

Template Week 5 – Operating Systems

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Used chatcpt for better words and wriite the sentences in a better formal way

Assignment 5.1: Unix-like

- a) Find out what the difference is between UNIX and unix-like operating systems?

UNIX: Certified operating systems that strictly follow UNIX standards (e.g., Research UNIX, Commercial UNIX).

Unix-like: Systems that behave similarly to UNIX but are not certified, such as Linux, macOS, and BSD-based systems.

- b) Study the image above named UNIX timeline. Find out who Ken Thompson, Dennis Ritchie, Bill Joy, Richard Stallman, and Linus Torvalds are and what they have contributed to the development of UNIX or unix-like systems and to IT in general. **TIP!** English-language sources often contain more detailed information about these individuals.

Ken Thompson: Co-created UNIX at Bell Labs and developed the B programming language.

Dennis Ritchie: Co-created UNIX and invented the C programming language, which UNIX is based on.

Bill Joy: Developed BSD UNIX (Berkeley Software Distribution), a significant UNIX variant.

Richard Stallman: Founded the GNU Project, aiming for free software, and created the GNU tools.

Linus Torvalds: Created the Linux kernel, the core of many Linux-based operating systems

- c) What is the philosophy of the GNU movement?

The GNU Movement promotes free software, where users can freely use, study, share, and modify software, aiming for user freedom and community-based development.

- d) Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement?

Please explain your answer.

Ubuntu uses the GNU tools and Linux kernel, but it includes **proprietary software** (like drivers and codecs) for better user experience, which doesn't fully align with the strict GNU philosophy.

- e) Find out what is the Windows Subsystem for Linux? The Windows Subsystem for Linux (WSL)

allows users to run Linux applications and commands on Windows without using a virtual machine or dual-boot setup.

- f) Find out, which operating system family belongs to Android, iOS and ChromeOS?

Android: Linux family (Linux-based). / **iOS:** Unix-like family (based on Darwin, derived from BSD).

/ **ChromeOS:** Linux family (Linux-based).

Assignment 5.2: Supercomputers and gameconsoles

- a) Research on this site what supercomputers are used for and write a short summary of it:

<https://www.computerhistory.org/timeline/search/?q=Supercomputer>

Supercomputers are extremely powerful machines used for solving complex problems and handling large amounts of data. They are used in areas like climate research, scientific studies, engineering simulations, and artificial intelligence to process data faster and more efficiently than regular computers.

- b) IBM is a company that has already built a number of supercomputers. One of them is IBM's Roadrunner. The CPU developed for this supercomputer was further developed at a later stage as the CPU for the PlayStation 3 console. Find out what a **PlayStation 3 cluster** is and what it was used for?

PlayStation 3 cluster is a group of PS3 consoles connected together to form a supercomputer. These clusters were used for high-performance computing, such as scientific research and data analysis, by using the powerful IBM Cell processors in each PS3.

- c) You can build a supercomputer by putting a few computers together in a cluster. Here's what Oracle did with a collection of Raspberry Pi's, for example:

<https://blogs.oracle.com/developers/post/building-the-worlds-largest-raspberry-pi-cluster>

What specific operating system is running on this cluster?

Oracle built a supercomputer using many Raspberry Pi computers. This cluster runs a special version of the Linux operating system, customized to manage the hardware and connections between the Raspberry Pi units.

- d) Does Oracle's Raspberry Pi supercomputer appear in the list of the 500 fastest supercomputers in the world? Make a logical decision for this, without going through the entire list.

<https://www.top500.org/lists/top500/list/2023/06/>

Oracle's Raspberry Pi supercomputer is not in the Top500 list of the world's fastest supercomputers. The Top500 list includes much more powerful machines with specialized hardware and cooling systems, which the Raspberry Pi cluster lacks.

- e) What CPU architecture is used for the PlayStation 5 and Xbox Series X?

What operating systems run on these consoles?

What conclusion can you draw from the answer to the previous question?

Both the PlayStation 5 and Xbox Series X use custom processors made by AMD, based on the Zen 2 architecture. The PS5 runs a custom version of the FreeBSD operating system, while the Xbox Series X uses a Windows-based operating system. This shows that both consoles use different types of operating systems but are based on similar modern technology.

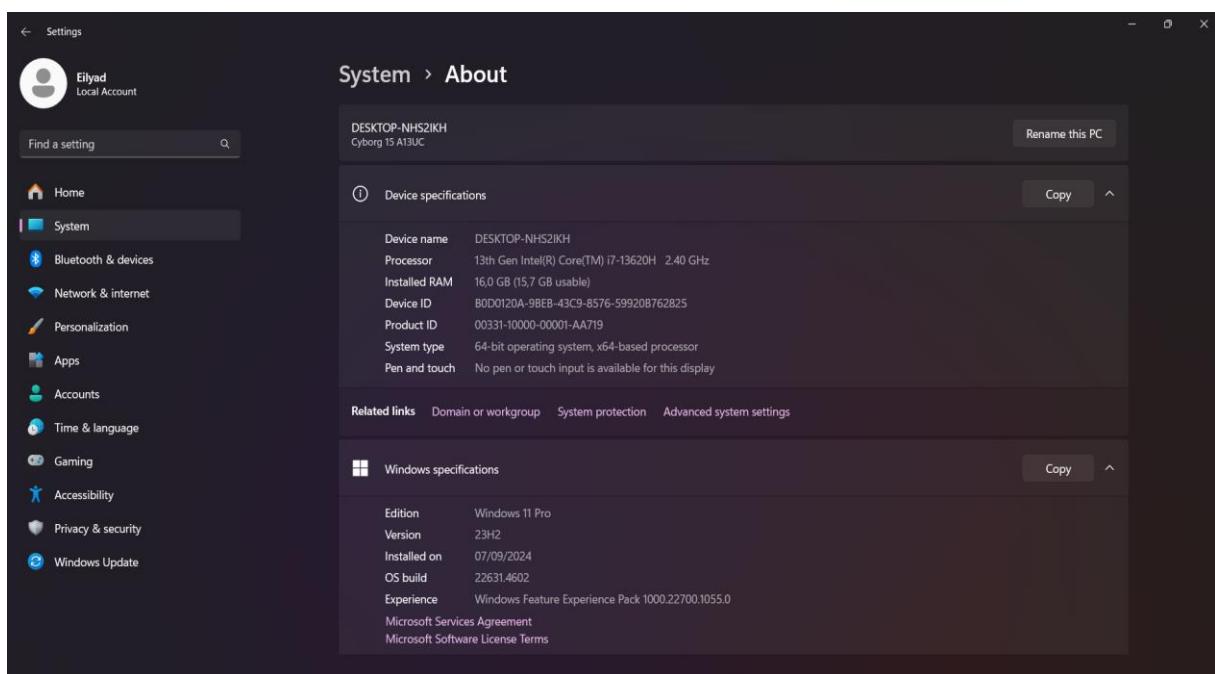
Assignment 5.3: Working with Windows

Take relevant screenshots of the assignments below

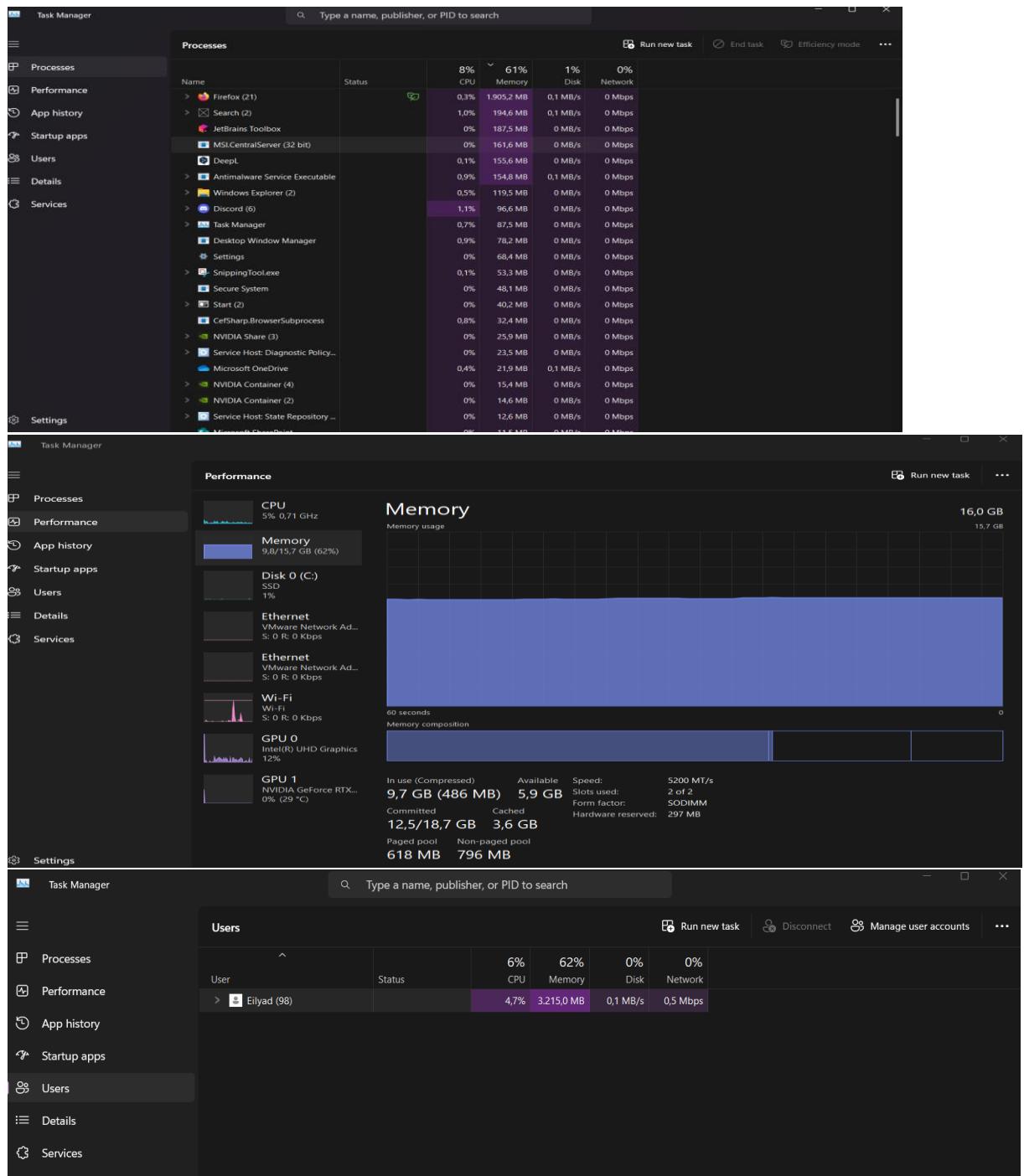
- a) Practice for about 10 minutes with the **Windows** keyboard shortcuts combinations, skip the general shortcuts in this exercise. Take a look at which screens are opened.

- b) The file explorer can be opened with **Windows** + E, Which key combination could you also use?
[You can also open File Explorer with Ctrl + Esc \(Start Menu\) and then selecting File Explorer.](#)

- c) Open the system properties with a **Windows** key combination, take a screenshot of the open screen.
Paste this screenshot into this template.



- d) Open task manager with a key combination. Take screenshots of the tabs: processes (shows active processes), performance, and users. Place these three screenshots in this template.



- e) If you're giving a PowerPoint presentation and you connect your laptop to a projector, Windows can use the projector as a second screen. For example, you may have Outlook open on your first screen that you don't show over the projector, while the PowerPoint presentation is displayed on the projector, or the second screen. Which key combination should you use for this?

To extend my display to a projector (as a second screen) during a PowerPoint presentation, use windows icon + P. This opens the projector display options (like Duplicate, Extend, etc.).

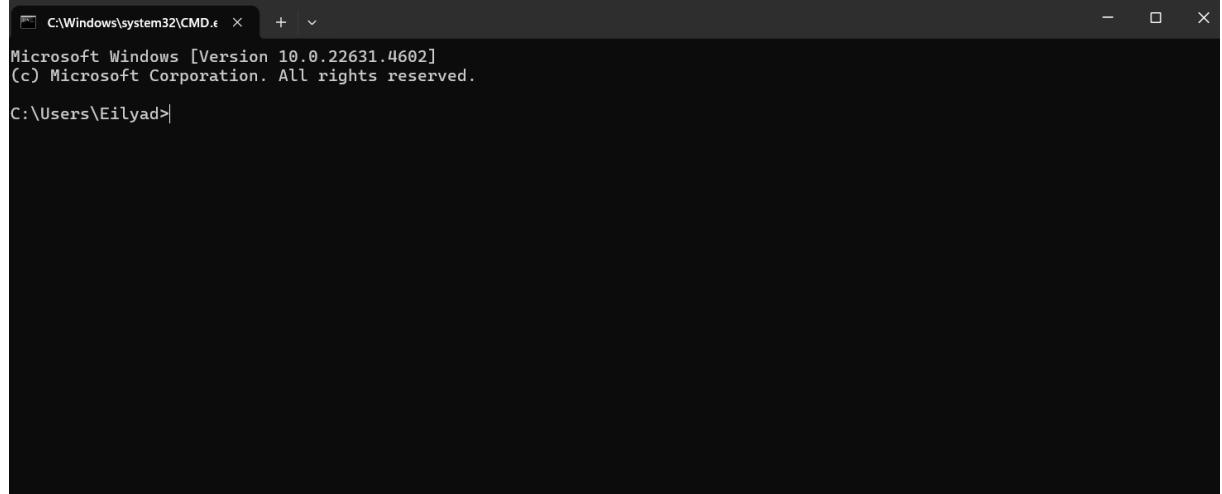
- f) If you leave the classroom for a while and you leave your laptop behind, it is wise to lock the screen. Your Apps will continue to run in the background. So, for example, if you're waiting for a

download that takes a while, lock the screen and get a cup of coffee. Which key combination do you use for this?

[Windows icon + L](#)

- g) Open the Run screen with a key combination. On this screen, type CMD and press <enter>. Take a screenshot of this result and paste it into this template.

[To open the Run screen, use windows icon + R. Then, type CMD and press Enter to open Command Prompt.](#)



Working in the File Explorer

Relevant screenshots **copy** command:

The screenshot shows a Windows 10 x64 virtual machine running in VMware Workstation. The taskbar at the top has tabs for "Windows 10 x64 eilyad 568209" and "VMware Workstation". The desktop background is blue with white clouds.

File Explorer Window:

- Left pane: "My Computer" folder containing:
 - Windows 10 x64 eilyad 568209
 - opnsense
 - Ubuntu 64 eilyad desktop
 - Ubuntu 64-bit
 - Ubuntu 64-bit fog
- Right pane: "New tab" window showing the contents of the "Windows 10 x64 eilyad 568209" drive.

Command Prompt Window:

```
C:\SAXION>dir
Volume in drive C has no label.
Volume Serial Number is 626D-5367

Directory of C:\SAXION

12/16/2024  08:04 PM    <DIR>      .
12/16/2024  08:04 PM    <DIR>      ..
12/16/2024  08:22 PM    <DIR>      HBOICT
          0 File(s)           0 bytes
          3 Dir(s)  36,352,253,952 bytes free

C:\SAXION>cd C:\SAXION\HBOICT\YEAR1\QUARTILE1\"Introduction to Programming\"
C:\SAXION\HBOICT\YEAR1\QUARTILE1\"Introduction to Programming\">dir
Volume in drive C has no label.
Volume Serial Number is 626D-5367

Directory of C:\SAXION\HBOICT\YEAR1\QUARTILE1\"Introduction to Programming\"

12/16/2024  08:16 PM    <DIR>      .
12/16/2024  08:16 PM    <DIR>      ..
12/16/2024  07:59 PM           359,595 Wave.png.png
          1 File(s)        359,595 bytes
          2 Dir(s)  36,352,122,880 bytes free

C:\SAXION\HBOICT\YEAR1\QUARTILE1\"Introduction to Programming\">
```

```
C:\SAXION\HBOICT\YEAR1\QUARTILE1>xd "Infrastructures"
"Infrastructures" is not recognized as an internal or external command,
operable program or batch file.

C:\SAXION\HBOICT\YEAR1\QUARTILE1>cd "Infrastructures"
C:\SAXION\HBOICT\YEAR1\QUARTILE1\Infrastructures>dir
Volume in drive C has no label.
Volume Serial Number is 626D-5367

Directory of C:\SAXION\HBOICT\YEAR1\QUARTILE1\Infrastructures

12/16/2024  08:17 PM    <DIR>          .
12/16/2024  08:17 PM    <DIR>          ..
12/16/2024  07:51 PM           46 info.txt.txt
12/16/2024  07:59 PM        812,255 Plug.png.png
                           2 File(s)   812,301 bytes
                           2 Dir(s)  36,350,681,088 bytes free

C:\SAXION\HBOICT\YEAR1\QUARTILE1\Infrastructures> cdc ..
'cdc' is not recognized as an internal or external command,
operable program or batch file.

C:\SAXION\HBOICT\YEAR1\QUARTILE1\Infrastructures>cd ..
C:\SAXION\HBOICT\YEAR1\QUARTILE1>cd "Organization and IT"
C:\SAXION\HBOICT\YEAR1\QUARTILE1\Organization and IT>dir
Volume in drive C has no label.
Volume Serial Number is 626D-5367

Directory of C:\SAXION\HBOICT\YEAR1\QUARTILE1\Organization and IT

12/16/2024  08:17 PM    <DIR>          .
12/16/2024  08:17 PM    <DIR>          ..
12/16/2024  07:59 PM        203,548 Tumble.png.png
                           1 File(s)  203,548 bytes
                           2 Dir(s)  36,350,103,552 bytes free

C:\SAXION\HBOICT\YEAR1\QUARTILE1\Organization and IT>
```

Relevant screenshots **tree** command:

Windows 10 x64 eilyad 568209 - VMware Workstation

File Edit View VM Tabs Help

Library

Type here to search

My Computer

- Windows 10 x64 eilyad 568209
- opnsense
- Ubuntu 64 eilyad desktop
- Ubuntu 64-bit
- Ubuntu 64-bit fog

Windows 10 x64 eilyad 568209

Command Prompt

```
C:\SAXION\HBOICT\YEAR1>dir
Volume in drive C has no label.
Volume Serial Number is 626D-5367

Directory of C:\SAXION\HBOICT\YEAR1

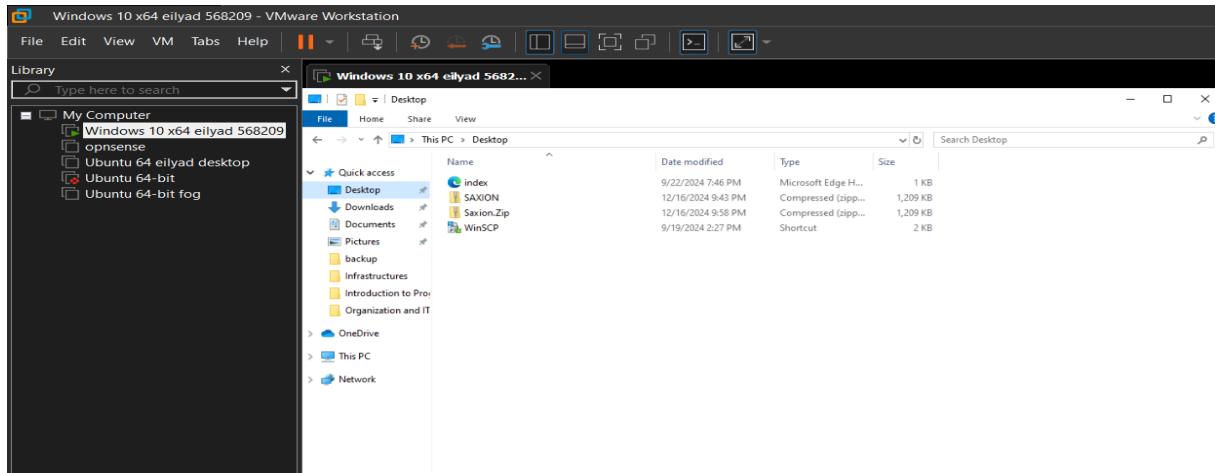
12/16/2024  08:22 PM    <DIR>      .
12/16/2024  08:22 PM    <DIR>      ..
12/16/2024  08:28 PM    <DIR>      QUARTILE1
12/16/2024  07:49 PM    <DIR>      QUARTILE2
12/16/2024  07:45 PM    <DIR>      QUARTILE3
12/16/2024  07:45 PM    <DIR>      QUARTILE4
               0 File(s)          0 bytes
               6 Dir(s)  36,349,837,312 bytes free

C:\SAXION\HBOICT\YEAR1>cd ..

C:\SAXION\HBOICT>tree /f
Folder PATH listing
Volume serial number is 626D-5367
C:.
    +-- YEAR 2
        +-- QUARTILE 1
        |   +-- QUARTILE 2
        |   +-- QUARTILE 3
        |   +-- QUARTILE 4
    +-- YEAR 3
    +-- YEAR 4
    +-- YEAR1
        +-- QUARTILE1
            +-- xd
                +-- Infrastructures
                    +-- info.txt.txt
                    +-- Plug.png.png
                +-- Introduction to Programming
                    +-- Wave.png.png
                +-- Organization and IT
                    +-- Tumble.png.png
        +-- QUARTILE2
            +-- Database
                +-- IT Fundamentals
                    +-- Project IT in the Game
        +-- QUARTILE3
        +-- QUARTILE4

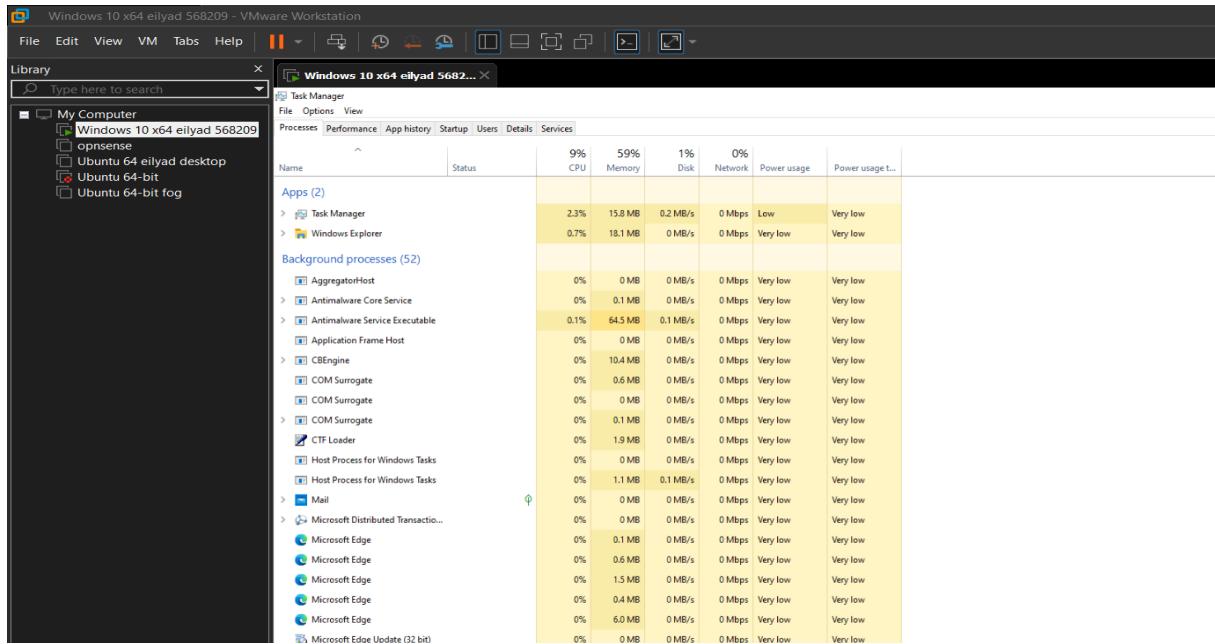
C:\SAXION\HBOICT>
```

Relevant screenshots in the file explorer of the folder c:\Saxion + created zip file.



Terminating Processes

Relevant Screenshots Task Manager Window:



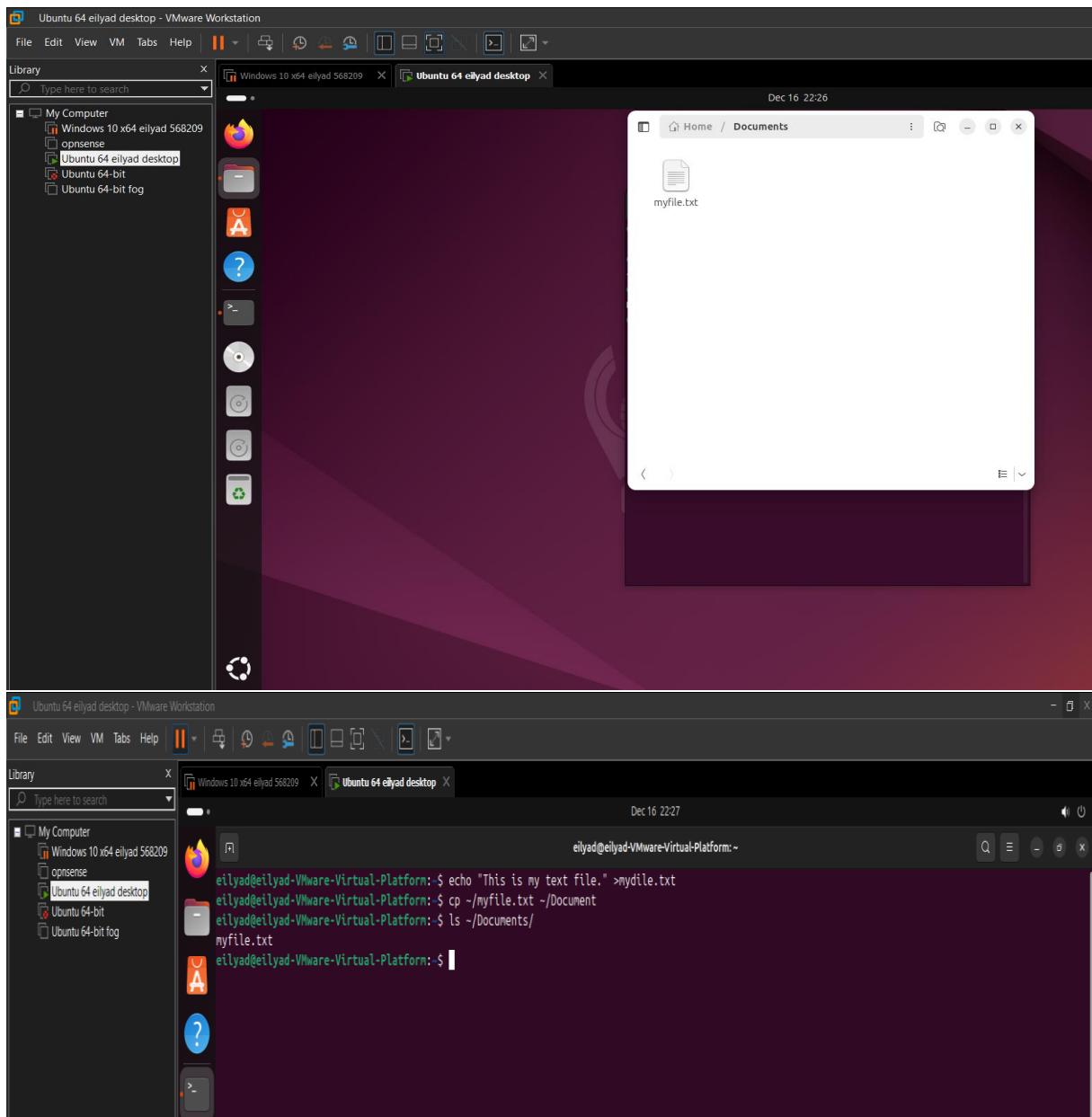
Install Software

Relevant screenshots that the following software is installed:

- WinSCP
 - Notepad++
 - 7zip

Assignment 5.4: Working with Linux

Relevant screenshots + motivation



The screenshot shows a VMware Workstation interface with two windows open:

- Ubuntu 64 eiyad desktop - VMware Workstation**: A terminal window where the user has run several commands to demonstrate file operations and compression/tar extraction.
- Windows 10 x64 eiyad 568209**: A file manager window showing the contents of a folder named "My Computer". It lists several items including "Windows 10 x64 eiyad 568209", "opnsense", "Ubuntu 64 eiyad desktop", "Ubuntu 64-bit", and "Ubuntu 64-bit fog".

Terminal Output (Ubuntu 64 eiyad desktop):

```

eiyad@eiyad-VMware-Virtual-Platform:~$ echo "This is my text file." >myfile.txt
eiyad@eiyad-VMware-Virtual-Platform:~$ cp ~/myfile.txt ~/Documents/
eiyad@eiyad-VMware-Virtual-Platform:~$ ls ~/Documents/
myfile.txt
eiyad@eiyad-VMware-Virtual-Platform:~$ cd /etc
eiyad@eiyad-VMware-Virtual-Platform:/etc$ pwd
/etc
eiyad@eiyad-VMware-Virtual-Platform:/etc$ cd ~
eiyad@eiyad-VMware-Virtual-Platform:~$ cd
eiyad@eiyad-VMware-Virtual-Platform:~$ tar -cvf myfile.tar myfile.txt
myfile.txt
eiyad@eiyad-VMware-Virtual-Platform:~$ tar -xvf myfile.tar
myfile.txt
eiyad@eiyad-VMware-Virtual-Platform:~$ tar -czvf myfile.tar.gz myfile.txt
myfile.txt
eiyad@eiyad-VMware-Virtual-Platform:~$ 

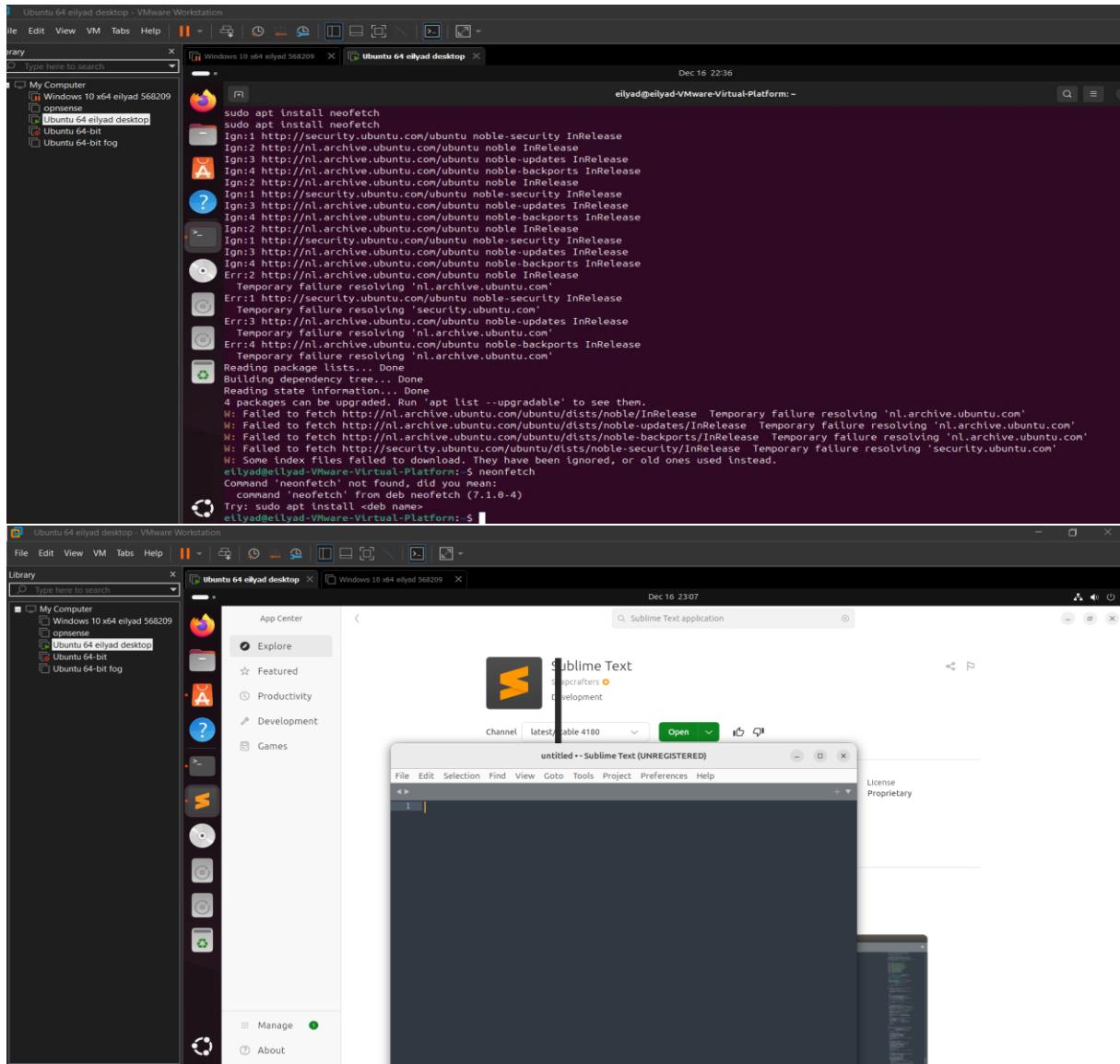
```

Terminal Output (Ubuntu 64 eiyad desktop - VMware Workstation):

```

[sudo] password for eiyad:
Ign1: http://security.ubuntu.com/ubuntu noble-security InRelease
Ign2: http://nl.archive.ubuntu.com/ubuntu noble InRelease
Ign3: http://nl.archive.ubuntu.com/ubuntu noble-updates InRelease
Ign4: http://nl.archive.ubuntu.com/ubuntu noble-security InRelease
Ign5: http://nl.archive.ubuntu.com/ubuntu noble InRelease
Ign1: http://security.ubuntu.com/ubuntu noble-security InRelease
Ign3: http://nl.archive.ubuntu.com/ubuntu noble-updates InRelease
Ign4: http://nl.archive.ubuntu.com/ubuntu noble-backports InRelease
Ign5: http://security.ubuntu.com/ubuntu noble-security InRelease
Ign3: http://nl.archive.ubuntu.com/ubuntu noble-updates InRelease
Ign4: http://nl.archive.ubuntu.com/ubuntu noble-backports InRelease
Err2: http://nl.archive.ubuntu.com/ubuntu noble InRelease
Temporary failure resolving 'nl.archive.ubuntu.com'
Err1: http://security.ubuntu.com/ubuntu noble-security InRelease
Temporary failure resolving 'nl.archive.ubuntu.com'
Err3: http://nl.archive.ubuntu.com/ubuntu noble-updates InRelease
Temporary failure resolving 'nl.archive.ubuntu.com'
Err4: http://nl.archive.ubuntu.com/ubuntu noble-backports InRelease
Temporary failure resolving 'nl.archive.ubuntu.com'
Reading package lists... Done
Building dependency tree... Done
Reading status information... Done
4 packages can be upgraded. Run 'apt list --upgradable' to see them.
W: Failed to fetch http://nl.archive.ubuntu.com/ubuntu/dists/noble/InRelease Temporary failure resolving 'nl.archive.ubuntu.com'
W: Failed to fetch http://security.ubuntu.com/ubuntu/dists/noble-updates/InRelease Temporary failure resolving 'nl.archive.ubuntu.com'
W: Failed to fetch http://nl.archive.ubuntu.com/ubuntu/dists/noble-backports/InRelease Temporary failure resolving 'nl.archive.ubuntu.com'
W: Failed to fetch http://security.ubuntu.com/ubuntu/dists/noble-security/InRelease Temporary failure resolving 'security.ubuntu.com'
W: Some index files failed to download. They have been ignored, or old ones used instead.
eiyad@eiyad-VMware-Virtual-Platform:~$ htop
Command 'htop' not found, but can be installed with:
sudo snap install htop # version 3.3.0+ or
sudo apt install htop # version 1:7.2+deb10u1
see 'snap info htop' for additional versions.

```



To copy a file from the home directory to the Documents directory in Ubuntu, you can either drag and drop the file in the File Explorer or use the cp command in the Terminal (`cp ~/filename ~/Documents/`).

To navigate to the /etc folder, use the File Explorer or the command `cd /etc` in the Terminal, and to return to the home folder, type `cd ~`. The main difference between Linux and Windows is that Linux uses a single root directory (/), while Windows uses drive letters like C: for storage.

The /etc folder contains system configuration files. To compress a text file into a tar archive, use `tar -cvf filename.tar filename.txt`, and to extract or compress it with gzip, use `tar -xvf filename.tar` or `tar -czvf filename.tar.gz filename.txt`.

To install htop, use `sudo apt install htop`; it shows a real-time list of processes with CPU, memory, and other system info.

For installing Sublime Text, you can use the Software Center or `sudo apt install sublime-text` in the Terminal, and for neofetch, use `sudo apt install neofetch` to display system information like OS version and hardware details in a colorful format.

Assignment 5.5: Users and permissions on Linux

Relevant screenshots + motivation

The screenshots show a VMware Workstation interface with two terminal windows. The top window shows a user named 'eilyad' trying to run a script named 'hello.sh' which contains a syntax error. The bottom window shows the user running the script again after changing its permissions to 754 using the 'chmod' command.

```
Ubuntu 64 eilyad desktop - VMware Workstation
File Edit View VM Tabs Help Library Type here to search
Ubuntu 64 eilyad desktop X Windows 10 x64 eilyad 568209
Dec 18 00:59
eilyad@eilyad-VMware-Virtual-Platform:~/hello
at ~/hellosu: user otheruser does not exist or the user entry does not contain all the required fields
eilyad@eilyad-VMware-Virtual-Platform:~$ cat ~/hello/hello.sh
#!/bin/bash
echo Hello <eilyad, 568209>

eilyad@eilyad-VMware-Virtual-Platform:~$ mkdir -p /home/eilyad/hello
mkdir: cannot create directory '/home/eilyad/hello': File exists
eilyad@eilyad-VMware-Virtual-Platform:~$ cd ~/hello
eilyad@eilyad-VMware-Virtual-Platform:~/hello$ nano hello.sh
eilyad@eilyad-VMware-Virtual-Platform:~/hello$ chmod +x hello.sh

eilyad@eilyad-VMware-Virtual-Platform:~/hello$ ls -l hello.sh
-rwxr-xr-x 1 eilyad eilyad 41 Dec 18 00:58 hello.sh
eilyad@eilyad-VMware-Virtual-Platform:~/hello$ ./hello.sh
./hello.sh: line 2: syntax error near unexpected token `newline'
./hello.sh: line 2: `echo Hello <eilyad, 568209>'

eilyad@eilyad-VMware-Virtual-Platform:~/hello$ eilyad@eilyad-VMware-Virtual-Platform:~/hello$
```



```
Ubuntu 64 eilyad desktop - VMware Workstation
File Edit View VM Tabs Help Library Type here to search
Ubuntu 64 eilyad desktop X Windows 10 x64 eilyad 568209
Dec 18 01:02
eilyad@eilyad-VMware-Virtual-Platform:~$ ./hello.sh
./hello.sh: line 2: syntax error near unexpected token `newline'
./hello.sh: line 2: `echo Hello <eilyad, 568209>'

eilyad@eilyad-VMware-Virtual-Platform:~$ chmod 754 hello.sh
eilyad@eilyad-VMware-Virtual-Platform:~$ ls -l hello.sh
-rwxr-xr- 1 eilyad eilyad 41 Dec 18 00:58 hello.sh
eilyad@eilyad-VMware-Virtual-Platform:~$ ./hello.sh
./hello.sh: line 2: syntax error near unexpected token `newline'
./hello.sh: line 2: `echo Hello <eilyad, 568209>'

eilyad@eilyad-VMware-Virtual-Platform:~$ su - eilyad@eilyad
su: user eilyad@eilyad does not exist or the user entry does not contain all the required fields
eilyad@eilyad-VMware-Virtual-Platform:~$ cat ~/hello/hello.sh
#!/bin/bash
echo Hello <eilyad, 568209>

eilyad@eilyad-VMware-Virtual-Platform:~$ su - eilyad
Password:
eilyad@eilyad-VMware-Virtual-Platform:~$
```

Provide a motivation explaining the steps and reasoning:

1. **Why use chmod?** The chmod command modifies file permissions, ensuring proper security and access control. In this case, we ensure:
 - a. The script can only be executed by the logged-in user.
 - b. Other users can only view the file but not run it or modify it.
2. **Why numeric notation?** Numeric notation (754) provides a concise way to define file permissions:
 - a. 7: Gives full control (read, write, execute) to the owner.

- b. **5**: Allows group members to read and execute but not write.
- c. **4**: Limits others to only reading the file.

3. Why the specific permissions?

- a. Security is enhanced because only the logged-in user can execute the script.
- b. Allowing others to view the script ensures transparency without giving them unnecessary control.

Assignment 5.6: View the contents of files

Relevant screenshots + motivation

```

HTTP request sent, awaiting response... 200 OK
Length: 607504 (593K) [text/plain]
Saving to: 'SherlockHolmes.txt'

SherlockHolmes.txt 100%[=====] 593.27K 800KB/s in 0.7s
2024-12-18 01:03:52 (800 KB/s) - 'SherlockHolmes.txt' saved [607504/607504]

eilyad@eilyad-VMware-Virtual-Platform: ~ ls Desktop Downloads myfile.tar Pictures simple.c.save Videos
eilyad@eilyad-VMware-Virtual-Platform: ~ Document hello myfile.tar.gz Public snap Templates
eilyad@eilyad-VMware-Virtual-Platform: ~ Documents Music SherlockHolmes.txt
eilyad@eilyad-VMware-Virtual-Platform: ~ 12306 197562 607504 SherlockHolmes.txt
eilyad@eilyad-VMware-Virtual-Platform: ~ grep -n "kingdom" SherlockHolmes.txt
490:"I tell you that I would give one of the provinces of my kingdom to
1124:And that was how a great scandal threatened to affect the kingdom of
eilyad@eilyad-VMware-Virtual-Platform: ~ grep -C 20 "kingdom" SherlockHolmes.txt
betrothal was publicly proclaimed. That will be next Monday."
"Oh, then we have three days yet," said Holmes with a yawn. "That is
very fortunate, as I have one or two matters of importance to look into
just at present. Your Majesty will, of course, stay in London for the
present?"
```



```

eilyad@eilyad-VMware-Virtual-Platform: ~ grep -n "kingdom" SherlockHolmes.txt
490:"I tell you that I would give one of the provinces of my kingdom to
1124:And that was how a great scandal threatened to affect the kingdom of
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"Oh, then we have three days yet," said Holmes with a yawn. "That is
very fortunate, as I have one or two matters of importance to look into
just at present. Your Majesty will, of course, stay in London for the
present?"
"Certainly. You will find me at the Langham under the name of the Count
Von Kramm."
"Then I shall drop you a line to let you know how we progress."
"Pray do so. I shall be all anxiety."
"Then, as to money?"
"You have _carte blanche_."
"Absolutely?"
"I tell you that I would give one of the provinces of my kingdom to
```

wc: Helps summarize a file's content.
grep: Locates specific words or patterns and their context.
head and tail: Allows focused viewing of specific portions of the file, useful for analyzing patterns or content near a specific line.

Assignment 5.7: Digital forensics

Relevant screenshots + motivation

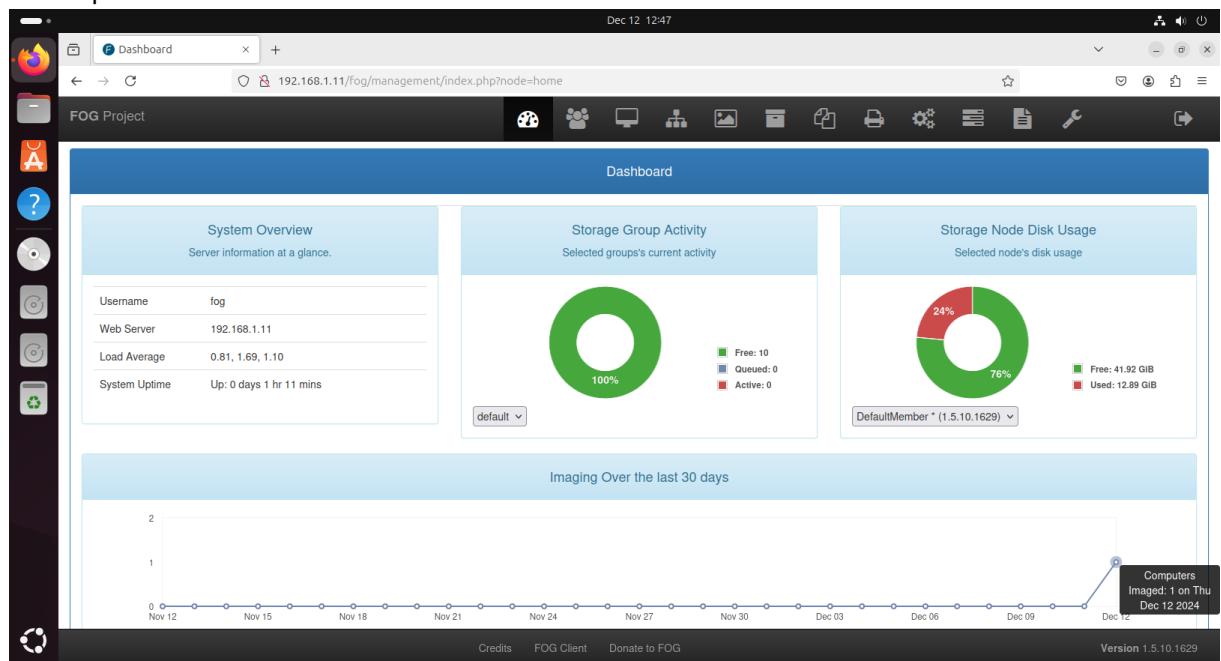
Assignment 5.8: Steganography

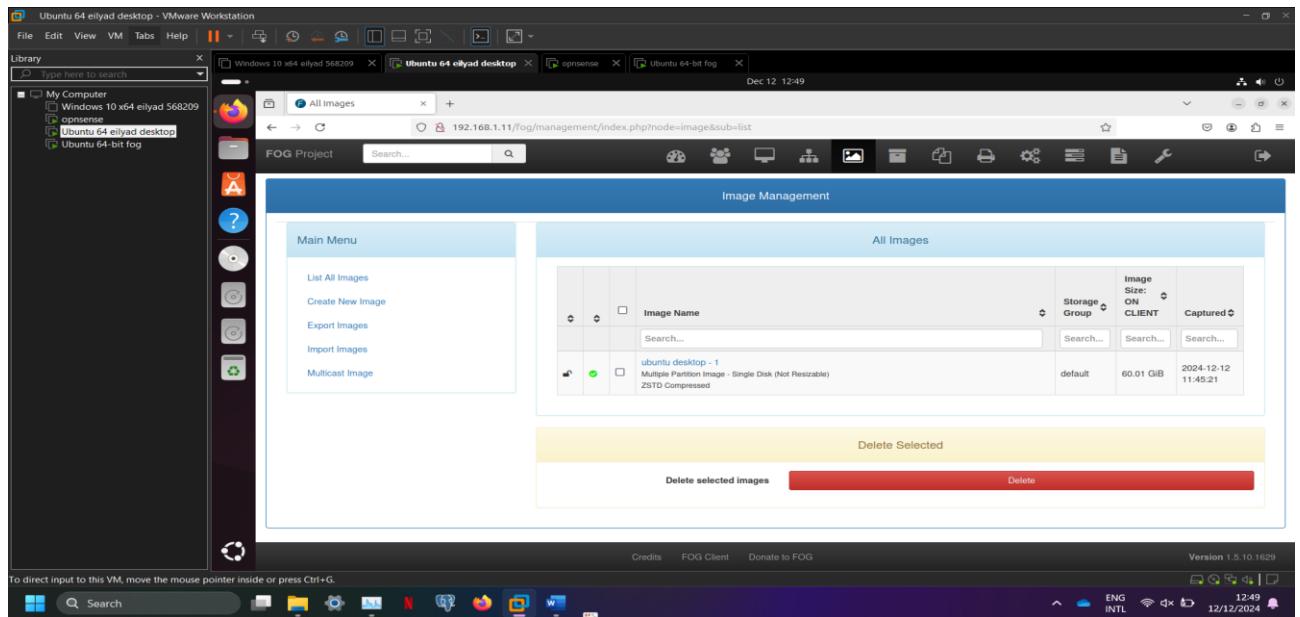
Relevant screenshots + motivation

Bonus point assignment – week 5

Make relevant screenshots + motivation:

- Proof that the FOG server is installed and is functioning correctly.
- Proof that the FOG server has made a back-up of the Windows11 VM or the Ubuntu 24.04 Desktop VM.





Ready? Save this file and export it as a pdf file with the name: [week5.pdf](#)