

Template Week 5 – Operating Systems

Student number: 573190

Assignment 5.1: Unix-like

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

Unix-like are known for their stability, security, and most powerful command line interfaces. While unix systems are known for their user friendliness.

- 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.

- c) What is the philosophy of the GNU movement?
It centers around the software freedom.

- d) Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement?
Please explain your answer.
Ubuntu as a Linux operating system conforms to the philosophy of the GNU movement, because Ubuntu offers free and opensource software.

- e) Find out what is the Windows Subsystem for Linux?
The windows subsystem is a feature that allows you to run a linux environment diretely on windows without needing a virtual environment.

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

All of them belong to the unix-like family.

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 powerful computing machines used for a variety of complex tasks that require immense computational power. They are mostly used for scientific research, engineering, healthcare, finance and national security.
- 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?

A playstation 3 cluster is a computer primarily composed of playstation 3 videogame consoles. PlayStation 3 clusters have been used in various high-performance computing applications due to their powerful IBM Cell CPUs.

- 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 linux
- d) Does Oracle's Raspberry Pi supercomputer appear in the list of the 500 fastest supercomputer in the world? Make a logical decision for this, without going through the entire list.
<https://www.top500.org/lists/top500/list/2023/06/>
It does not appear in the list

- 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?

CPU Architecture

PlayStation 5: The PlayStation 5 uses a custom AMD Zen 2 CPU with 8 cores and 16 threads¹.

Xbox Series X: The Xbox Series X also uses a custom AMD Zen 2 CPU with 8 cores and 16 threads².

Operating Systems

PlayStation 5: The PlayStation 5 runs on a proprietary operating system called Orbis OS, which is based on FreeBSD³.


Xbox Series X: The Xbox Series X runs on a custom operating system based on the Windows kernel, incorporating DirectX features optimized for the console⁴.

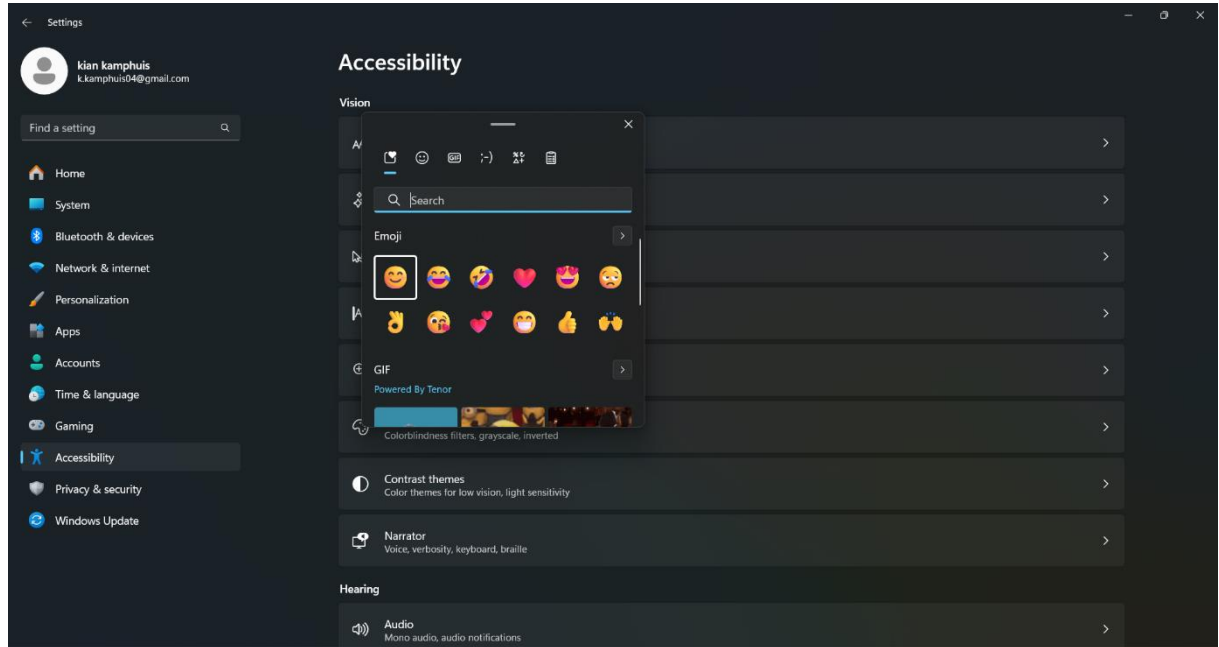
Conclusion


Both the PlayStation 5 and Xbox Series X use similar CPU architectures (custom AMD Zen 2), but they run on different operating systems. The PlayStation 5 uses a Unix-like OS (FreeBSD-based), while the Xbox Series X uses a Windows-based OS. This difference reflects the companies' broader strategies: Sony leverages a Unix-like system for its gaming consoles, while Microsoft integrates its console ecosystem more closely with its Windows platform, potentially offering better synergy with PC gaming and other Windows-based services.

Assignment 5.3: Working with Windows


Take relevant screenshots of the assignments below

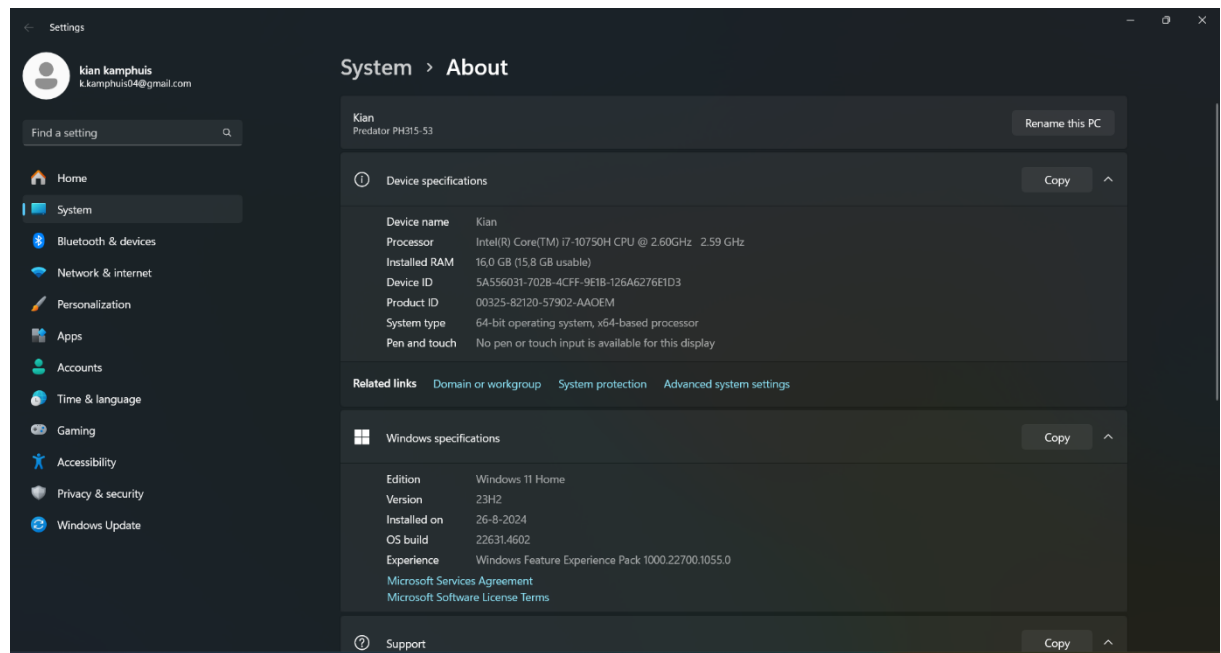
- a) Practice for about 10 minutes with the  keyboard shortcuts combinations, skip the general shortcuts in this exercise. Take a look at which screens are opened.



- b) The file explorer can be opened with  + E, Which key combination could you also use?

Windows key + X and E

- c) Open the system properties with a  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.



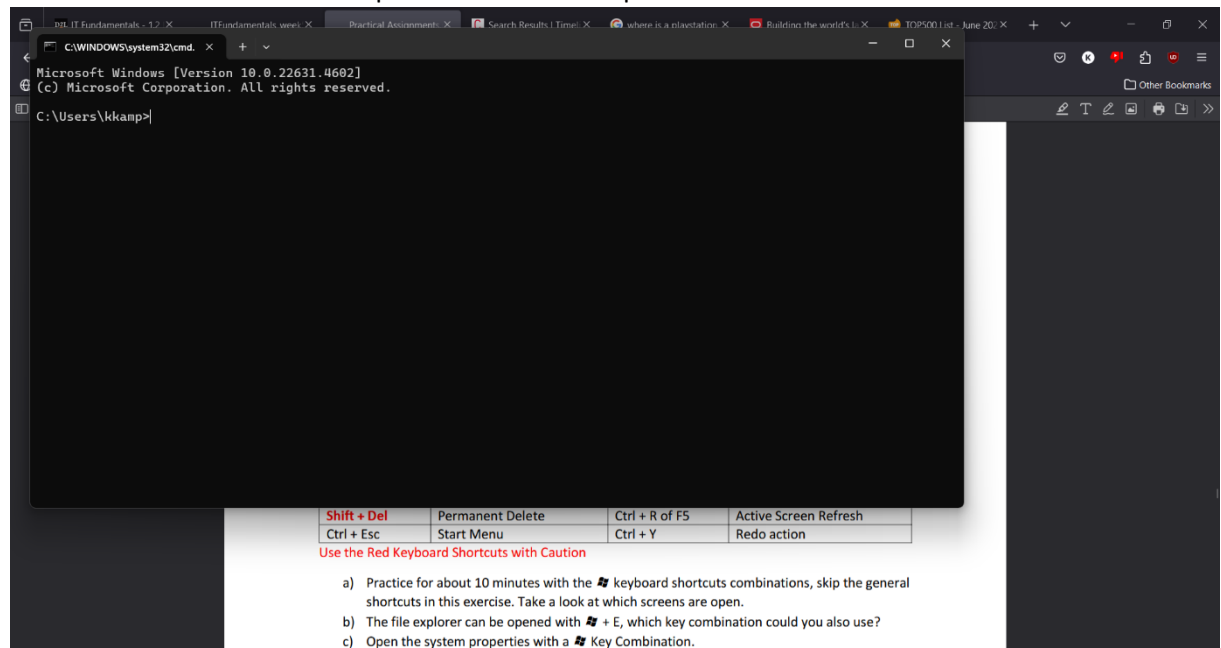
- e) If you're giving a PowerPoint presentation and you connect your laptop to a projector, Windows can use the projector as a second screen. For example, you may have Outlook open on your first screen that you don't show over the projector, while the PowerPoint presentation is displayed on the projector,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

Windows key + P

- 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?

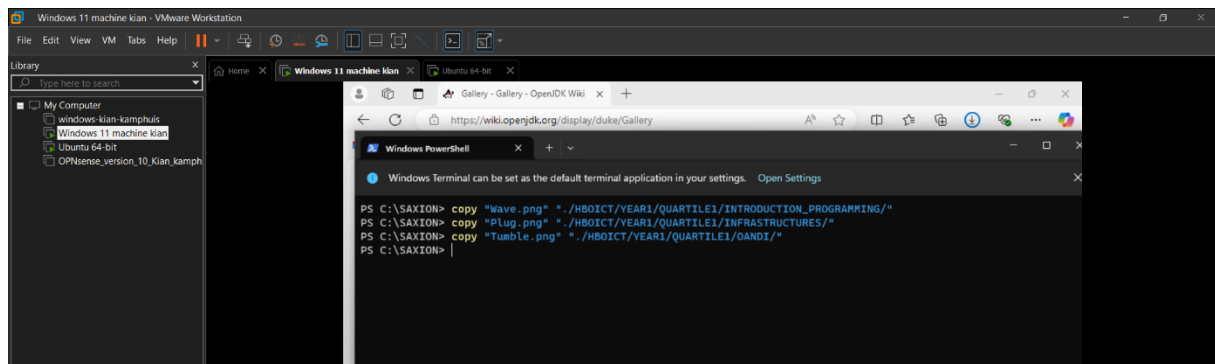
Windows key + L

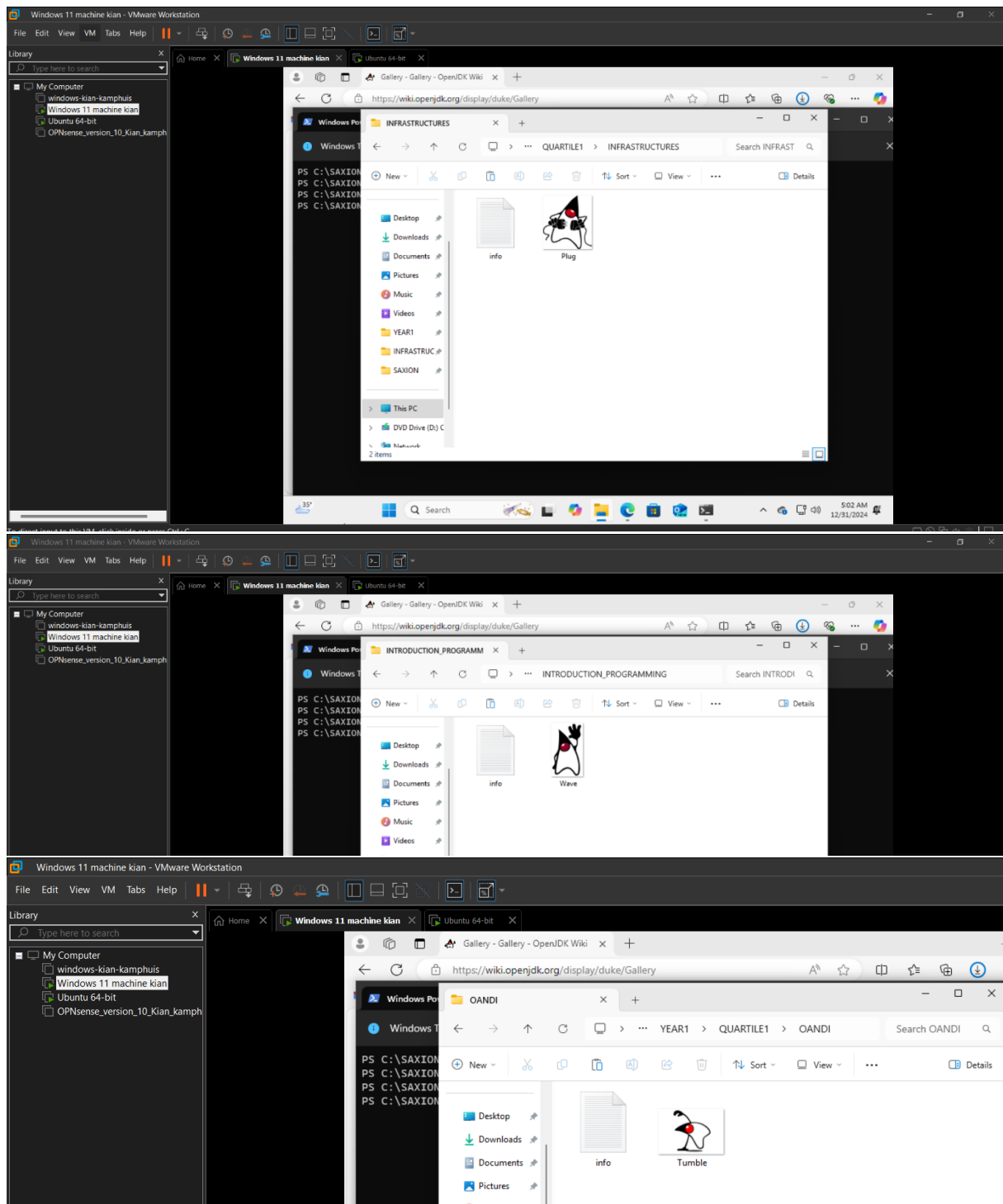
- g) Open the Run screen with a key combination. On this screen, type CMD and press <enter>. Take a screenshot of this result and paste it into this template.



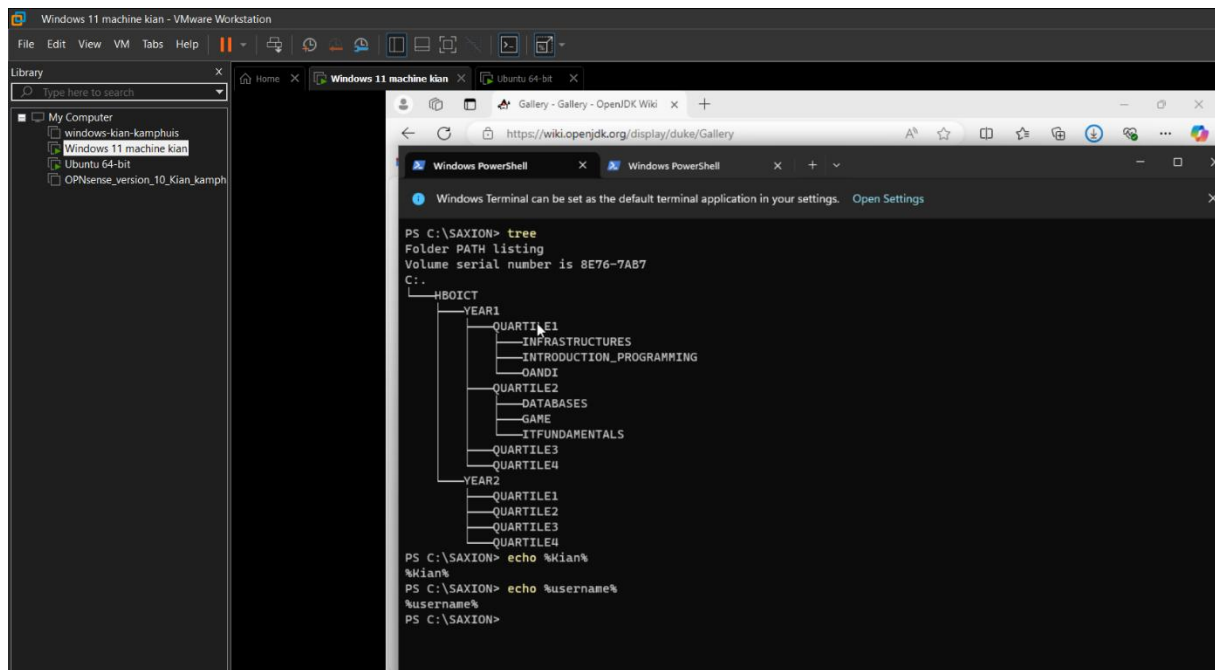
Working in the File Explorer

Relevant screenshots **copy** command:



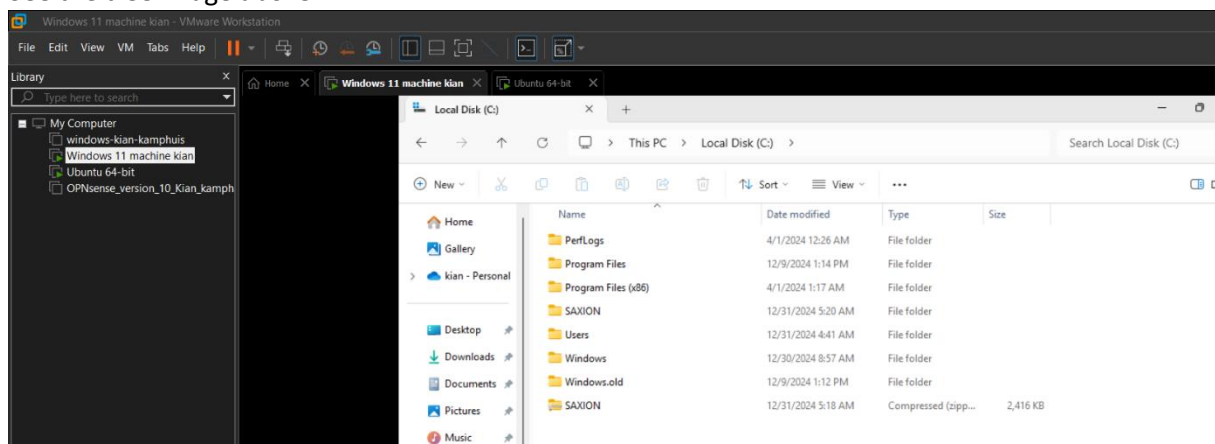


Relevant screenshots **tree** command:



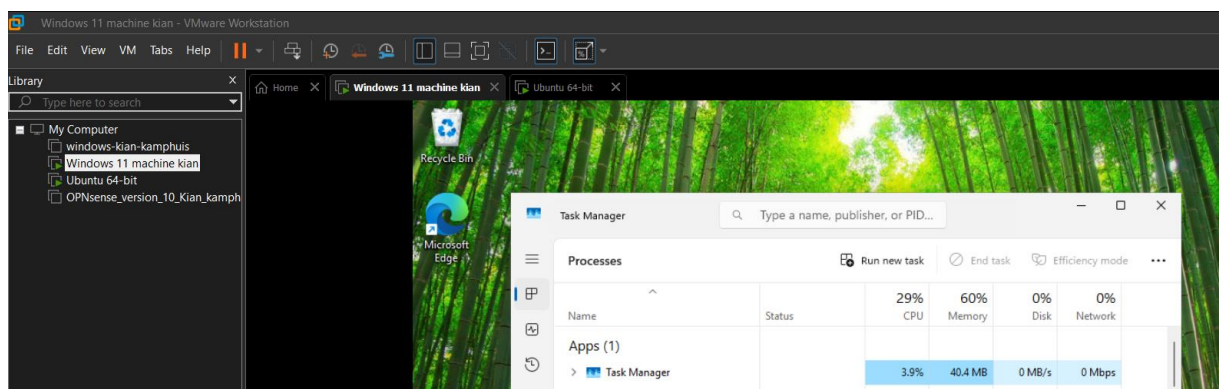
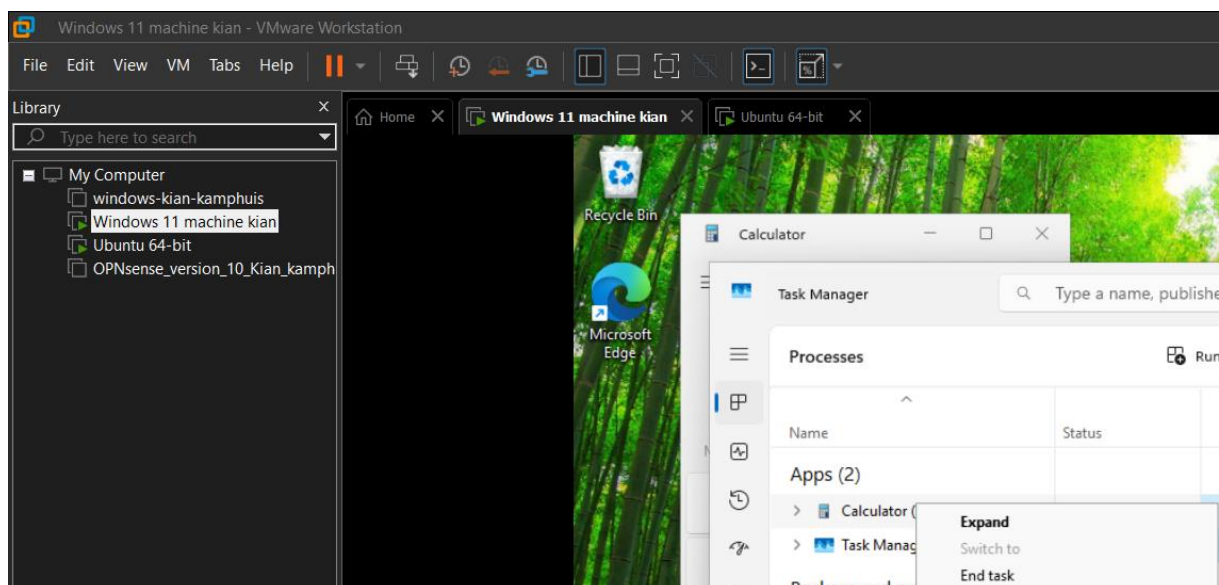
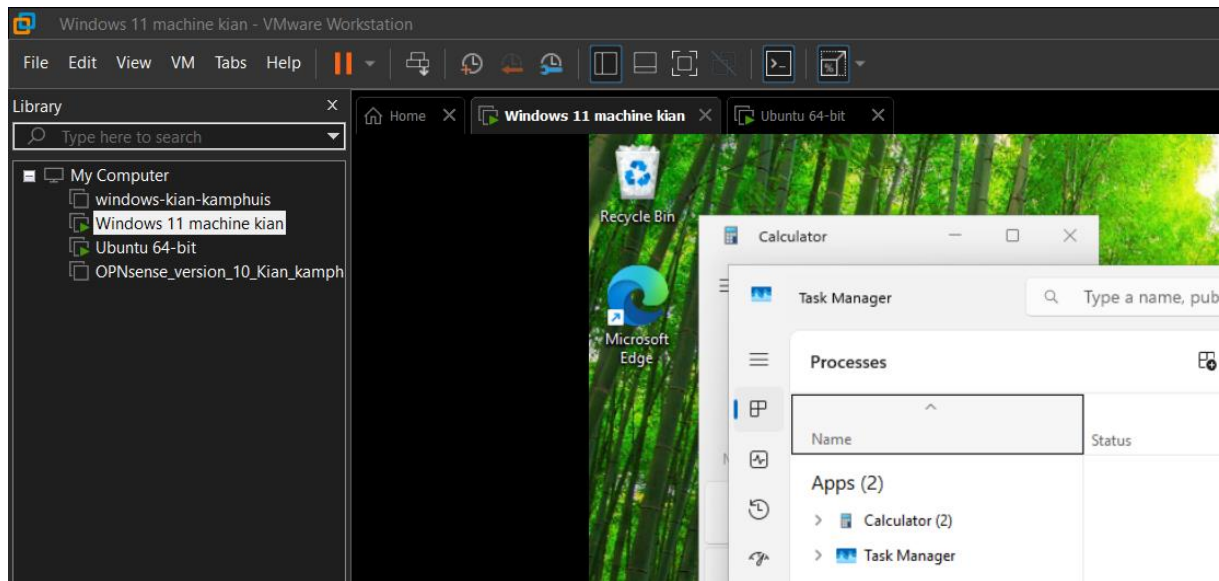
Relevant screenshots in the file explorer of the folder c:\Saxion + created zip file.

See the tree image above



Terminating Processes

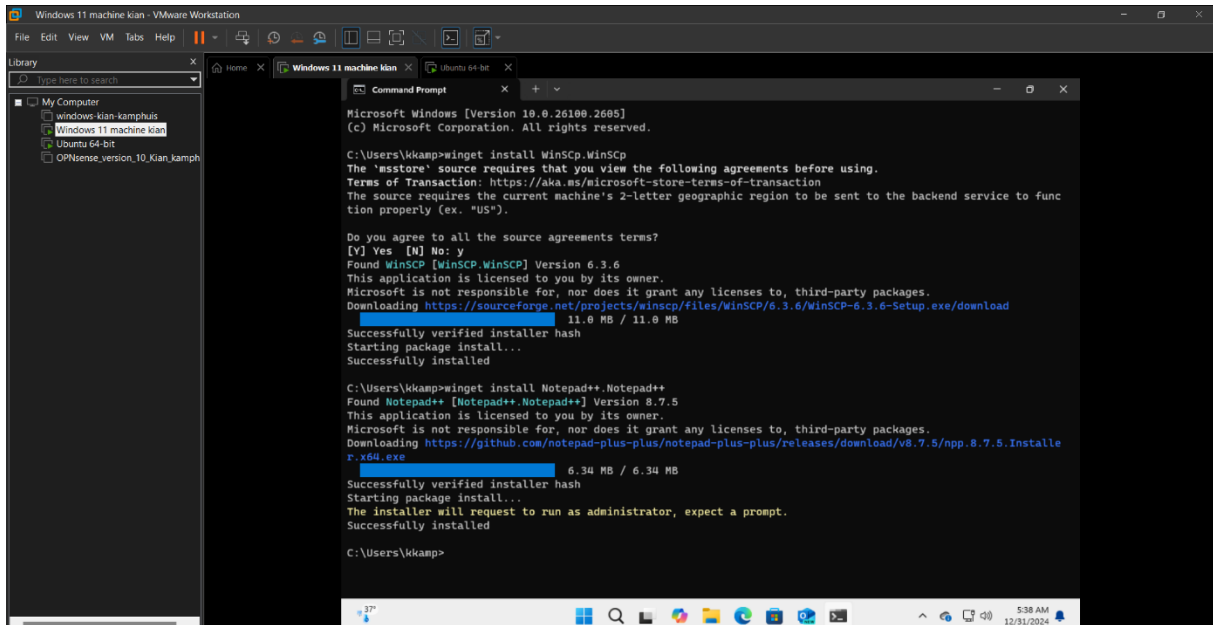
Relevant Screenshots Task Manager Window:



Install Software

Relevant screenshots that the following software is installed:

- WinSCP
- Notepad++
- 7zip



The screenshot shows a Windows 11 virtual machine running in VMware Workstation. A Command Prompt window is open, displaying the installation of WinSCP and Notepad++ using the Windows Package Manager (winget).

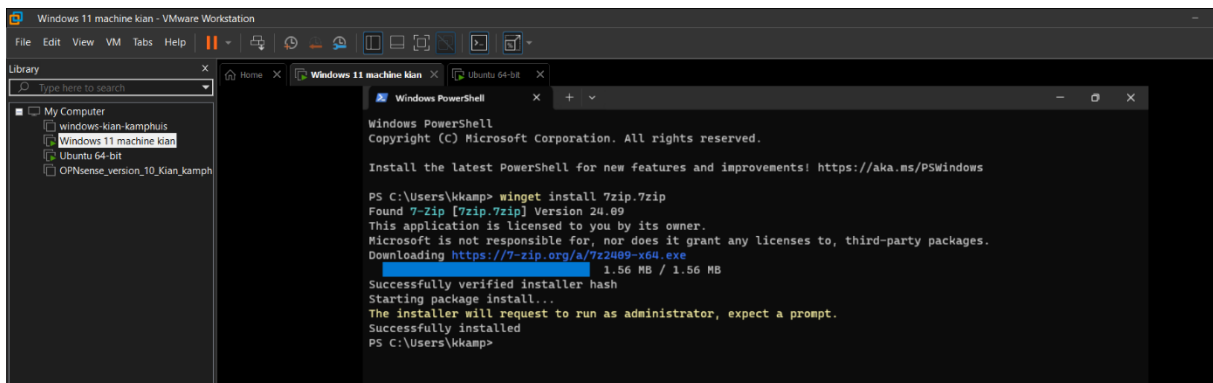
```
Microsoft Windows [Version 10.0.26100.2605]
(c) Microsoft Corporation. All rights reserved.

C:\Users\kkamp>winget install WinSCP.WinSCP
The 'msstore' source requires that you view the following agreements before using.
Terms of Transaction: https://aka.ms/microsoft-store-terms-of-transaction
The source requires the current machine's 2-letter geographic region to be sent to the backend service to function properly (ex. "US").

Do you agree to all the source agreements terms?
[Y] Yes [N] No: y
Found WinSCP [WinSCP.WinSCP] Version 6.3.6
This application is licensed to you by its owner.
Microsoft is not responsible for, nor does it grant any licenses to, third-party packages.
Downloading https://sourceforge.net/projects/winscp/files/WinSCP/6.3.6/WinSCP-6.3.6-Setup.exe/download
11.0 MB / 11.0 MB
Successfully verified installer hash
Starting package install...
Successfully installed

C:\Users\kkamp>winget install Notepad++.Notepad++
Found Notepad++ [Notepad++.Notepad++] Version 8.7.5
This application is licensed to you by its owner.
Microsoft is not responsible for, nor does it grant any licenses to, third-party packages.
Downloading https://github.com/notepad-plus-plus/notepad-plus-plus/releases/download/v8.7.5/npp.8.7.5.Installer.x64.exe
6.34 MB / 6.34 MB
Successfully verified installer hash
Starting package install...
The installer will request to run as administrator, expect a prompt.
Successfully installed

C:\Users\kkamp>
```



The screenshot shows the same Windows 11 virtual machine. A Windows PowerShell window is open, displaying the installation of 7zip using the Windows Package Manager (winget).

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

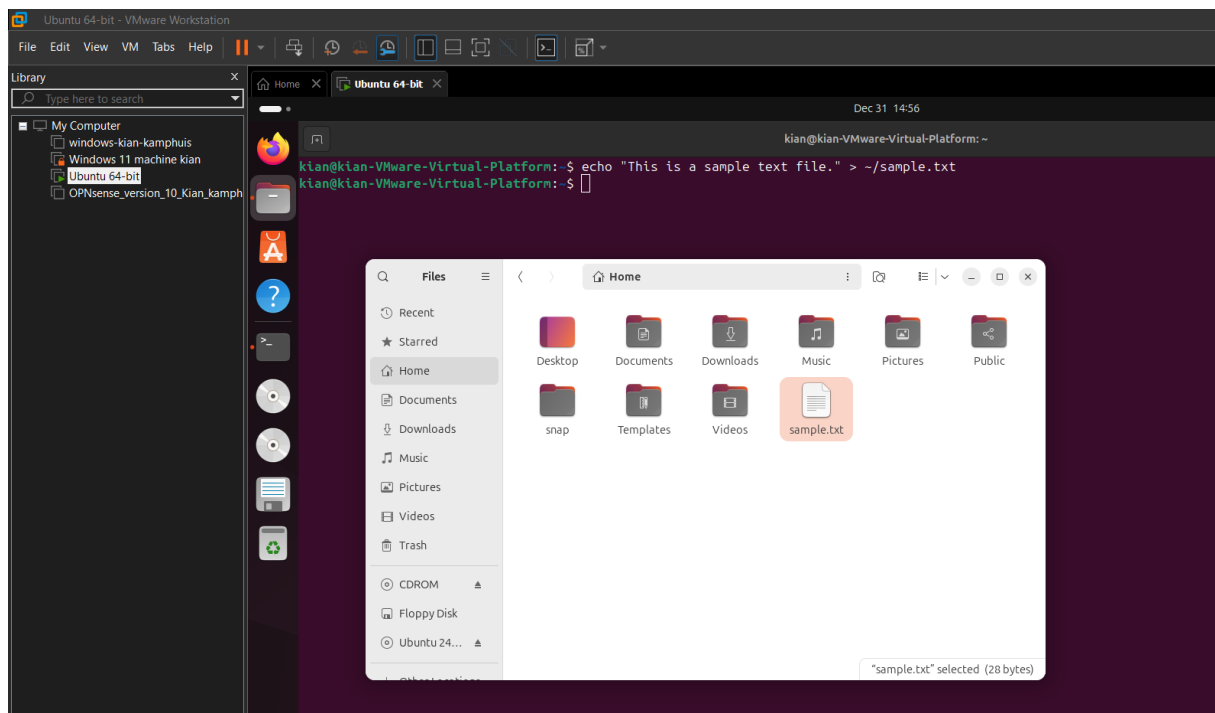
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\kkamp> winget install 7zip.7zip
Found 7-Zip [7zip.7zip] Version 24.09
This application is licensed to you by its owner.
Microsoft is not responsible for, nor does it grant any licenses to, third-party packages.
Downloading https://7-zip.org/a/7z2409-x64.exe
1.56 MB / 1.56 MB
Successfully verified installer hash
Starting package install...
The installer will request to run as administrator, expect a prompt.
Successfully installed
PS C:\Users\kkamp>
```

Assignment 5.4: Working with Linux

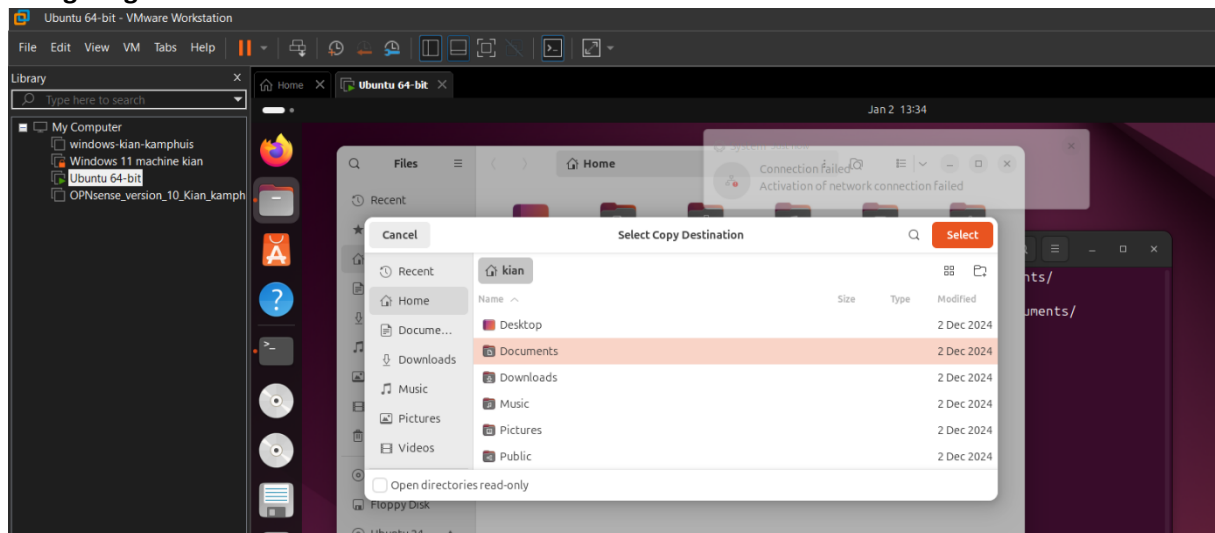
Relevant screenshots + motivation

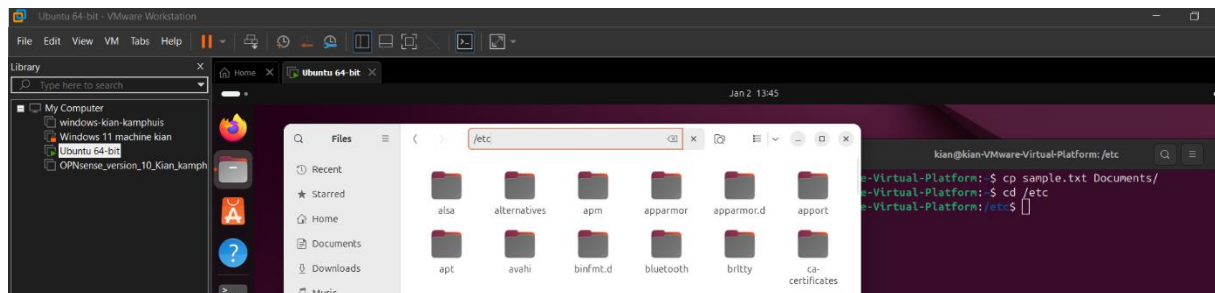
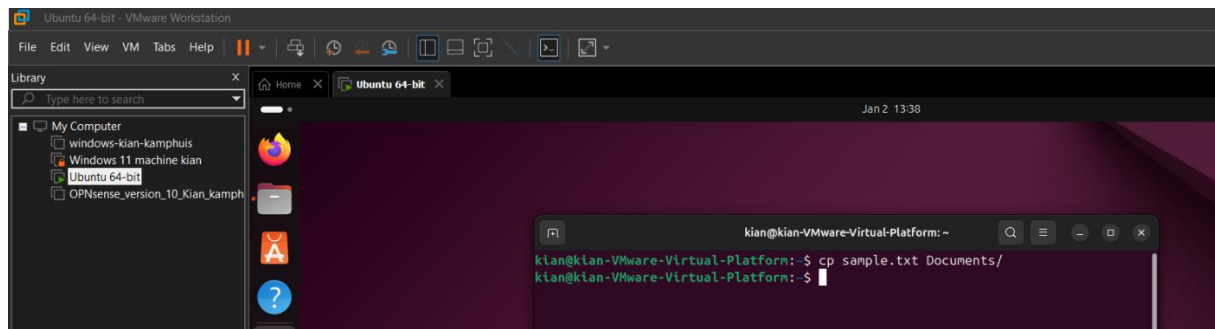
Copying files



Created the txt file using the command above.

Navigating the file structure





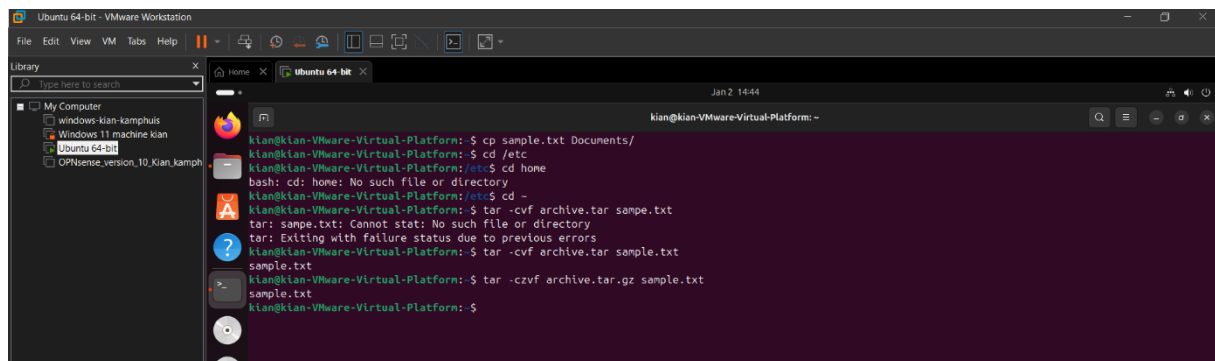
Linux uses a single hierarchical directory structure, starting from the root directory (/), whereas Windows uses multiple root directories (e.g., C:\, D:\)

The /etc directory contains configuration files for the system and applications.

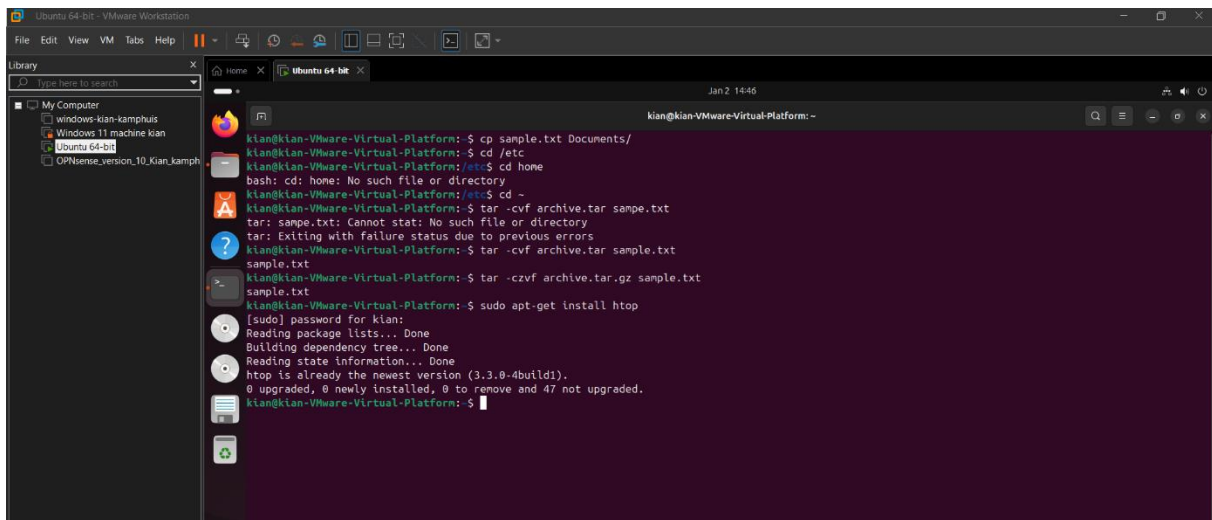
Compress files

`tar -cvf archive.tar sample.txt`

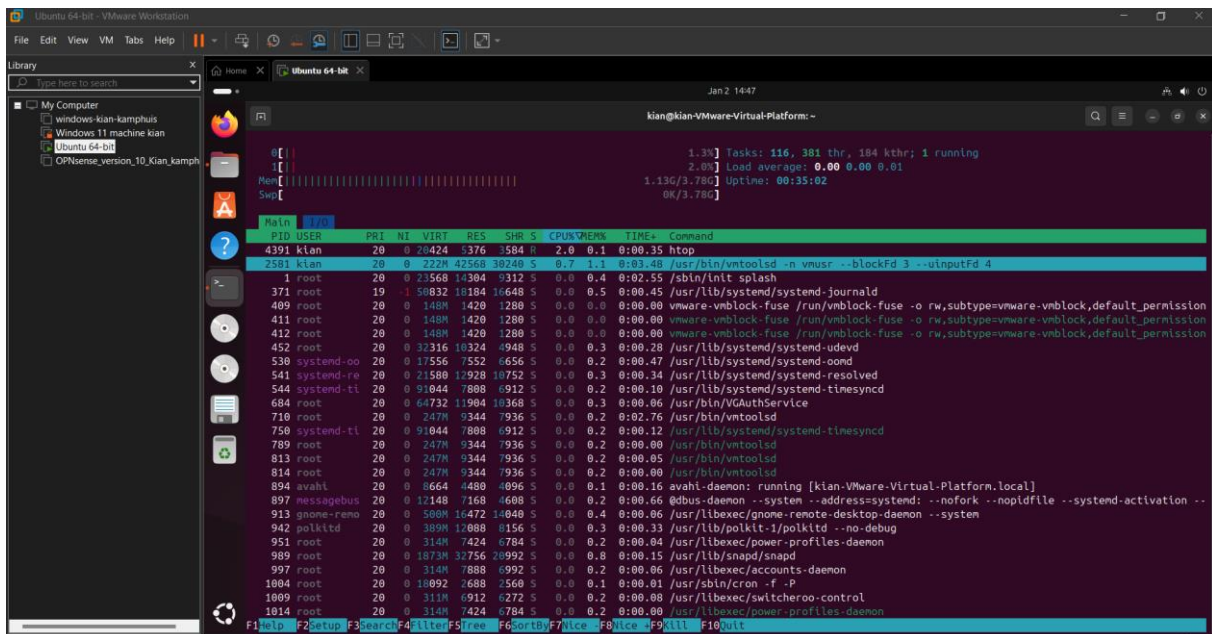
`tar -xvf archive.tar`



View processes



```
kian@kian-VMware-Virtual-Platform: $ cp sample.txt Documents/
kian@kian-VMware-Virtual-Platform: $ cd /etc
kian@kian-VMware-Virtual-Platform: $ cd home
bash: cd: home: No such file or directory
kian@kian-VMware-Virtual-Platform: $ cd -
kian@kian-VMware-Virtual-Platform: $ tar -cvf archive.tar sampe.txt
tar: sampe.txt: Cannot stat: No such file or directory
tar: Exiting with failure status due to previous errors
kian@kian-VMware-Virtual-Platform: $ tar -cvf archive.tar sample.txt
sample.txt
kian@kian-VMware-Virtual-Platform: $ tar -czvf archive.tar.gz sample.txt
sample.txt
kian@kian-VMware-Virtual-Platform: $ sudo apt-get install htop
[sudo] password for kian:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
htop is already the newest version (3.3.0-4build1).
0 upgraded, 0 newly installed, 0 to remove and 47 not upgraded.
kian@kian-VMware-Virtual-Platform: $
```



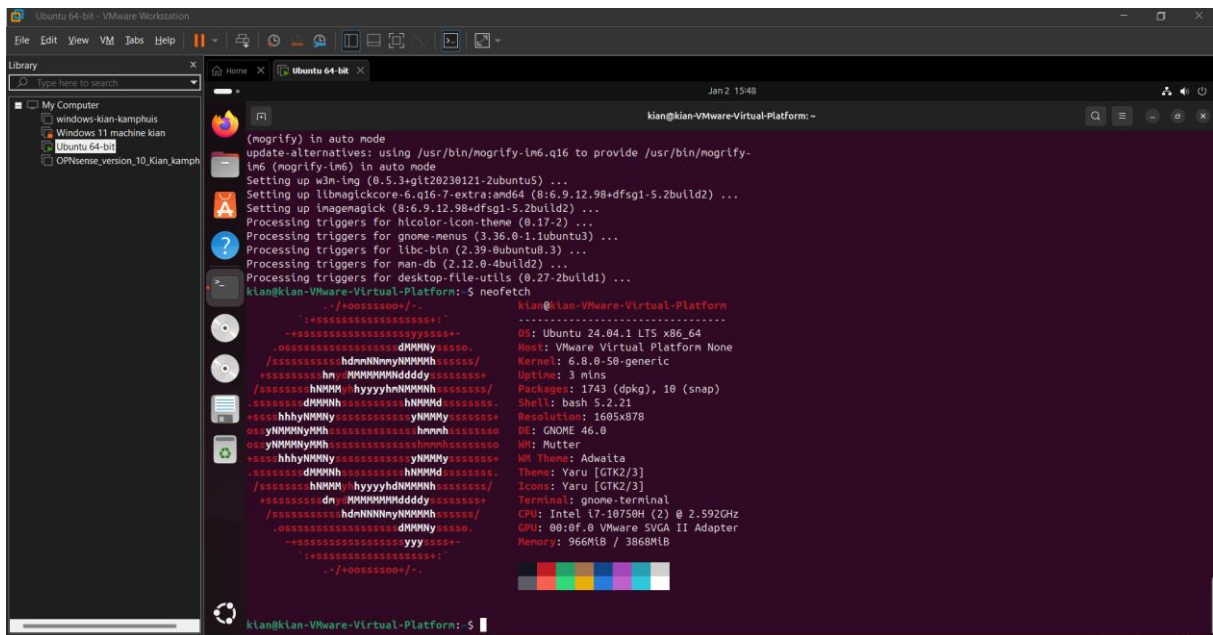
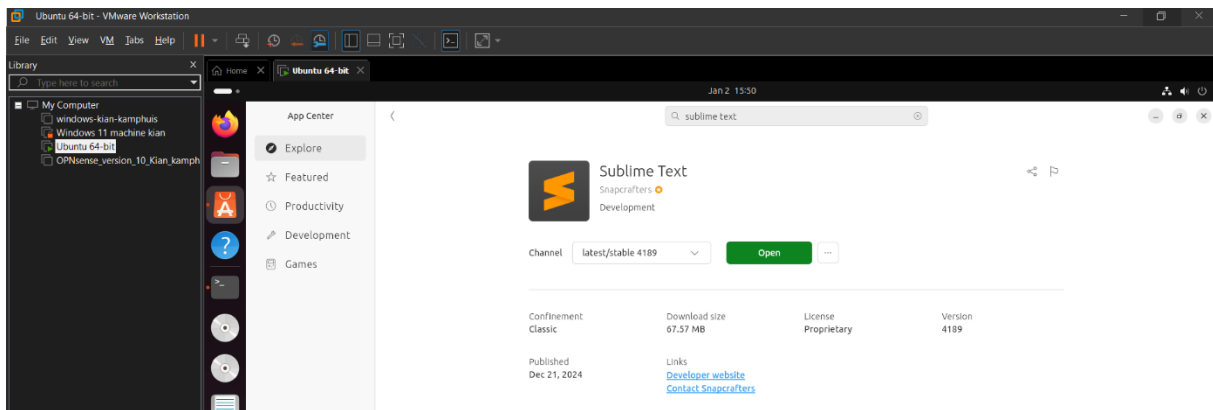
```
0% 1.3% Tasks: 116, 381 thr, 184 kthr; 1 running
2.0% Load average: 0.00 0.00 0.01
1.13G/3.78G Uptime: 00:35:02
0K/3.78G

Main 11/0
PID USER PRI NI VIRT RES SHR S CPU% MEM% TIME+ Command
4391 kian 20 0 20424 5376 584 R 2.0 0.1 0:00.35 htop
2581 kian 20 0 2220 42560 30240 S 0.7 1.1 0:03.40 /usr/bin/vmtoolsd -n vmusr --blockfd 3 --inputfd 4
1 root 20 0 21568 14384 9312 S 0.0 0.4 0:02.55 /sbin/init splash
371 root 19 -1 50832 18184 16648 S 0.0 0.5 0:00.45 /usr/lib/systemd/systemd-journald
409 root 20 0 148M 1420 1280 S 0.0 0.0 0:00.00 vmware-vmblock-fuse /run/vmblock-fuse -o rw,subtype=vmware-vmblock,default_permission
411 root 20 0 148M 1420 1280 S 0.0 0.0 0:00.00 vmware-vmblock-fuse /run/vmblock-fuse -o rw,subtype=vmware-vmblock,default_permission
412 root 20 0 148M 1420 1280 S 0.0 0.0 0:00.00 vmware-vmblock-fuse /run/vmblock-fuse -o rw,subtype=vmware-vmblock,default_permission
452 root 20 0 32316 10324 4948 S 0.0 0.3 0:00.28 /usr/lib/systemd/systemd-udevd
538 system-oo 20 0 17556 7552 6656 S 0.0 0.2 0:00.47 /usr/lib/systemd/systemd-oomd
541 system-re 20 0 21580 12020 10752 S 0.0 0.3 0:00.34 /usr/lib/systemd/systemd-resolved
544 system-ti 20 0 91044 7808 6912 S 0.0 0.2 0:00.10 /usr/lib/systemd/systemd-timesyncd
684 root 20 0 64732 11904 10368 S 0.0 0.3 0:00.06 /usr/bin/VCAuthService
710 root 20 0 247M 9344 7936 S 0.0 0.2 0:02.76 /usr/bin/vmtoolsd
750 system-ti 20 0 91044 7808 6912 S 0.0 0.2 0:00.12 /usr/lib/systemd/systemd-timesyncd
789 root 20 0 247M 9344 7936 S 0.0 0.2 0:00.00 /usr/bin/vmtoolsd
813 root 20 0 247M 9344 7936 S 0.0 0.2 0:00.05 /usr/bin/vmtoolsd
814 root 20 0 247M 9344 7936 S 0.0 0.2 0:00.00 /usr/bin/vmtoolsd
894 avahi 20 0 8664 4480 4096 S 0.0 0.1 0:00.16 avahi-daemon: running [kian-VMware-Virtual-Platform.local]
897 messagebus 20 0 12148 7168 4608 S 0.0 0.2 0:00.66 dbus-daemon --system --address=systemd: --nofork --nopidfile --systemd-activation --
913 gnome-remo 20 0 500M 16472 14040 S 0.0 0.4 0:00.06 /usr/libexec/gnome-remote-desktop-daemon --system
942 polkitd 20 0 389M 12088 8156 S 0.0 0.3 0:00.33 /usr/lib/polkit-1/polkitd --no-debug
951 root 20 0 314M 7424 6784 S 0.0 0.2 0:00.04 /usr/libexec/power-profiles-daemon
989 root 20 0 1873M 32756 20992 S 0.0 0.8 0:00.15 /usr/lib/snapd/snapd
997 root 20 0 314M 7888 6992 S 0.0 0.2 0:00.06 /usr/libexec/accounts-daemon
1004 root 20 0 10092 2680 2560 S 0.0 0.1 0:00.01 /usr/sbin/cron -M P
1009 root 20 0 311M 6912 6272 S 0.0 0.2 0:00.00 /usr/libexec/switcheroo-control
1014 root 20 0 314M 7424 6784 S 0.0 0.2 0:00.00 /usr/libexec/power-profiles-daemon

F1:Help F2:Setup F3:Search F4:Filter F5:Free F6:SortBy F7:Nice F8:Nice F9:Kill F10:Quit
```

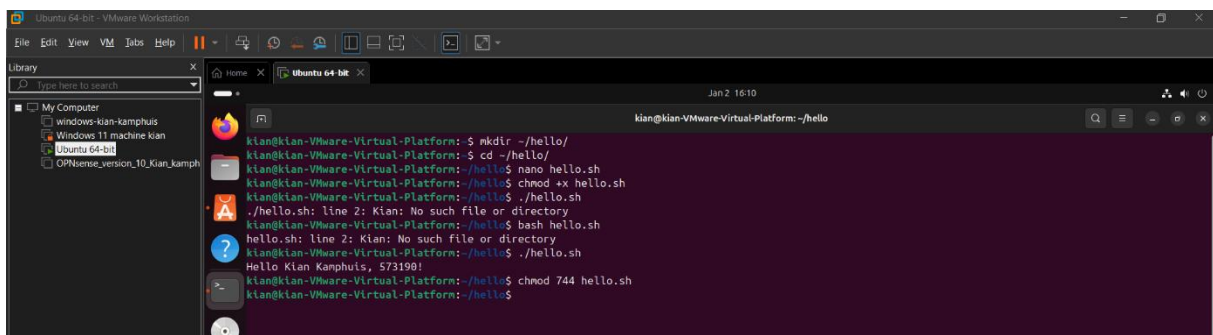
htop is an interactive process viewer for Unix systems. It shows a list of running processes, along with their CPU and memory usage, and allows you to manage processes (e.g., kill, renice) directly from the interface.

Install Software



Assignment 5.5: Users and permissions on Linux

Relevant screenshots + motivation



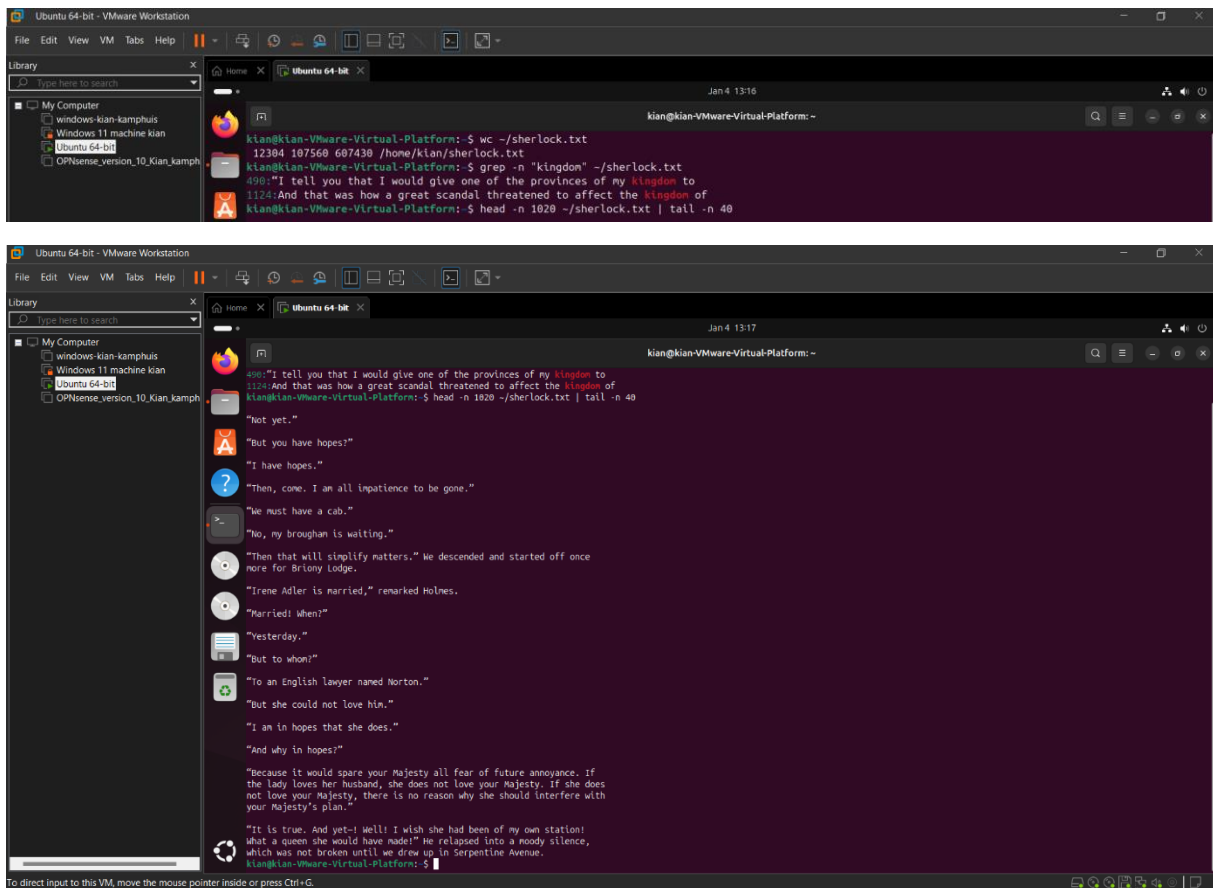
Assignment 5.6: View the contents of files

Relevant screenshots + motivation

1. Understanding the Commands

- **cat**: Concatenates and displays the content of files.
- **wc**: Word count; it can count lines, words, and characters in a file.
- **less**: Allows you to view the content of a file one screen at a time.
- **tail**: Displays the last part of a file.
- **head**: Displays the first part of a file.
- **grep**: Searches for patterns within files.

2. Commands



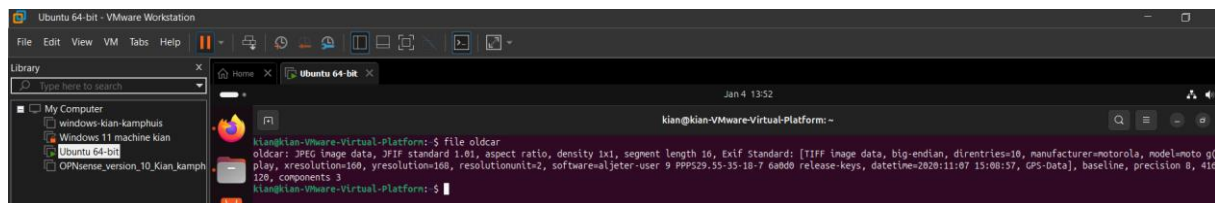
Assignment 5.7: Digital forensics

Relevant screenshots + motivation

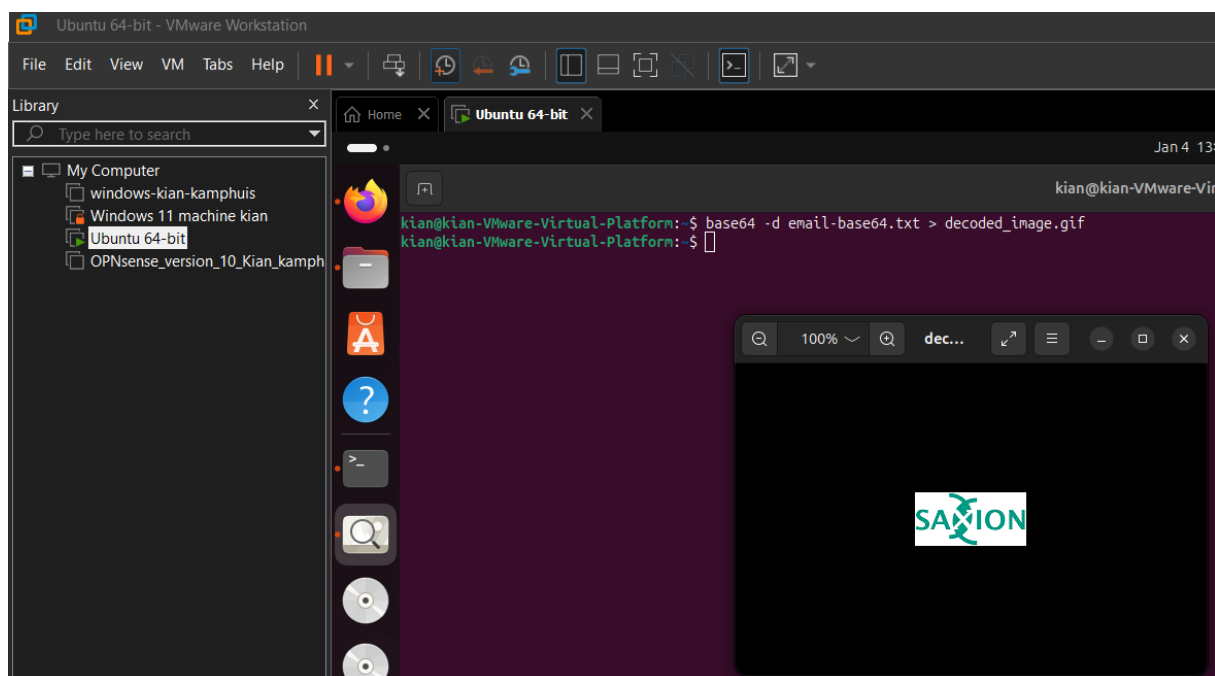
Latitude 53.11.39.6794

Longitude 6.32.12.9018

Model moto g(6) play

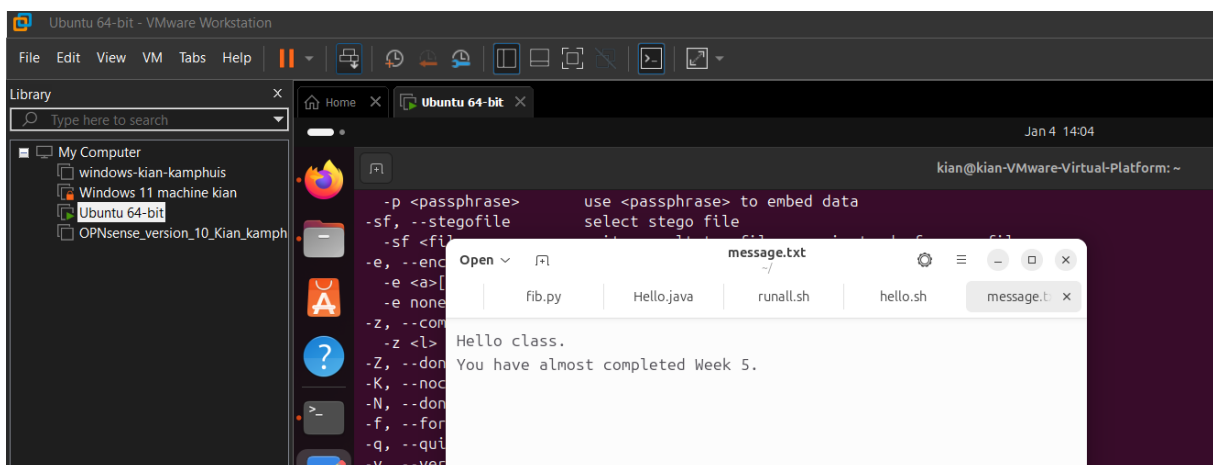
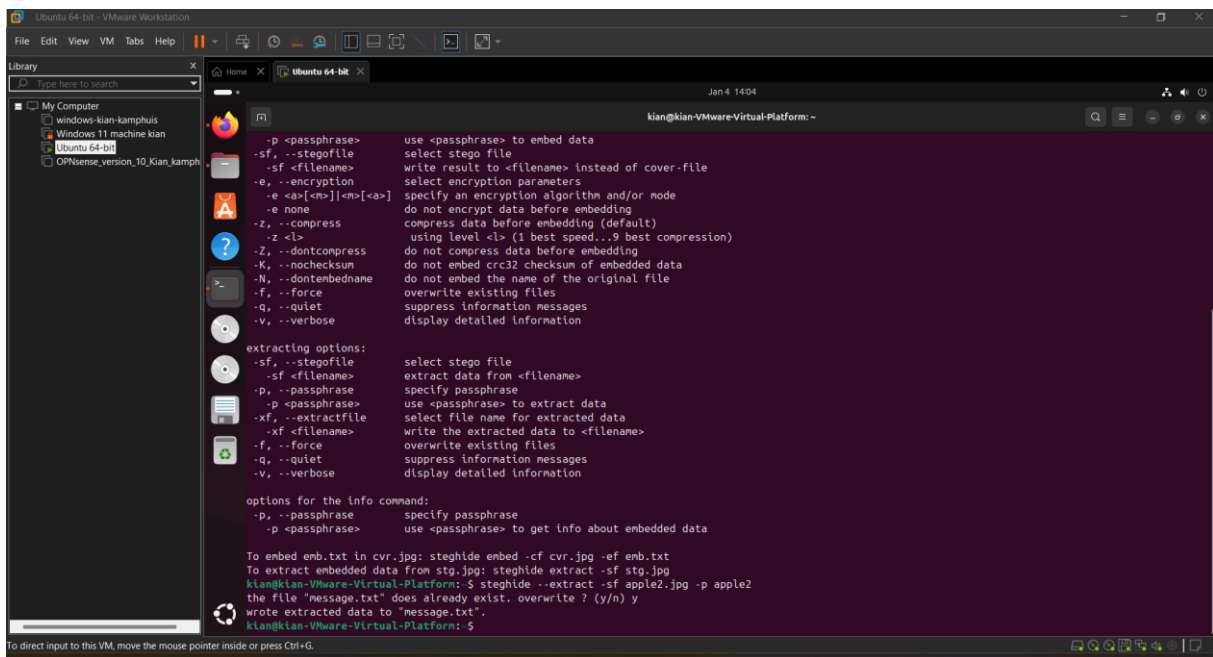
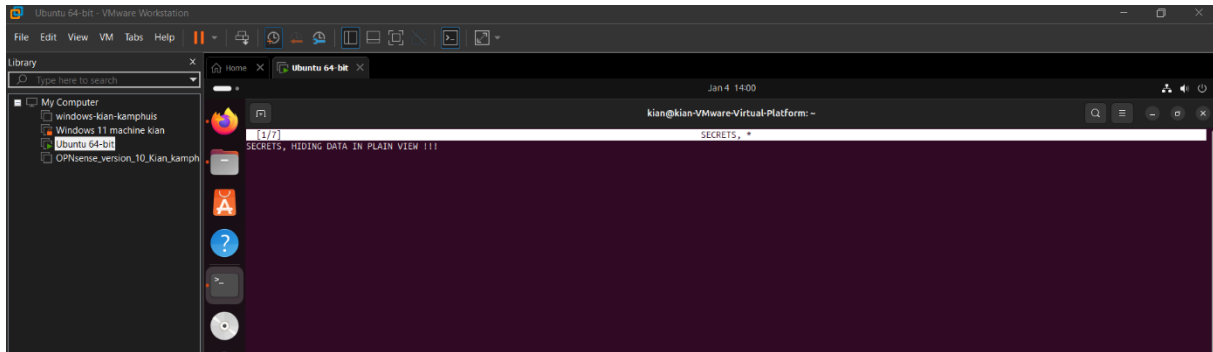


Ubuntu sees the file as a JPEG file.



Assignment 5.8: Steganography

Relevant screenshots + motivation

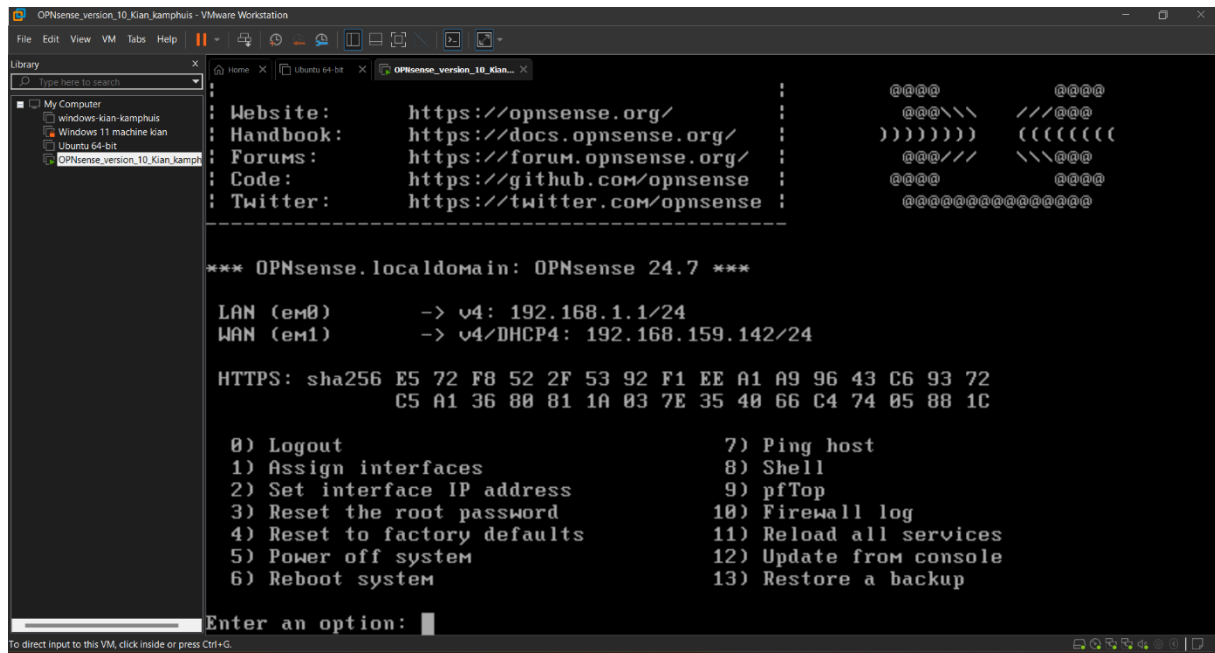


Bonus point assignment – week 5

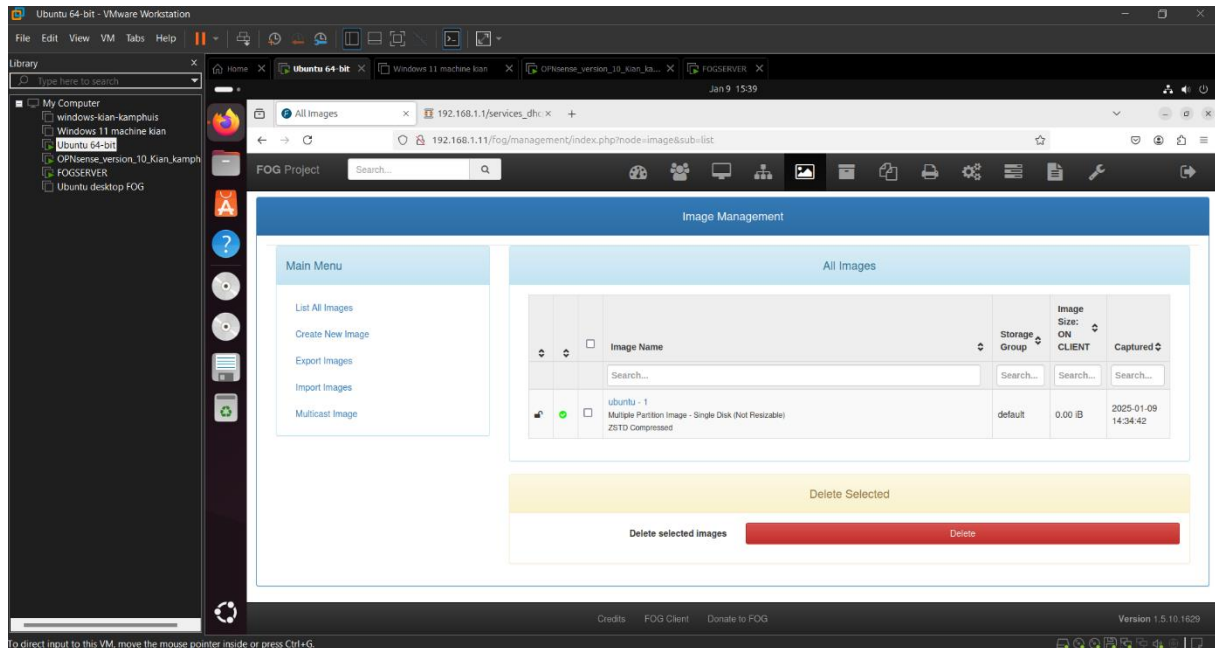
Make relevant screenshots + motivation:

- 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.

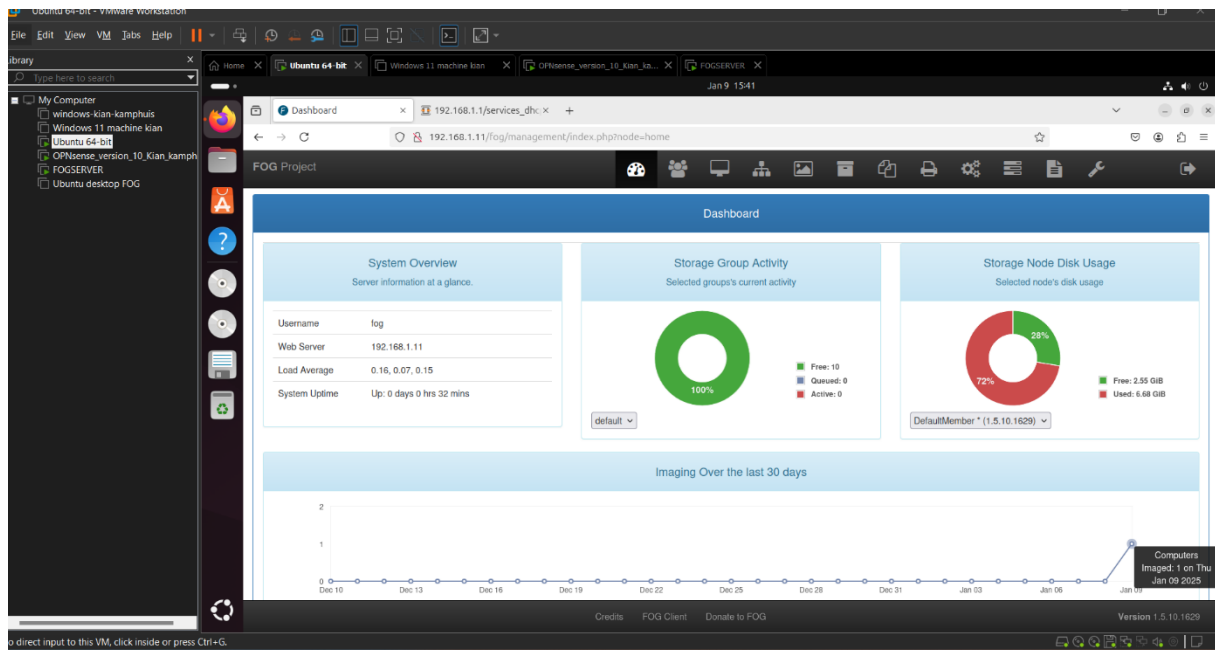
OPNsense server:



FOG Image management:



FOG Dashboard:



The image is so small because it only did the boot.

Ready? Save this file and export it as a pdf file with the name: [weessk5.pdf](#)