw-rw-r-- 1 lab18 lab18 221 Jun 7 09:34 broadcast-listeners.json
-rw----- 1 lab18 lab18 320K Jun 7 09:34 cert9.db
-rw----- 1 lab18 lab18 199 Jun 7 09:34 compatibility.ini
-rw-rw-r-- 1 lab18 lab18 939 Jun 7 09:34 containers.json
-rw-r--r-- 1 lab18 lab18 224K Jun 7 09:34 content-prefs.sqlite
-rw-r--r-- 1 lab18 lab18 512K Jun 7 09:34 cookies.sqlite
-rw-r--r-- 1 lab18 lab18 0 Jun 7 09:34 cookies.sqlite-wal
drwx----- 3 lab18 lab18 4.0K Jun 7 09:34 crashes
```

```
Activities Terminal 18 Jun 10:18 lab18@lab18-HP-ProDesk-400-G4-MT

ls -l /tmp/lab18
-rw-rw-r-- 1 lab18 lab18 685 Jun 7 09:34 shield-preference-experiments.json
-rw-rw-r-- 1 lab18 lab18 7.9K Jun 7 09:34 SiteSecurityServiceState.bin
drwxr-xr-x 6 lab18 lab18 4.0K Jun 7 09:34 storage
-rw-r--r-- 1 lab18 lab18 7.5K Jun 7 09:34 storage.sqlite
-rw-r----- 1 lab18 lab18 50 Jun 7 09:34 times.json
-rw-r--r-- 1 lab18 lab18 96K Jun 7 09:34 webappsstore.sqlite
-rw-r--r-- 1 lab18 lab18 0 Jun 7 09:34 webappsstore.sqlite-wal
-rw-rw-r-- 1 lab18 lab18 170 Jun 7 09:34 xulstore.json

./Desktop/Old Firefox Data/y4fmmu8v.default/bookmarkbackups':
total 8.0K
-rw-rw-r-- 1 lab18 lab18 949 Jun 7 09:34 'bookmarks-2022-11-23_11_BCYJrKz1Fwast0V9nPdl8Q==.jsonlz4'
-rw-rw-r-- 1 lab18 lab18 950 Jun 7 09:34 'bookmarks-2023-11-10_11_JAczGTSUImge8CpDrdSbDA==.jsonlz4'

./Desktop/Old Firefox Data/y4fmmu8v.default/crashes':
total 8.0K
drwx----- 2 lab18 lab18 4.0K Jun 7 09:34 events
-rw-rw-r-- 1 lab18 lab18 66 Jun 7 09:34 store.json.mozlz4

./Desktop/Old Firefox Data/y4fmmu8v.default/crashes/events':
total 0

./Desktop/Old Firefox Data/y4fmmu8v.default/datareporting':
total 16K
drwx----- 5 lab18 lab18 4.0K Jun 7 09:34 archived
drwxrwxr-x 6 lab18 lab18 4.0K Jun 7 09:34 glean
-rw----- 1 lab18 lab18 162 Jun 7 09:34 session-state.json
-rw-rw-r-- 1 lab18 lab18 51 Jun 7 09:34 state.json

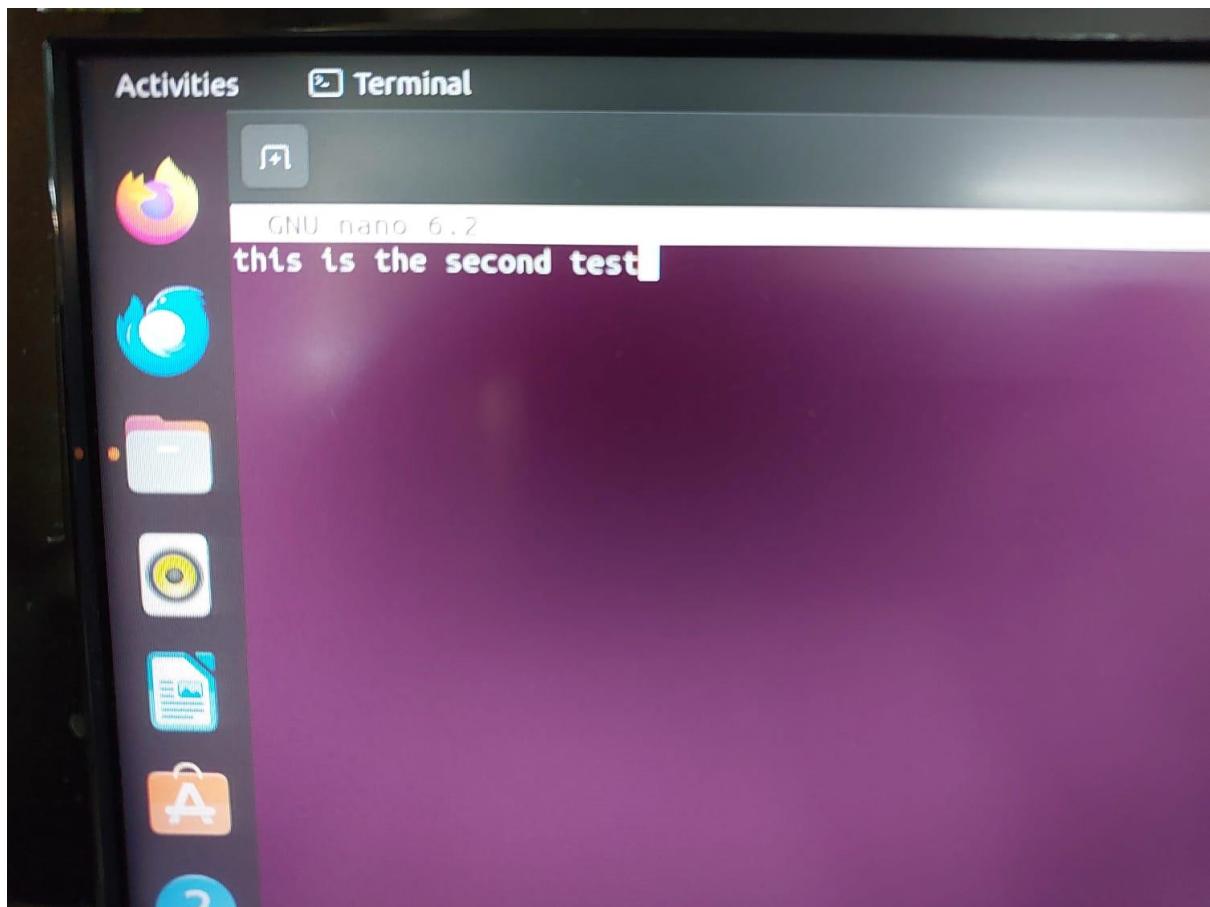
./Desktop/Old Firefox Data/y4fmmu8v.default/datareporting/archived':
total 12K
drwxr-xr-x 2 lab18 lab18 4.0K Jun 7 09:34 2023-10
drwxr-xr-x 2 lab18 lab18 4.0K Jun 7 09:34 2023-11
drwxr-xr-x 2 lab18 lab18 4.0K Jun 7 09:34 2024-06

./Desktop/Old Firefox Data/y4fmmu8v.default/datareporting/archived/2023-10':
total 492K
-rw-rw-r-- 1 lab18 lab18 3.9K Jun 7 09:34 1697534089690.e170sd22-65bd-4472-92e4-720521b9ac83.event.jsonlz4
-rw-rw-r-- 1 lab18 lab18 22K Jun 7 09:34 1697534089697.c4ba06cd-1130-416e-b3a0-072dc2a2d98.main.jsonlz4
-rw-rw-r-- 1 lab18 lab18 3.9K Jun 7 09:34 1697607623527.e35d4d19-67a6-4ebf-accc-b5084a0570a0.event.jsonlz4
-rw-rw-r-- 1 lab18 lab18 16K Jun 7 09:34 1697607623532.1f95-429e-9a0b-e780493c7df2.main.jsonlz4
-rw-rw-r-- 1 lab18 lab18 16K Jun 7 09:34 1697607832658.3c47048e-ef75-4606-ac79-5ecd1b9de6d7.event.jsonlz4
-rw-rw-r-- 1 lab18 lab18 34K Jun 7 09:34 1697607832670.bd7f8167-b65b-4081-b751-314116187066.main.jsonlz4
-rw-rw-r-- 1 lab18 lab18 8.8K Jun 7 09:34 1698039532919.0ceBba0e-f50e-4d02-84e6-5539489675d0.event.jsonlz4
-rw-rw-r-- 1 lab18 lab18 19K Jun 7 09:34 1698039532923.b1db7c16-b8f0-4de9-94db-2839beaf3b73.main.jsonlz4
-rw-rw-r-- 1 lab18 lab18 8.5K Jun 7 09:34 1698054116902.f764ca96-6798-4a71-abbd-198412b594be.event.jsonlz4
-rw-rw-r-- 1 lab18 lab18 40K Jun 7 09:34 1698054116914.b0a8f42f-6b4b-4db2-8b9a-9bba0d1f6009.main.jsonlz4
-rw-rw-r-- 1 lab18 lab18 17K Jun 7 09:34 1698128280842.65a3be51-65aa-4e04-8e07-5c9b32ba5693.nodules.jsonlz4
-rw-rw-r-- 1 lab18 lab18 8.6K Jun 7 09:34 1698128310179.2ca526b3-79a9-4361-ae88-845a53eb2557.event.jsonlz4
-rw-rw-r-- 1 lab18 lab18 8.3K Jun 7 09:34 1698129784919.8643852a-b1ae-4e0b-a03a-58d0fe57485a.event.jsonlz4
-rw-rw-r-- 1 lab18 lab18 49K Jun 7 09:34 1698129784933.de7e5d1f-4523-419b-a7b2-8791e30d172a.main.jsonlz4
-rw-rw-r-- 1 lab18 lab18 8.5K Jun 7 09:34 1698397911878.f74ef20b-7c3f-44ec-a02c-6210ecb3bab4.event.jsonlz4
-rw-rw-r-- 1 lab18 lab18 8.3K Jun 7 09:34 1698402590989.9e76d290-2794-4d52-a166-3022b6e4c421.event.jsonlz4
-rw-rw-r-- 1 lab18 lab18 41K Jun 7 09:34 1698402591001.7dac73a9-3e8c-4cf5-bca4-be463a3d7a79.main.jsonlz4
-rw-rw-r-- 1 lab18 lab18 16K Jun 7 09:34 169861594727.63ab61ce-2a91-4a1e-9d6a-5c99b6a2d59.event.jsonlz4
```

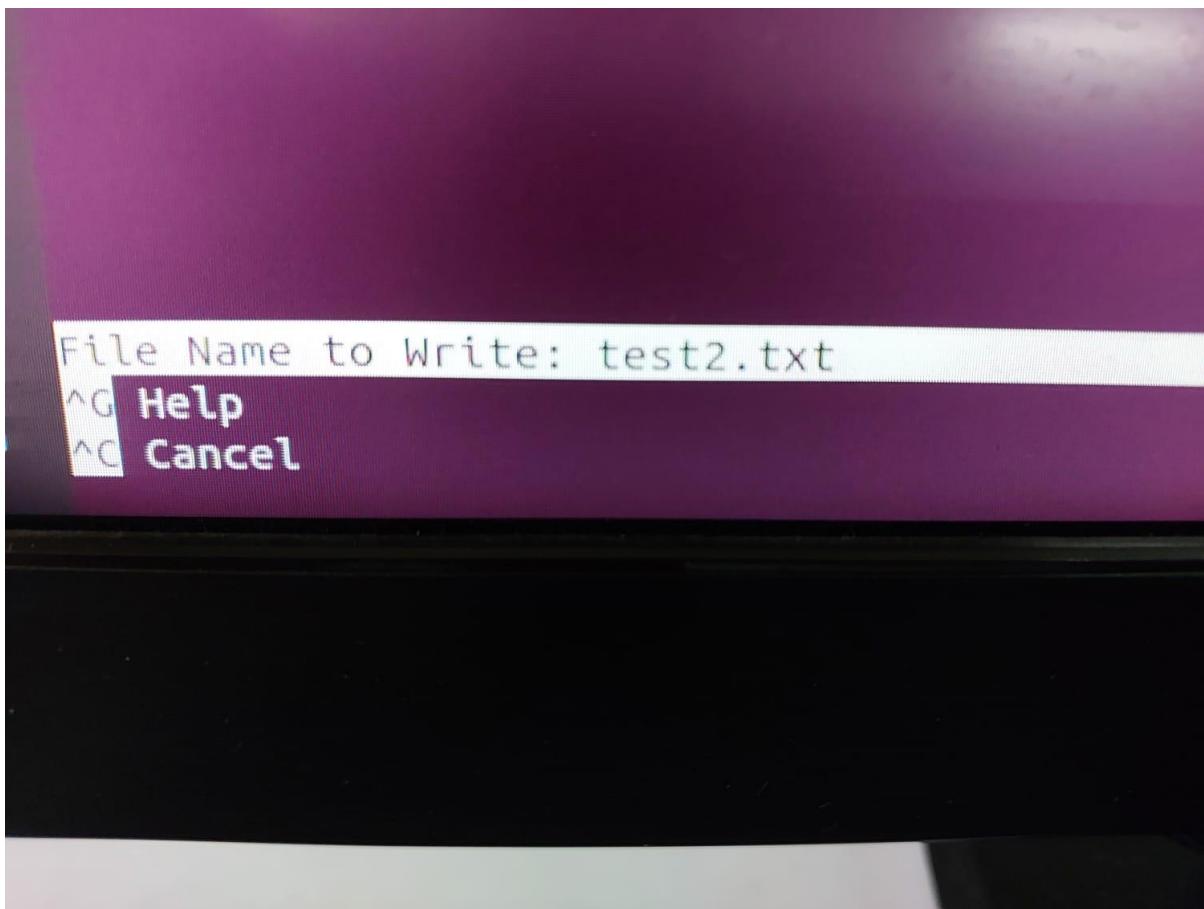
9. Create directory temp2 using mkdir command.

```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls  
butterfly.jpg Documents error fib fruit gene  
Desktop Downloads fac forloop fruit2 i.jpg  
lab18@lab18-HP-ProDesk-400-G4-MT:~$ nano  
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls  
butterfly.jpg Documents error fib fruit gene  
Desktop Downloads fac forloop fruit2 i.jpg  
lab18@lab18-HP-ProDesk-400-G4-MT:~$ mkdir temp2  
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

10. Type nano temp2 to open a textfile nano named temp2.



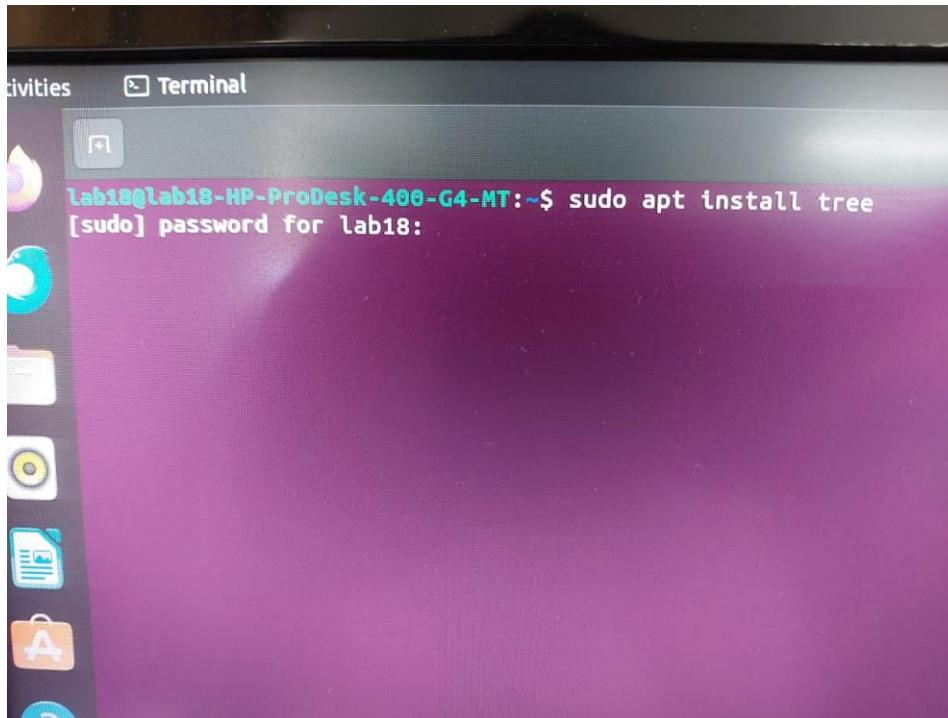
11. Ctrl+o to save filename test2.txt.



12. Ctrl+x to exit
13. Trying command tree but administrative right is required. So, we can try sudo to access the right to install tree application)

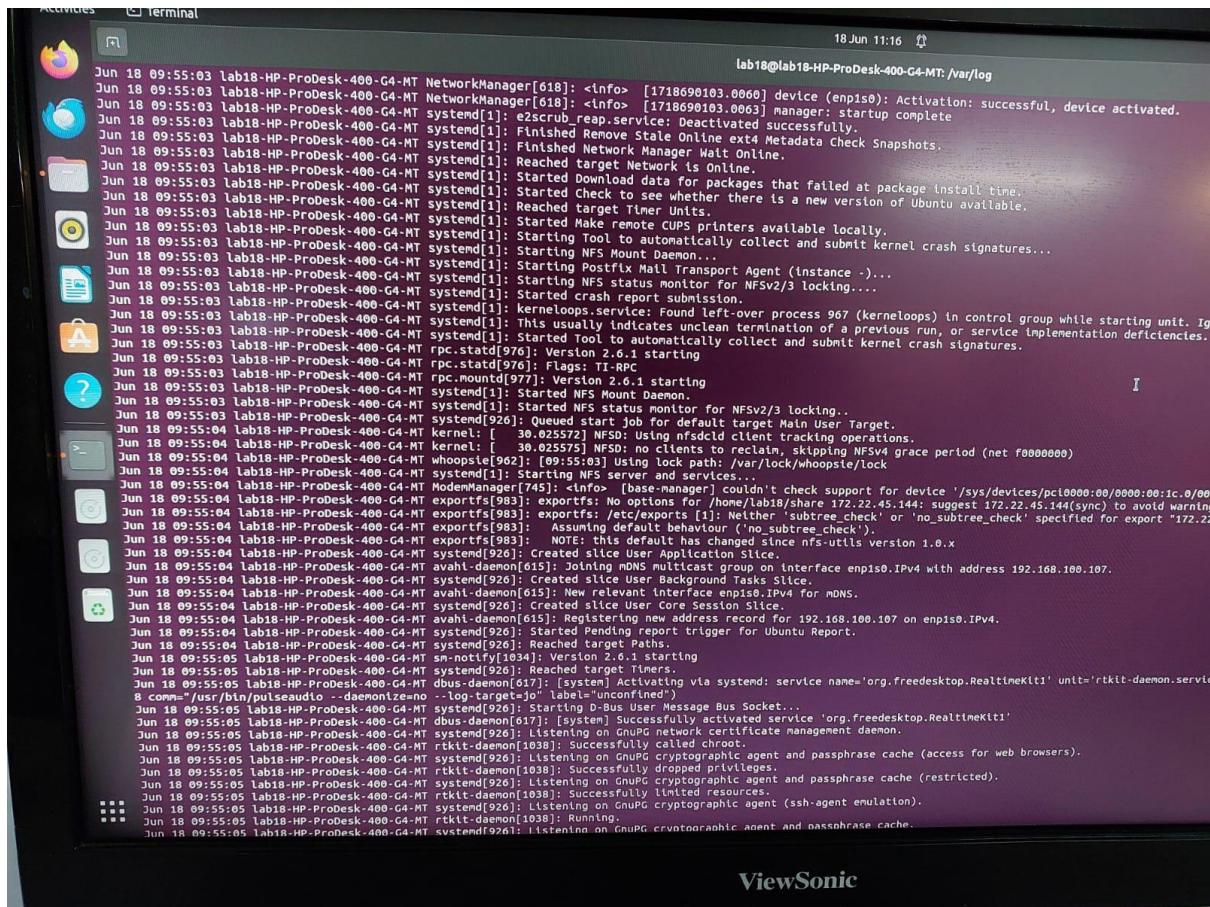
```
Desktop      Downloads fac    forloop fruit2 i.jpg
lab18@lab18-HP-ProDesk-400-G4-MT:~$ nano
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls
butterfly.jpg Documents error fib    fruit  gene-desc.
Desktop      Downloads fac    forloop fruit2 i.jpg
lab18@lab18-HP-ProDesk-400-G4-MT:~$ mkdir temp2
lab18@lab18-HP-ProDesk-400-G4-MT:~$ nano temp2
lab18@lab18-HP-ProDesk-400-G4-MT:~$ tree
Command 'tree' not found, but can be installed with:
  sudo snap install tree # version 1.8.0+pkg-3fd6, or
  sudo apt install tree # version 2.0.2-1
See 'snap info tree' for additional versions.
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo apt install tree
```

Password is lab18



14. Logs(logs are found in var directory). Then we use cat to output whatever there is in syslog

```
lab18@lab18-HP-ProDesk-400-G4-MT:/var/log$ cat syslog
bash: var/log: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:$ var/logs
bash: var/logs: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:$ cd ../../..
lab18@lab18-HP-ProDesk-400-G4-MT:/var$ cat log
cat: log: Is a directory
lab18@lab18-HP-ProDesk-400-G4-MT:/var$ cd log
lab18@lab18-HP-ProDesk-400-G4-MT:/var/log$ syslog
Command 'syslog' not found, did you mean:
  command 'syslogd' from deb busybox-syslog (1:1.30.1-7ubuntu3)
  command 'syslogd' from deb inetutils-syslogd (2:2.2-2ubuntu0.1)
Try: sudo apt install <deb name>
lab18@lab18-HP-ProDesk-400-G4-MT:/var/log$ cat/syslog
bash: cat/syslog: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:/var/log$ cat syslog
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT systemd[1]: rsyslog.service: Sent signal SIGHUP to main process 642 (rsyslogd) on c...
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0408] modem-manager: ModemManager not available
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT systemd[1]: Started Modem Manager.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0726] modem-manager: ModemManager now available
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT systemd[1]: logrotate.service: Deactivated successfully.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Finished Rotate log files.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Leaving mDNS multicast group on interface enp1s0. IPv6 with address fe80::a09b:e4b3:9a1a:a5a3 no longer relevant for mDNS.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Joining mDNS multicast group on interface enp1s0. IPv6 with address fe80::a09b:e4b3:9a1a:a5a3 for mDNS.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: New relevant interface enp1s0. IPv6 for mDNS.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT kernel: [ 27.324568] IPv6: enp1s0: IPv6 duplicate address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Leaving mDNS multicast group on interface enp1s0. IPv6 with address fe80::a09b:e4b3:9a1a:a5a3 on enp1s0.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Joining mDNS multicast group on interface enp1s0. IPv6 with address fe80::a09b:e4b3:9a1a:a5a3 for mDNS.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: New relevant interface enp1s0. IPv6 for mDNS.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT kernel: [ 27.466817] IPv6: enp1s0: IPv6 duplicate address fe80::a09b:e4b3:9a1a:a5a3 on enp1s0
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT snapd[644]: overlord.go:271: Acquiring state lock file
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT snapd[644]: overlord.go:276: Acquired state lock file
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT networkd-dispatcher[639]: No valid path found for interface enp1s0.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Leaving mDNS multicast group on interface enp1s0. IPv6 with address fe80::a09b:e4b3:9a1a:a5a3 for mDNS.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT kernel: [ 27.466817] IPv6: enp1s0: IPv6 duplicate address fe80::9b02:82e0:125:1f8b on enp1s0
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Registering new address record for fe80::9b02:82e0:125:1f8b on enp1s0
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT kernel: [ 27.466817] IPv6: enp1s0: IPv6 duplicate address fe80::a09b:e4b3:9a1a:a5a3 on enp1s0
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT snapd[644]: overlord.go:271: Acquiring state lock file
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT snapd[644]: overlord.go:276: Acquired state lock file
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT networkd-dispatcher[639]: No valid path found for interface enp1s0.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Leaving mDNS multicast group on interface enp1s0. IPv6 with address fe80::a09b:e4b3:9a1a:a5a3 for mDNS.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT kernel: [ 27.804403] IPv6: enp1s0: IPv6 duplicate address fe80::9b02:82e0:125:1f8b used
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT snapd[644]: daemon.go:247: started snapd/2.63 (series 16; classic) ubuntu/22.04 (amd64) lib
d=0 pid=918 comm="/usr/bin/networkctl list --no-pager --no-legend" "label='unconfined'"
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT dbus-daemon[617]: [system] Activating via systemd: service name='org.freedesktop.networkw...
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT dbus-daemon[617]: [system] Activation via systemd failed for unit 'dbus-org.freedesktop.ne...
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT networkd-dispatcher[918]: WARNING: systemd-networkd is not running, output will be incompl...
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT networkd-dispatcher[639]: ERROR:Unknown state for interface NetworkctlListState(idx=1, name...
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT
```



```

Activities terminal 18 Jun 11:16 ⓘ
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690103.0060] device (enp1s0): Activation: successful, device activated.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690103.0063] manager: startup complete
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: e2scrub_reap.service: Deactivated successfully.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Finished Remove Stale Online ext4 Metadata Check Snapshots.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Reached target Network Walt Online.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Started Download data for packages that failed at package install time.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Started Check to see whether there is a new version of Ubuntu available.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Reached target Timer Units.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Started Make remote CUPS printers available locally.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Starting Tool to automatically collect and submit kernel crash signatures...
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Starting NFS Mount Daemon...
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Starting Postfix Mail Transport Agent (instance ...
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Starting NFS status monitor for NFSv2/3 locking....
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT kerneloops.service: Found left-over process 967 (kerneloops) in control group while starting unit. Ig
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT kerneloops[1]: This usually indicates unclean termination of a previous run, or service implementation deficiencies.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT rpc.statd[976]: Version 2.6.1 starting
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT rpc.statd[976]: Flags: TI-RPC
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT rpc.mountd[977]: Version 2.6.1 starting
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Started NFS Mount Daemon.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[1]: Started NFS status monitor for NFSv2/3 locking..
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT systemd[926]: queued start job for default target Main User Target.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT kernel[1]: [ 30.025572] nfssd: Using nfscd client tracking operations.
Jun 18 09:55:03 lab18-HP-ProDesk-400-G4-MT kernel[1]: [ 30.025575] NFSD: attempting to reclaim, skipping NFSv4 grace period (net f0000000)
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT whoopsie[962]: [09:55:03] Using lock path /var/lock/whoopsie/lock
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT systemd[1]: Starting NFS server and services...
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT ModemManager[745]: <info> [base-manager] couldn't check support for device '/sys/devices/pci0000:00/0000:00:1c.0/00
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT exports[983]: exports: No options for '/home/lab18/share 172.22.45.144: suggest 172.22.45.144(sync) to avoid warning
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT exports[983]: exports: /etc(exports [1]: Neither 'subtree_check' or 'no_subtree_check' specified for export '172.22
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT exports[983]: Assuming default behaviour ('no_subtree_check').
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT systemd[926]: Created slice User Application Slice.
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Joining mDNS multicast group on interface enp1s0.IPv4 with address 192.168.100.107.
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT systemd[926]: Created slice User Background Tasks Slice.
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: New relevant interface enp1s0.IPv4 for mDNS.
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT systemd[926]: Created slice User Core Session Slice.
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Registering new address record for 192.168.100.107 on enp1s0.IPv4.
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT systemd[926]: Started Periodic report trigger for Ubuntu Report.
Jun 18 09:55:04 lab18-HP-ProDesk-400-G4-MT systemd[926]: Reached target Paths.
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT rmt-notify[1034]: Version 2.6.1 starting
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT systemd[926]: Reached target Timers.
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT dbus-daemon[617]: [system] Activating via systemd: service name='org.freedesktop.RealtimeKit' unit='rtkit-daemon.servic
8 comma"/usr/bin/pulseaudio --daemonize=no --log-target=journal --label="unconfined"
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT systemd[926]: Starting D-Bus User Message Bus Socket...
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT dbus-daemon[617]: [system] Successfully activated service 'org.freedesktop.RealtimeKit'
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT systemd[926]: Listening on GnuPG cryptographic agent management daemon.
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT rtkit-daemon[618]: Listening on GnuPG cryptographic agent and passphrase cache (access for web browsers).
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT rtkit-daemon[618]: Listening on GnuPG cryptographic agent and passphrase cache (restricted).
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT rtkit-daemon[1038]: Successfully dropped privileges.
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT rtkit-daemon[1038]: Successfully limited resources.
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT rtkit-daemon[1038]: Listening on GnuPG cryptographic agent (ssh-agent emulation).
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT rtkit-daemon[1038]: Running.
Jun 18 09:55:05 lab18-HP-ProDesk-400-G4-MT systemd[926]: Listening on GnuPG cryptographic agent and passphrase cache.

```

ViewSonic

15. Head syslog for all syslog at top and tail syslog for all syslog at bottom

```

Jun 18 11:13:16 Lab18-HP-ProDesk-400-G4-MT kernel: [ 4721.523395] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:13:20 lab18-HP-ProDesk-400-G4-MT kernel: [ 4721.523400] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:13:28 lab18-HP-ProDesk-400-G4-MT kernel: [ 4733.671436] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0; state changed new lease, address=192.168.100.123
Jun 18 11:13:40 lab18-HP-ProDesk-400-G4-MT kernel: [ 4733.671441] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:13:50 lab18-HP-ProDesk-400-G4-MT kernel: [ 4745.971500] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:13:52 lab18-HP-ProDesk-400-G4-MT kernel: [ 4745.971542] NetworkManager[618]: <info> [1718694830.6412] dhcp4 (enp1s0): state changed new lease, address=192.168.100.123
Jun 18 11:13:52 lab18-HP-ProDesk-400-G4-MT kernel: [ 4757.947546] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:04 lab18-HP-ProDesk-400-G4-MT kernel: [ 4757.947552] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:04 lab18-HP-ProDesk-400-G4-MT kernel: [ 4770.385366] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:18 lab18-HP-ProDesk-400-G4-MT kernel: [ 4770.385397] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:18 lab18-HP-ProDesk-400-G4-MT kernel: [ 4783.529787] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:20 lab18-HP-ProDesk-400-G4-MT kernel: [ 4783.529841] NetworkManager[618]: <info> [1718694860.6429] dhcp4 (enp1s0): state changed new lease, address=192.168.100.123
Jun 18 11:14:29 lab18-HP-ProDesk-400-G4-MT kernel: [ 4795.170226] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:41 lab18-HP-ProDesk-400-G4-MT kernel: [ 4795.170231] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:41 lab18-HP-ProDesk-400-G4-MT kernel: [ 4807.306630] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:50 lab18-HP-ProDesk-400-G4-MT kernel: [ 4807.306670] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:50 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718694890.6534] dhcp4 (enp1s0): state changed new lease, address=192.168.100.123
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT head syslog
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT systemd[1]: rsyslog.service: Sent signal SIGHUP to main process 642 (rsyslogd) or its children.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0408] modem-manager: ModemManager not available
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0726] modem-manager: ModemManager now available
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0726] modem-manager: Deactivated successfully.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Withdrawing address record for fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Leaving mDNS multicast group on interface enp1s0. IPv6 no longer relevant for mDNS.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Joining mDNS multicast group on interface enp1s0. IPv6 with address fe80::1c28:354a:a915:9446
Lab18@Lab18-HP-ProDesk-400-G4-MT: /var/log$ tail syslog
Jun 18 11:14:20 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718694860.6429] dhcp4 (enp1s0): state changed new lease, address=192.168.100.123
Jun 18 11:14:29 lab18-HP-ProDesk-400-G4-MT kernel: [ 4795.170226] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:29 lab18-HP-ProDesk-400-G4-MT kernel: [ 4795.170231] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:41 lab18-HP-ProDesk-400-G4-MT kernel: [ 4807.306630] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:41 lab18-HP-ProDesk-400-G4-MT kernel: [ 4807.306670] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:50 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718694890.6534] dhcp4 (enp1s0): state changed new lease, address=192.168.100.123
Jun 18 11:14:50 lab18-HP-ProDesk-400-G4-MT kernel: [ 4819.955705] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:14:54 lab18-HP-ProDesk-400-G4-MT kernel: [ 4819.955745] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:15:06 lab18-HP-ProDesk-400-G4-MT kernel: [ 4832.131818] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:15:06 lab18-HP-ProDesk-400-G4-MT kernel: [ 4832.131827] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Lab18@Lab18-HP-ProDesk-400-G4-MT: /var/log$ grep -B 5 "scheduler" syslog
Lab18@Lab18-HP-ProDesk-400-G4-MT: /var/log$ 

```

16. Tail -5 syslog for last 5 lines of syslog. Can be used for head also.

```

Activities Terminal 18 Jun 11:38 lab18@lab18-HP-ProDesk-400-G4-MT: /var/log
lab18@lab18-HP-ProDesk-400-G4-MT: /var/log$ tail -5 syslog
Jun 18 11:18:46 lab18-HP-ProDesk-400-G4-MT kernel: [ 5052.052378] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:18:59 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718695130.6442] dhcpc (enp1s0): state changed new lease, address=192.168.100.123
Jun 18 11:18:59 lab18-HP-ProDesk-400-G4-MT kernel: [ 5064.212455] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:18:59 lab18-HP-ProDesk-400-G4-MT kernel: [ 5064.212518] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:09 lab18-HP-ProDesk-400-G4-MT kernel: [ 5075.160228] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:20 lab18-HP-ProDesk-400-G4-MT kernel: [ 5075.160328] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:20 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718695130.6382] dhcpc (enp1s0): state changed new lease, address=192.168.100.123
Jun 18 11:19:21 lab18-HP-ProDesk-400-G4-MT kernel: [ 5086.211367] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:21 lab18-HP-ProDesk-400-G4-MT kernel: [ 5086.211378] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT kernel: [ 5086.211378] dhcpc (enp1s0): Sent signal SIGHUP to main process 642 (rsyslogd) on client request.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0408] modem-manager: ModemManager not available
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0726] modem-manager: ModemManager now available
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0726] modem-manager: Deactivated successfully.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Withdrawing address record for fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Leaving mDNS multicast group on interface enp1s0. IPv6 no longer relevant for mDNS.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Joining mDNS multicast group on interface enp1s0. IPv6 with address fe80::1c28:354a:a915:9446
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT avahi-daemon[615]: Leaving mDNS multicast group on interface enp1s0. IPv6 with address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0726] modem-manager: ModemManager not available
Jun 18 11:18:59 lab18-HP-ProDesk-400-G4-MT kernel: [ 5064.212455] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:18:59 lab18-HP-ProDesk-400-G4-MT kernel: [ 5064.212518] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:09 lab18-HP-ProDesk-400-G4-MT kernel: [ 5075.160228] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:20 lab18-HP-ProDesk-400-G4-MT kernel: [ 5075.160328] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:20 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718695130.6382] dhcpc (enp1s0): state changed new lease, address=192.168.100.123
Jun 18 11:19:21 lab18-HP-ProDesk-400-G4-MT kernel: [ 5086.211367] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:21 lab18-HP-ProDesk-400-G4-MT kernel: [ 5086.211378] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:33 lab18-HP-ProDesk-400-G4-MT kernel: [ 5099.185904] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:33 lab18-HP-ProDesk-400-G4-MT kernel: [ 5099.185904] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 09:55:01 lab18@lab18-HP-ProDesk-400-G4-MT: /var/log$ grep -B 5 "scheduler" syslog
lab18@lab18-HP-ProDesk-400-G4-MT: /var/log$ man var
No manual entry for var
lab18@lab18-HP-ProDesk-400-G4-MT: /var/log$ grep -5 "scheduler" syslog
lab18@lab18-HP-ProDesk-400-G4-MT: /var/log$ tail -5 syslog
Jun 18 11:18:48 lab18-HP-ProDesk-400-G4-MT kernel: [ 5064.212455] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:09 lab18-HP-ProDesk-400-G4-MT kernel: [ 5075.160228] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:20 lab18-HP-ProDesk-400-G4-MT kernel: [ 5075.160328] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:19:20 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718695550.6309] dhcpc (enp1s0): state changed new lease, address=192.168.100.123
Jun 18 11:26:01 lab18-HP-ProDesk-400-G4-MT kernel: [ 5487.446443] ICMPv6: NA: a0:8c:fd:d0:2b:26 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
Jun 18 11:26:01 lab18-HP-ProDesk-400-G4-MT kernel: [ 5487.446492] ICMPv6: NA: a0:8c:fd:d7:48:22 advertised our address fe80::1c28:354a:a915:9446 on enp1s0
lab18@lab18-HP-ProDesk-400-G4-MT: /var/log$ head -5 "scheduler" syslog
head: cannot open 'scheduler' for reading: No such file or directory
** syslog: open 'scheduler' for reading: No such file or directory
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT kernel: [ 5086.211367] dhcpc (enp1s0): Sent signal SIGHUP to main process 642 (rsyslogd) on client request.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0408] modem-manager: ModemManager not available
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0726] modem-manager: ModemManager now available
Jun 18 09:55:01 lab18@lab18-HP-ProDesk-400-G4-MT: /var/log$ grep -5 "scheduler" syslog
lab18@lab18-HP-ProDesk-400-G4-MT: /var/log$ 

```

17. Ps aux to show all processes currently running.

```

Activities Terminal 18 Jun 12:17
lab18@lab18-HP-ProDesk-400-G4-MT: /var/log
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0408] modem-manager: ModemManager not available
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT systemd[1]: Started Modem Manager.
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT NetworkManager[618]: <info> [1718690101.0726] modem-manager: ModemManager now available
Jun 18 09:55:01 lab18-HP-ProDesk-400-G4-MT systemd[1]: logrotate.service: Deactivated successfully.
lab18@lab18-HP-ProDesk-400-G4-MT: /var/log$ grep -B 5 "scheduler" syslog
lab18@lab18-HP-ProDesk-400-G4-MT: /var/log$ ps aux
USER      PID %CPU %MEM   VSZ RSS TTY      STAT START   TIME COMMAND
root         1  0.0  0.1 167032 12160 ?        Ss  09:54  0:06 /lib/systemd/systemd splash --system --deserialize 45
root         2  0.0  0.0     0  0 ?        S   09:54  0:00 [kthreadd]
root         3  0.0  0.0     0  0 ?        I<  09:54  0:00 [rcu_gp]
root         4  0.0  0.0     0  0 ?        I<  09:54  0:00 [rcu_par_gp]
root         5  0.0  0.0     0  0 ?        I<  09:54  0:00 [slub_flushwq]
root         6  0.0  0.0     0  0 ?        I<  09:54  0:00 [netns]
root         8  0.0  0.0     0  0 ?        I<  09:54  0:00 [kworker/0:0H-events_highpri]
root         9  0.0  0.0     0  0 ?        I   09:54  0:02 [kworker/u8:0-flush-8:0]
root        10  0.0  0.0     0  0 ?        I<  09:54  0:00 [mm_percpu_wq]
root        11  0.0  0.0     0  0 ?        I   09:54  0:00 [rcu_tasks_kthread]
root        12  0.0  0.0     0  0 ?        I   09:54  0:00 [rcu_tasks_rude_kthread]
root        13  0.0  0.0     0  0 ?        I   09:54  0:00 [rcu_tasks_trace_kthread]
root        14  0.0  0.0     0  0 ?        S   09:54  0:00 [ksoftirqd/0]
root        15  0.0  0.0     0  0 ?        I   09:54  0:04 [rcu_preempt]
root        16  0.0  0.0     0  0 ?        S   09:54  0:00 [migration/0]
root        17  0.0  0.0     0  0 ?        S   09:54  0:00 [idle_inject/0]
root        19  0.0  0.0     0  0 ?        S   09:54  0:00 [cpuhp/0]
root        20  0.0  0.0     0  0 ?        S   09:54  0:00 [cpuhp/1]
root        21  0.0  0.0     0  0 ?        S   09:54  0:00 [idle_inject/1]
root        22  0.0  0.0     0  0 ?        S   09:54  0:00 [migration/1]
root        23  0.0  0.0     0  0 ?        S   09:54  0:01 [ksoftirqd/1]
root        25  0.0  0.0     0  0 ?        I<  09:54  0:00 [kworker/1:0H-events_highpri]
root        26  0.0  0.0     0  0 ?        S   09:54  0:00 [cpuhp/2]
root        27  0.0  0.0     0  0 ?        S   09:54  0:00 [idle_inject/2]
root        28  0.0  0.0     0  0 ?        S   09:54  0:00 [migration/2]
root        29  0.0  0.0     0  0 ?        S   09:54  0:00 [ksoftirqd/2]
root        31  0.0  0.0     0  0 ?        I<  09:54  0:00 [kworker/2:0H-events_highpri]
root        32  0.0  0.0     0  0 ?        S   09:54  0:00 [cpuhp/3]
root        33  0.0  0.0     0  0 ?        S   09:54  0:00 [idle_inject/3]
root        34  0.0  0.0     0  0 ?        S   09:54  0:00 [migration/3]
root        35  0.0  0.0     0  0 ?        S   09:54  0:00 [ksoftirqd/3]
root        38  0.0  0.0     0  0 ?        S   09:54  0:00 [kdevtmpfs]
root        39  0.0  0.0     0  0 ?        I<  09:54  0:00 [inet_frag_wq]
root        40  0.0  0.0     0  0 ?        S   09:54  0:00 [kaudittd]
root        41  0.0  0.0     0  0 ?        S   09:54  0:00 [khungtaskd]
root        43  0.0  0.0     0  0 ?        S   09:54  0:00 [oom_reaper]
root        45  0.0  0.0     0  0 ?        I<  09:54  0:00 [writeback]
root        46  0.0  0.0     0  0 ?        S   09:54  0:00 [kcompactd0]
root        47  0.0  0.0     0  0 ?        SN  09:54  0:00 [ksmd]
root        49  0.0  0.0     0  0 ?        SN  09:54  0:00 [khugepaged]
root        50  0.0  0.0     0  0 ?        I<  09:54  0:00 [kintegrityd]
root        51  0.0  0.0     0  0 ?        I<  09:54  0:00 [kblockd]
root        52  0.0  0.0     0  0 ?        I<  09:54  0:00 [blkcg_punt_bio]
root        53  0.0  0.0     0  0 ?        I<  09:54  0:00 [tpm_dev_wq]
root        54  0.0  0.0     0  0 ?        I<  09:54  0:00 [ata_sff]
root        55  0.0  0.0     0  0 ?        I<  09:54  0:00 [nd]
root        56  0.0  0.0     0  0 ?        I<  09:54  0:00 [edac-poller]
root        57  0.0  0.0     0  0 ?        I<  09:54  0:00 [devfreq_wq]
root        58  0.0  0.0     0  0 ?        S   09:54  0:00 [watchdogd]

```

18. Top for all active processes using processor in real time.

Activities Terminal 18 Jun 12:19

```
root@lab18:~# top
top - 12:19:50 up 2:25, 1 user, load average: 0.38, 0.24, 0.10
Tasks: 257 total, 1 running, 256 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.7 us, 0.2 sy, 0.0 ni, 98.5 id, 0.6 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 7826.8 total, 1773.7 free, 1177.1 used, 4876.0 buff/cache
MiB Swap: 7628.0 total, 7628.0 free, 0.0 used. 6055.1 avail Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1811 lab18 20 0 5445560 300460 137192 S 1.7 3.7 1:07.13 gnome-shell
86279 lab18 20 0 561328 59512 45624 S 1.7 0.7 0:13.40 gnome-terminal-
87153 lab18 20 0 13596 4352 3456 R 0.7 0.1 0:00.02 top
2068 lab18 20 0 466308 10624 9216 S 0.3 0.1 0:00.24 gsd-sharing
1 root 20 0 167032 12160 8320 S 0.0 0.2 0:06.91 systemd
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kthreadd
3 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_gp
4 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_par_gp
5 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 slab_flushwq
6 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 netns
8 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/0:0H-events_highpri
9 root 20 0 0 0 0 I 0.0 0.0 0:02.12 kworker/u8:0-flush-8:0
10 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 mm_percpu_wq
11 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tasks_kthread
12 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tasks_rude_kthread
13 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tasks_trace_kthread
14 root 20 0 0 0 0 S 0.0 0.0 0:00.49 ksoftirqd/0
15 root 20 0 0 0 0 I 0.0 0.0 0:04.26 rCU_prempt
16 root rt 0 0 0 0 S 0.0 0.0 0:00.04 migration/0
17 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/0
19 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/0
20 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/1
21 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/1
22 root rt 0 0 0 0 S 0.0 0.0 0:00.18 migration/1
23 root 20 0 0 0 0 S 0.0 0.0 0:01.17 ksoftirqd/1
25 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/1:0H-events_highpri
26 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/2
27 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/2
28 root rt 0 0 0 0 S 0.0 0.0 0:00.18 migration/2
29 root 20 0 0 0 0 S 0.0 0.0 0:00.45 ksoftirqd/2
31 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/2:0H-events_highpri
32 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/3
33 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/3
34 root rt 0 0 0 0 S 0.0 0.0 0:00.18 migration/3
35 root 20 0 0 0 0 S 0.0 0.0 0:00.42 ksoftirqd/3
38 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kdevtmpfs
39 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 inet_frag_wq
40 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kaudited
41 root 20 0 0 0 0 S 0.0 0.0 0:00.00 khungtaskd
43 root 20 0 0 0 0 S 0.0 0.0 0:00.00 oom_reaper
45 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 writeback
46 root 20 0 0 0 0 S 0.0 0.0 0:00.19 kcompactd0
47 root 20 0 0 0 0 S 0.0 0.0 0:00.00 ksmd
49 root 39 19 0 0 0 S 0.0 0.0 0:00.00 khugepaged
50 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kintegrityd
51 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kblockd
52 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 dircg_punt_blo
53 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 tpm_dev_wq
```

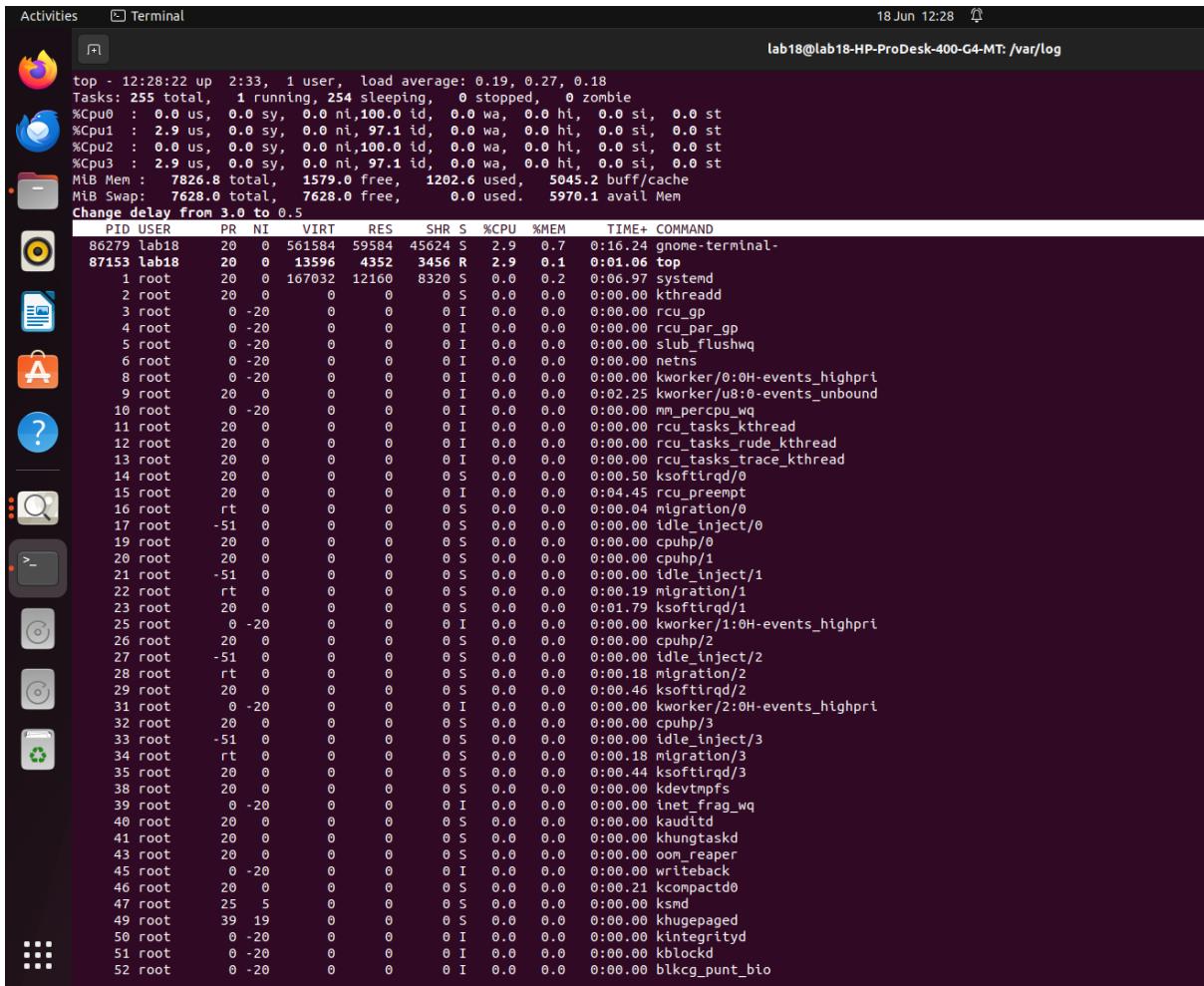
19. By pressing 1, it shows each statistic of each core individually.

Activities Terminal 18 Jun 12:28

```
root@lab18:~# top
top - 12:28:02 up 2:33, 1 user, load average: 0.08, 0.26, 0.17
Tasks: 252 total, 1 running, 251 sleeping, 0 stopped, 0 zombie
%Cpu0 : 0.9 us, 0.0 sy, 0.0 nt, 99.1 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
%Cpu1 : 0.9 us, 0.0 sy, 0.0 nt, 98.1 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
%Cpu2 : 0.0 us, 0.0 sy, 0.0 nt, 100.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
%Cpu3 : 0.0 us, 0.0 sy, 0.0 nt, 99.0 id, 1.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 7826.8 total, 1607.7 free, 1178.1 used, 5040.9 buff/cache
MiB Swap: 7628.0 total, 7628.0 free, 0.0 used. 5997.7 avail Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
86279 lab18 20 0 561072 59148 45024 S 0.0 0.7 0:15.91 gnome-terminal-
1 root 20 0 167032 12160 8320 S 0.0 0.2 0:06.96 systemd
2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kthreadd
3 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_gp
4 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_par_gp
5 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 slab_flushwq
6 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 netns
8 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/0:0H-events_highpri
9 root 20 0 0 0 0 I 0.0 0.0 0:02.25 kworker/u8:0-events_unbound
10 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 mm_percpu_wq
11 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rCU_tasks_kthread
12 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rCU_tasks_rude_kthread
13 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rCU_tasks_trace_kthread
14 root 20 0 0 0 0 S 0.0 0.0 0:00.50 ksoftirqd/0
15 root 20 0 0 0 0 I 0.0 0.0 0:04.44 rCU_prempt
16 root rt 0 0 0 0 S 0.0 0.0 0:00.04 migration/0
17 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/0
19 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/0
20 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/1
21 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/1
22 root rt 0 0 0 0 S 0.0 0.0 0:00.75 migration/1
23 root 20 0 0 0 0 S 0.0 0.0 0:00.00 ksoftirqd/1
25 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/1:0H-events_highpri
26 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/2
27 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/2
28 root rt 0 0 0 0 S 0.0 0.0 0:00.18 migration/2
29 root 20 0 0 0 0 S 0.0 0.0 0:00.46 ksoftirqd/2
31 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker/2:0H-events_highpri
32 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/3
33 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_inject/3
34 root rt 0 0 0 0 S 0.0 0.0 0:00.18 migration/3
35 root 20 0 0 0 0 S 0.0 0.0 0:00.50 ksoftirqd/3
38 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kdevtmpfs
39 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 inet_frag_wq
40 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kaudited
41 root 20 0 0 0 0 S 0.0 0.0 0:00.00 khungtaskd
43 root 20 0 0 0 0 S 0.0 0.0 0:00.00 oom_reaper
45 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 writeback
46 root 20 0 0 0 0 S 0.0 0.0 0:00.21 kcompactd0
47 root 25 5 0 0 0 S 0.0 0.0 0:00.00 ksmd
49 root 39 19 0 0 0 S 0.0 0.0 0:00.00 khugepaged
50 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kintegrityd
51 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kblockd
52 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 dircg_punt_blo
53 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 tpm_dev_wq
```

20. By pressing d, I change 3 to 0.5, which means that the state of the CPU refreshes every 0.5 sec and we can see changes faster.



The screenshot shows a Linux desktop interface with a terminal window open. The terminal window title is 'Terminal' and the command being run is 'top'. The output of the 'top' command is displayed, showing system load averages, CPU usage statistics for four cores, memory usage (7826.8 MiB total, 1579.0 MiB free), and a detailed process list. The process list includes columns for PID, USER, PR, NI, VIRT, RES, SHR, %CPU, %MEM, TIME+, and COMMAND. Many processes are listed as 'kworker' or 'rcu' tasks, indicating background system activity. The terminal window also shows the date and time as 18 Jun 12:28 and the host name as lab18@lab18-HP-ProDesk-400-G4-MT: /var/log.

```

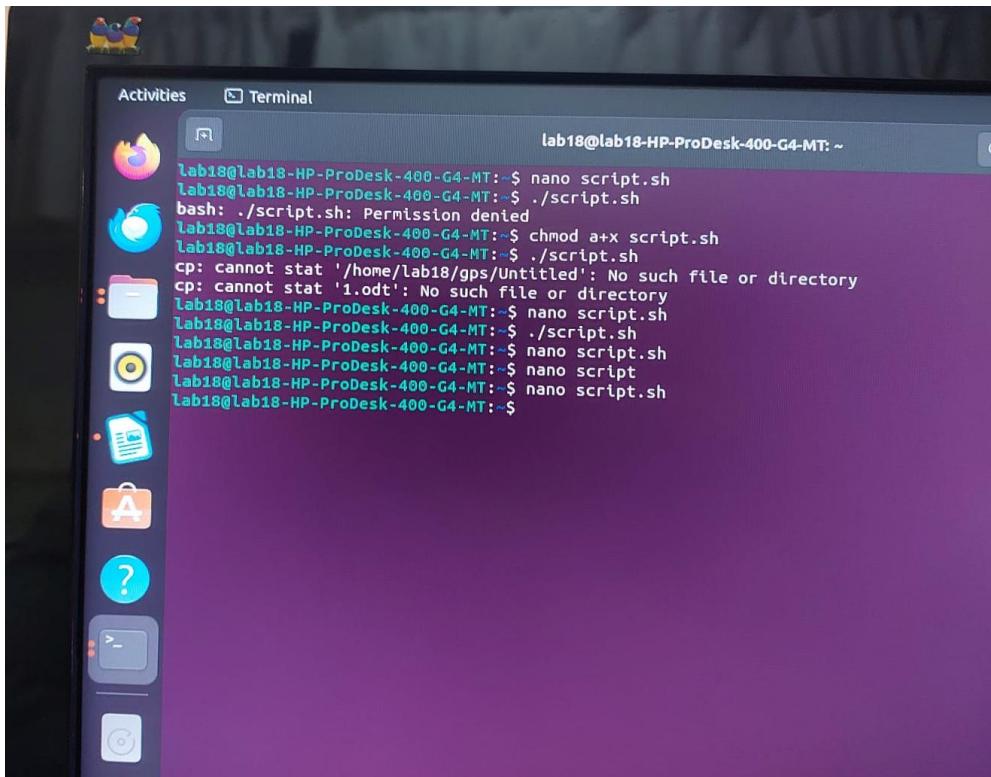
Activities Terminal 18 Jun 12:28 lab18@lab18-HP-ProDesk-400-G4-MT: /var/log
top - 12:28:22 up 2:33, 1 user, load average: 0.19, 0.27, 0.18
Tasks: 255 total, 1 running, 254 sleeping, 0 stopped, 0 zombie
%Cpu0 : 0.0 us, 0.0 sy, 0.0 ni,100.0 id, 0.0 wa, 0.0 hi, 0.0 sl, 0.0 st
%Cpu1 : 2.9 us, 0.0 sy, 0.0 ni, 97.1 id, 0.0 wa, 0.0 hi, 0.0 sl, 0.0 st
%Cpu2 : 0.0 us, 0.0 sy, 0.0 ni,100.0 id, 0.0 wa, 0.0 hi, 0.0 sl, 0.0 st
%Cpu3 : 2.9 us, 0.0 sy, 0.0 ni, 97.1 id, 0.0 wa, 0.0 hi, 0.0 sl, 0.0 st
MiB Mem : 7826.8 total, 1579.0 free, 1202.6 used, 5645.2 buff/cache
MiB Swap: 7628.0 total, 7628.0 free, 0.0 used. 5970.1 avail Mem
Change delay from 3.0 to 0.5

```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
86279	lab18	20	0	501584	59584	45624	S	2.9	0.7	0:16.24	gnome-terminal
87153	lab18	20	0	13596	4352	3456	R	2.9	0.1	0:01.06	top
1	root	20	0	167032	12160	8320	S	0.0	0.2	0:06.97	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kthreadd
3	root	-20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_gp
4	root	-20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_par_gp
5	root	-20	0	0	0	0	I	0.0	0.0	0:00.00	slub_flushwq
6	root	-20	0	0	0	0	I	0.0	0.0	0:00.00	netns
8	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/0:0H-events_highpri
9	root	20	0	0	0	0	I	0.0	0.0	0:02.25	kworker/u8:0-events_unbound
10	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	mm_percpu_wq
11	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_kthread
12	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_rude_kthread
13	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_trace_kthread
14	root	20	0	0	0	0	S	0.0	0.0	0:00.50	ksoftirqd/0
15	root	20	0	0	0	0	I	0.0	0.0	0:04.45	rcu_preempt
16	root	rt	0	0	0	0	S	0.0	0.0	0:00.04	migration/0
17	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_inject/0
19	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/0
20	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/1
21	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_inject/1
22	root	rt	0	0	0	0	S	0.0	0.0	0:00.19	migration/1
23	root	20	0	0	0	0	S	0.0	0.0	0:01.79	ksoftirqd/1
25	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/i:0H-events_highpri
26	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/2
27	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_inject/2
28	root	rt	0	0	0	0	S	0.0	0.0	0:00.18	migration/2
29	root	20	0	0	0	0	S	0.0	0.0	0:00.46	ksoftirqd/2
31	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/2:0H-events_highpri
32	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/3
33	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_inject/3
34	root	rt	0	0	0	0	S	0.0	0.0	0:00.18	migration/3
35	root	20	0	0	0	0	S	0.0	0.0	0:00.44	ksoftirqd/3
38	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kdevtmpfs
39	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	inet_frag_wq
40	root	20	0	0	0	0	S	0.0	0.0	0:00.00	kaudit
41	root	20	0	0	0	0	S	0.0	0.0	0:00.00	khungtaskd
43	root	20	0	0	0	0	S	0.0	0.0	0:00.00	oom_reaper
45	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	writeback
46	root	20	0	0	0	0	S	0.0	0.0	0:00.21	kcompactd0
47	root	25	5	0	0	0	S	0.0	0.0	0:00.00	ksmd
49	root	39	19	0	0	0	S	0.0	0.0	0:00.00	khugepaged
50	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kintegrityd
51	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kblockd
52	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	blkcg_punt_bio

Giving permission using chmod a+x

1. We create a shellscript file in nano. Then we try to execute the file, eventually getting denied of access. We type `chmod a+x script.sh`. It basically gives permission to all to execute it. Then we can execute it as many times as we want.



A screenshot of a Linux terminal window showing a file transfer and script execution. The terminal has a dark purple background and displays the following command-line session:

```
Command 'cp' from deb coreutils (8.32-4.1ubuntu1)
Try: sudo apt install <deb name>
lab18@lab18-HP-ProDesk-400-G4-MT:~/temp1$ cp test2.txt /home/lab18/temp2
lab18@lab18-HP-ProDesk-400-G4-MT:~/temp1$ nano test2.sh
lab18@lab18-HP-ProDesk-400-G4-MT:~/temp1$ ./test2.sh
bash: ./test2.sh: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:~/temp1$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ./test2.sh
bash: ./test2.sh: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ./script.sh
bash: ./script.sh: Permission denied
lab18@lab18-HP-ProDesk-400-G4-MT:~$ nano script.sh
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ./script.sh
bash: ./script.sh: Permission denied
lab18@lab18-HP-ProDesk-400-G4-MT:~$ chmod a+x script.sh
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ./script.sh
./script.sh: line 1: /home/lab18: Is a directory
current directory is: /home/lab18
cp: '/home/lab18/temp1/test2.txt' and '/home/lab18/temp1/test2.txt' are the same file
lab18@lab18-HP-ProDesk-400-G4-MT:~$ nano script.sh
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

2. Create shortcut/link to access a file from different directories



```
lab18@lab18-HP-ProDesk-400-G4-MT:/$ mkdir temp3
mkdir: cannot create directory 'temp3': Permission denied
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo mkdir temp3
[sudo] password for lab18:
lab18@lab18-HP-ProDesk-400-G4-MT:/$ mkdir temp3
mkdir: cannot create directory 'temp3': File exists
lab18@lab18-HP-ProDesk-400-G4-MT:/$ cd temp3
lab18@lab18-HP-ProDesk-400-G4-MT:/temp3$ ls
lab18@lab18-HP-ProDesk-400-G4-MT:/temp3$ man ln
lab18@lab18-HP-ProDesk-400-G4-MT:/temp3$ ls
lab18@lab18-HP-ProDesk-400-G4-MT:/temp3$ nano test2.txt
lab18@lab18-HP-ProDesk-400-G4-MT:/temp3$ cat test2.txt
cat: test2.txt: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:/temp3$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:/$ cat test2.txt
cat: test2.txt: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:/$ rm test2 .txt
rm: cannot remove 'test2': No such file or directory
rm: cannot remove '.txt': No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:/$ ls test2.txt
ls: cannot access 'test2.txt': No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:/$ man ln
lab18@lab18-HP-ProDesk-400-G4-MT:/$ ln -s temp3/test2.txt test2_shortcut.txt
ln: failed to create symbolic link 'test2_shortcut.txt': Permission denied
lab18@lab18-HP-ProDesk-400-G4-MT:/$ ls -s
total 80
  0 bin      4 cdrom    12 etc      0 lib      0 lib64     16 lost+found    4 mnt      0 proc      0 run
  4 boot     0 dev      4 home     0 lib32     0 libx32     4 media      4 opt      4 root      0 sbin
lab18@lab18-HP-ProDesk-400-G4-MT:/$ cat test2_shortcut.txt
cat: test2_shortcut.txt: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:/$ cd temp
bash: cd: temp: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:/$ cat test2.txt
cat: test2.txt: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:/$ history
 1  sudo passwd root
 2  su
 3  lst_release -a
 4  sudo passwd root
 5  su
```

Accessing server with username on host vara.hopto.org

1. Use command ssh followed by username@vara.hopto.org. Then enter default password assigned by Mr Appavoo.

```
SSH: Could not resolve hostname host. Temporary failure in name resolution
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ssh jankee@vara.hopto.org

jankee@vara.hopto.org's password:
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 6.5.0-1015-aws x86_64)

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

 System information as of Tue Jun 18 10:17:39 UTC 2024

A System load:  0.0          Processes:      178
Usage of /:   96.0% of 7.57GB  Users logged in:   6
Memory usage: 38%           IPv4 address for eth0: 172.31.93.235
Swap usage:   0%
=> / is using 96.0% of 7.57GB

: Expanded Security Maintenance for Applications is not enabled.

-> 88 updates can be applied immediately.
19 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

 2 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

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

@ The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

jankee@vara:~$ jankee@vara:~$
```

2. Ls command to list all users on the server. Create example.txt on my account using command touch. Then give permission to only owner using chmod 700 example.txt which means 111 000 000 in binary. 111 to owner,000 to group, 000 to others. Only owner has access to the text file right now.

Activities Terminal

```
lab18@lab18-HP-ProDesk-400-G4-MT: /
```

- * Documentation: <https://help.ubuntu.com>
- * Management: <https://landscape.canonical.com>
- * Support: <https://ubuntu.com/advantage>

System information as of Tue Jun 18 10:17:39 UTC 2024

System load:	0.0	Processes:	178
Usage of /:	96.0% of 7.57GB	Users logged in:	6
Memory usage:	38%	IPv4 address for eth0:	172.31.93.235
Swap usage:	0%		

=> / is using 96.0% of 7.57GB

Expanded Security Maintenance for Applications is not enabled.

88 updates can be applied immediately.
 19 of these updates are standard security updates.
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 To check for new updates run: sudo apt update

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 the exact distribution terms for each program are described in the
 individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
 applicable law.

```
jankee@vara:~$  

jankee@vara:~$ pwd  

/home/jankee  

jankee@vara:~$ ls ..  

adiilah  bhugaloo  choychoo  dooshina  harsha  jauhan  kavish  komal  lov  

ahotar  bibi      curpen    drishti   hitesh  jaune   kazi    koralie luc  

auromooga  bissonauth  dabeedyal  dussuruth  hrithik  jeevraj  kherdali  krishi man  

ayushee  boodhun  daby      farhanah  hulk    jheelan  khilesh  krishna mar  

barah    bundhun  darshini  fawaaz   ict2202  johaheer  khodadin  kurmally mat  

beekawa  cannoo   derek     geerish   imrit   jokhoo   khooseeal  lafleche mol  

beemola  casseeram  dikshant  gerval   isha    jugessur  khyatee  Lee    mol  

beeponee  charles  domun    goinden  jankee  kamlesh  kisto   lew    mol  

bhagirath  chetraj  doorgachurn  gokool  jauffurally  karishma  koi-chin  loubna mul  

jankee@vara:~$ each test.txt  

each: command not found  

jankee@vara:~$ touch example.txt  

jankee@vara:~$ chmod 700 example.txt  

jankee@vara:~$
```

3. I tried to access my friend Charles account but he restricted it to himself. Afterwards he changed restriction to 777, open to all. I also opened mine to everyone and then I tried to access Charles again and read his file having text “testing” and I was successful.

Activities Terminal

```

Expanded Security Maintenance for Applications is not enabled.

88 updates can be applied immediately.
19 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

2 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

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

Last login: Tue Jun 18 10:17:40 2024 from 102.117.166.223
jankee@vara:~$ 
jankee@vara:~$ 
jankee@vara:~$ ls ..
adilah      bhugaloo   choychoo   dooshina  harsha    jauhan   kavish    komal     lov
ahotar      bibi        curpen     drishti   hitesh    jaune    kazi      koralie   luc
euromooga   bissonauth dabeeidal  dussuruth hrithik   jeevraj  kherdali krishi    mar
ayushee     boodhun    darshini   fawaaz    ict2202  jheelan  khilesh  krishna   mar
barah       bundhu    derek      geerish   imrit    johaeer  khodadin kurmally mat
beekawa     cannoo    dikshant  gerval    isha      jokhoo   khooseeal lafleche mol
beemola     casseeran  domun    goinden  jankee   jugessur khyatee  lee      mol
beeponee    charles   doorgachurn gokool   jauffurally kamlesh  kisto    lew      mol
bhagirath   chetraj   doorgachurn gokool   jauffurally karishma koi-chin loubna  muh
jankee@vara:~$ touch examples.txt
jankee@vara:~$ chmod 700 examples.txt
jankee@vara:~$ cd ..
jankee@vara:/home$ cd charles
-bash: cd: charles: Permission denied
jankee@vara:/home$ chmod 007 examples.txt
chmod: cannot access 'examples.txt': No such file or directory
jankee@vara:/home$ cd ..
jankee@vara:/~$ chmod 007 examples.txt
chmod: cannot access 'examples.txt': No such file or directory
jankee@vara:/~$ chmod 777 ..jankee
chmod: cannot access '../jankee': No such file or directory
jankee@vara:/~$ chmod 777 examples.txt
chmod: cannot access 'examples.txt': No such file or directory
jankee@vara:/~$ cd home
jankee@vara:/home$ chmod 777 examples.txt
chmod: cannot access 'examples.txt': No such file or directory
jankee@vara:/home$ cd curpen
-bash: cd: curpen: Permission denied
jankee@vara:/home$ cd charles
jankee@vara:/home/charles$ 
jankee@vara:/home/charles$ cd ..
jankee@vara:/home$ chmod 777 jankee
jankee@vara:/home$ cd charles
jankee@vara:/home/charles$ cat example.txt
testing
jankee@vara:/home/charles$ 

```

Uploading a photo to the server

1. Uploading a picture from my pc to destination on server on my account using scp, which means secure copy.

Activities Terminal

```

jankee@vara:~$ 
lab18@lab18-HP-ProDesk-400-G4-MT:~$ scp /home/lab18/Downloads/firefox.tmp jankee@vara.hopto.org:/home/jankee
/home/Lab18/Downloads/firefox.tmp: not a regular file
lab18@lab18-HP-ProDesk-400-G4-MT:~$ scp /home/lab18/Downloads/firefox.tmp/ved.jpeg jankee@vara.hopto.org:/home/jankee
jankee@vara.hopto.org's password:
ved.jpeg
lab18@Lab18-HP-ProDesk-400-G4-MT:~$ 

```

2. I change my directory to home, then to jankee(my account), then listed all files and the picture ved.jpeg appeared.

```
bin@vra:~$ cd ..
jankee@vara:/home$ cd ..
jankee@vara:/$ cd jankee
-bash: cd: jankee: No such file or directory
jankee@vara:/$ ls
'-' bin boot dev etc home lib lib32 lib64
jankee@vara:/$ pwd
/
jankee@vara:/$ cd home
jankee@vara:/home$ cd jankee
jankee@vara:~/jankee$ ls
example.txt examples.txt ved.jpeg
jankee@vara:~/jankee$
```

Day 3

Learning objectives

- Create a link from my account on the server to a picture found on my local PC.
- Use website www.vara.hopto.org/csl1-1
- Use cron for backup
- Device manager
- Using terminal to retrieve information about hardwares
- PC assembly

Creating link

1. Create a folder in my account(home/jankee) which i named upload(should have been public)
2. I copied the image I uploaded on day 2 on the server, to the folder upload.

```
-bash: cd: homw: No such file or directory
jankee@vara:/$ cd home
jankee@vara:/home$ cd jankee
jankee@vara:~/jankee$ mkdir upload
jankee@vara:~/jankee$ scp /home/jankee/ved.jpeg /home/jankee/upload
jankee@vara:~/jankee$ cd upload
jankee@vara:~/jankee/upload$ ls
ved.jpeg
jankee@vara:~/jankee/upload$
```

3. I navigated to the directory var/www/html/csl1-1(csl1-1 is the folder name on the host server website vara.hopto.org)
4. There, I created a link using ln -s to the image in folder upload



```

jankee@vara:~/var$ cd www
jankee@vara:/var/www$ cd html
jankee@vara:/var/www/html$ cd cs11-1
jankee@vara:/var/www/html/cs11-1$ ln -s /home/jankee/upload/ved.jpeg ved.jpeg
jankee@vara:/var/www/html/cs11-1$ ls -l
total 252
lrwxrwxrwx 1 derek derek 18 Jun 19 06:07 derek -> /home/derek/public
lrwxrwxrwx 1 peeroo peeroo 19 Jun 19 06:12 peeroo -> /home/peeroo/public
-rw-rw-r-- 2 charles charles 257904 Jun 19 06:01 screenshotlink.png
lrwxrwxrwx 1 jankee jankee 28 Jun 19 06:13 ved.jpeg -> /home/jankee/upload/ved.jpeg
jankee@vara:/var/www/html/cs11-1$ ;n -s /home/jankee/public ved.jpeg
-bash: syntax error near unexpected token `;'
jankee@vara:/var/www/html/cs11-1$ chmod 777 ved.jpeg
jankee@vara:/var/www/html/cs11-1$
```

5. Mr apavoo pointed out a mistake where my folder name should have been public and should have uploaded the folder instead of the image itself
6. So, I renamed the folder using mv command.



```

/home/jankee
jankee@vara:~$ mv /home/jankee/upload /home/jankee/public
jankee@vara:~$ ls
```

7. I navigated to var/www/html/cs11-1 and remove the image ved.jpeg.



```

jankee@vara:/var/www/html/cs11-1$ rm ved.jpeg
jankee@vara:/var/www/html/cs11-1$ ls
ahotar ayushee btssonauth charles derek johaheer konal krishna munazir murday peeroo poonit rushika sewtohul simtysha
```

8. Then I created the link again this time with folder not image



```

ahotar ayushee btssonauth charles derek johaheer krishna munazir murday peeroo poonit public rushika sewtohul simtysha
jankee@vara:/var/www/html/cs11-1$ ln -s /home/jankee/public ved.jpeg
jankee@vara:/var/www/html/cs11-1$ ls
ahotar ayushee btssonauth charles derek johaheer krishna munazir murday peeroo poonit public rushika sewtohul simtysha ved.jpeg
jankee@vara:/var/www/html/cs11-1$ ls -l
total 0
lrwxrwxrwx 1 ahotar ahotar 20 Jun 19 06:32 ahotar -> /home/ahotar/public/
lrwxrwxrwx 1 ayushee ayushee 20 Jun 19 06:37 ayushee -> /home/ayushee/public
lrwxrwxrwx 1 btssonauth btssonauth 23 Jun 19 06:46 btssonauth -> /home/btssonauth/public
lrwxrwxrwx 1 charles charles 20 Jun 19 06:33 charles -> /home/charles/public
lrwxrwxrwx 1 derek derek 18 Jun 19 06:07 derek -> /home/derek/public/
lrwxrwxrwx 1 johaheer johaheer 21 Jun 19 06:39 johaheer -> /home/johaheer/public
lrwxrwxrwx 1 krishna krishna 20 Jun 19 06:33 krishna -> /home/krishna/public
lrwxrwxrwx 1 munazir munazir 20 Jun 19 06:36 munazir -> /home/munazir/public
lrwxrwxrwx 1 murday murday 20 Jun 19 06:22 murday -> /home/murday/public/
lrwxrwxrwx 1 peeroo peeroo 19 Jun 19 06:12 peeroo -> /home/peeroo/public
lrwxrwxrwx 1 poonit poonit 19 Jun 19 06:34 poonit -> /home/poonit/public
lrwxrwxrwx 1 jankee jankee 19 Jun 19 07:00 public -> /home/jankee/public
lrwxrwxrwx 1 rushika rushika 20 Jun 19 06:45 rushika -> /home/rushika/public
lrwxrwxrwx 1 sewtohul sewtohul 21 Jun 19 06:36 sewtohul -> /home/sewtohul/public
lrwxrwxrwx 1 simtysha simtysha 21 Jun 19 06:39 simtysha -> /home/simtysha/public
lrwxrwxrwx 1 jankee jankee 19 Jun 19 07:02 ved.jpeg -> /home/jankee/public
jankee@vara:/var/www/html/cs11-1$
```

Use of website



Index of /csl1-1

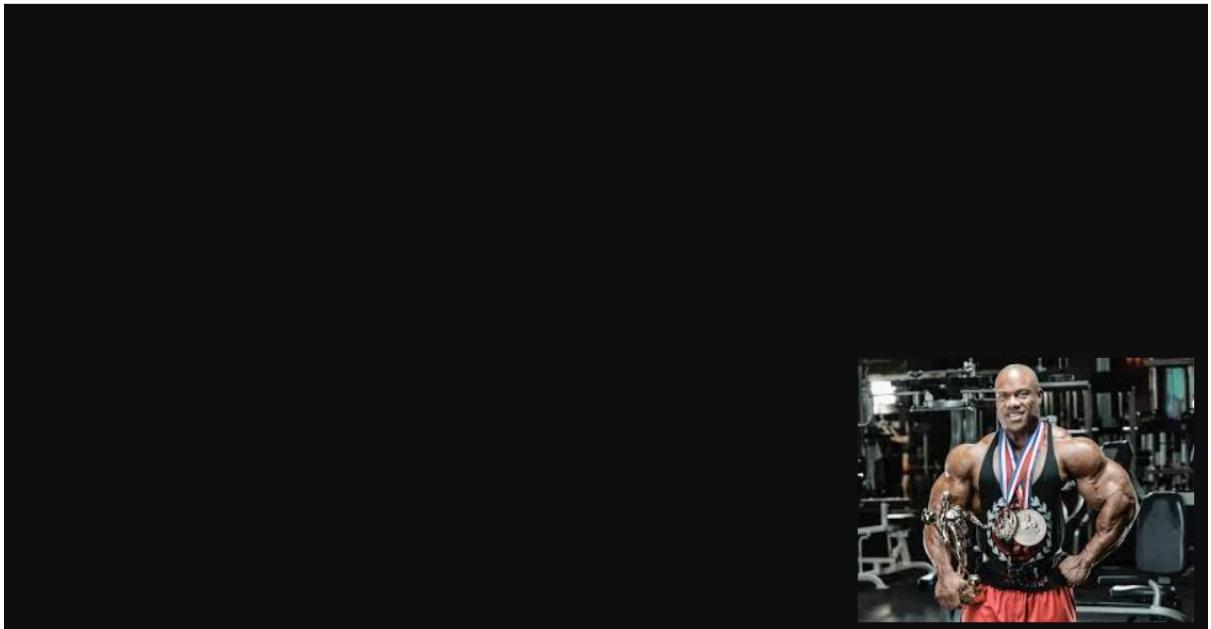
	<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
	Parent Directory		-	
	ahotar/	2024-06-19 06:16	-	
	ayushee/	2024-06-19 06:27	-	
	bissonauth/	2024-06-19 06:42	-	
	charles/	2024-06-19 06:28	-	
	derek/	2024-06-19 06:03	-	
	johaheer/	2024-06-19 06:13	-	
	komal/	2024-06-19 06:27	-	
	krishna/	2024-06-19 06:36	-	
	munazir/	2024-06-19 06:37	-	
	murday/	2024-06-19 06:43	-	
	peeroo/	2024-06-19 06:30	-	
	poonit/	2024-06-19 06:25	-	
	public/	2024-06-19 06:05	-	
	rushika/	2024-06-19 06:29	-	
	sewtohul/	2024-06-19 06:33	-	
	simtysha/	2024-06-19 06:20	-	
	ved.jpeg/	2024-06-19 06:05	-	

Apache/2.4.52 (Ubuntu) Server at vara.hopto.org Port 443

Index of /csl1-1/ved.jpeg

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
<a>Parent Directory		-	
<a>ved.jpeg	2024-06-19 06:05	12K	

Apache/2.4.52 (Ubuntu) Server at vara.hopto.org Port 443



9. Mr apavoo again pointed out a mistake where there should be only ved not ved.jpeg and remove my extra public folder on the csl1-1. I removed ved.jpeg and public folder. I created a link again with ved instead of ved.jpeg.

Activities Terminal 20 Jun 14:42

```
jankee@vara: /var/www/html/cs1-1
jankee@vara: /var/www/html/cs1-1
jankee@vara: /var/www/html/cs1-1$ ls -l
total 16
drwxrwxrwx 1 ahotar ahotar 20 Jun 19 06:32 ahotar -> /home/ahotar/public/
drwxrwxrwx 1 ayushee ayushee 20 Jun 19 06:37 ayushee -> /home/ayushee/public/
drwxrwxrwx 1 bissonauth bissonauth 23 Jun 19 06:46 bissonauth -> /home/bissonauth/public/
drwxrwxrwx 1 charles charles 20 Jun 19 06:37 charles -> /home/charles/public/
drwxrwxrwx 1 derek derek 20 Jun 19 06:07 derek -> /home/derek/public/
drwxrwxrwx 1 johaheer johaheer 21 Jun 19 06:39 johaheer -> /home/johaheer/public/
drwxrwxrwx 1 komal komal 19 Jun 19 07:09 komal -> /home/komal/public/
drwxrwxrwx 1 krishna krishna 29 Jun 19 06:33 krishna -> /home/krishna/public/
drwxrwxrwx 1 munazir munazir 20 Jun 19 06:36 munazir -> /home/munazir/public/
drwxrwxrwx 1 murday murday 20 Jun 19 06:22 murday -> /home/murday/public/
drwxrwxrwx 1 peeroo peeroo 19 Jun 19 06:12 peeroo -> /home/peeroo/public/
drwxrwxrwx 1 poonit poonit 19 Jun 19 06:34 poonit -> /home/poonit/public/
drwxrwxrwx 1 rushika rushika 20 Jun 19 06:45 rushika -> /home/rushika/public/
drwxrwxrwx 1 sewtohul sewtohul 21 Jun 19 06:36 sewtohul -> /home/sewtohul/public/
drwxrwxrwx 1 simtysha simtysha 21 Jun 19 06:39 simtysha -> /home/simtysha/public/
drwxrwxrwx 1 jankee jankee 19 Jun 19 07:02 ved -> /home/jankee/public/
jankee@vara: /var/www/html/cs1-1$ rm ved.jpeg
jankee@vara: /var/www/html/cs1-1$ ls -l
total 16
drwxrwxrwx 1 ahotar ahotar 20 Jun 19 06:32 ahotar -> /home/ahotar/public/
drwxrwxrwx 1 ayushee ayushee 20 Jun 19 06:37 ayushee -> /home/ayushee/public/
drwxrwxrwx 1 bissonauth bissonauth 23 Jun 19 06:46 bissonauth -> /home/bissonauth/public/
drwxrwxrwx 1 charles charles 20 Jun 19 06:37 charles -> /home/charles/public/
drwxrwxrwx 1 derek derek 20 Jun 19 06:07 derek -> /home/derek/public/
drwxrwxrwx 1 johaheer johaheer 21 Jun 19 06:39 johaheer -> /home/johaheer/public/
drwxrwxrwx 1 komal komal 19 Jun 19 07:09 komal -> /home/komal/public/
drwxrwxrwx 1 krishna krishna 29 Jun 19 06:33 krishna -> /home/krishna/public/
drwxrwxrwx 1 munazir munazir 20 Jun 19 06:36 munazir -> /home/munazir/public/
drwxrwxrwx 1 murday murday 20 Jun 19 06:22 murday -> /home/murday/public/
drwxrwxrwx 1 peeroo peeroo 19 Jun 19 06:12 peeroo -> /home/peeroo/public/
drwxrwxrwx 1 poonit poonit 19 Jun 19 06:34 poonit -> /home/poonit/public/
drwxrwxrwx 1 rushika rushika 20 Jun 19 06:45 rushika -> /home/rushika/public/
drwxrwxrwx 1 sewtohul sewtohul 21 Jun 19 06:36 sewtohul -> /home/sewtohul/public/
drwxrwxrwx 1 simtysha simtysha 21 Jun 19 06:39 simtysha -> /home/simtysha/public/
jankee@vara: /var/www/html/cs1-1$ ls -s /home/jankee/public ved
ls: cannot access 'ved': No such file or directory
total 0
jankee@vara: /var/www/html/cs1-1$ ls -s
total 0
jankee@vara: /var/www/html/cs1-1$ ls -l
total 16
drwxrwxrwx 1 ahotar ahotar 20 Jun 19 06:32 ahotar -> /home/ahotar/public/
drwxrwxrwx 1 ayushee ayushee 20 Jun 19 06:37 ayushee -> /home/ayushee/public/
drwxrwxrwx 1 bissonauth bissonauth 23 Jun 19 06:46 bissonauth -> /home/bissonauth/public/
drwxrwxrwx 1 charles charles 20 Jun 19 06:37 charles -> /home/charles/public/
drwxrwxrwx 1 derek derek 20 Jun 19 06:07 derek -> /home/derek/public/
drwxrwxrwx 1 johaheer johaheer 21 Jun 19 06:39 johaheer -> /home/johaheer/public/
drwxrwxrwx 1 komal komal 19 Jun 19 07:09 komal -> /home/komal/public/
drwxrwxrwx 1 krishna krishna 29 Jun 19 06:33 krishna -> /home/krishna/public/
drwxrwxrwx 1 munazir munazir 20 Jun 19 06:36 munazir -> /home/munazir/public/
drwxrwxrwx 1 murday murday 20 Jun 19 06:22 murday -> /home/murday/public/
drwxrwxrwx 1 peeroo peeroo 19 Jun 19 06:12 peeroo -> /home/peeroo/public/
drwxrwxrwx 1 poonit poonit 19 Jun 19 06:34 poonit -> /home/poonit/public/
drwxrwxrwx 1 rushika rushika 20 Jun 19 06:45 rushika -> /home/rushika/public/
drwxrwxrwx 1 sewtohul sewtohul 21 Jun 19 06:36 sewtohul -> /home/sewtohul/public/
drwxrwxrwx 1 simtysha simtysha 21 Jun 19 06:39 simtysha -> /home/simtysha/public/
drwxrwxrwx 1 jankee jankee 19 Jun 20 10:41 ved -> /home/jankee/public/
jankee@vara: /var/www/html/cs1-1$
```

10. Viewing the image on the website www.vara.hopto.org/cs1-1-1

Index of /cs1-1-1

Name	Last modified	Size	Description
Parent Directory		-	
ahotar/	2024-06-19 06:16	-	
ayushee/	2024-06-19 06:27	-	
bissonauth/	2024-06-19 06:42	-	
charles/	2024-06-19 06:28	-	
derek/	2024-06-19 06:03	-	
johaheer/	2024-06-19 06:13	-	
komal/	2024-06-19 06:27	-	
krishna/	2024-06-19 06:36	-	
munazir/	2024-06-19 06:37	-	
murday/	2024-06-19 06:43	-	
peeroo/	2024-06-19 06:30	-	
poonit/	2024-06-19 06:25	-	
rushika/	2024-06-19 06:29	-	
sewtohul/	2024-06-19 06:33	-	
simtysha/	2024-06-19 06:20	-	
ved/	2024-06-19 06:05	-	

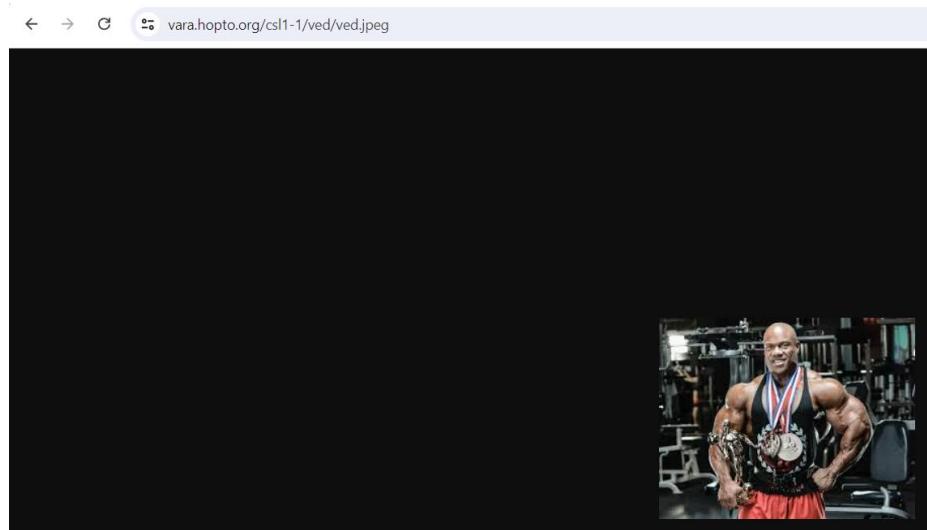
Apache/2.4.52 (Ubuntu) Server at vara.hopto.org Port 443



Index of /csl1-1/ved

Name	Last modified	Size	Description
Parent Directory		-	
 ved.jpeg	2024-06-19 06:05	12K	

Apache/2.4.52 (Ubuntu) Server at varahopto.org Port 443



Using cron for backup

1. First I create a shell script file test.sh in nano and echo “this is a a test” >>mydata.dat. The last part appends the text to mydata.dat file.
2. Then I gave it permission to all with chmod a+x test.sh
3. I executed the file test.sh.
4. Cat mydata.dat to output it.
5. Repeat 3-4, 2 more times.

*Note: I apologize for not having taken screenshots during the above steps. Hence, I will write all the codes I typed for the above.

- Nano test.sh
- Chmod a+x test.sh
- ./test.sh
- Cat mydata.dat
- ./test.sh
- Cat mydata.dat

- ./test.sh
 - Cat mydata.dat
6. Cron is used to backup data at regular intervals.
 7. Sudo apt install cron.
 8. Update cron.
 9. Enable cron to run in background using sudo systemctl enable cron.
 10. Sudo service cron reload to reload its configuration files without stopping, making it automatic and not disrupting the scheduled tasks.
 11. Crontab -e(editor) and select 1.

The screenshot shows a terminal window titled 'Terminal' with the command line interface. The session starts with 'sudo apt install cron', followed by 'sudo apt update'. It then shows the download of security and updates files from the Ubuntu repositories. After updating, 'cron' is enabled with 'sudo systemctl enable cron'. The user then reloads the cron service with 'sudo service cron reload'. Finally, the user runs 'crontab -e' to edit the crontab file, selects nano as the editor, and installs the new crontab. The terminal ends with 'cat mydata.dat'.

```

Activities Terminal 19 Jun 11:4
jankee@vara:/var/www/html/csl1-1
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo apt install cron
[sudo] password for lab18:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
cron is already the newest version (3.0pl1-137ubuntu3).
cron set to manually installed.
The following packages were automatically installed and are no longer required:
libwpe-1.6-1 libwpebackend-fdo-1.0-1
Use 'sudo apt autoremove' to remove them.
0 to upgrade, 0 to newly install, 0 to remove and 266 not to upgrade.
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo apt update
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Hit:2 https://archive.ubuntu.com/ubuntu Jammy InRelease
Hit:3 https://archive.ubuntu.com/ubuntu jammy-updates InRelease
Fetched 129 kB in 0s (93.5 kB/s)
crontab -e
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
266 packages can be upgraded. Run 'apt list --upgradable' to see them.
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo service cron reload
 * Reloading configuration files for periodic command scheduler cron
lab18@lab18-HP-ProDesk-400-G4-MT:~$ crontab
crontab -e
^C
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo systemctl enable cron
Synchronizing state of cron.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable cron
lab18@lab18-HP-ProDesk-400-G4-MT:~$ crontab -e
no crontab for lab18 - using an empty one
Select an editor. To change later, run 'select-editor'.
 1. /bin/nano      <----- easiest
 2. /usr/bin/vim.tiny
 3. /bin/ed
Choose 1-3 [1]: 1
crontab: installing new crontab
lab18@lab18-HP-ProDesk-400-G4-MT:~$ cat mydata.dat

```

12. Edit the line to * * * * * followed by path of the shellscript file.

The screenshot shows a terminal window titled "Activities Terminal" with the command "jankee@vara: /var/www/html/csl1-1" in the title bar. The window displays the "GNU nano 6.2" man page for "crontab(5)". The text in the window includes instructions on defining cron tasks using fields like minute, hour, day of month, month, and day of week, along with examples and notes about daemon output and error reporting.

13. Type `watch -n 1 cat mydata.dat`.

The screenshot shows a terminal window with the following commands and output:

```

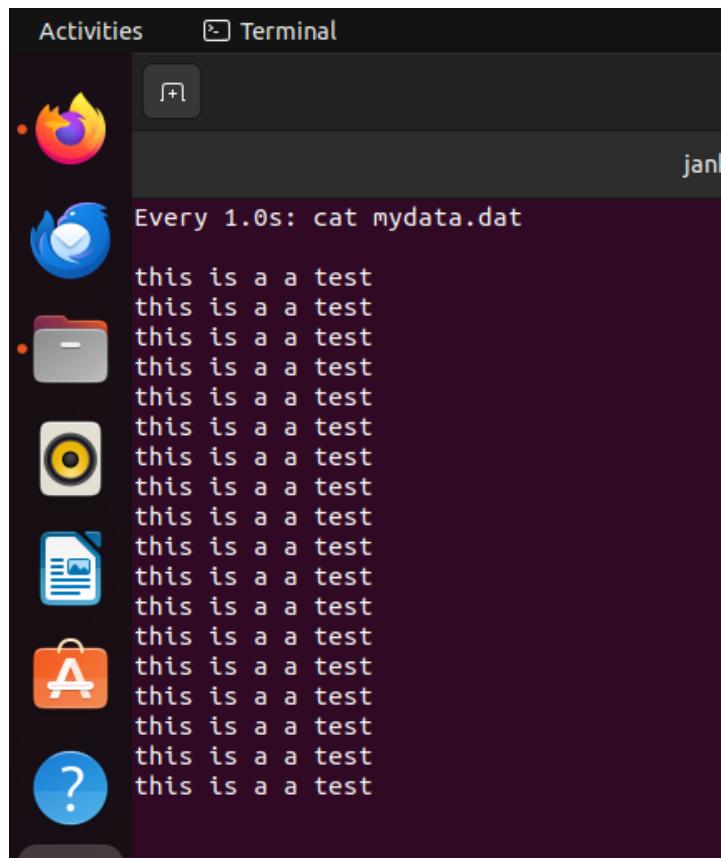
crontab: installing new crontab
lab18@lab18-HP-ProDesk-400-G4-MT:~$ crontab -e
No modification made
lab18@lab18-HP-ProDesk-400-G4-MT:~$ watch -n 1 cat mydata.dat

```

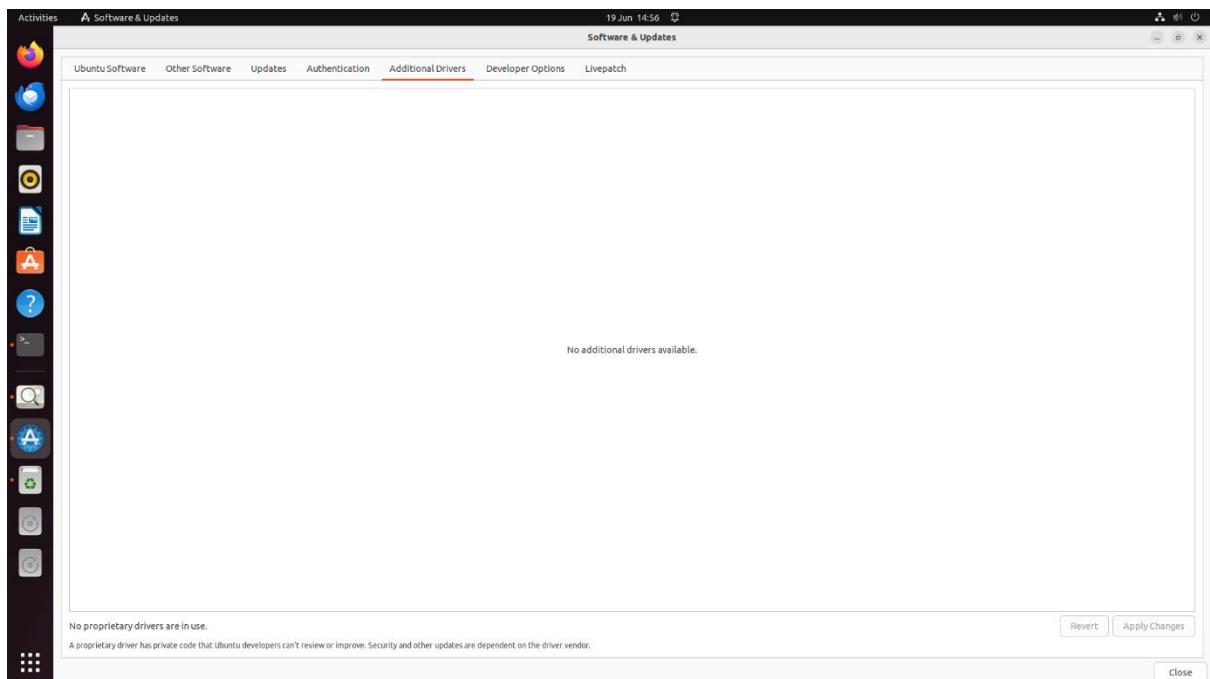
14. At first only 3 “this is a a test” text appear.

The screenshot shows a terminal window with the command "Every 1.0s: cat mydata.dat" entered. The output shows three lines of text: "this is a a test", "this is a a test", and "this is a a test".

15. The text appears every minute as a form of backup. The screenshot below is taken after a few minutes.



Device manager in ubuntu



Using terminal to retrieve information about hardwares.

1. Lsb_release -a gives information about the linux operating system.

```

Activities Terminal 19 Jun 14:59
jankee@vara:/var/www/html/csl1-1 lab18@lab18-HP-ProDesk-400-G4-MT: ~
No LSB modules are available.
Description: Ubuntu 22.04 LTS
Distributor ID: Ubuntu
Release: 22.04
Codename: jammy
lab18@lab18-HP-ProDesk-400-G4-MT: $ lsb_release -a
00:00.0 Host bridge: Intel Corporation Xeon E3-1200 v5/E3-1500 v5/6th Gen Core Processor Host Bridge/DRAM Registers (rev 07)
00:02.0 VGA compatible controller: Intel Corporation HD Graphics 530 (rev 06)
00:02.1 USB controller: Intel Corporation Xeon E3-1200 v5/E3-1500 v5/6th Gen Core Processor USB 3.0 xHCI Controller
00:14.2 Signal processing controller: Intel Corporation 200 Series PCH Thermal Subsystem
00:16.0 Communication controller: Intel Corporation 200 Series PCH CSME HECI #1
00:17.0 SATA controller: Intel Corporation 200 Series PCH SATA controller [AHCI mode]
00:1c.0 PCI bridge: Intel Corporation 200 Series PCH PCI Express Root Port #5 (rev f0)
00:1c.1 PCI bridge: Intel Corporation 200 Series PCH PCI Express Root Port #2 (rev f0)
00:1f.2 Monitor controller: Intel Corporation 200 Series PCH HD Graphics/Z370 Chipset Family Power Management Controller
00:1f.3 Audio device: Intel Corporation 200 Series/Z370 Chipset Family HD Audio
00:1f.4 SMBus: Intel Corporation 200 Series/Z370 Chipset Family SMBus Controller
01:00.0 Ethernet controller: Realtek Semiconductor Co., Ltd. RTL8111/8168/8411 PCI Express Gigabit Ethernet Controller (rev 15)
lab18@lab18-HP-ProDesk-400-G4-MT: ~

```

2. Lspci -v gives detailed information about peripherals/devices connected to the PC.

```

Activities Terminal 19 Jun 15:01
jankee@vara:/var/www/html/csl1-1 lab18@lab18-HP-ProDesk-400-G4-MT: ~
01:00.0 Ethernet controller: Realtek Semiconductor Co., Ltd. RTL8111/8168/8411 PCI Express Gigabit Ethernet Controller (rev 15)
-lab18@lab18-HP-ProDesk-400-G4-MT: $ lspci -v
-lab18@lab18-HP-ProDesk-400-G4-MT: ~
00:00.0 Host bridge: Intel Corporation Xeon E3-1200 v5/E3-1500 v5/6th Gen Core Processor Host Bridge/DRAM Registers (rev 07)
    Subsystem: Hewlett-Packard Company Xeon E3-1200 v5/E3-1500 v5/6th Gen Core Processor Host Bridge/DRAM Registers
    Flags: bus master, fast devsel, latency 0
    Capabilities: <access denied>
    Kernel driver in use: skl_uncore
    Kernel modules: i935k_edac

00:02.0 VGA compatible controller: Intel Corporation HD Graphics 530 (rev 06) (prog-if 00 [VGA controller])
    DeviceName: Onboard IDG
    Subsystem: Hewlett-Packard Company HD Graphics 530
    Flags: bus master, fast devsel, latency 0, IRQ 127
    Memory at fffe000000 (64-bit, non-prefetchable) [size=16M]
    Memory at d0000000 (64-bit, prefetchable) [size=256M]
    I/O ports at 4000 [size=64]
    Expansion ROM at 000c0000 [virtual] [disabled] [size=128K]
    Capabilities: <access denied>
    Kernel driver in use: i915
    Kernel modules: i915

00:14.0 USB controller: Intel Corporation 200 Series/Z370 Chipset Family USB 3.0 xHCI Controller (prog-if 30 [xHCI])
    Subsystem: Hewlett-Packard Company 200 Series/Z370 Chipset Family USB 3.0 xHCI Controller
    Flags: bus master, medium devsel, latency 0, IRQ 124
    Memory at e0100000 (64-bit, non-prefetchable) [size=4K]
    Capabilities: <access denied>
    Kernel driver in use: xhci_hcd
    Kernel modules: xhci_pcl

00:14.2 Signal processing controller: Intel Corporation 200 Series PCH Thermal Subsystem
    Subsystem: Hewlett-Packard Company 200 Series PCH Thermal Subsystem
    Flags: bus master, fast devsel, latency 0, IRQ 11
    Memory at ffff0000 (64-bit, non-prefetchable) [size=4K]
    Capabilities: <access denied>

00:16.0 Communication controller: Intel Corporation 200 Series PCH CSME HECI #1
    Subsystem: Hewlett-Packard Company 200 Series PCH CSME HECI
    Flags: bus master, fast devsel, latency 0, IRQ 122
    Memory at e0114000 (32-bit, non-prefetchable) [size=8K]
    Memory at e0117000 (32-bit, non-prefetchable) [size=256]
    I/O ports at 4000 [size=4]
    I/O ports at 4000 [size=4]
    I/O ports at 4000 [size=32]
    Memory at e0118000 (32-bit, non-prefetchable) [size=4K]

00:17.0 SATA controller: Intel Corporation 200 Series PCH SATA controller [AHCI mode] (prog-if 01 [AHCI mode])
    Subsystem: Hewlett-Packard Company 200 Series PCH SATA controller [AHCI mode]
    Flags: bus master, 60MHz, medium devsel, latency 0, IRQ 123
    Memory at e0114000 (32-bit, non-prefetchable) [size=8K]
    Memory at e0117000 (32-bit, non-prefetchable) [size=256]
    I/O ports at 4080 [size=4]
    I/O ports at 4060 [size=32]
    Memory at e0118000 (32-bit, non-prefetchable) [size=4K]
lab18@lab18-HP-ProDesk-400-G4-MT: ~

```

3. Lspci -vv more details as compared to the above.

```

lspci -vvv
00:00.0 Host bridge: Intel Corporation Xeon E3-1200 v5/E3-1500 v5/6th Gen Core Processor Host Bridge/DRAM Registers (rev 07)
    Subsystem: Hewlett-Packard Company Xeon E3-1200 v5/E3-1500 v5/6th Gen Core Processor Host Bridge/DRAM Registers
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR+ FastB2B- DlSINTx+
    Status: Cap+ 60MHz- UDF- FastB2B+ ParErr- DEVSEL=fast >Abort- <Abort- <Abort- >SERR- <PERR- INTx-
    Latency: 0
    Capabilities: <access denied>
    Kernel driver in use: skl_uncore
    Kernel modules: iwl1200_edac

00:02.0 VGA compatible controller: Intel Corporation HD Graphics 530 (rev 06) (prog-if 00 [VGA controller])
    DeviceName: Onboard IGD
    Subsystem: Hewlett-Packard Company HD Graphics 530
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DlSINTx+
    Status: Cap+ 60MHz- UDF- FastB2B+ ParErr- DEVSEL=medium >Abort- <Abort- <Abort- >SERR- <PERR- INTx-
    Latency: 0
    Interrupt: pin A routed to IRQ 127
    Region 0: Memory at 0ffe00000 (64-bit, non-prefetchable) [size=16M]
    Region 2: Memory at d0000000 (64-bit, prefetchable) [size=256M]
    Region 3: I/O ports at 4000 [size=64]
    Expansion ROM at 000c0000 [virtual] [disabled] [size=128K]
    Capabilities: <access denied>
    Kernel driver in use: i915
    Kernel modules: i915

00:14.0 USB controller: Intel Corporation 200 Series/Z370 Chipset Family USB 3.0 xHCI Controller (prog-if 30 [xHCI])
    Subsystem: Hewlett-Packard Company 200 Series/Z370 Chipset Family USB 3.0 xHCI Controller
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DlSINTx+
    Status: Cap+ 60MHz- UDF- FastB2B+ ParErr- DEVSEL=medium >Abort- <Abort- <Abort- >SERR- <PERR- INTx-
    Latency: 0
    Interrupt: pin A routed to IRQ 124
    Region 0: Memory at e9100000 (64-bit, non-prefetchable) [size=64K]
    Capabilities: <access denied>
    Kernel driver in use: xhci_hcd
    Kernel modules: xhci_hcd

00:14.2 Signal processing controller: Intel Corporation 200 Series PCH Thermal Subsystem
    Subsystem: Hewlett-Packard Company 200 Series PCH Thermal Subsystem
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DlSINTx-
    Status: Cap+ 60MHz- UDF- FastB2B+ ParErr- DEVSEL=fast >Abort- <Abort- <Abort- >SERR- <PERR- INTx-
    Latency: 0
    Interrupt: pin C routed to IRQ 11
    Region 0: Memory at 0fff01000 (64-bit, non-prefetchable) [size=4K]
    Capabilities: <access denied>

00:16.0 Communication controller: Intel Corporation 200 Series PCH CSME HECI #1
    Subsystem: Hewlett-Packard Company 200 Series PCH CSME HECI
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DlSINTx+
    Status: Cap+ 60MHz- UDF- FastB2B+ ParErr- DEVSEL=fast >Abort- <Abort- <Abort- >SERR- <PERR- INTx-
    Latency: 0
    Interrupt: pin A routed to IRQ 126
    Region 0: Memory at 1fff01000 (64-bit, non-prefetchable) [size=4K]
    Capabilities: <access denied>

```

4. Lspci -vvv gives even more information.

```

lspci -vvv
00:00.0 Host bridge: Intel Corporation Xeon E3-1200 v5/E3-1500 v5/6th Gen Core Processor Host Bridge/DRAM Registers (rev 07)
    Subsystem: Hewlett-Packard Company Xeon E3-1200 v5/E3-1500 v5/6th Gen Core Processor Host Bridge/DRAM Registers
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR+ FastB2B- DlSINTx+
    Status: Cap+ 60MHz- UDF- FastB2B+ ParErr- DEVSEL=fast >Abort- <Abort- <Abort- >SERR+ <PERR- INTx-
    Latency: 0
    Capabilities: <access denied>
    Kernel driver in use: skl_uncore
    Kernel modules: iwl1200_edac

00:02.0 VGA compatible controller: Intel Corporation HD Graphics 530 (rev 06) (prog-if 00 [VGA controller])
    DeviceName: Onboard IGD
    Subsystem: Hewlett-Packard Company HD Graphics 530
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DlSINTx+
    Status: Cap+ 60MHz- UDF- FastB2B+ ParErr- DEVSEL=medium >Abort- <Abort- <Abort- >SERR- <PERR- INTx-
    Latency: 0
    Interrupt: pin A routed to IRQ 127
    Region 0: Memory at 0ffe00000 (64-bit, non-prefetchable) [size=16M]
    Region 2: Memory at d0000000 (64-bit, prefetchable) [size=256M]
    Region 3: I/O ports at 4000 [size=64]
    Expansion ROM at 000c0000 [virtual] [disabled] [size=128K]
    Capabilities: <access denied>
    Kernel driver in use: i915
    Kernel modules: i915

00:14.0 USB controller: Intel Corporation 200 Series/Z370 Chipset Family USB 3.0 xHCI Controller (prog-if 30 [xHCI])
    Subsystem: Hewlett-Packard Company 200 Series/Z370 Chipset Family USB 3.0 xHCI Controller
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR+ FastB2B- DlSINTx+
    Status: Cap+ 60MHz- UDF- FastB2B+ ParErr- DEVSEL=medium >Abort- <Abort- <Abort- >SERR- <PERR- INTx-
    Latency: 0
    Interrupt: pin A routed to IRQ 124
    Region 0: Memory at e9100000 (64-bit, non-prefetchable) [size=64K]
    Capabilities: <access denied>
    Kernel driver in use: xhci_hcd
    Kernel modules: xhci_hcd

00:14.2 Signal processing controller: Intel Corporation 200 Series PCH Thermal Subsystem
    Subsystem: Hewlett-Packard Company 200 Series PCH Thermal Subsystem
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DlSINTx-
    Status: Cap+ 60MHz- UDF- FastB2B+ ParErr- DEVSEL=fast >Abort- <Abort- <Abort- >SERR- <PERR- INTx-
    Latency: 0
    Interrupt: pin C routed to IRQ 11
    Region 0: Memory at 0fff01000 (64-bit, non-prefetchable) [size=4K]
    Capabilities: <access denied>

00:16.0 Communication controller: Intel Corporation 200 Series PCH CSME HECI #1
    Subsystem: Hewlett-Packard Company 200 Series PCH CSME HECI
    Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DlSINTx+
    Status: Cap+ 60MHz- UDF- FastB2B+ ParErr- DEVSEL=fast >Abort- <Abort- <Abort- >SERR- <PERR- INTx-
    Latency: 0
    Interrupt: pin A routed to IRQ 126
    Region 0: Memory at 1fff01000 (64-bit, non-prefetchable) [size=4K]
    Capabilities: <access denied>

```

5. Lsusb gives information about devices connected to the PC via USB.

```

lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 002: ID 04f0:114a HP, Inc. Optical Mouse
Bus 001 Device 003: ID 0461:0010 Primax Electronics, Ltd HP PR1101U / Primax PMX-KPR1101U Keyboard
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub

```

6. Lshw lists hardwares and their configurations.

```
jankee@vara:/var/www/html/csl1-1          x      lab18@lab18-HP-ProDesk-400-G4-MT: ~      x      lab18@lab18-HP-ProDesk-400-G4-MT: ~      x      19 Jun 15:02  🔍

product: PNP device PNP0c02
physical id: 1
capabilities: pnp
configuration: driver=system
*-pnpo0r0
product: PNP device PNP0c02
physical id: 2
capabilities: pnp
configuration: driver=system
*-pnpo0r1
product: PNP device PNP0c02
physical id: 3
capabilities: pnp
configuration: driver=system
*-pnpo0r4
product: PNP device PNP0B00
physical id: 4
capabilities: pnp
configuration: driver=rtc_cmos
*-pnpo0r5
product: PNP device INT1F0d
physical id: 5
capabilities: pnp
configuration: driver=system
*-pnpo0r6
product: PNP device HPQ8002
physical id: 6
capabilities: pnp
configuration: driver=i8042_kbd
*-pnpo0r7
product: PNP device PNP0f13
physical id: 7
capabilities: pnp
configuration: driver=system
*-pnpo0r8
product: PNP device i8042 aux
physical id: 8
capabilities: pnp
configuration: driver=system
*-pnpo0r9
product: PNP device PNP0c02
physical id: 9
capabilities: pnp
configuration: driver=system
*-pnpo0r0a
product: PNP device IX0B02
physical id: a
capabilities: pnp
configuration: driver=tpm_tls
*-memory UNCLAIMED
description: Memory controller
product: 200 Series/Z370 Chipset Family Power Management Controller
vendor: Intel Corporation
physical id: 0
size: 16GiB
```

```

Activities Terminal 19 Jun 15:02
jankee@vara:/var/www/html/csl1-1 x lab18@lab18-HP-ProDesk-400-G4-MT:~ x
Screenshot captured
You can paste the image from the clipboard.

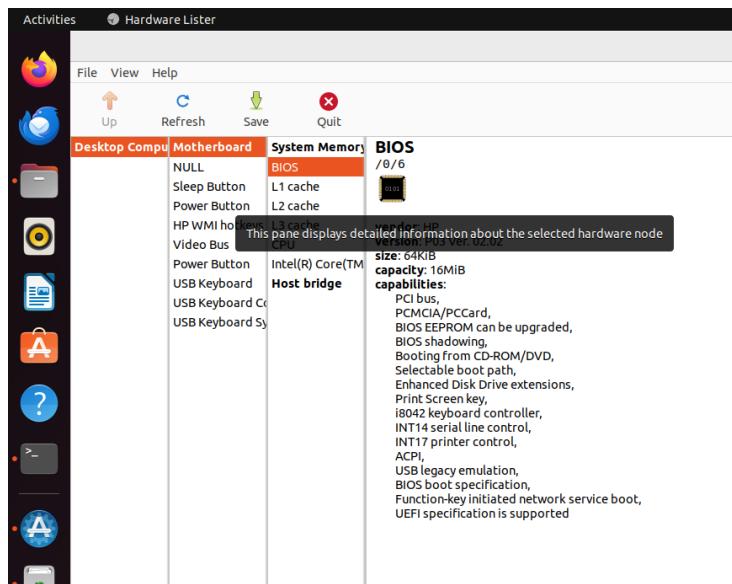
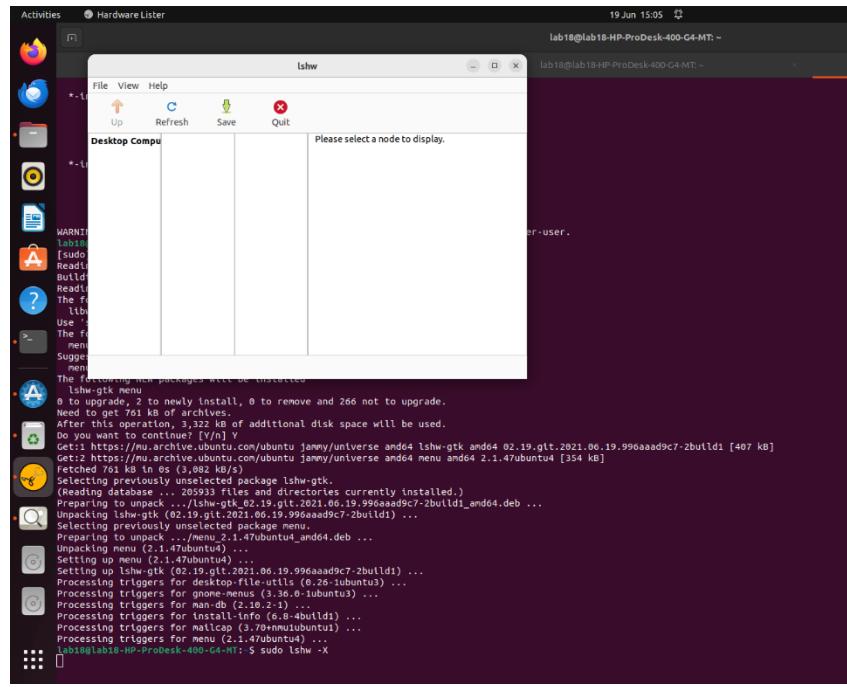
logical name: input0
logical name: /dev/input/event1
capabilities: platform
*-input2
    product: HP WMI hotkeys
    physical id: 3
    logical name: input0
    logical name: /dev/input/event7
    capabilities: platform
*-input3
    product: Video Bus
    physical id: 4
    logical name: input1
    logical name: /dev/input/events
    capabilities: platform
*-input4
    product: Power Button
    physical id: 5
    logical name: input2
    logical name: /dev/input/event2
    capabilities: platform
*-input5
    product: PixArt HP USB Optical Mouse
    physical id: 6
    logical name: input0
    logical name: /dev/input/event3
    logical name: /dev/input/mouse0
    capabilities: platform
*-input6
    product: USB Keyboard
    physical id: 7
    logical name: input7
    logical name: /dev/input/event4
    logical name: input::capslock
    logical name: input::compose
    logical name: input7::kana
    logical name: input7::numlock
    logical name: input7::scrolllock
    capabilities: usb
*-input7
    product: USB Keyboard Consumer Control
    physical id: 8
    logical name: input8
    logical name: /dev/input/events
    capabilities: usb
*-input8
    product: USB Keyboard System Control
    physical id: 9
    logical name: input9
    logical name: /dev/input/event6
    capabilities: usb
WARNING: output may be incomplete or inaccurate, you should run this program as super-user.
lab18@Lab18-HP-ProDesk-400-G4-MT:~
```

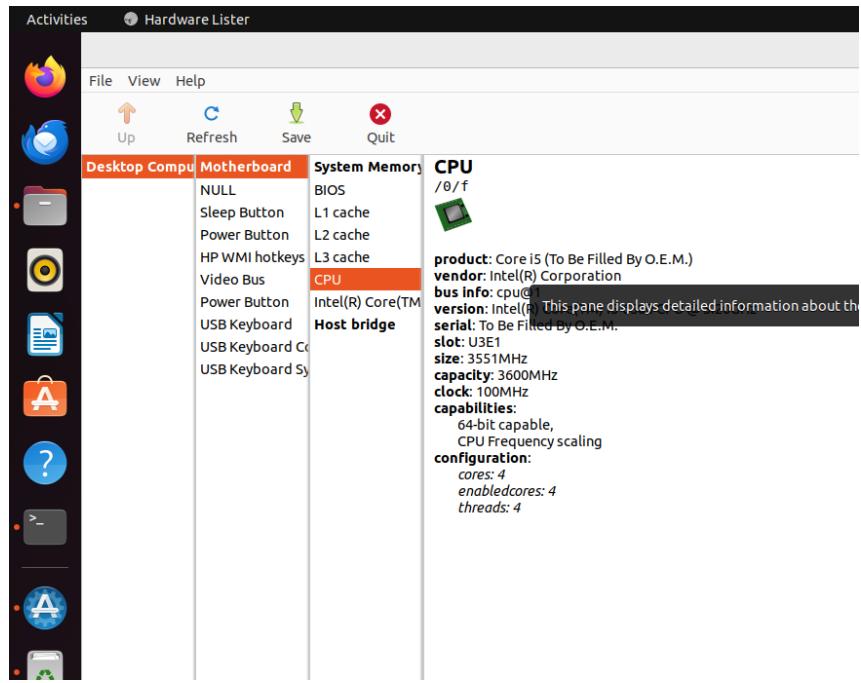
7. Sudo apt install lshw-gtk.

```

Activities Terminal 19 Jun 15:04
jankee@vara:/var/www/html/csl1-1 x lab18@lab18-HP-ProDesk-400-G4-MT:~ x
capabilities: usb
*-input7
    product: USB Keyboard Consumer Control
    physical id: 8
    logical name: input8
    logical name: /dev/input/events
    capabilities: usb
*-input9
    product: USB Keyboard System Control
    physical id: 9
    logical name: input9
    logical name: /dev/input/event6
    capabilities: usb
WARNING: output may be incomplete or inaccurate, you should run this program as super-user.
[lab18@Lab18-HP-ProDesk-400-G4-MT:~ $ sudo apt install lshw-gtk
[sudo] password for lab18:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libx11-xcb-1.0-1 libxkbcommon-x11-0.1
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libxkbcommon-x11-0.1 libxkbcommon-x11-data-0.1 libxkbcommon-x11-0.1-0.1
Suggested packages:
  menu-l10n gksu | kde-runtime | ktsuuss
The following NEW packages will be installed:
  lshw-gtk menu
0 upgraded, 2 newly installed, 0 to remove and 266 not to upgrade.
Need to get 761 kB of archives.
After this operation, 3,322 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get: https://ppa.launchpad.net/linrunner/jammy/universe amd64 lshw-gtk amd64 02.19.glt.2021.06.19.996aaad9c7-2build1 [407 kB]
Get: https://ppa.launchpad.net/linrunner/jammy/universe amd64 menu amd64 2.1.47ubuntu4 [354 kB]
Fetched 761 kB in 0s (1,082 kB/s)
Selecting previously unselected package lshw-gtk.
(Reading database ... 205933 files and directories currently installed.)
Preparing to unpack .../lshw-gtk_02.19.glt.2021.06.19.996aaad9c7-2build1_amd64.deb ...
Unpacking lshw-gtk (02.19.glt.2021.06.19.996aaad9c7-2build1) ...
Selecting previously unselected package menu.
Preparing to unpack .../menu_2.1.47ubuntu4_amd64.deb ...
Unpacking menu (2.1.47ubuntu4) ...
Setting up lshw-gtk (02.19.glt.2021.06.19.996aaad9c7-2build1) ...
Processing triggers for desktop-file-utils (0.26-1ubuntu3) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu3) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for install-info (6.8-4ubuntu1) ...
Processing triggers for man-db (2.1.4-1ubuntu4) ...
Processing triggers for man-db (2.1.4-1ubuntu4) ...
[lab18@Lab18-HP-ProDesk-400-G4-MT:~ $
```

8. Sudo lshw -X gives a visual view of hardware and CPU.





9. Sudo fdisk to view partitions.

```

Activities Terminal lab18@vara:~$ sudo fdisk -l
jankee@vara:/var/www/html/csl1-1 x lab18@vara:~$ ^C
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo fdisk -l
Disk /dev/loop0: 4 KiB, 4096 bytes, 8 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop1: 63.46 MiB, 66547712 bytes, 129976 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop2: 63.95 MiB, 67051520 bytes, 130960 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop3: 74.24 MiB, 77844480 bytes, 152040 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop4: 73.9 MiB, 77492224 bytes, 151352 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop5: 6.41 MiB, 6725632 bytes, 13136 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop6: 240.32 MiB, 251994112 bytes, 492176 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop7: 349.69 MiB, 366678016 bytes, 716168 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/sda: 931.51 GiB, 1000204886016 bytes, 1953525168 sectors
Disk model: ST1000DM002-1EYN1

```

Activities Terminal

jankee@vara: /var/www/html/csl1-1

Screenshot
You can paste

```
Disk /dev/loop11: 81.26 MiB, 85209088 bytes, 166424 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop12: 45.93 MiB, 48160768 bytes, 94064 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop13: 91.69 MiB, 96141312 bytes, 187776 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop14: 12.32 MiB, 12922880 bytes, 25240 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop15: 40.86 MiB, 42840064 bytes, 83672 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop16: 38.83 MiB, 40714240 bytes, 79520 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop17: 476 KiB, 487424 bytes, 952 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop18: 240.32 MiB, 251990016 bytes, 492168 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop19: 452 KiB, 462848 bytes, 904 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

10. Gparted used to manage disk partitions.

Activities Terminal 19 Jun 1
jankee@vara:/var/www/html/csl1-1 lab18@lab18-HP-ProD

```
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop18: 240.32 MiB, 251990016 bytes, 492168 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop19: 452 KiB, 462848 bytes, 904 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
lab18@lab18-HP-ProDesk-400-G4-MT:~$ gparted
Command 'gparted' not found, but can be installed with:
sudo apt install gparted
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo apt install gparted
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libwpe-1.0-1 libwpебакенд-fdo-1.0-1
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  gparted-common
Suggested packages:
  dmraid gpart jfsutils kpartx mtools reiser4progs reiserfsprogs udftools xfsprogs exfatprogs
The following NEW packages will be installed:
  gparted gparted-common
0 to upgrade, 2 to newly install, 0 to remove and 266 not to upgrade.
Need to get 490 kB of archives.
After this operation, 2,128 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 https://archive.ubuntu.com/ubuntu jammy/main amd64 gparted-common all 1.3.1-1ubuntu1 [71.9 kB]
Get:2 https://archive.ubuntu.com/ubuntu jammy/main amd64 gparted amd64 1.3.1-1ubuntu1 [418 kB]
Fetched 490 kB in 0s (2,382 kB/s)
Selecting previously unselected package gparted-common.
(Reading database ... 206167 files and directories currently installed.)
Preparing to unpack .../gparted-common_1.3.1-1ubuntu1_all.deb ...
Unpacking gparted-common (1.3.1-1ubuntu1) ...
Selecting previously unselected package gparted.
Preparing to unpack .../gparted_1.3.1-1ubuntu1_amd64.deb ...
Unpacking gparted (1.3.1-1ubuntu1) ...
Setting up gparted-common (1.3.1-1ubuntu1) ...
Setting up gparted (1.3.1-1ubuntu1) ...
Processing triggers for mailcap (3.70+nmu1ubuntu1) ...
Processing triggers for desktop-file-utils (0.26-1ubuntu3) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu3) ...
Processing triggers for man-db (2.10.2-1) ...
```

Activities GParted

jankee@vara:/var/www/html/csl1-1

Disk /dev/loop18: 240.32 MB, 251990016 bytes, 492168 sectors
 Units: sectors of 1 * 512 = 512 bytes
 Sector size (logical/physical): 512 bytes / 512 bytes
 I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/loop19: 452 KiB, 462848 bytes, 904 sectors
 Units: sectors of 1 * 512 = 512 bytes
 Sector size (logical/physical): 512 bytes / 512 bytes
 I/O size (minimum/optimal): 512 bytes / 512 bytes

Lab18@lab18-HP-ProDesk-400-G4-MT:~\$ gparted

Command: gparted not found, but can be installed with:
 sudo apt install gparted

Reading package lists... Done
 Building dependency tree... Done
 Reading state information... Done
 The following packages were automatically installed and are no longer required:
 liblwpe-1.0-1 liblwpebackend-fdo-1.0-1
 Use 'sudo apt autoremove' to remove them.
 The following additional packages will be installed:
 gparted-common
 Suggested packages:
 dmraid gpart jfsutils kpartx mtools reiserfsprogs reiserfsprogs udftools xfspro
 The following NEW packages will be installed
 gparted gparted-common
 0 to upgrade, 2 to newly install, 0 to remove and 266 not to upgrade.
 Need to get 490 kB of archives.
 After this operation, 2,128 kB of additional disk space will be used.
 Do you want to continue? [Y/n] Y
 Get:1 https://mu.archive.ubuntu.com/ubuntu jammy/main amd64 gparted-common all
 Get:2 https://mu.archive.ubuntu.com/ubuntu jammy/main amd64 gparted amd64 1.3.1
 Fetched 490 kB in (2,382 kB/s)
 Selecting previously unselected package gparted-common.
 (Reading database ... 206167 files and directories currently installed.)
 Preparing to unpack .../gparted-common_1.3.1-1ubuntui_all.deb ...
 Unpacking gparted-common (1.3.1-1ubuntui) ...
 Selecting previously unselected package gparted.
 Preparing to unpack .../gparted_1.3.1-1ubuntui_amd64.deb ...
 Unpacking gparted (1.3.1-1ubuntui) ...
 Setting up gparted-common (1.3.1-1ubuntui) ...
 Setting up gparted (1.3.1-1ubuntui) ...
 Processing triggers for mallcap (3.70+muuibuntu1) ...
 Processing triggers for desktop-file-utils (0.26-1ubuntui3) ...
 Processing triggers for hicolor-icon-theme (0.17-2) ...
 Processing triggers for gnome-menus (3.36.0-1ubuntui3) ...
 Processing triggers for man-db (2.10.2-1) ...
 Lab18@lab18-HP-ProDesk-400-G4-MT:~\$ gparted
 GParted 1.3.1
 configuration --enable-libparted-dmraid --enable-online-resize
 libparted 3.4

lab18@lab18-HP-ProDesk-400-G4-MT:~

lab18@lab18-HP-Pro

GParted - /dev/sda - GParted

/dev/sda - GParted

Partition Filesystem Mount Point Label Size Used Unused Flags

Partition	Filesystem	Mount Point	Label	Size	Used	Unused	Flags
/dev/sda1	ntfs		System Reserved	1.00 GiB	490.32 MiB	533.68 MiB	boot
/dev/sda2	ntfs			530.50 GiB	222.97 GiB	307.53 GiB	
/dev/sda3	extended			100.58 GiB	—	—	
/dev/sda5	ext4	./var/snap...		93.13 GiB	14.26 GiB	78.87 GiB	
unallocated	unallocated			1.48 MiB	—	—	
/dev/sda6	linux-swap			7.45 GiB	0.00 B	7.45 GiB	
/dev/sda4	ntfs	New Volume		299.43 GiB	137.11 MiB	299.29 GiB	
unallocated	unallocated			2.71 MiB	—	—	

0 operations pending

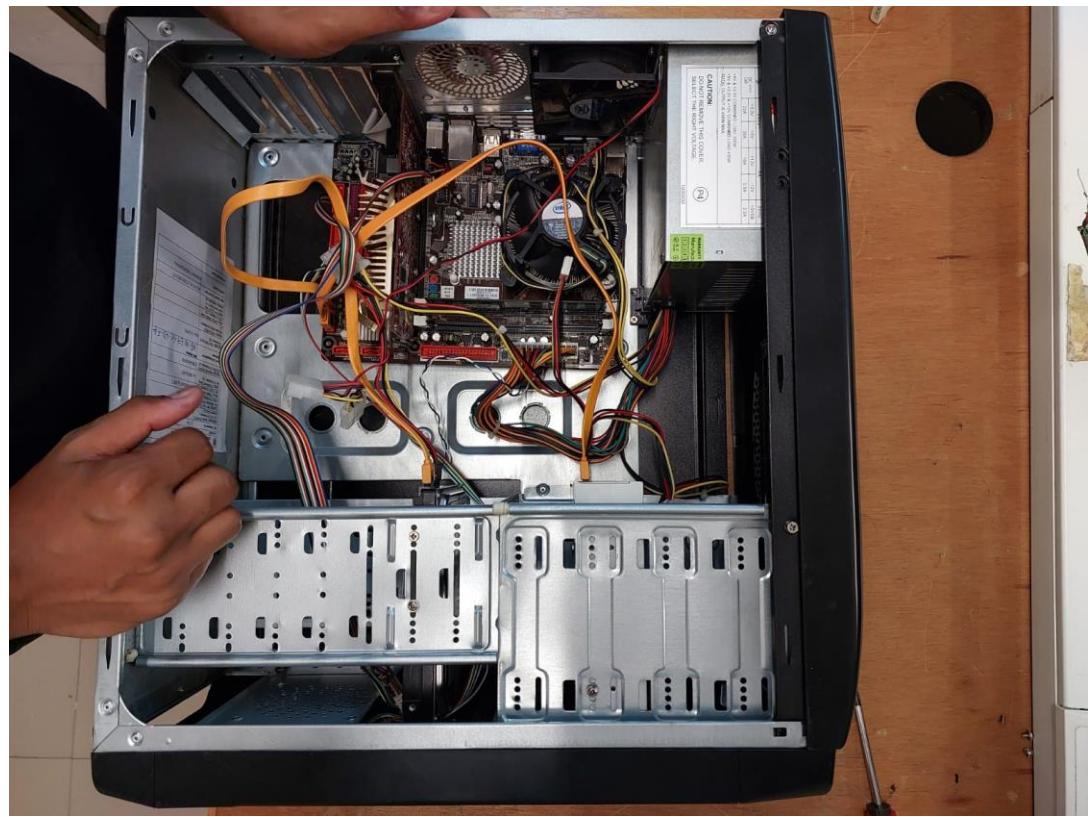
Pc assembly

1. The PC to be disassembled is shown below. Before disassembling, it is important to ground ourself to avoid static electricity, by grabbing the PC casing.

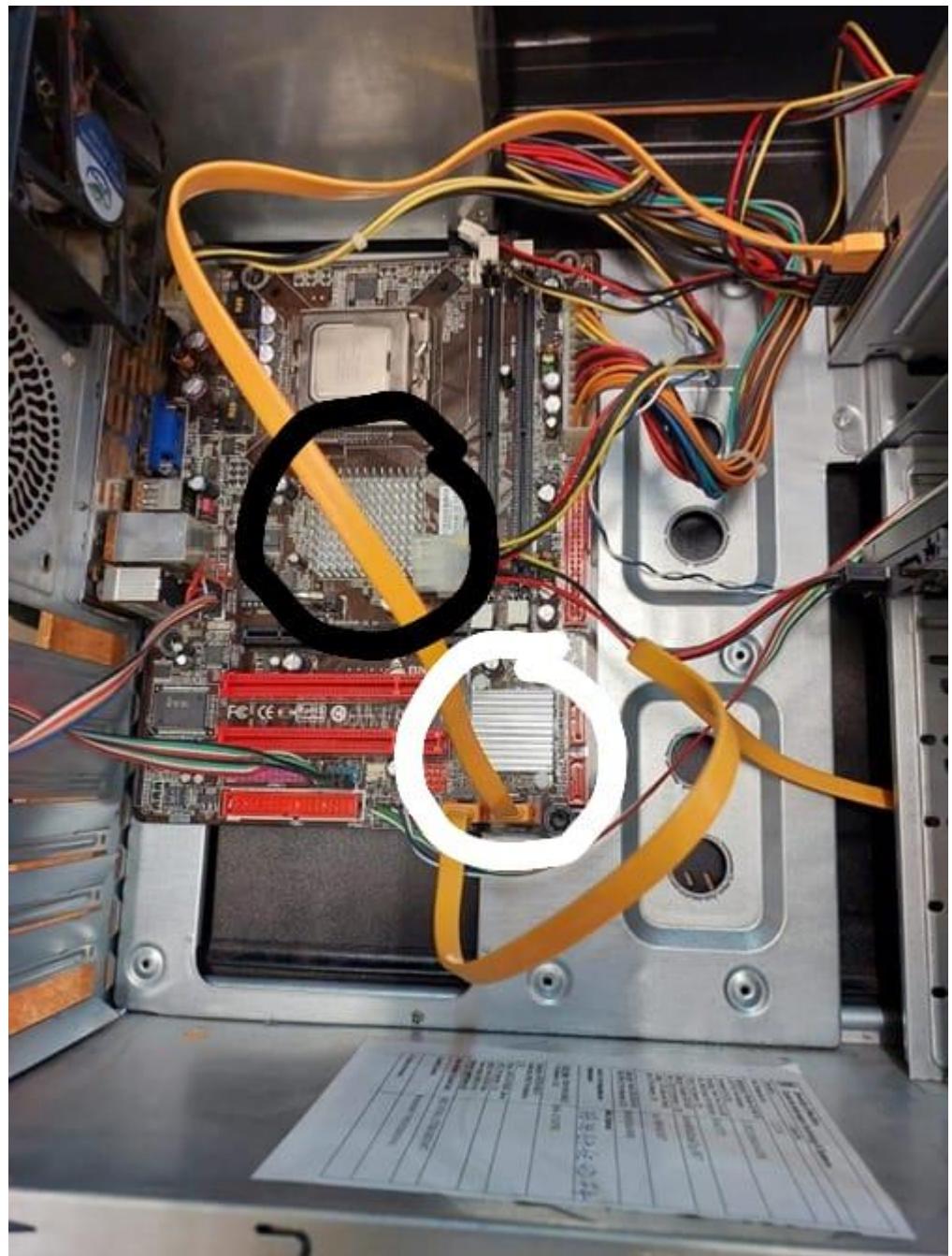




2. This is the PC after removing the side frame.



3. All the wire connections can be seen below.

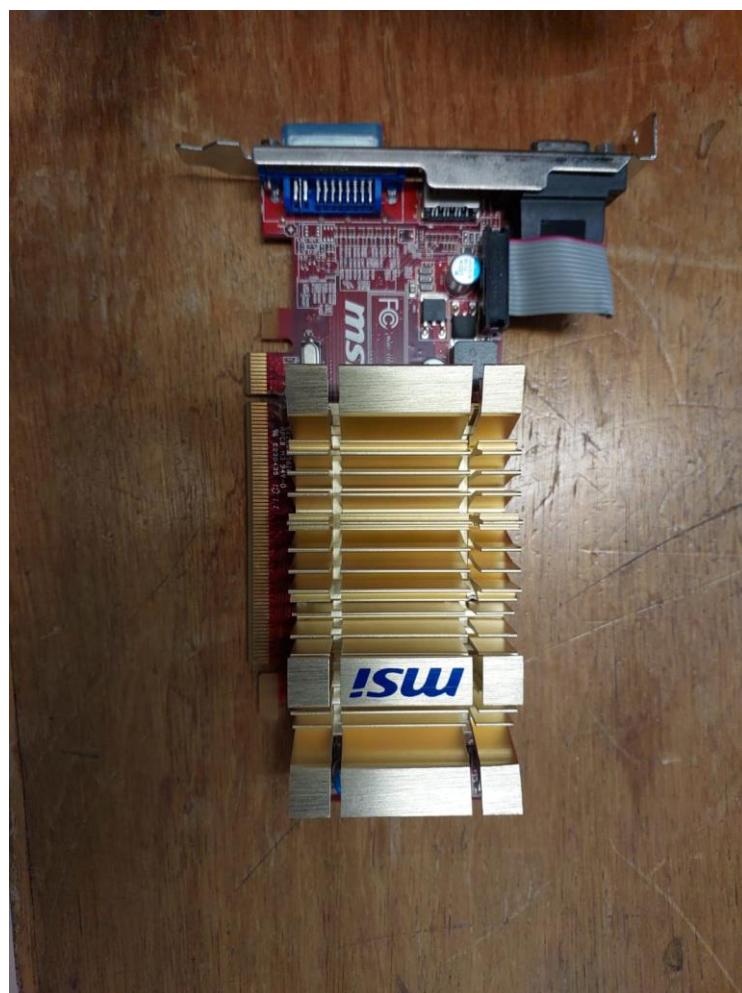


The component inside the black circle is the north bridge and the one in the white circle is the south bridge.

4. The SRAM.



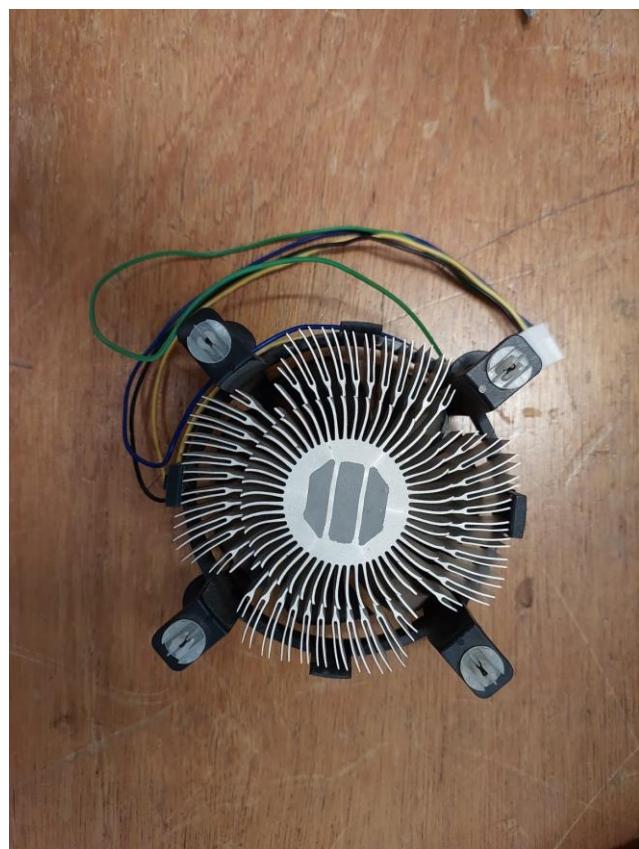
5. Graphics card.



6. Cooling fan.



7. CPU cooler.



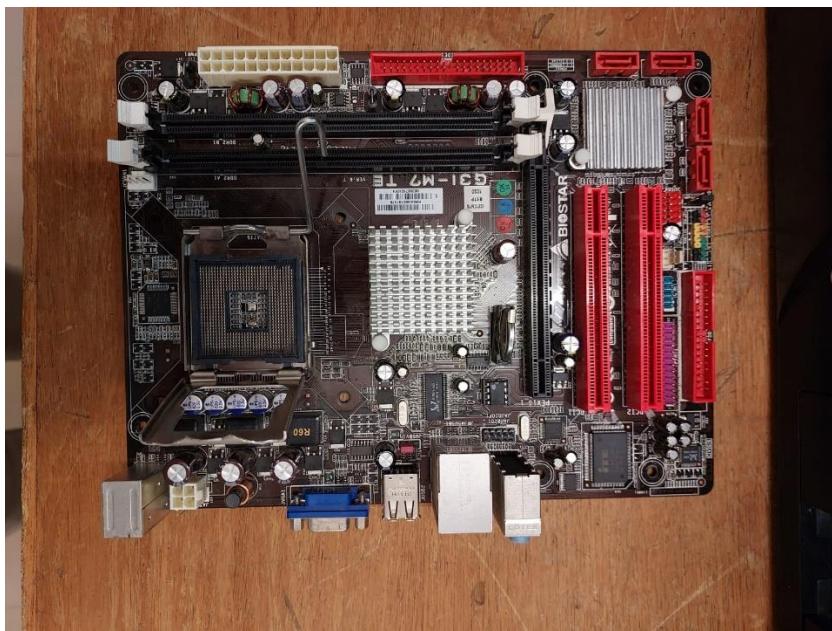
8. HDD(hard disk).



9. Optical disk drive.



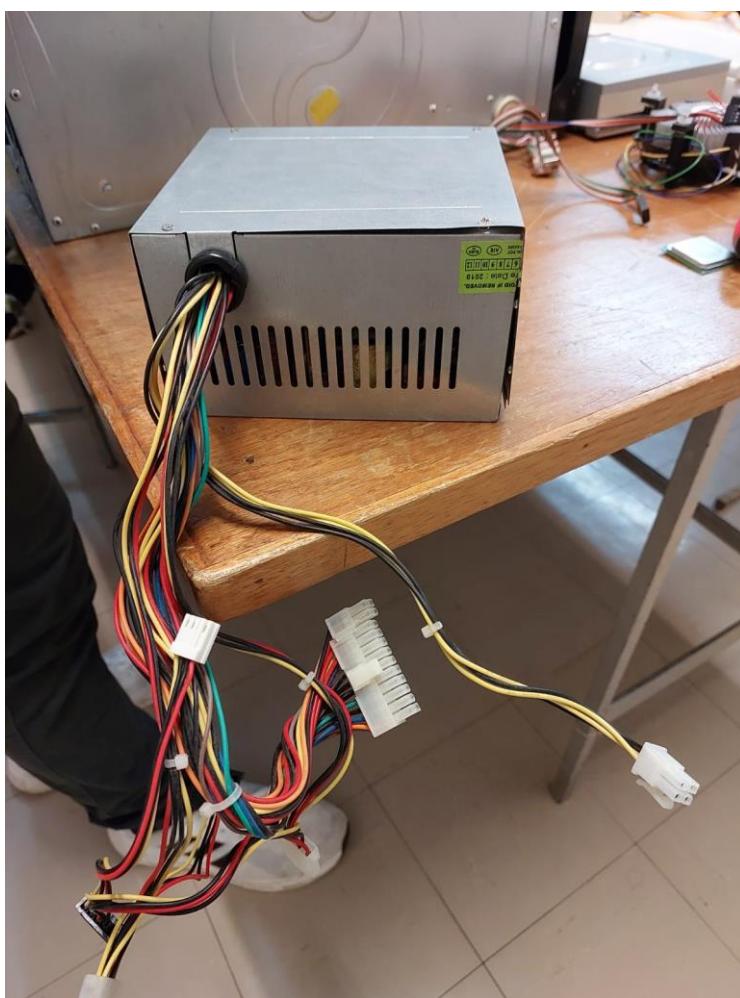
10. Motherboard.



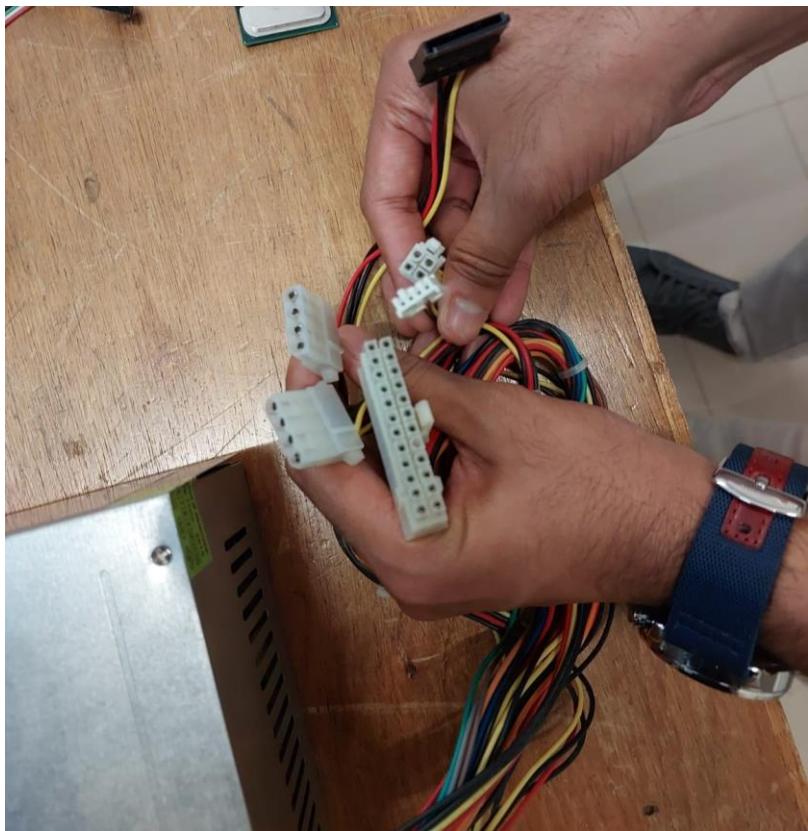
11. Processor.



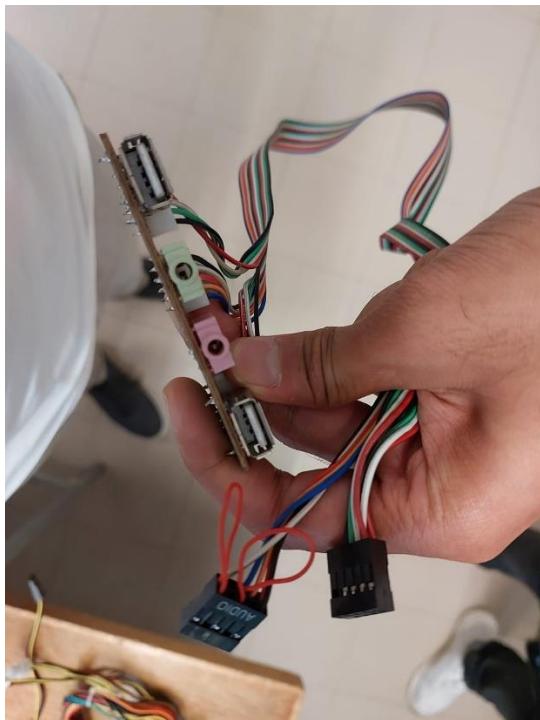
12. Power supply.



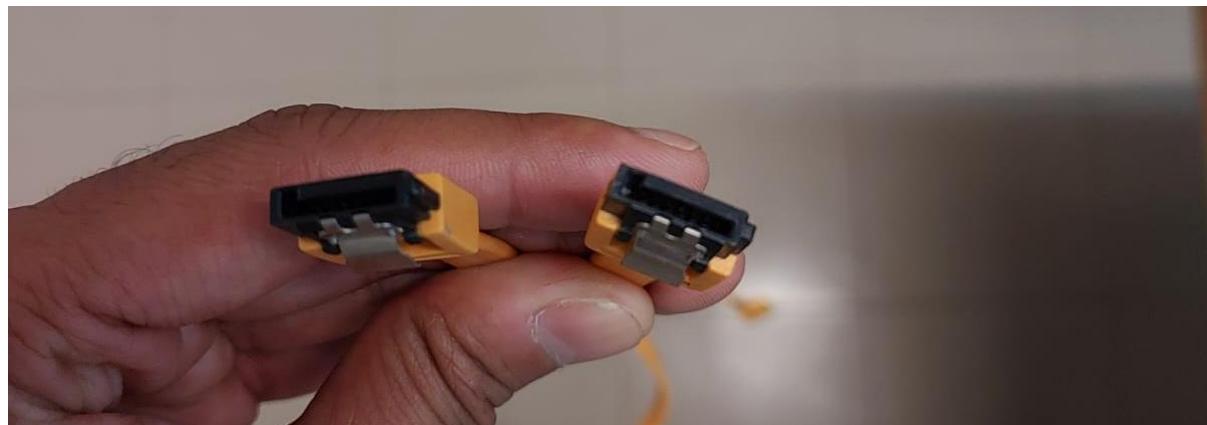
13. Cables of the power supply.



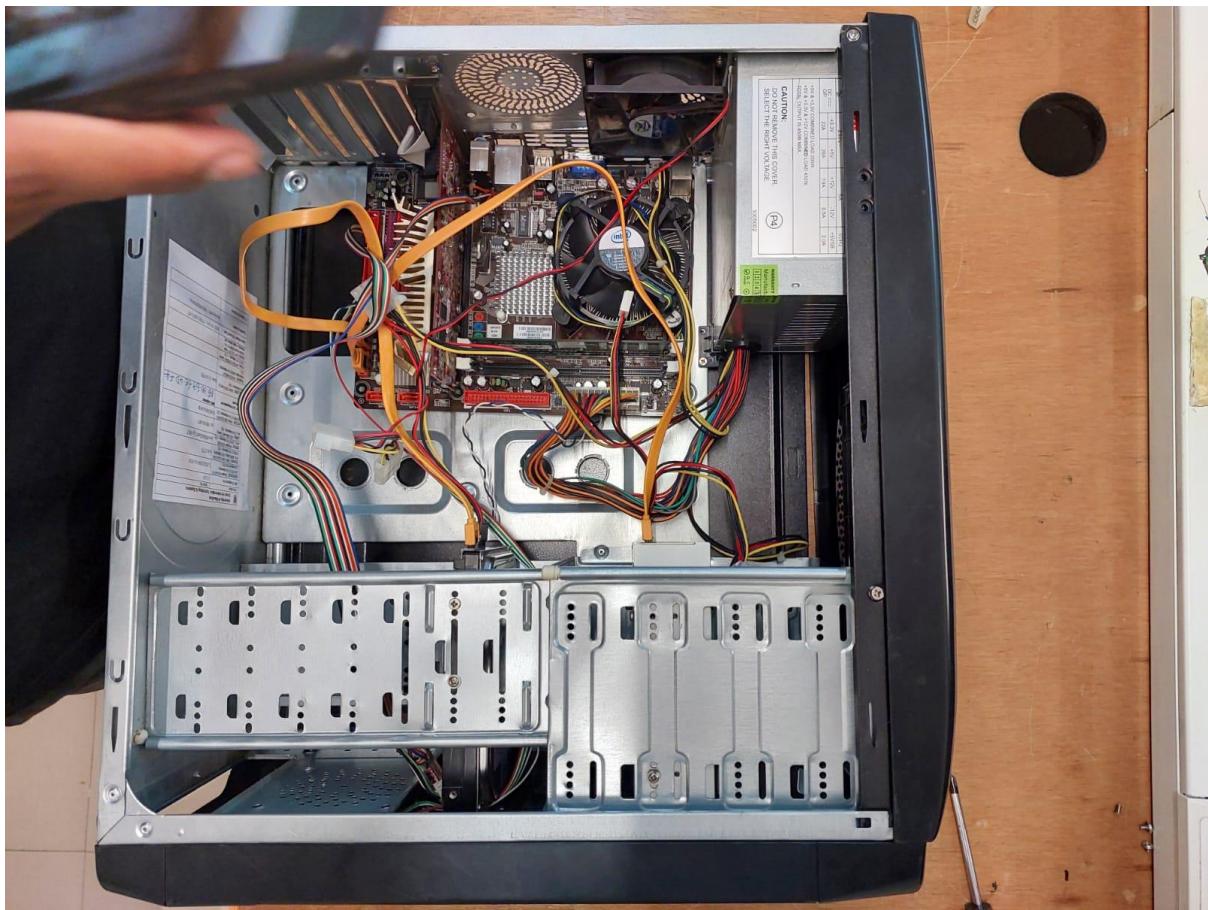
14. Front panel I/O ports.



15. SATA cables.



16. PC after assembling it back.



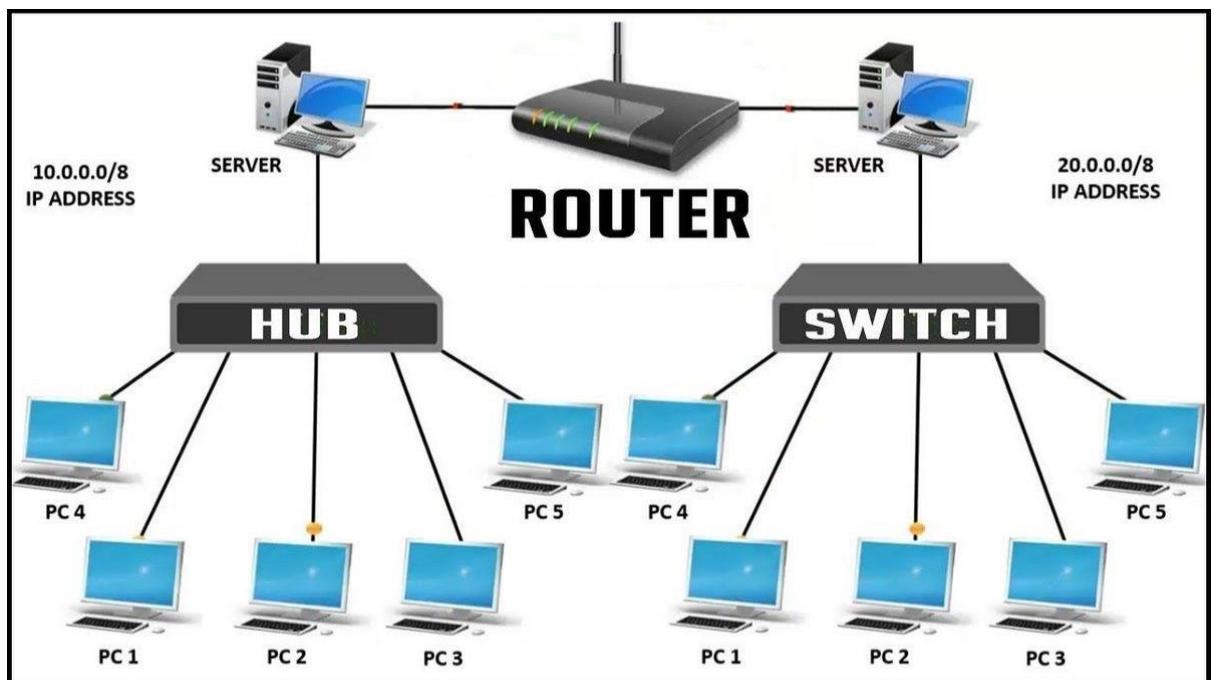
Day 4

Learning objectives

- LAN/Hub/switch/IPv4/IPv6
- Basic commands for IP addresses/MAC addresses
- Curl command
- Creating IPs and subnetworks.
- Traceroute
- Clipping cable and inserting in RJ45 plugs

LAN

1. The figure below shows how computers are connected to a router via a Hub, switch and server.



- A hub is a hardware that connects multiple computers/devices to a single network.
- A switch is a hardware that connects many computers/devices on one computer network.
- A router is a hardware that sends packets of data to another router or across the internet.
- Each PC/device has a MAC address assigned by the manufacturer and is static.
- Each PC/device connected to the internet has either an IPv4 or IPv6.
- IPv4 uses 32 bits whereas IPv6 uses 128 bits to represent addresses.

Commands associated with IP/MAC address.

1. Ifconfig gives information about the network interface that is the MAC address, IP address etc...

```

Activities Terminal lab1
jankee@vara: /var/www/html/csl1-1

lab18@lab18-HP-ProDesk-400-G4-MT:~$ ifconfig
enp1s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.100.123  netmask 255.255.255.0  broadcast 192.168.100.255
                ether a0:8c:fd:d0:2b:11  txqueuelen 1000  (Ethernet)
                RX packets 169965  bytes 235186055 (235.1 MB)
                RX errors 0  dropped 0  overruns 0  frame 0
                TX packets 82914  bytes 5780022 (5.7 MB)
                TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
                loop  txqueuelen 1000  (Local Loopback)
                RX packets 4355  bytes 535879 (535.8 KB)
                RX errors 0  dropped 0  overruns 0  frame 0
                TX packets 4355  bytes 535879 (535.8 KB)
                TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0

lab18@lab18-HP-ProDesk-400-G4-MT:~$

```

2. Ping IP: The PC sends packets to the specified ip and the receiver responds to the sender. Then we know if the IP is reachable or not.

```

lab18@lab18-HP-ProDesk-400-G4-MT:~$ ping 192.168.100.135
PING 192.168.100.135 (192.168.100.135) 56(84) bytes of data.
64 bytes from 192.168.100.135: icmp_seq=1 ttl=64 time=0.983 ms
64 bytes from 192.168.100.135: icmp_seq=2 ttl=64 time=0.459 ms
64 bytes from 192.168.100.135: icmp_seq=3 ttl=64 time=0.492 ms
64 bytes from 192.168.100.135: icmp_seq=4 ttl=64 time=0.551 ms
64 bytes from 192.168.100.135: icmp_seq=5 ttl=64 time=0.554 ms
64 bytes from 192.168.100.135: icmp_seq=6 ttl=64 time=0.480 ms
64 bytes from 192.168.100.135: icmp_seq=7 ttl=64 time=0.486 ms
64 bytes from 192.168.100.135: icmp_seq=8 ttl=64 time=0.557 ms
64 bytes from 192.168.100.135: icmp_seq=9 ttl=64 time=0.478 ms
64 bytes from 192.168.100.135: icmp_seq=10 ttl=64 time=0.470 ms
64 bytes from 192.168.100.135: icmp_seq=11 ttl=64 time=0.468 ms
64 bytes from 192.168.100.135: icmp_seq=12 ttl=64 time=0.465 ms
64 bytes from 192.168.100.135: icmp_seq=13 ttl=64 time=0.394 ms
64 bytes from 192.168.100.135: icmp_seq=14 ttl=64 time=0.472 ms
64 bytes from 192.168.100.135: icmp_seq=15 ttl=64 time=0.467 ms
64 bytes from 192.168.100.135: icmp_seq=16 ttl=64 time=0.478 ms
64 bytes from 192.168.100.135: icmp_seq=17 ttl=64 time=0.465 ms
64 bytes from 192.168.100.135: icmp_seq=18 ttl=64 time=0.564 ms
64 bytes from 192.168.100.135: icmp_seq=19 ttl=64 time=0.464 ms
64 bytes from 192.168.100.135: icmp_seq=20 ttl=64 time=0.555 ms
64 bytes from 192.168.100.135: icmp_seq=21 ttl=64 time=0.550 ms
64 bytes from 192.168.100.135: icmp_seq=22 ttl=64 time=0.474 ms
64 bytes from 192.168.100.135: icmp_seq=23 ttl=64 time=0.358 ms
64 bytes from 192.168.100.135: icmp_seq=24 ttl=64 time=0.461 ms
64 bytes from 192.168.100.135: icmp_seq=25 ttl=64 time=0.560 ms
64 bytes from 192.168.100.135: icmp_seq=26 ttl=64 time=0.449 ms
64 bytes from 192.168.100.135: icmp_seq=27 ttl=64 time=0.449 ms
64 bytes from 192.168.100.135: icmp_seq=28 ttl=64 time=0.453 ms
64 bytes from 192.168.100.135: icmp_seq=29 ttl=64 time=0.550 ms
64 bytes from 192.168.100.135: icmp_seq=30 ttl=64 time=0.439 ms
64 bytes from 192.168.100.135: icmp_seq=31 ttl=64 time=0.450 ms
^C
--- 192.168.100.135 ping statistics ---
31 packets transmitted, 31 received, 0% packet loss, time 30688ms
rtt min/avg/max/mdev = 0.358/0.499/0.983/0.100 ms
lab18@lab18-HP-ProDesk-400-G4-MT:~$

```

3. Arp command displays all the IPs and MAC addresses of all devices my PC has communicated with recently. Once I ping another PC or vice versa, the IP and MAC of that PC will appear in the table.

```

Activities Terminal
jankee@vara:/var/www/html/csl1-1

lab18@lab18-HP-ProDesk-400-G4-MT:~$ arp
Address      HWtype  HWaddress          Flags Mask     Iface
192.168.100.135   ether   a0:8c:fd:d7:48:50   C        enp1s0
_gateway       ether   f8:75:88:4f:dd:a8   C        enp1s0
192.168.100.117   ether   40:b9:3c:0a:03:b2   C        enp1s0
192.168.100.92    ether   a0:8c:fd:d7:c1:b1   C        enp1s0
192.168.100.115   ether   5c:8a:38:63:e8:08   C        enp1s0
192.168.100.137   ether   a0:8c:fd:d0:2b:26   C        enp1s0

```

4. I will try to ping(communicate) with IP 192.168.100.128 which is not yet in my arp table(as you can see above)

```

PING 192.168.100.128 (192.168.100.128) 56(84) bytes of data.
64 bytes from 192.168.100.128: icmp_seq=1 ttl=64 time=0.713 ms
64 bytes from 192.168.100.128: icmp_seq=2 ttl=64 time=0.566 ms
64 bytes from 192.168.100.128: icmp_seq=3 ttl=64 time=0.580 ms
64 bytes from 192.168.100.128: icmp_seq=4 ttl=64 time=0.583 ms
64 bytes from 192.168.100.128: icmp_seq=5 ttl=64 time=0.580 ms
64 bytes from 192.168.100.128: icmp_seq=6 ttl=64 time=0.508 ms
64 bytes from 192.168.100.128: icmp_seq=7 ttl=64 time=0.581 ms
64 bytes from 192.168.100.128: icmp_seq=8 ttl=64 time=0.577 ms
64 bytes from 192.168.100.128: icmp_seq=9 ttl=64 time=0.580 ms
64 bytes from 192.168.100.128: icmp_seq=10 ttl=64 time=0.593 ms
64 bytes from 192.168.100.128: icmp_seq=11 ttl=64 time=0.573 ms
64 bytes from 192.168.100.128: icmp_seq=12 ttl=64 time=0.578 ms
64 bytes from 192.168.100.128: icmp_seq=13 ttl=64 time=0.576 ms
64 bytes from 192.168.100.128: icmp_seq=14 ttl=64 time=0.578 ms
^C
--- 192.168.100.128 ping statistics ---
14 packets transmitted, 14 received, 0% packet loss, time 13297ms
rtt min/avg/max/mdev = 0.508/0.583/0.713/0.040 ms
lab18@lab18-HP-ProDesk-400-G4-MT:~$ arp
Address      HWtype  HWaddress          Flags Mask     Iface
192.168.100.135   ether   a0:8c:fd:d7:48:50   C        enp1s0
_gateway       ether   f8:75:88:4f:dd:a8   C        enp1s0
192.168.100.117   ether   40:b9:3c:0a:03:b2   C        enp1s0
192.168.100.92    ether   a0:8c:fd:d7:c1:b1   C        enp1s0
192.168.100.128   ether   a0:8c:fd:d7:c1:c9   C        enp1s0
192.168.100.115   ether   5c:8a:38:63:e8:08   C        enp1s0
192.168.100.137   ether   a0:8c:fd:d0:2b:26   C        enp1s0
lab18@lab18-HP-ProDesk-400-G4-MT:~$ 

```

Curl

1. Curl command. It retrieves content of the website specified along with its html.


```
Activities Terminal 20 Jun 10:29 lab18@lab18-HP-ProDesk-400-G4-MT: ~
jankee@vara:/var/www/html/csl1-1
<ll><a href="//www.wikipedia.org/" lang="as" title="ଓଡ଼ିଆ">ଓଡ଼ିଆ</a></li>
<ll><a href="//pa.wikipedia.org/" lang="pa" title="Panjabî (Gurmukhi)">>ਪੰਜਾਬੀ</a></li>
<ll><a href="//ps.wikipedia.org/" lang="ps" title="پاکستاني">پاکستانی</a></li>
<ll><a href="//nds.wikipedia.org/" lang="nds" title="Plattdeutsch">>پلٹت دیٹش</a></li>
<ll><a href="//crh.wikipedia.org/" lang="crh" title="Runa Simi">>رۇنە سىمى</a></li>
<ll><a href="//gu.wikipedia.org/" lang="gu" title="ગુજરાતી">>ગુજરાતી</a></li>
<ll><a href="//sat.wikipedia.org/" lang="sat" title="Santali">>সান্তালি</a></li>
<ll><a href="//sah.wikipedia.org/" lang="sah" title="Saxa Tylo">>Саха Тыло</a></li>
<ll><a href="//scs.wikipedia.org/" lang="sco" title="Scots">>سکات</a></li>
<ll><a href="//sn.wikipedia.org/" lang="sn" title="chiShona">>شیشونا</a></li>
<ll><a href="//sq.wikipedia.org/" lang="sq" title="shqip">>شکیپ</a></li>
<ll><a href="//sr.wikipedia.org/" lang="sr" title="Srpski">>српски</a></li>
<ll><a href="//si.wikipedia.org/" lang="si" title="Sinhala">>සිංහල</a></li>
<ll><a href="//sd.wikipedia.org/" lang="sd" title="Sindhi">>بندھو</a></li>
<ll><a href="//szl.wikipedia.org/" lang="szl" title="Słownik">>سلونسکي</a></li>
<ll><a href="//su.wikipedia.org/" lang="su" title="Basa Sunda">>سوندا</a></li>
<ll><a href="//ta.wikipedia.org/" lang="ta" title="தமிழ்">>தமிழ்</a></li>
<ll><a href="//tl.wikipedia.org/" lang="tl" title="Tagalog">>تالوغ</a></li>
<ll><a href="//shn.wikipedia.org/" lang="shn" title="col:zh-hans">>شانه</a></li>
<ll><a href="//te.wikipedia.org/" lang="te" title="Telugu">>తెలుగు</a></li>
<ll><a href="//tm.wikipedia.org/" lang="tum" title="Chitumbuka">>چیتمبکا</a></li>
<ll><a href="//bug.wikipedia.org/" lang="bug" title="Basa Ugi">>بسا اوگي</a></li>
<ll><a href="//vec.wikipedia.org/" lang="vec" title="Vecchia Italiana">>vecchia italiana</a></li>
<ll><a href="//wa.wikipedia.org/" lang="wa" title="Walone">>والون</a></li>
<ll><a href="//zh-classical.wikipedia.org/" lang="zh" title="ményán">文言</a></li>
<ll><a href="//wuu.wikipedia.org/" lang="wuu" title="Wóyóo">吳語</a></li>
<ll><a href="//yi.wikipedia.org/" lang="yi" title="Yidish">>يیدиш</a></li>
<ll><a href="//jv.wikipedia.org/" lang="jv" title="Jawa">>جاوا</a></li>
<ll><a href="//diq.wikipedia.org/" lang="d iq" title="Zazaki">>زازاکی</a></li>
<ll><a href="//bat-sng.wikipedia.org/" lang="sgs" title="Zenatéška">>زناتېشکا</a></li>
<ll><a href="//zu.wikipedia.org/" lang="zu" title="isiZulu">>িশিজুলু</a></li>
<ll><a href="//mn.wikipedia.org/" lang="mn" title="Mongolian">>mongolian</a></li>
</ul>
</div>
<h2 class="bookshelf container">
<span class="bookshelf">
<span class="text">
<bdi dir="ltr">
    1,000+
</bdi>
<span class="js10n" data-js10n="portal.entries">
articles
</span>
</span>
</span>
</h2>
<div class="langlist hlist" data-el-section="secondary links">
<ul>
<li><a href="//lad.wikipedia.org/" lang="lad">>සාම්බුන්ධ ලංඡනය</a></li>
<li><a href="//lad.wikipedia.org/" lang="lad-latn" data-bzudeemo="span" />සාම්බුන්ධ ලංඡනය</a></li>
<li><a href="//lad.wikipedia.org/" lang="lad-hebr" dir="rtl">>סָםְבּוּנְדָה</a></li>

```

```
Activities Terminal 20 Jun 10:29 lab18@lab18-HP-ProDesk-400-G4-MT: ~
jankee@vara:/var/www/html/csl1-1 lab18@lab18-HP-ProDesk-400-G4-MT: ~
<div class="other-project-text">
<span class="other-project-title js10n" data-js10n="metawiki.name">Meta-Wiki</span>
<span class="other-project-tagline js10n" data-js10n="metawiki.slogan">Community coordination & documentation</span>
</div>
</div>
</nav>
<sp class="site-license">
<small class="js10n" data-js10n="license">This page is available under the <a href="https://creativecommons.org/licenses/by-sa/4.0/">Creative Commons Attribution-ShareAlike License</a></small>
<small class="js10n" data-js10n="terms_use"><a href="https://meta.wikimedia.org/wki/Terms_of_Use/>Terms of Use</a></small>
<small class="js10n" data-js10n="privacy_policy"><a href="https://meta.wikimedia.org/wki/Privacy_policy">Privacy Policy</a></small>
</sp>
</footer>
<script>
var rtllangs = ['ar','arc','arz','bcc','bgn','bqt','ckb','dv','fa','glk','he','kk-cn','kk-arab','khw','ks','ku-arab','lkl','luz','mzn','nqo','pnb','ps','sd','sdh','skr','ug','ur','yl'],
translationsHash = 'b3e81a61',
/* This variable is used to convert the generic "portal" keyword in the data-js10n attributes
 * e.g. 'data-js10n="portal.footer-description"' into a portal-specific key, e.g. 'Wikit'
 * for the Wikipedia portal.
 */
translationsPortalKey = 'wikit';
/**/
translationsPortalKey = 'wikit';
/* The wn-typeahead.js feature is used for search, and it uses domain name for searching. We want domain
 * name to be portal Specific (different for every portal). So by declaring variable 'portalSearchDomain'
 * in index.handlebars we will make this portal Specific.
 */
portalSearchDomain = 'wikipedia.org'
/*
This object is used by l10n scripts (page-localized.js, topten-localized.js)
to reveal the page content after l10n json is loaded.
A timer is also set to prevent JS from hiding page content indefinitely.
This script is inlined to safeguard against script loading errors and placed
at the top of the page to safeguard against any HTML loading/parsing errors.
*/
wl10nVisible = {
    ready: false,
    makeVisible: function(){
        if ( !wl10nVisible.ready ) {
            wl10nVisible.ready = true;
            document.body.className += ' js10n-visible';
        }
    }
};
window.setTimeout( wl10nVisible.makeVisible, 1000 )
</script>
<script src="portal/wikipedia.org/assets/js/Index-b8982cf4a5.js"></script>
<script src="portal/wikipedia.org/assets/js/gt-ie9-ce3fe8e88d.js"></script>
<style>
.styled-select {
    display: block;
}
</style>
```

2. Curl website -v provides more information such as its IP, port number, protocol information etc...

3. Host www.google.com or host www.microsoft.com displays their respective IP addresses

```
Connection closed by foreign host.  
lab18@lab18-HP-ProDesk-400-G4-MT:~$ host www.google.com  
www.google.com has address 216.58.223.100  
www.google.com has IPv6 address 2a00:1450:401a:805::2004  
lab18@lab18-HP-ProDesk-400-G4-MT:~$ host microsoft.com  
microsoft.com has address 20.236.44.162  
microsoft.com has address 20.70.246.20  
microsoft.com has address 20.76.201.171  
microsoft.com has address 20.231.239.246  
microsoft.com has address 20.112.250.133  
microsoft.com has IPv6 address 2603:1030:c02:8::14  
microsoft.com has IPv6 address 2603:1030:b:3::152  
microsoft.com has IPv6 address 2603:1010:3:3::5b  
microsoft.com has IPv6 address 2603:1020:201:10::10f  
microsoft.com has IPv6 address 2603:1030:20e:3::23c  
microsoft.com mail is handled by 10 microsoft-com.mail.protection.outlook.com.  
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

Creating IP/subnetworks

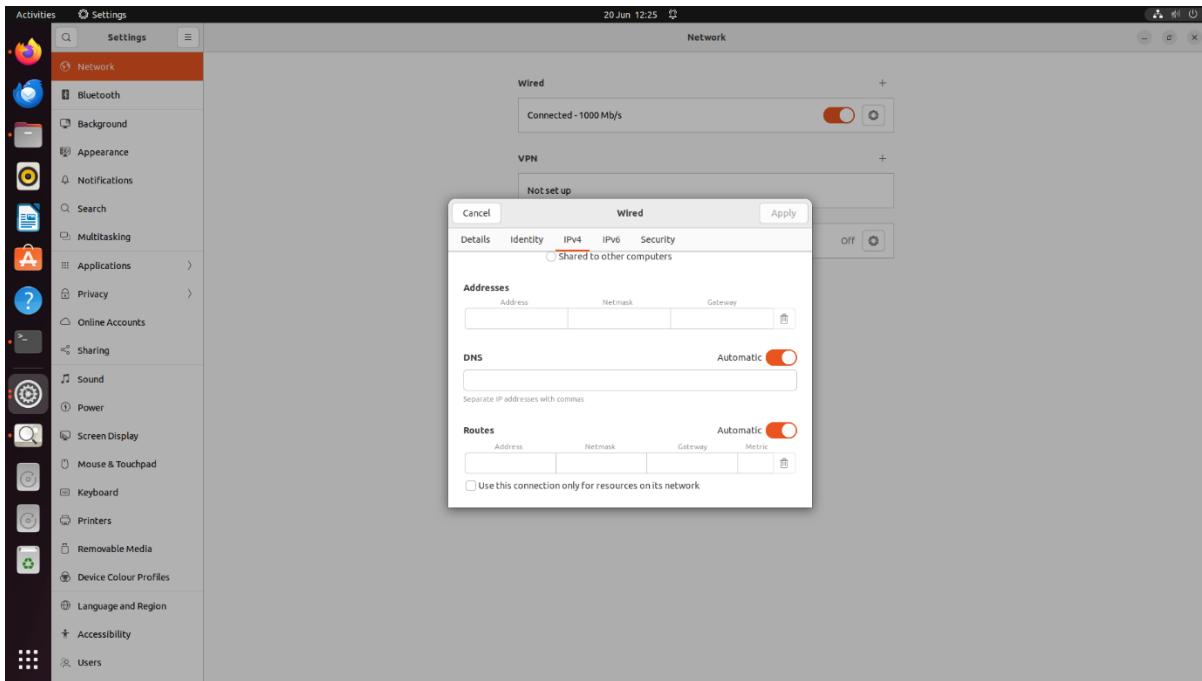
1. Click on first symbol on top right and click on network then wired settings. Then click on manual. Address is 10.0.0.2(10.0.0 is same for everyone and remaining 8bits divided into two parts; 3 bits for subnetworks($2^3 = 8$ subnetworks can exist) and 5 bits for number of PCs in 1 subnetwork($2^5 = 32$ PCs can exist))

Netmask is 255.255.255.224 and is used to divide an IP address into a network address and a host address

For gateway, we used the IP of the first person in my group which is 10.0.0.1. It is used to connect all the subnetworks together and anyone from any subnetwork can access the gateway.

DNS is 8.8.8.8.

At last, we click apply.



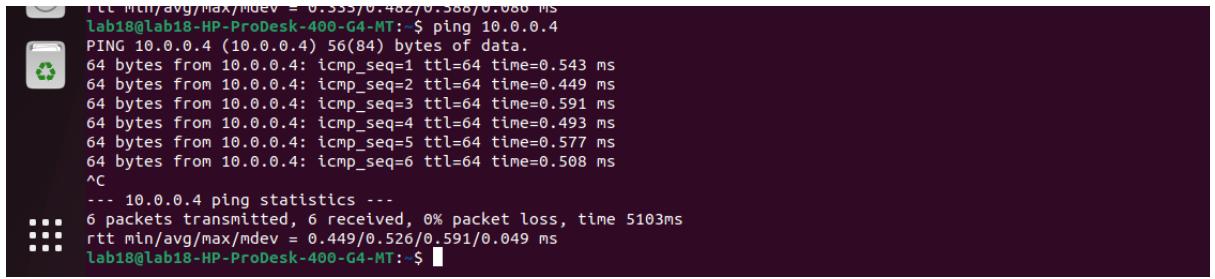
2. Use command ifconfig to check my new IP. It changed to 10.0.0.2.

A screenshot of a terminal window with a dark background. The terminal prompt is 'lab18@lab18-HP-ProDesk-400-G4-MT: ~\$'. The user then runs the 'ifconfig' command. The output shows two network interfaces: 'enp1s0' and 'lo'. The 'enp1s0' interface has an IP address of 10.0.0.2, a netmask of 255.255.255.224, and a broadcast address of 10.0.0.31. The 'lo' interface has an IP address of 127.0.0.1, a netmask of 255.0.0.0, and a broadcast address of 127.0.0.1. Both interfaces show statistics for RX and TX packets, errors, and collisions.

3. I tried to ping the first PC in my subnetwork and it was a success, as it was the case for everyone in different groups/subnet as they used same gateway.

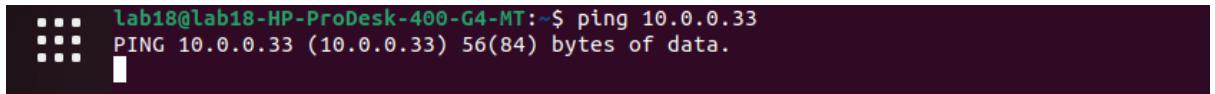
A screenshot of a terminal window with a dark background. The terminal prompt is 'lab18@lab18-HP-ProDesk-400-G4-MT: ~\$'. The user runs the 'ping' command to test connectivity to a host at 10.0.0.1. The output shows 12 packets transmitted, 12 received, and 0% packet loss. The round-trip time (RTT) is listed as 0.335 ms, 0.482 ms, and 0.588 ms. The command ends with '^C' and a summary of the ping statistics.

- I ping someone else in my group and it was a success.



```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ping 10.0.0.4
PING 10.0.0.4 (10.0.0.4) 56(84) bytes of data.
64 bytes from 10.0.0.4: icmp_seq=1 ttl=64 time=0.543 ms
64 bytes from 10.0.0.4: icmp_seq=2 ttl=64 time=0.449 ms
64 bytes from 10.0.0.4: icmp_seq=3 ttl=64 time=0.591 ms
64 bytes from 10.0.0.4: icmp_seq=4 ttl=64 time=0.493 ms
64 bytes from 10.0.0.4: icmp_seq=5 ttl=64 time=0.577 ms
64 bytes from 10.0.0.4: icmp_seq=6 ttl=64 time=0.508 ms
^C
--- 10.0.0.4 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5103ms
rtt min/avg/max/mdev = 0.449/0.526/0.591/0.049 ms
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

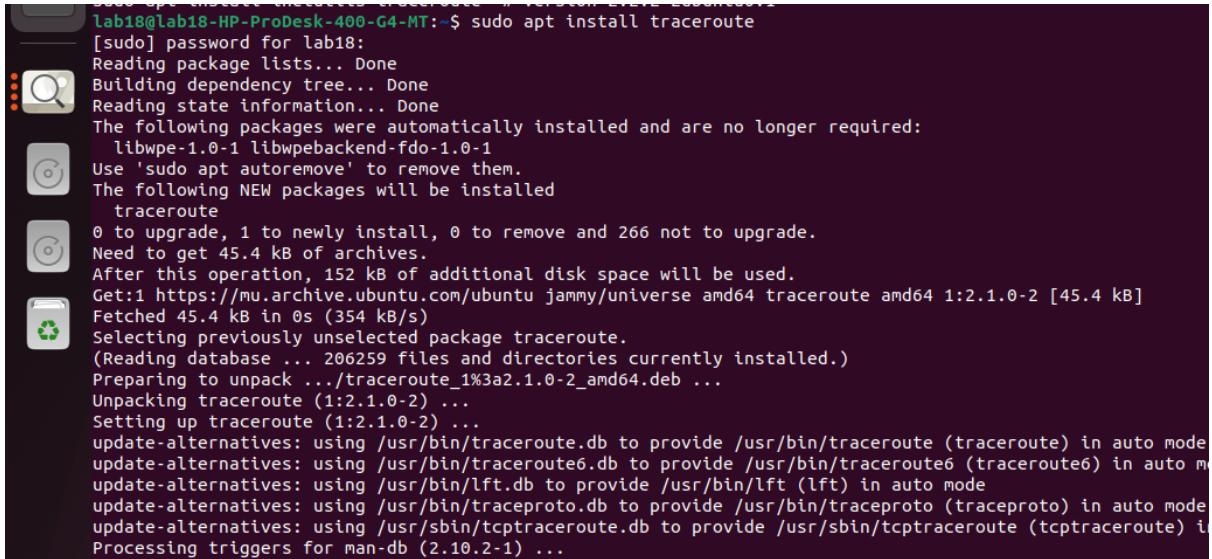
- I tried to ping someone not in my group and it was not successful.



```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ping 10.0.0.33
PING 10.0.0.33 (10.0.0.33) 56(84) bytes of data.
```

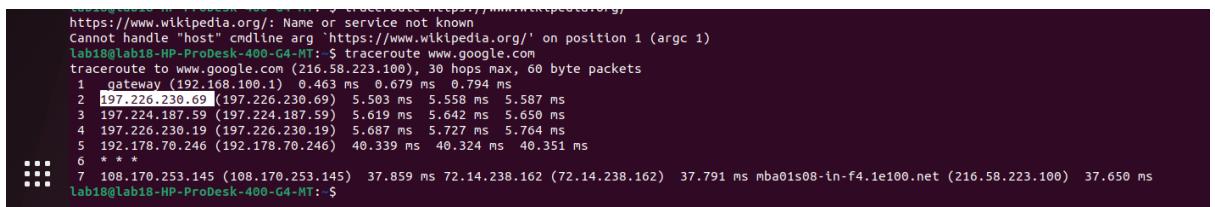
Traceroute

- Install traceroute



```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo apt install traceroute
[sudo] password for lab18:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  traceroute
0 to upgrade, 1 to newly install, 0 to remove and 266 not to upgrade.
Need to get 45.4 kB of archives.
After this operation, 152 kB of additional disk space will be used.
Get:1 https://mu.archive.ubuntu.com/ubuntu jammy/universe amd64 traceroute amd64 1:2.1.0-2 [45.4 kB]
Fetched 45.4 kB in 0s (354 kB/s)
Selecting previously unselected package traceroute.
(Reading database ... 206259 files and directories currently installed.)
Preparing to unpack .../traceroute_1%3a2.1.0-2_amd64.deb ...
Unpacking traceroute (1:2.1.0-2) ...
Setting up traceroute (1:2.1.0-2) ...
update-alternatives: using /usr/bin/traceroute.db to provide /usr/bin/traceroute (traceroute) in auto mode
update-alternatives: using /usr/bin/traceroute6.db to provide /usr/bin/traceroute6 (traceroute6) in auto mode
update-alternatives: using /usr/bin/lft.db to provide /usr/bin/lft (lft) in auto mode
update-alternatives: using /usr/bin/traceproto.db to provide /usr/bin/traceproto (traceproto) in auto mode
update-alternatives: using /usr/sbin/tcptraceroute.db to provide /usr/sbin/tcptraceroute (tcptraceroute) in auto mode
Processing triggers for man-db (2.10.2-1) ...
```

- Traceroute website. It traces the route of packets sent to the website and records Ips of routers they pass through.



```
https://www.wikipédia.org/: Name or service not known
Cannot handle "host" cmdline arg https://www.wikipédia.org/' on position 1 (argc 1)
lab18@lab18-HP-ProDesk-400-G4-MT:~$ traceroute www.google.com
traceroute to www.google.com (216.58.223.100), 30 hops max, 60 byte packets
  1  gateway (192.168.100.1)  0.463 ms  0.679 ms  0.794 ms
  2  197.226.230.69 (197.226.230.69)  5.503 ms  5.558 ms  5.587 ms
  3  197.224.187.59 (197.224.187.59)  5.619 ms  5.642 ms  5.650 ms
  4  197.226.230.19 (197.226.230.19)  5.687 ms  5.727 ms  5.764 ms
  5  192.178.70.246 (192.178.70.246)  40.339 ms  40.324 ms  40.351 ms
  6  * *
  7  108.170.253.145 (108.170.253.145)  37.859 ms  72.14.238.162 (72.14.238.162)  37.791 ms  mba01s08-in-f4.1e100.net (216.58.223.100)  37.650 ms
```

- When I copy the first IP appearing, on an IP finder(tools.keycdn.com), I can see the geographical location of the first router through which the packets first passed.

IP Location Finder - IP Location Finder

IP address or hostname: 197.226.230.69

LOCATION

- City: Floréal
- Region: Plaines Wilhems District (PW)
- Country: Mauritius (MU)
- Continent: Africa (AF)
- Coordinates: -20.3128 (lat) / 57.4982 (long)
- Time: 2024-06-20 13:17:24 (Indian/Mauritius)

NETWORK

- IP address: 197.226.230.69
- Hostname: 197.226.230.69
- Provider: MauritiusTelecom
- ASN: 23889

- Last IP (IP of google) is copied to the IP finder.

IP Location Finder - IP Location Finder

IP address or hostname: 108.170.253.145

LOCATION

- Country: United States (US)
- Continent: North America (NA)
- Coordinates: 37.751 (lat) / -97.822 (long)
- Time: 2024-06-20 04:06:07 (America/Chicago)

NETWORK

- IP address: 108.170.253.145
- Hostname: 108.170.253.145
- Provider: GOOGLE
- ASN: 15169

- Nmap -sn 192.168.100.123/24. The IP address is mine and 24 is bit length of the subnet mask. It displays all hosts that are up and active.



```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ nmap -sn 192.168.100.123/24
Starting Nmap 7.80 ( https://nmap.org ) at 2024-06-20 15:19 +04
Nmap scan report for _gateway (192.168.100.1)
Host is up (0.00075s latency).
Nmap scan report for 192.168.100.94
Host is up (0.00033s latency).
Nmap scan report for 192.168.100.95
Host is up (0.00031s latency).
Nmap scan report for 192.168.100.107
Host is up (0.00073s latency).
Nmap scan report for 192.168.100.111
Host is up (0.00047s latency).
Nmap scan report for 192.168.100.113
Host is up (0.050s latency).
Nmap scan report for 192.168.100.114
Host is up (0.00045s latency).
Nmap scan report for 192.168.100.115
Host is up (0.016s latency).
Nmap scan report for 192.168.100.116
Host is up (0.00042s latency).
Nmap scan report for 192.168.100.117
Host is up (0.015s latency).
Nmap scan report for 192.168.100.118
Host is up (0.00038s latency).
Nmap scan report for 192.168.100.119
Host is up (0.00035s latency).
Nmap scan report for 192.168.100.122
Host is up (0.00037s latency).
Nmap scan report for lab18-HP-ProDesk-400-G4-MT (192.168.100.123)
Host is up (0.00036s latency).
Nmap scan report for 192.168.100.124
Host is up (0.00084s latency).
Nmap scan report for 192.168.100.125
Host is up (0.00080s latency).
Nmap scan report for 192.168.100.128
Host is up (0.00035s latency).
Nmap scan report for 192.168.100.130
Host is up (0.00066s latency).
Nmap scan report for 192.168.100.134
Host is up (0.00059s latency).
Nmap scan report for 192.168.100.135
Host is up (0.00057s latency).
Nmap scan report for 192.168.100.137
Host is up (0.00054s latency).
Nmap done: 256 IP addresses (21 hosts up) scanned in 2.83 seconds
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

6. Nmap 192.168.100.137 will display what services the IP is running and through which port they are open.



```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ nmap 192.168.100.137
Starting Nmap 7.80 ( https://nmap.org ) at 2024-06-20 15:20 +04
Nmap scan report for 192.168.100.137
Host is up (0.00014s latency).
Not shown: 994 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
25/tcp    open  smtp
80/tcp    open  http
111/tcp   open  rpcbind
2049/tcp  open  nfs
3689/tcp  open  rendezvous

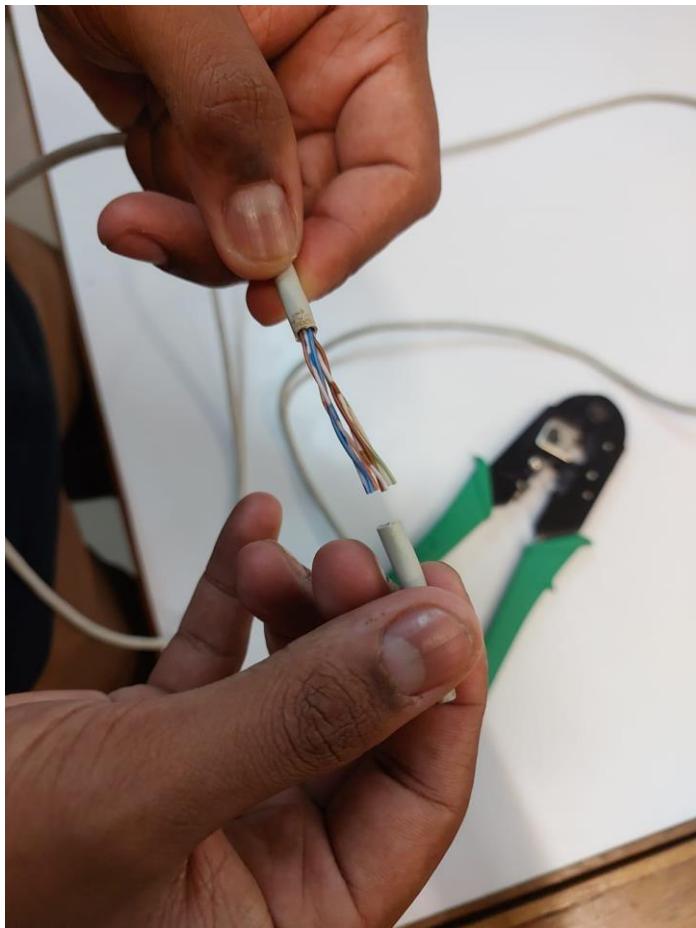
Nmap done: 1 IP address (1 host up) scanned in 0.06 seconds
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

7. I install openssh-server which has port number 22.

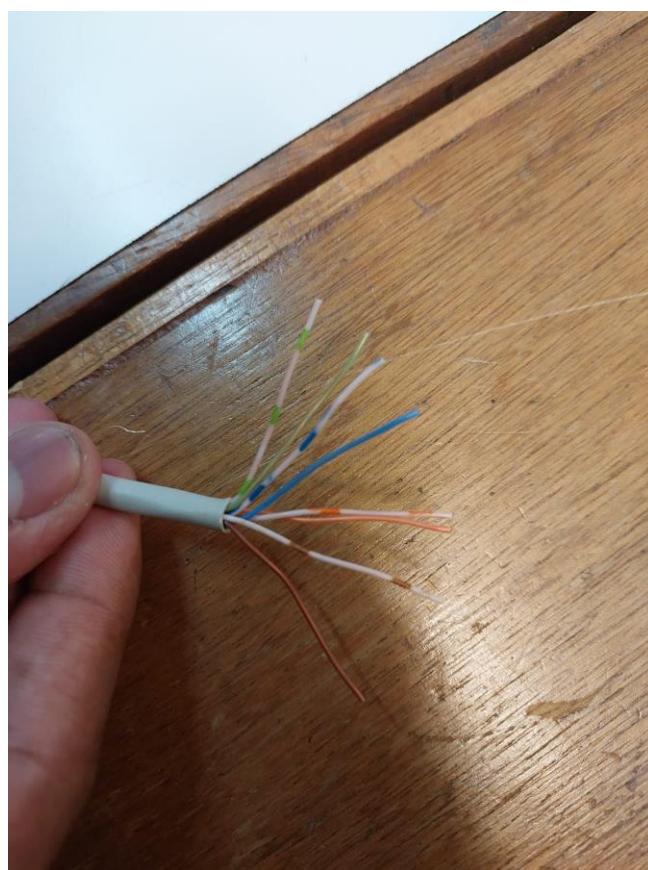
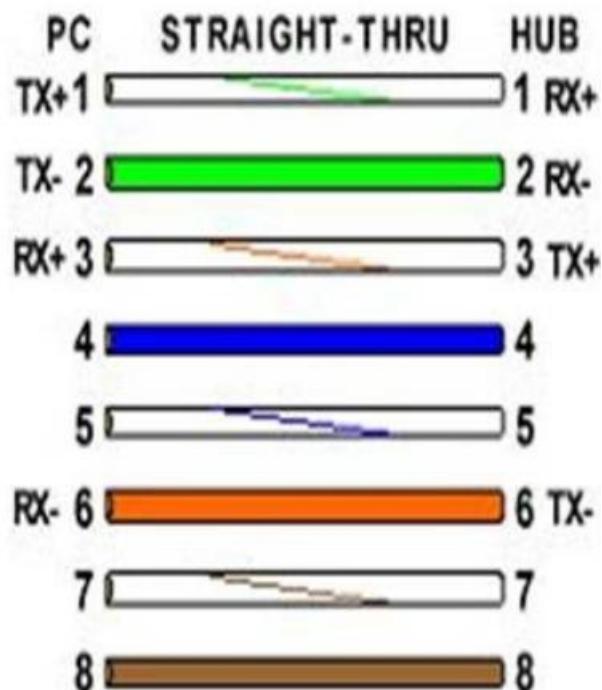
```
! openSSH-server: command not found
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo apt install openssh-server
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  openssh-client openssh-sftp-server
Suggested packages:
  keychain libpam-ssh monkeysphere ssh-askpass molly-guard
The following packages will be upgraded:
  openssh-client openssh-server openssh-sftp-server
  3 to upgrade, 0 to newly install, 0 to remove and 263 not to upgrade.
Need to get 1,380 kB of archives.
After this operation, 0 B of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 https://mir.archive.ubuntu.com/ubuntu jammy-updates/main amd64 openssh-sftp-server amd64 1:8.9p1-3ubuntu0.7 [38.9 kB]
Get:2 https://mir.archive.ubuntu.com/ubuntu jammy-updates/main amd64 openssh-server amd64 1:8.9p1-3ubuntu0.7 [435 kB]
Get:3 https://mir.archive.ubuntu.com/ubuntu jammy-updates/main amd64 openssh-client amd64 1:8.9p1-3ubuntu0.7 [906 kB]
Fetched 1,380 kB in 0s (4,489 kB/s)
Preconfiguring packages ...
(Reading database ... 206279 files and directories currently installed.)
Preparing to unpack .../openssh-sftp-server_1%3a8.9p1-3ubuntu0.7_amd64.deb ...
Unpacking openssh-sftp-server (1:8.9p1-3ubuntu0.7) over (1:8.9p1-3ubuntu0.6) ...
Preparing to unpack .../openssh-server_1%3a8.9p1-3ubuntu0.7_amd64.deb ...
Unpacking openssh-server (1:8.9p1-3ubuntu0.7) over (1:8.9p1-3ubuntu0.6) ...
Preparing to unpack .../openssh-client_1%3a8.9p1-3ubuntu0.7_amd64.deb ...
Unpacking openssh-client (1:8.9p1-3ubuntu0.7) over (1:8.9p1-3ubuntu0.6) ...
Setting up openssh-client (1:8.9p1-3ubuntu0.7) ...
Setting up openssh-sftp-server (1:8.9p1-3ubuntu0.7) ...
Setting up openssh-server (1:8.9p1-3ubuntu0.7) ...
rescue-ssh.target is a disabled or a static unit not running, not starting it.
```

Clipping cable and inserting in RJ45 plugs

1. Cut the outer layer at about 4 cm and remove it.



2. The coloured wires should be ordered in the order shown below.



3. The wires are cut at 1.5 cm using a RJ45 crimping tool and inserted into the RJ45 plug. The tool is used to crimp the plug pins.

4. A cable tester as shown below, is used to test if the cable was correctly inserted and conducting.



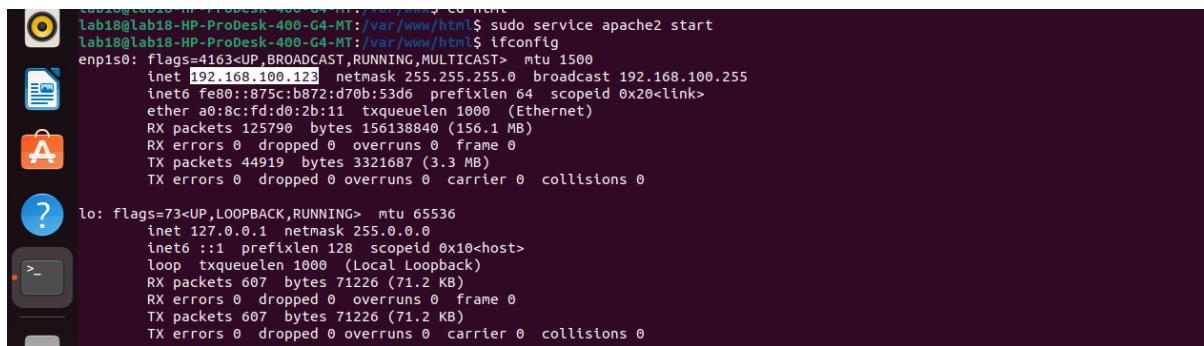
Day 5

Learning objectives

- Install apache2 and start the service.
- Install openssh-server.
- Scan an IP address to display its open ports and active services, using nmap command.
- Add a user account on my account on a server.
- Enable/disable firewall. Block an IP/subnet.
- Install and use fail2ban.
- SMTP. Send or open mail.
- NFS(Network File Sharing).

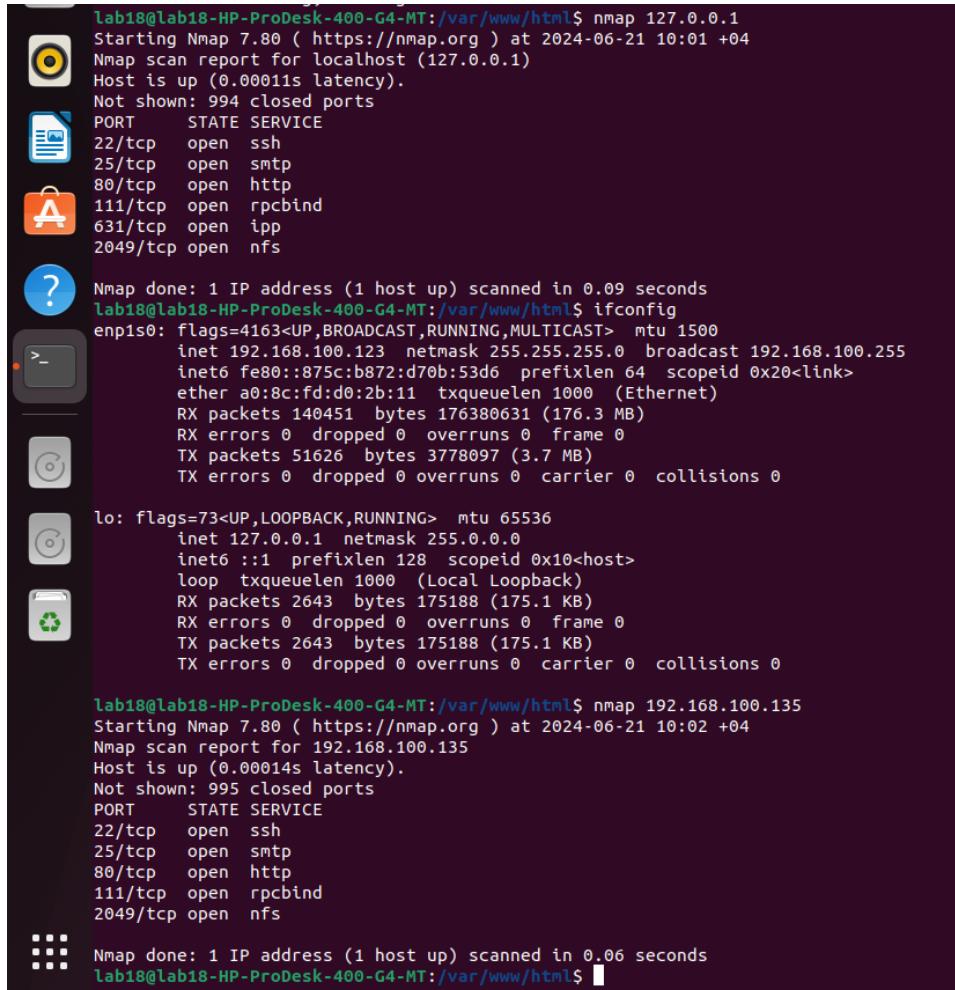
Openssh-server, Apache2

1. Apache2 was already installed. Sudo service apache2 start command is used to start the service.



```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ifconfig
lab18@lab18-HP-ProDesk-400-G4-MT:/var/www/html$ sudo service apache2 start
lab18@lab18-HP-ProDesk-400-G4-MT:/var/www/html$ ifconfig
enp1s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 192.168.100.123 netmask 255.255.255.0 broadcast 192.168.100.255
              inet6 fe80::875c:b872:d70b:53d6 prefixlen 64 scopeid 0x20<link>
                    ether a0:8c:fd:d0:2b:11 txqueuelen 1000 (Ethernet)
                      RX packets 125790 bytes 156138840 (156.1 MB)
                      RX errors 0 dropped 0 overruns 0 frame 0
                      TX packets 44919 bytes 3321687 (3.3 MB)
                      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
              inet6 ::1 prefixlen 128 scopeid 0x10<host>
                    loop txqueuelen 1000 (Local Loopback)
                      RX packets 607 bytes 71226 (71.2 KB)
                      RX errors 0 dropped 0 overruns 0 frame 0
                      TX packets 607 bytes 71226 (71.2 KB)
                      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

2. Nmap command is used on localhost IP and my friend's IP address.



```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ nmap 127.0.0.1
Starting Nmap 7.80 ( https://nmap.org ) at 2024-06-21 10:01 +04
Nmap scan report for localhost (127.0.0.1)
Host is up (0.00011s latency).
Not shown: 994 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
25/tcp    open  smtp
80/tcp    open  http
111/tcp   open  rpcbind
631/tcp   open  ipp
2049/tcp  open  nfs

Nmap done: 1 IP address (1 host up) scanned in 0.09 seconds
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ifconfig
enp1s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 192.168.100.123 netmask 255.255.255.0 broadcast 192.168.100.255
              inet6 fe80::875c:b872:d70b:53d6 prefixlen 64 scopeid 0x20<link>
                    ether a0:8c:fd:d0:2b:11 txqueuelen 1000 (Ethernet)
                      RX packets 140451 bytes 176380631 (176.3 MB)
                      RX errors 0 dropped 0 overruns 0 frame 0
                      TX packets 51626 bytes 3778097 (3.7 MB)
                      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
              inet6 ::1 prefixlen 128 scopeid 0x10<host>
                    loop txqueuelen 1000 (Local Loopback)
                      RX packets 2643 bytes 175188 (175.1 KB)
                      RX errors 0 dropped 0 overruns 0 frame 0
                      TX packets 2643 bytes 175188 (175.1 KB)
                      TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lab18@lab18-HP-ProDesk-400-G4-MT:~$ nmap 192.168.100.135
Starting Nmap 7.80 ( https://nmap.org ) at 2024-06-21 10:02 +04
Nmap scan report for 192.168.100.135
Host is up (0.00014s latency).
Not shown: 995 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
25/tcp    open  smtp
80/tcp    open  http
111/tcp   open  rpcbind
2049/tcp  open  nfs

Nmap done: 1 IP address (1 host up) scanned in 0.06 seconds
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

3. Openssh-server is a software used to remotely access and manage a server. Install openssh-server.

```
lab18@lab18-HP-ProDesk-400-G4-MT:/var/www/html$ sudo apt install openssh-server
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
openssh-server is already the newest version (1:8.9p1-3ubuntu0.7).
The following packages were automatically installed and are no longer required:
  libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'sudo apt autoremove' to remove them.
0 to upgrade, 0 to newly install, 0 to remove and 263 not to upgrade.
lab18@lab18-HP-ProDesk-400-G4-MT:/var/www/html$
```

- From screenshot 2, we can conclude that ssh service of IP address 192.168.100.135 is open and active. Hence, we can try to login my friend's account while trying different combinations of passwords.

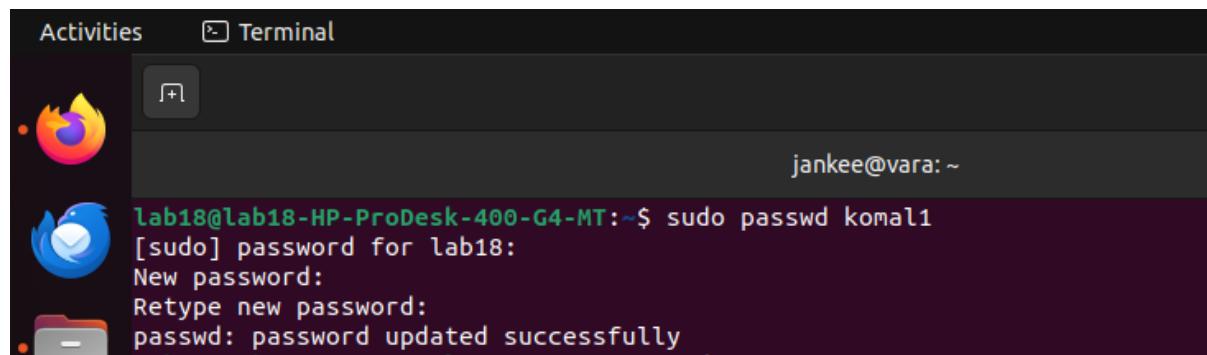
```
lab18@lab18-HP-ProDesk-400-G4-MT:/var/www/html$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:/var/www$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:/var$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:$ ssh admin@192.168.100.135
The authenticity of host '192.168.100.135 (192.168.100.135)' can't be established.
ED25519 key fingerprint is SHA256:76TgWVwcqz3q/3y6ziim8uTJtGAAalv9I085azbq+Tg.
This host key is known by the following other names/addresses:
  ~/.ssh/known_hosts:4: [hashed name]
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.100.135' (ED25519) to the list of known hosts.
admin@192.168.100.135's password:
Permission denied, please try again.
admin@192.168.100.135's password:
```

Adding a user

- The command below is used to add a user 'komal' to my account.

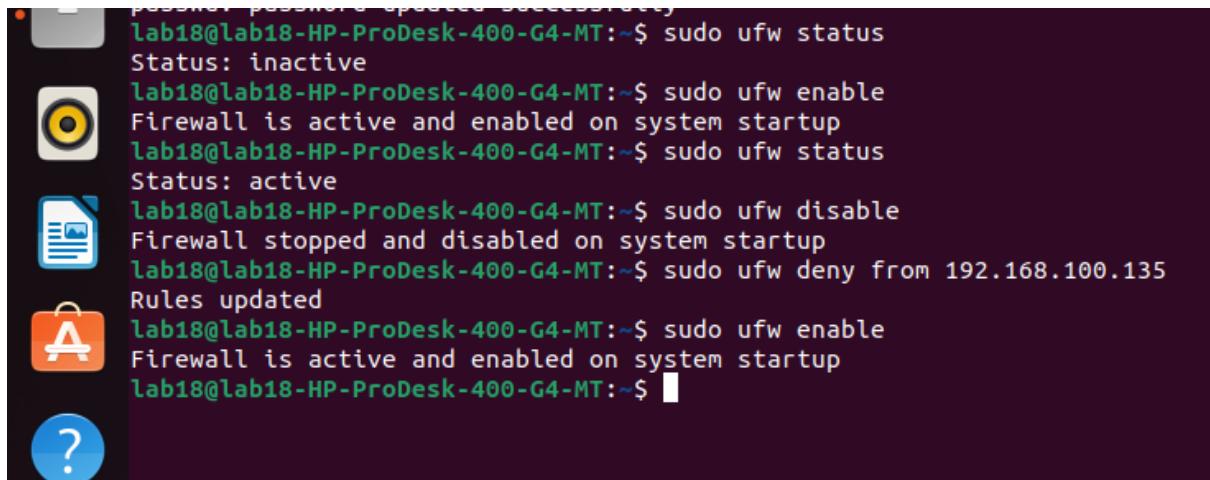
```
jankee@vara:~$ sudo useradd -m -s $(which bash) komal
[sudo] password for jankee:
[sudo] password is required
jankee@vara:~$ cd /var/log/auth.log
```

- I assigned a password to the account.



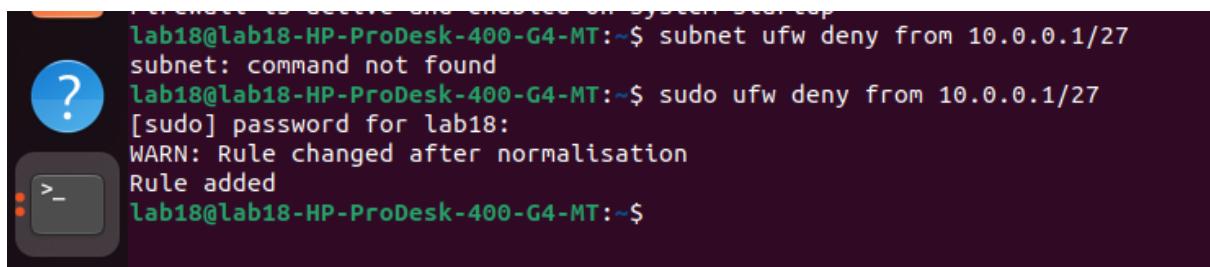
Firewall, blocking IP/subnet

- Sudo ufw status command displays if the firewall of the PC is active or inactive.
- Sudo ufw enable enables the firewall.
- Sudo ufw deny from 192.168.100.135 blocks any access from that IP address.



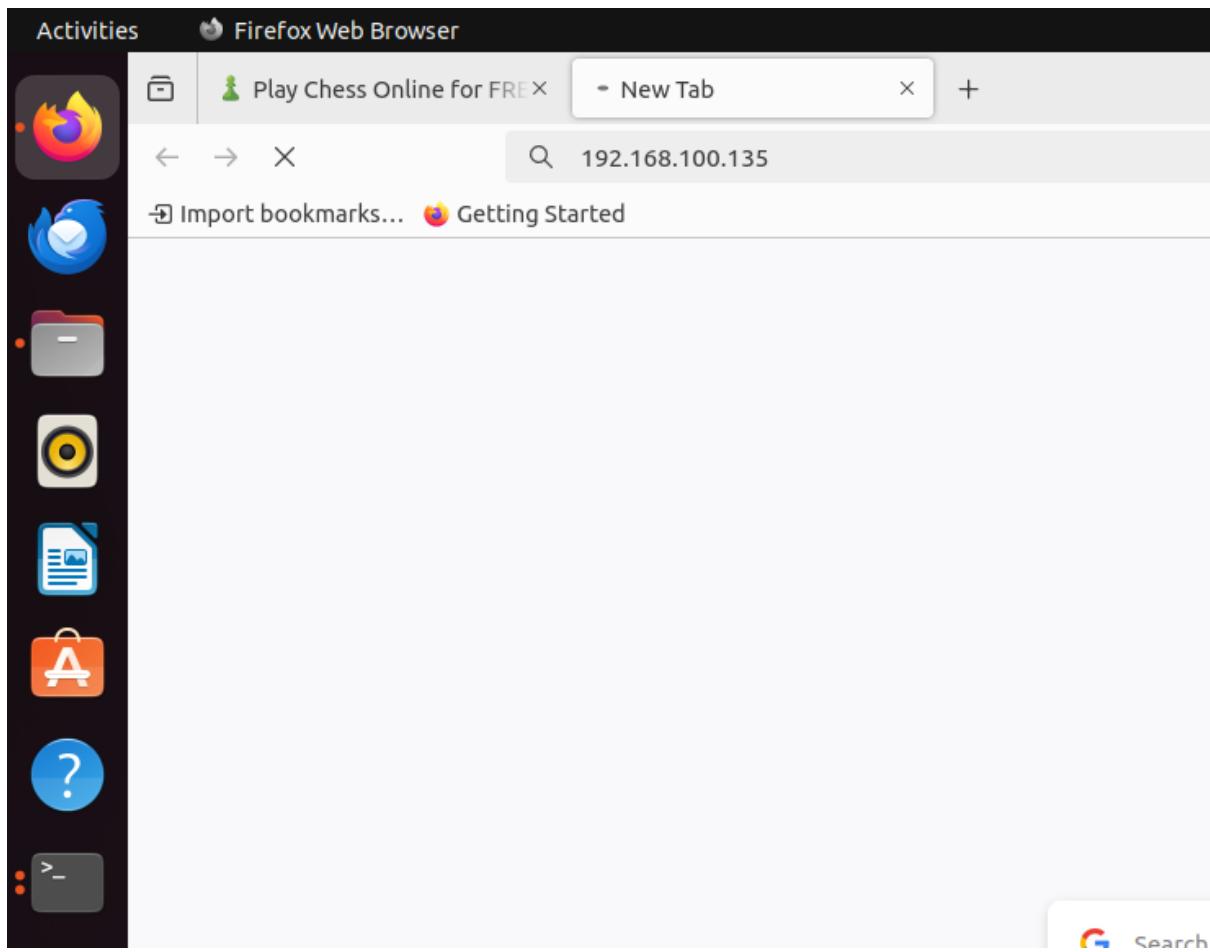
```
● [●] password updated successfully
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo ufw status
Status: inactive
[●] Firewall is active and enabled on system startup
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo ufw status
Status: active
[●] Firewall stopped and disabled on system startup
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo ufw deny from 192.168.100.135
Rules updated
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo ufw enable
Firewall is active and enabled on system startup
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

4. Sudo ufw deny from 10.0.0.1/27 blocks subnet.



```
[●] Firewall is active and enabled on system startup
lab18@lab18-HP-ProDesk-400-G4-MT:~$ subnet ufw deny from 10.0.0.1/27
subnet: command not found
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo ufw deny from 10.0.0.1/27
[sudo] password for lab18:
WARN: Rule changed after normalisation
Rule added
lab18@lab18-HP-ProDesk-400-G4-MT:~$
```

5. My friend with IP 192.168.100.135 blocked me using the same commands as in the screenshot 3. He was unable to access my IP address.



Fail2ban

1. Install fail2ban.

```

lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo apt install fail2ban
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  python3-pyinotify whois
Suggested packages:
  monit sqlite3 python3-pyinotify-doc
The following NEW packages will be installed
  fail2ban python3-pyinotify whois
0 to upgrade, 3 to newly install, 0 to remove and 262 not to upgrade.
Need to get 473 kB of archives.
After this operation, 2,486 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 https://nn.archive.ubuntu.com/ubuntu jammy/universe amd64 fail2ban all 0.11.2-6 [394 kB]
Get:2 https://nn.archive.ubuntu.com/ubuntu jammy/main amd64 python3-pyinotify all 0.9.6-1.3 [24.8 kB]
Get:3 https://nn.archive.ubuntu.com/ubuntu jammy/main amd64 whois amd64 5.5.13 [53.4 kB]
Fetched 473 kB in 1s (881 kB/s)
Selecting previously unselected package fail2ban.
(Reading database ... 207940 files and directories currently installed.)
Preparing to unpack .../fail2ban_0.11.2-6_all.deb ...
Unpacking fail2ban (0.11.2-6) ...
Selecting previously unselected package python3-pyinotify.
Preparing to unpack .../python3-pyinotify_0.9.6-1.3_all.deb ...
Unpacking python3-pyinotify (0.9.6-1.3) ...
Selecting previously unselected package whois.
Preparing to unpack .../whois_5.5.13_amd64.deb ...
Unpacking whois (5.5.13) ...
Setting up whois (5.5.13) ...
Setting up fail2ban (0.11.2-6) ...
Setting up python3-pyinotify (0.9.6-1.3) ...
Processing triggers for man-db (2.10.2-1) ...
lab18@lab18-HP-ProDesk-400-G4-MT:~$ 

```

- Sudo nano /etc/fail2ban/jail.conf command opens an editor where we can change variables.

```

lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo nano /etc/fail2ban/jail.conf
lab18@lab18-HP-ProDesk-400-G4-MT:~$ 

```

- We can set bantime to 3 minutes and maxretry to 5.

```

# can be defined using space (and/or comma) separator.
#ignoreip = 127.0.0.1/8 ::1

# External command that will take an tagged arguments to ignore, e.g. <ip>, # and return true if the IP is to be ignored. False otherwise.
# ignorecommand = /path/to/command <ip>
# ignorecommand = /path/to/command <ip>

# "bantime" is the number of seconds that a host is banned.
bantime = 300

# A host is banned if it has generated "maxretry" during the last "findtime"
# seconds.
findtime = 10m

# "maxretry" is the number of failures before a host get banned.
maxretry = 5

# "maxmatches" is the number of matches stored in ticket (resolvable via tag <matches> in actions).
maxmatches = %maxretry

# "backend" specifies the backend used to get files modification.
# Available options are "pyinotify", "gamin", "polling", "systemd" and "auto".
# This option can be overridden in each jail as well.
# backend = auto

# pyinotify: requires pyinotify (a file alteration monitor) to be installed.
#           If pyinotify is not installed, Fail2ban will use auto.
# gamin:   requires Gamin (a file alteration monitor) to be installed.
#           If Gamin is not installed, Fail2ban will use auto.
# polling: uses polling algorithm which does not require external libraries.
# systemd: uses systemd python library to access the systemd journal.
#           Specifying "logpath" is not valid for this backend.
# auto:    will try to use the following backends, in order:
#           pyinotify, gamin, polling.

# Note: If system backend is chosen as the default but you enable a jail
#       for which logs are present only in its own log files, specify some other
#       backend for that jail (e.g., "logpath" or "auto" depending on your needs).
#       For more details, see https://github.com/fail2ban/fail2ban/issues/959#issuecomment-74901200
backend = auto

# "usedns" specifies if jails should trust hostnames in logs,
# warn when DNS lookups are performed, or ignore all hostnames in logs
# usedns = warn

# yes:  if a hostname is encountered, a DNS lookup will be performed.
# warn: if a hostname is encountered, a DNS lookup will be performed,
#       but it will be logged as a warning.
# usedns = warn

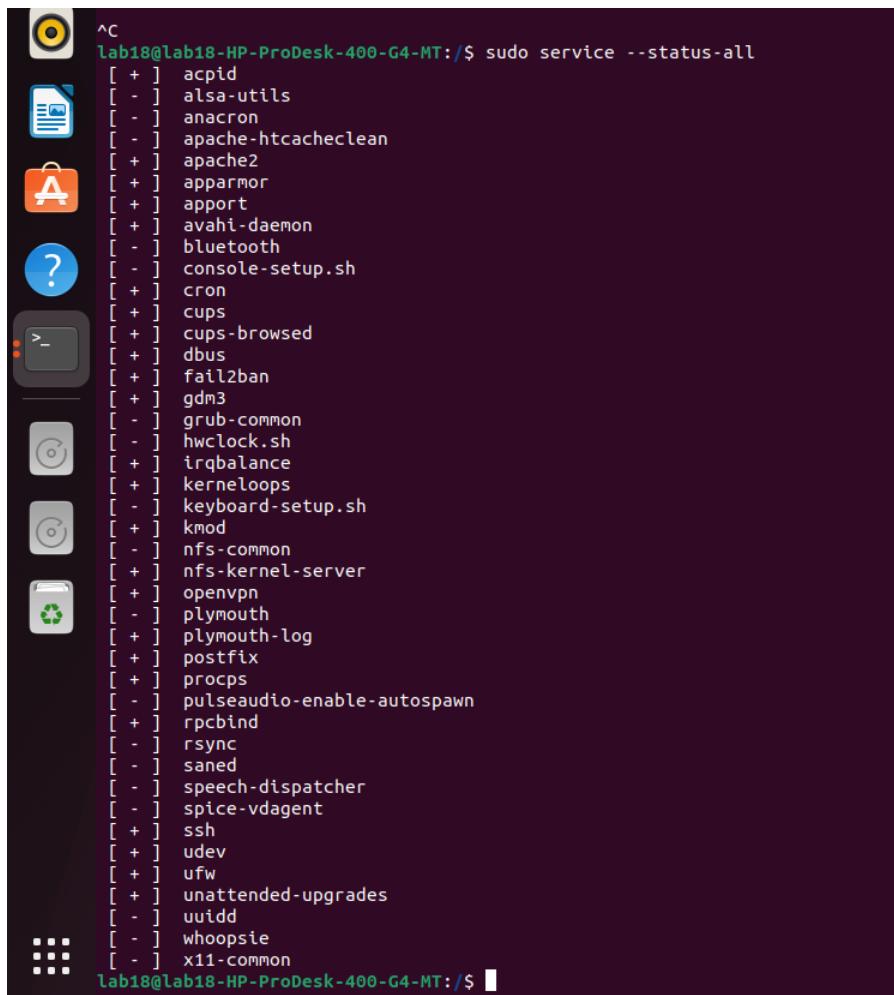
*** Help   Write Out  Where Is  Cut  Execute  Location  Undo  Set Mark  To Bracket  Previous  Back  Exit  Read File  Replace  Paste  Justify  Go To Line  Redo  Copy  Where Was  Next  Forwards  Prev Word  Next Word

```

- Sudo service fail2ban start activates the service. Sudo service fail2ban reload command reloads the configurations of the service on the system.

```
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo service fail2ban start
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo nano /etc/fail2ban/jail.conf
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo service fail2ban reload
lab18@lab18-HP-ProDesk-400-G4-MT:/$ ^C
```

5. We can check the status of services running currently on the system using the command below.



```
^C
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo service --status-all
[ + ] acpid
[ - ] alsa-utils
[ - ] anacron
[ - ] apache-htcacheclean
[ + ] apache2
[ + ] apparmor
[ + ] apport
[ + ] avahi-daemon
[ - ] bluetooth
[ - ] console-setup.sh
[ + ] cron
[ + ] cups
[ + ] cups-browsed
[ + ] dbus
[ + ] fail2ban
[ + ] gdm3
[ - ] grub-common
[ - ] hwclock.sh
[ + ] irqbalance
[ + ] kerneloops
[ - ] keyboard-setup.sh
[ + ] kmmod
[ - ] nfs-common
[ + ] nfs-kernel-server
[ + ] openvpn
[ - ] plymouth
[ + ] plymouth-log
[ + ] postfix
[ + ] procps
[ - ] pulseaudio-enable-autospawn
[ + ] rpcbind
[ - ] rsync
[ - ] saned
[ - ] speech-dispatcher
[ - ] spice-vdagent
[ + ] ssh
[ + ] udev
[ + ] ufw
[ + ] unattended-upgrades
[ - ] uuidd
[ - ] whoopsie
[ - ] x11-common
lab18@lab18-HP-ProDesk-400-G4-MT:/$ ^C
```

6. I tried to access my friend's account. He set bantime to 5min and maxretry to 3. I am allowed to enter a password only 3 times before I get banned.

```
lab18@lab18-HP-ProDesk-400-G4-MT:/etc/fail2ban$ sudo ssh admin@192.168.100.116
The authenticity of host '192.168.100.116 (192.168.100.116)' can't be established.
ED25519 key fingerprint is SHA256:76TgWVwcqz3q/3y6ziiM8uTJtGAAalv9I085azbq+Tg.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.100.116' (ED25519) to the list of known hosts.
admin@192.168.100.116's password:
Permission denied, please try again.
admin@192.168.100.116's password:
Permission denied, please try again.
admin@192.168.100.116's password:

^C
lab18@lab18-HP-ProDesk-400-G4-MT:/etc/fail2ban$ sudo ssh admin@192.168.100.116
ssh: connect to host 192.168.100.116 port 22: Connection refused
lab18@lab18-HP-ProDesk-400-G4-MT:/etc/fail2ban$ ^C
```

- The command below can be used to check if someone has been banned.

```

lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo cat /var/log/fail2ban.log
[19511]: INFO  -----
[19511]: INFO  Starting Fail2ban v0.11.2
[19511]: INFO  Observer start...
[19511]: INFO  Connected to fail2ban persistent database '/var/lib/fail2ban/fail2ban.sqlite3'
[19511]: WARNING New database created. Version '4'
[19511]: INFO  Creating new jail 'sshd'
[19511]: INFO  Jail 'sshd' uses pyinotify {}
[19511]: INFO  Initiated 'pyinotify' backend
[19511]: INFO  maxLines: 1
[19511]: INFO  maxRetry: 5
[19511]: INFO  findtime: 600
[19511]: INFO  banTime: 180
[19511]: INFO  encoding: UTF-8
[19511]: INFO  Added logfile: '/var/log/auth.log' (pos = 0, hash = 6c7ba7d1532e4438236c08de753ab8bdb02c180e)
[19511]: INFO  Jail 'sshd' started
[19511]: INFO  Reload all jails
[19511]: INFO  Reload jail 'sshd'
[19511]: INFO  maxLines: 1
[19511]: INFO  maxRetry: 5
[19511]: INFO  findtime: 600
[19511]: INFO  banTime: 180
[19511]: INFO  encoding: UTF-8
[19511]: INFO  Jail 'sshd' reloaded
[19511]: INFO  Reload finished.
[19511]: INFO  Reload all jails
[19511]: INFO  Reload jail 'sshd'
[19511]: INFO  maxLines: 1
[19511]: INFO  maxRetry: 5
[19511]: INFO  findtime: 600
[19511]: INFO  banTime: 180
[19511]: INFO  encoding: UTF-8
[19511]: INFO  Jail 'sshd' reloaded
[19511]: INFO  Reload finished.
[19511]: INFO  Reload finished.

```

SMTP/Mail

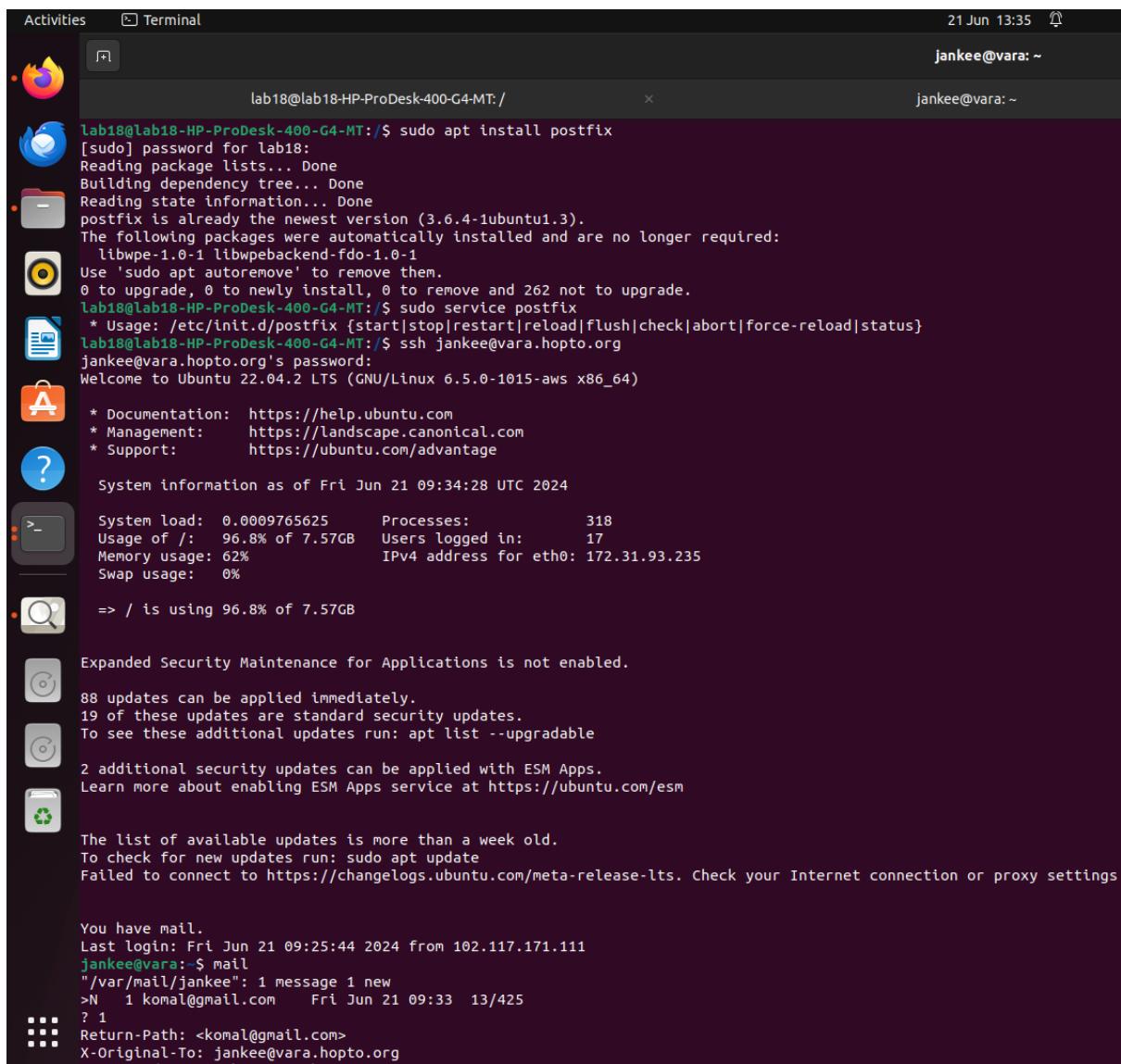
- The command 'telnet localhost 25' is used as an attempt to establish a connection with the protocol SMTP, which is used to send and receive mails. 25 is the port of the service. The format below is used to send a mail from 'jankee@vara.hopto.org' to 'komal@vara.hopto.org'.

```

lab18@lab18-HP-ProDesk-400-G4-MT:~$ telnet localhost 25
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
220 lab18-HP-ProDesk-400-G4-MT ESMTP Postfix (Ubuntu)
heLo gmail.com
250 lab18-HP-ProDesk-400-G4-MT
mail from: jankee@vara.hopto.org
250 2.1.0 Ok
rcpt to: komal@vara.hopto.org
250 2.1.5 Ok
data
354 End data with <CR><LF>.<CR><LF>
waa moi sa jankee ki dir
ok
.
250 2.0.0 Ok: queued as ED3E7C13D1
quit
221 2.0.0 Bye
Connection closed by foreign host.
lab18@lab18-HP-ProDesk-400-G4-MT:~$ 

```

- Postfix can be used to send and receive mails. When logging into my account, I get notified at the bottom that I received a mail.



```

Activities Terminal 21 Jun 13:35
jankee@vara: ~
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo apt install postfix
[sudo] password for lab18:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
postfix is already the newest version (3.6.4-1ubuntu1.3).
The following packages were automatically installed and are no longer required:
  libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'sudo apt autoremove' to remove them.
0 to upgrade, 0 to newly install, 0 to remove and 262 not to upgrade.
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo service postfix
 * Usage: /etc/init.d/postfix {start|stop|restart|reload|flush|check|abort|force-reload|status}
lab18@Lab18-HP-ProDesk-400-G4-MT:/$ ssh jankee@vara.hopto.org
jankee@vara.hopto.org's password:
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 6.5.0-1015-aws x86_64)

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

System information as of Fri Jun 21 09:34:28 UTC 2024

System load: 0.0009765625 Processes: 318
Usage of /: 96.8% of 7.57GB Users logged in: 17
Memory usage: 62% IPv4 address for eth0: 172.31.93.235
Swap usage: 0%

=> / is using 96.8% of 7.57GB

Expanded Security Maintenance for Applications is not enabled.

88 updates can be applied immediately.
19 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

2 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

The list of available updates is more than a week old.
To check for new updates run: sudo apt update
Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection or proxy settings

You have mail.
Last login: Fri Jun 21 09:25:44 2024 from 102.117.171.111
jankee@vara: $ mail
"/var/mail/jankee": 1 message 1 new
>N 1 komal@gmail.com Fri Jun 21 09:33 13/425
? 1
Return-Path: <komal@gmail.com>
X-Original-To: jankee@vara.hopto.org
Delivered-To: jankee@vara.hopto.org
Received: from gmail.com (localhost [127.0.0.1])
      by vara.hopto.org (Postfix) with SMTP id 047FA3F136
      for <jankee@vara.hopto.org>; Fri, 21 Jun 2024 09:32:30 +0000 (UTC)
Message-ID: <>20240621093301.047FA3F136@vara.hopto.org>
Date: Fri, 21 Jun 2024 09:32:30 +0000 (UTC)
From: komal@gmail.com

koserrr le jankee
komal ici
? 

```

3. Type mail, then press 1 to view the mail.



```

jankee@vara: $ mail
"/var/mail/jankee": 1 message 1 new
>N 1 komal@gmail.com Fri Jun 21 09:33 13/425
? 1
Return-Path: <komal@gmail.com>
X-Original-To: jankee@vara.hopto.org
Delivered-To: jankee@vara.hopto.org
Received: from gmail.com (localhost [127.0.0.1])
      by vara.hopto.org (Postfix) with SMTP id 047FA3F136
      for <jankee@vara.hopto.org>; Fri, 21 Jun 2024 09:32:30 +0000 (UTC)
Message-ID: <>20240621093301.047FA3F136@vara.hopto.org>
Date: Fri, 21 Jun 2024 09:32:30 +0000 (UTC)
From: komal@gmail.com

koserrr le jankee
komal ici
? 

```

NFS (Network File Sharing)

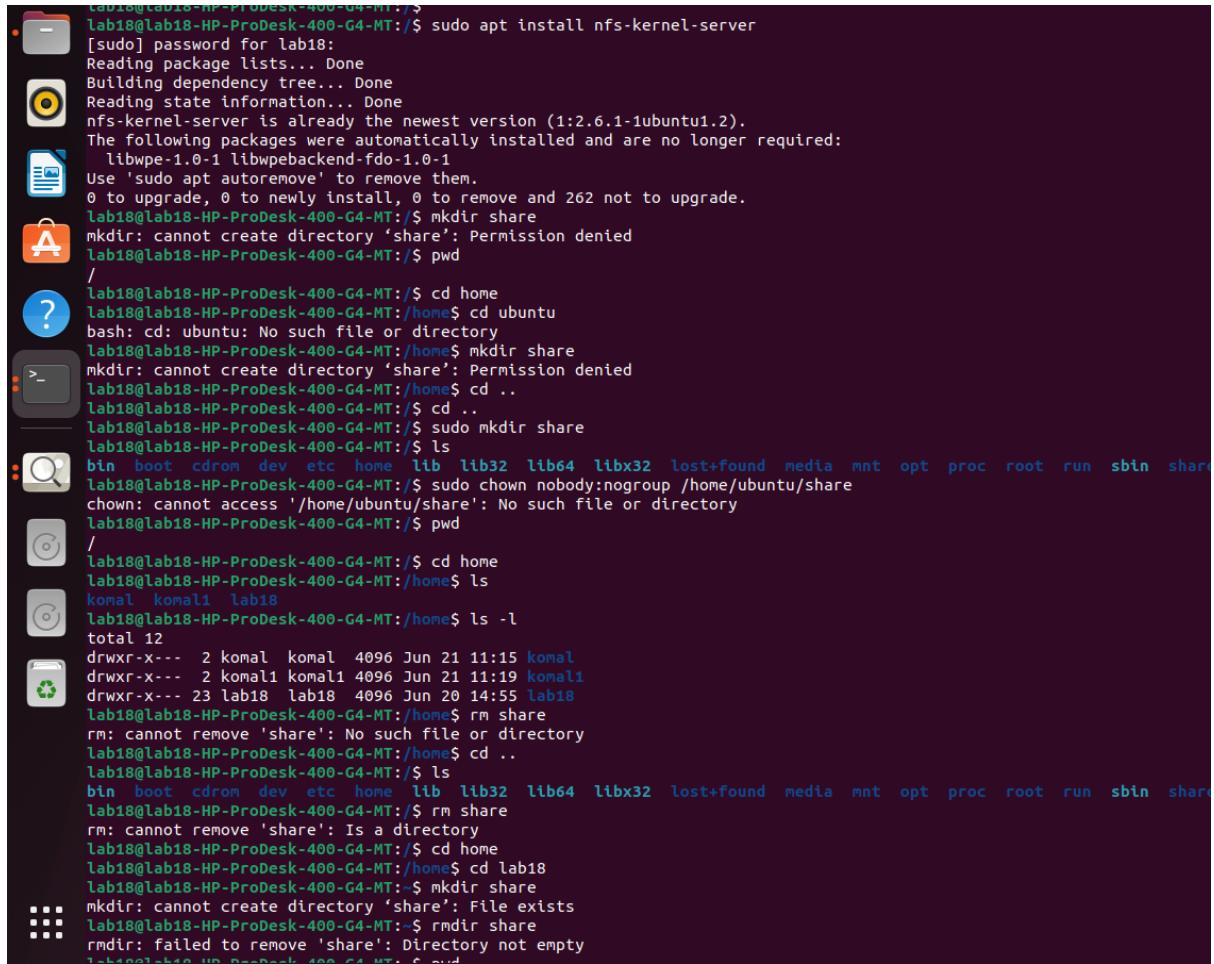
In network file sharing, there are two sides; the client side and server side. Sudo apt install nfs-kernel-server allows access to shared directories. In this activity, I am on the server side. I create a directory called share. The command sudo chown nobody:nogroup /home/ubuntu/share allows other PCs(client) to access the directory and change it. The NFS exports file is configured and displayed. My friend komal was on the client side whereby the codes he had to type were as follows:

```
sudo apt install nfs-common
```

```
mkdir nfs_share_drive
```

s.s.s.s is the IP address of the server

```
sudo mount s.s.s.s:/home/ubuntu/share nfs_share_drive
```



```
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo apt install nfs-kernel-server
[sudo] password for lab18:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
nfs-kernel-server is already the newest version (1:2.6.1-1ubuntu1.2).
The following packages were automatically installed and are no longer required:
  libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'sudo apt autoremove' to remove them.
0 to upgrade, 0 to newly install, 0 to remove and 262 not to upgrade.
lab18@lab18-HP-ProDesk-400-G4-MT:~$ mkdir share
mkdir: cannot create directory 'share': Permission denied
lab18@lab18-HP-ProDesk-400-G4-MT:~$ pwd
/
lab18@lab18-HP-ProDesk-400-G4-MT:~$ cd home
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ cd ubuntu
bash: cd: ubuntu: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ mkdir share
mkdir: cannot create directory 'share': Permission denied
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:~$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo mkdir share
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls
bin boot cdrom dev etc home lib lib32 lib64 libx32 lost+found media mnt opt proc root run sbin share
lab18@lab18-HP-ProDesk-400-G4-MT:~$ sudo chown nobody:nogroup /home/ubuntu/share
chown: cannot access '/home/ubuntu/share': No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:~$ pwd
/
lab18@lab18-HP-ProDesk-400-G4-MT:~$ cd home
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ ls
komal komali lab18
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ ls -l
total 12
drwxr-x-- 2 komal komal 4096 Jun 21 11:15 komal
drwxr-x-- 2 komali komali 4096 Jun 21 11:19 komali
drwxr-x-- 23 lab18 lab18 4096 Jun 20 14:55 lab18
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ rm share
rm: cannot remove 'share': No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:~$ ls
bin boot cdrom dev etc home lib lib32 lib64 libx32 lost+found media mnt opt proc root run sbin share
lab18@lab18-HP-ProDesk-400-G4-MT:~$ rm share
rm: cannot remove 'share': Is a directory
lab18@lab18-HP-ProDesk-400-G4-MT:~$ cd home
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ cd lab18
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ mkdir share
mkdir: cannot create directory 'share': File exists
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ rmdir share
rmdir: failed to remove 'share': Directory not empty
```

Activities Terminal 21 Jun 13:58 lab18@lab18-HP-ProDesk-400-G4-MT: /

```
Use 'sudo apt autoremove' to remove them.
0 to upgrade, 0 to newly install, 0 to remove and 262 not to upgrade.
lab18@lab18-HP-ProDesk-400-G4-MT:/$ mkdir share
mkdir: cannot create directory 'share': Permission denied
lab18@lab18-HP-ProDesk-400-G4-MT:/$ pwd
/
lab18@lab18-HP-ProDesk-400-G4-MT:/$ cd home
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ cd ubuntu
bash: cd: ubuntu: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ mkdir share
mkdir: cannot create directory 'share': Permission denied
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo mkdir share
lab18@lab18-HP-ProDesk-400-G4-MT:/$ ls
bin boot cpio dev etc home lib lib32 lib64 libx32 lost+found media mnt opt proc root run sbin share snap srv sys temp3 tmp usr var
chown: cannot access '/home/ubuntu/share': No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:/$ pwd
/
lab18@lab18-HP-ProDesk-400-G4-MT:/$ cd home
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ ls
komal komali lab18
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ ls -l
total 12
drwxr-x--- 2 komal komal 4096 Jun 21 11:15 komal
drwxr-x--- 2 komali komali 4096 Jun 21 11:19 komali
drwxr-x--- 23 lab18 lab18 4096 Jun 20 14:55 lab18
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ rm share
rm: cannot remove 'share': No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:/$ ls
bin boot cpio dev etc home lib lib32 lib64 libx32 lost+found media mnt opt proc root run sbin share snap srv sys temp3 tmp usr var
rm: cannot remove 'share': Is a directory
lab18@lab18-HP-ProDesk-400-G4-MT:/$ cd home
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ cd lab18
lab18@lab18-HP-ProDesk-400-G4-MT:/$ mkdir share
mkdir: cannot create directory 'share': File exists
lab18@lab18-HP-ProDesk-400-G4-MT:/$ rmdir share
rmdir: failed to remove 'share': Directory not empty
lab18@lab18-HP-ProDesk-400-G4-MT:/$ pwd
/home/lab18
lab18@lab18-HP-ProDesk-400-G4-MT:/$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ rmdir share
rmdir: failed to remove 'share': No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ cd ..
lab18@lab18-HP-ProDesk-400-G4-MT:/$ rmdir share
rmdir: failed to remove 'share': Permission denied
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo rmdir share
lab18@lab18-HP-ProDesk-400-G4-MT:/$ ls
bin boot cpio dev etc home lib lib32 lib64 libx32 lost+found media mnt opt proc root run sbin snap srv sys temp3 tmp usr var
lab18@lab18-HP-ProDesk-400-G4-MT:/$ cd home
```

Activities Terminal 21 Jun 14:07 lab18@lab18-HP-ProDesk-400-G4-MT: ~

```
lab18@lab18-HP-ProDesk-400-G4-MT:~/home$ cd lab18\
>
lab18@lab18-HP-ProDesk-400-G4-MT:~/cd lab18
bash: cd: lab18: No such file or directory
lab18@lab18-HP-ProDesk-400-G4-MT:~/cd lab18
/
lab18@lab18-HP-ProDesk-400-G4-MT:/$ mkdir share
mkdir: cannot create directory 'share': File exists
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo mkdir share
mkdir: cannot create directory 'share': File exists
lab18@lab18-HP-ProDesk-400-G4-MT:/$ ls
backup.sh Desktop Downloads fac forloop fruit2 i.jpg Music output poetry Public secret-of-the-universe share stderr tem
butterfly.jpg Documents error fib fruit gene-desc.txt message mydata.dat Pictures public script.sh secretoftheunlverse snap temp1 Tem
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo chown nobody:nogroup /home/lab18/share
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo nano /etc/exports
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo exportfs -a
exportfs: No options for /home/lab18/share 191.168.100.123/24; suggest 191.168.100.123/24(sync) to avoid warning
exportfs: /etc/exports [1]: Neither 'subtree_check' or 'no_subtree_check' specified for export "191.168.100.123/24:/home/lab18/share".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x

lab18@lab18-HP-ProDesk-400-G4-MT:/$ showmount -e localhost
Export list for localhost:
/home/lab18/share 191.168.100.123/24,172.22.45.144
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo nano /etc/exports
lab18@lab18-HP-ProDesk-400-G4-MT:/$ sudo exportfs -a
exportfs: No options for /home/lab18/share 191.168.100.123/24; suggest 191.168.100.123/24(sync) to avoid warning
exportfs: /etc/exports [1]: Neither 'subtree_check' or 'no_subtree_check' specified for export "191.168.100.123/24:/home/lab18/share".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x

exportfs: No options for Force the: suggest the(sync) to avoid warning
exportfs: /etc/exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "the:Force".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x

exportfs: Failed to resolve the
exportfs: Failed to resolve the
exportfs: No options for Force nfs: suggest nfs(sync) to avoid warning
exportfs: /etc/exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "nfs:Force".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x

exportfs: Failed to resolve nfs
exportfs: Failed to resolve nfs
exportfs: No options for Force server: suggest server(sync) to avoid warning
exportfs: /etc/exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "server:Force".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x

exportfs: Failed to resolve server
exportfs: Failed to resolve server
exportfs: No options for Force to: suggest to(sync) to avoid warning
```

```

Activities Terminal 21 Jun 14:10 lab18@lab18-HP-ProDesk-400-G4-MT: ~
lab18@lab18-HP-ProDesk-400-G4-MT: ~
exportfs: No options for Force nfs: suggest nfs(sync) to avoid warning
exportfs: /etc(exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "nfs:Force".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x
exportfs: Failed to resolve nfs
exportfs: Failed to resolve nfs
exportfs: No options for Force server: suggest server(sync) to avoid warning
exportfs: /etc(exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "server:Force".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x
exportfs: Failed to resolve server
exportfs: Failed to resolve server
exportfs: No options for Force to: suggest to(sync) to avoid warning
exportfs: /etc(exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "to:Force".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x
exportfs: Failed to resolve to
exportfs: Failed to resolve to
exportfs: No options for Force re-read: suggest re-read(sync) to avoid warning
exportfs: /etc(exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "re-read:Force".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x
exportfs: Failed to resolve re-read
exportfs: Failed to resolve re-read
exportfs: No options for Force the: suggest the(sync) to avoid warning
exportfs: /etc(exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "the:Force".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x
exportfs: Failed to resolve the
exportfs: Failed to resolve the
exportfs: No options for Force configuration: suggest configuration(sync) to avoid warning
exportfs: /etc(exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "configuration:Force".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x
exportfs: Failed to resolve configuration
exportfs: Failed to resolve configuration
exportfs: No options for Force file: suggest file(sync) to avoid warning
exportfs: /etc(exports [2]: Neither 'subtree_check' or 'no_subtree_check' specified for export "file:Force".
Assuming default behaviour ('no_subtree_check').
NOTE: this default has changed since nfs-utils version 1.0.x
exportfs: Failed to resolve file
exportfs: Failed to resolve file
lab18@lab18-HP-ProDesk-400-G4-MT: ~$ showmount -e localhost
Export list for localhost:
/home/lab18/share 191.168.100.123/24,192.168.100.123/24,172.22.45.144
lab18@lab18-HP-ProDesk-400-G4-MT: ~$
```

References

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