Template Week 5 – Operating Systems

Student number:

Assignment 5.1: Unix-like

a) Find out what the difference is between UNIX and unix-like operating systems?
   - **UNIX**: A trademarked operating system originally developed in the 1970s at Bell Labs. It strictly adheres to the Single UNIX Specification.
   - **Unix-like**: Operating systems that mimic the functionality and design principles of UNIX but are not certified as UNIX, such as Linux and BSD.

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-creator of UNIX at Bell Labs, designed the B programming language, a precursor to C.
   - **Dennis Ritchie**: Co-creator of UNIX and creator of the C programming language, which became foundational for system programming.
   - **Bill Joy**: Co-founder of Sun Microsystems, developed the BSD version of UNIX and the vi editor.
   - **Richard Stallman**: Founder of the GNU Project and Free Software Foundation, promoting open-source software and creating essential tools for Unix-like systems.
   - **Linus Torvalds**: Creator of the Linux kernel, which became the foundation for many Unix-like operating systems.

c) What is the philosophy of the GNU movement?
   - **Freedom to run, study, modify, and share software**.
   - Opposes proprietary software, advocating for free and open-source software.

d) Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement? Please explain your answer.
   Partially:
   - **Yes**: Ubuntu uses GNU tools and adheres to open-source principles.
   - **No**: It includes proprietary drivers and software, which violates the strict GNU philosophy.

e) Find out what is the Windows Subsystem for Linux?
   A feature in Windows that allows users to run a Linux environment, including command-line tools and applications, directly on Windows without the need for virtualization.

f) Find out, which operating system family belongs to Android, iOS and ChromeOS?
   - **Android**: Linux-based.
   - **iOS**: Unix-based (derived from Darwin, which is based on BSD).
   - **ChromeOS**: 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 high-performance systems designed for tasks requiring immense computational power. They are used for scientific research, climate modeling, space exploration, genomics, artificial intelligence, and financial modeling, solving complex problems that involve massive datasets and calculations.

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** involves connecting multiple PlayStation 3 consoles to form a computing cluster. This approach was used for research purposes, including physics simulations, cryptographic analysis, and other high-performance computing tasks. The PS3's Cell processor, derived from IBM's Roadrunner supercomputer CPU, made it suitable for such tasks.

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's Raspberry Pi cluster runs on **Oracle Linux**, an open-source operating system based on Red Hat Enterprise Linux.

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/
   - No, Oracle's Raspberry Pi cluster does not appear on the **Top 500 Supercomputers** list. Such clusters lack the raw computational power, energy efficiency, and specialized hardware required to compete with the world's fastest systems.

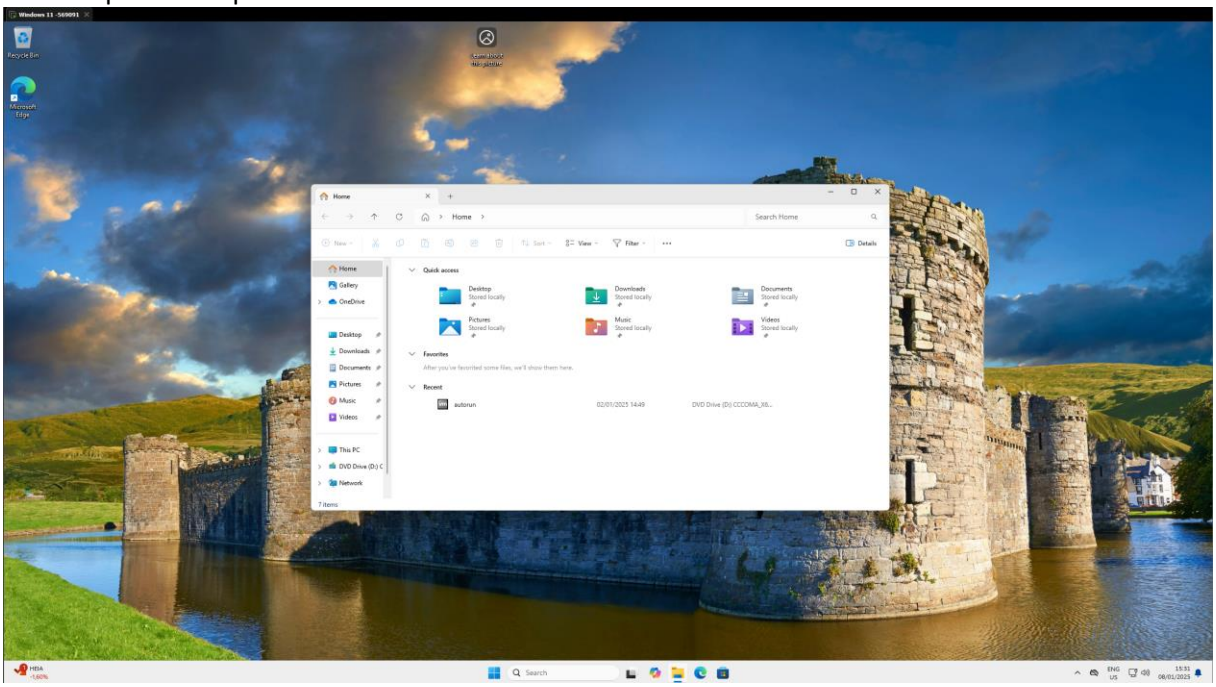
e) What CPU architecture is used for the PlayStation 5 and Xbox Series X?
What operating systems run on these consoles?
What conclusion can you draw from the answer to the previous question?
   - **PlayStation 5**: Uses a custom AMD Zen 2 CPU with RDNA 2 architecture. Runs on a customized version of FreeBSD.
   - **Xbox Series X**: Also uses a custom AMD Zen 2 CPU with RDNA 2 architecture. Runs on a customized Windows-based OS.

Assignment 5.3: Working with Windows

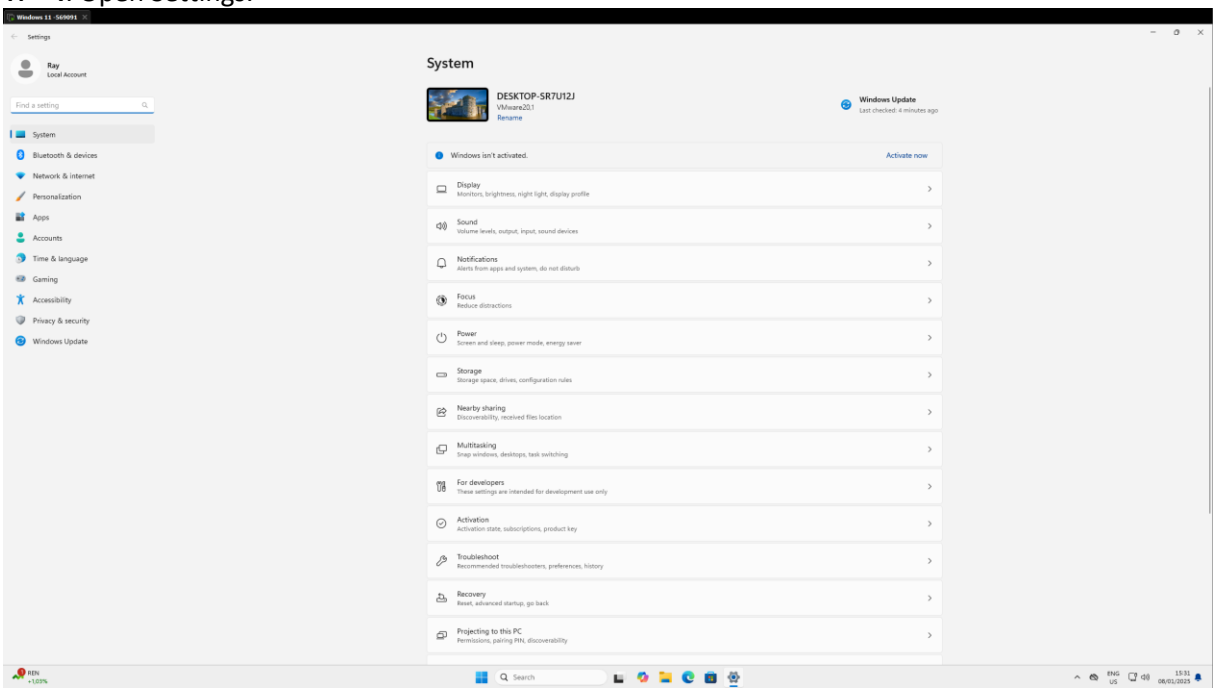
Take relevant screenshots of the assignments below

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.

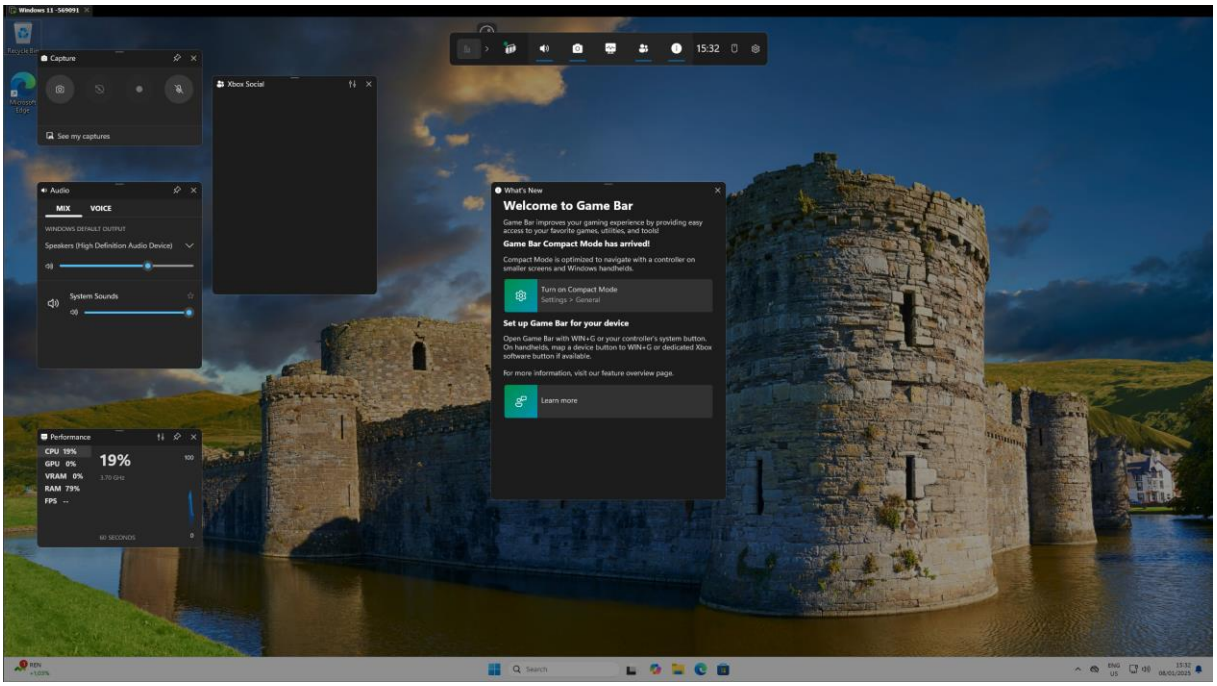
- W + **E**: Open File Explorer.



- W + **I**: Open Settings.



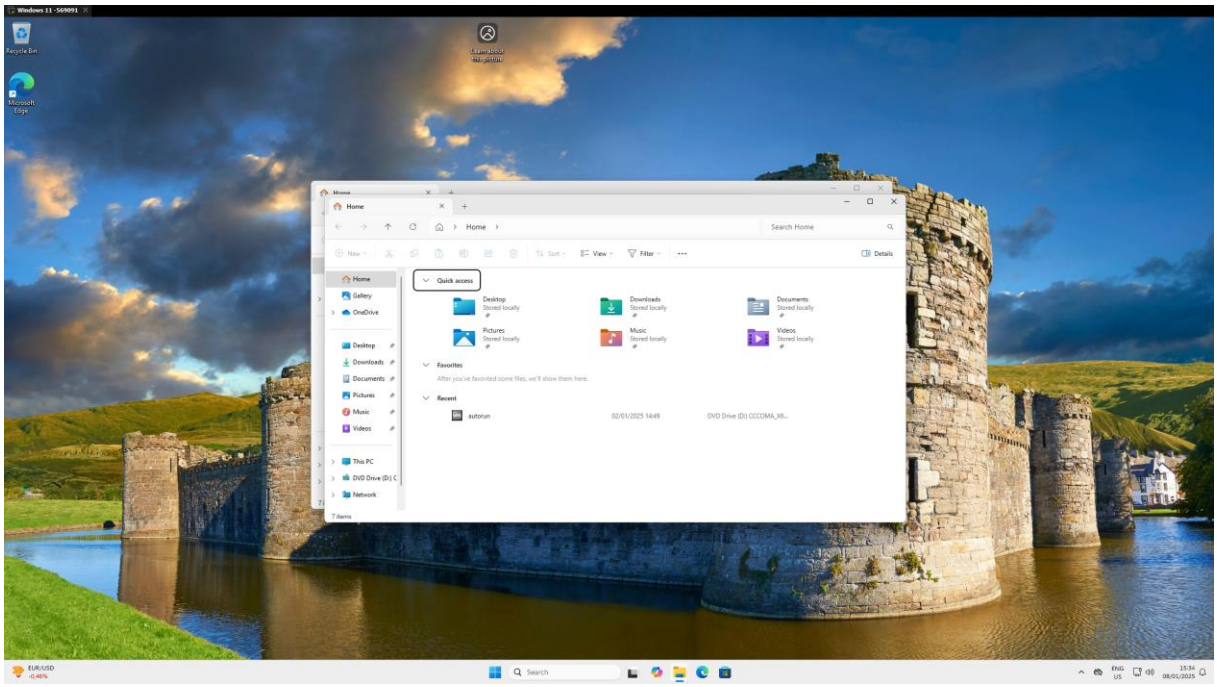
- W + **G**: Open Game Bar.



- W **+ Tab**: Open Task View.

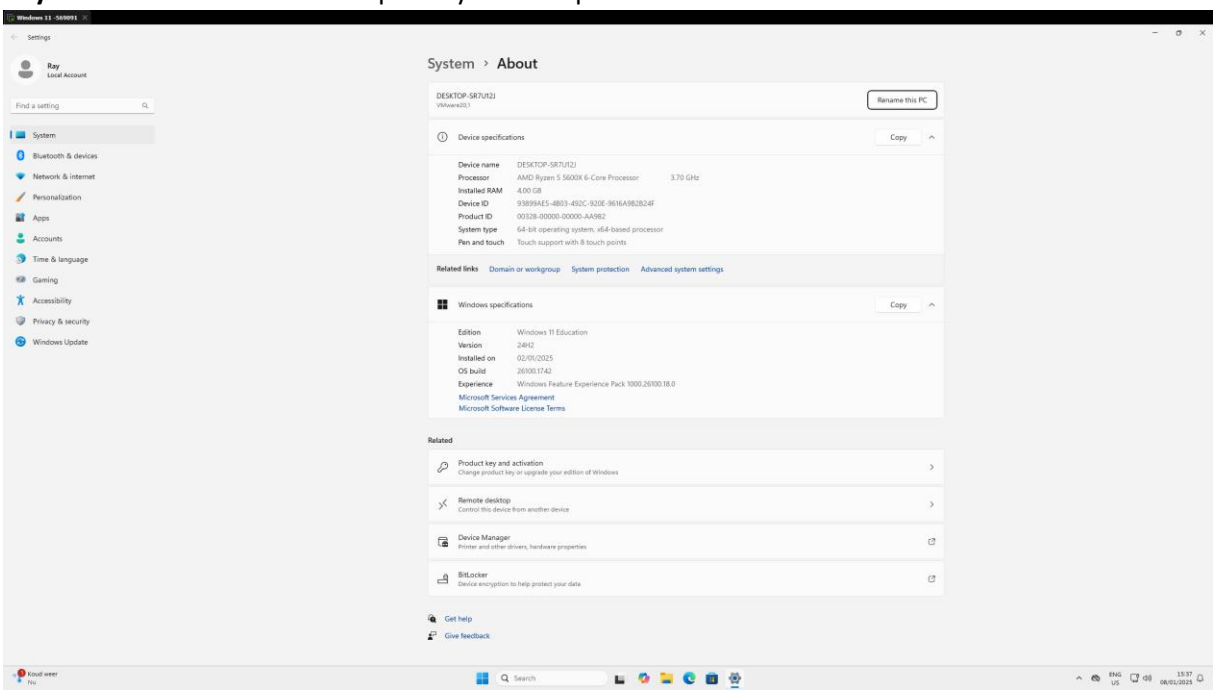
b) The file explorer can be opened with ⊞ + E, Which key combination could you also use?

- **Key Combination**: Use **Ctrl + N** within an open File Explorer window to open a new instance.



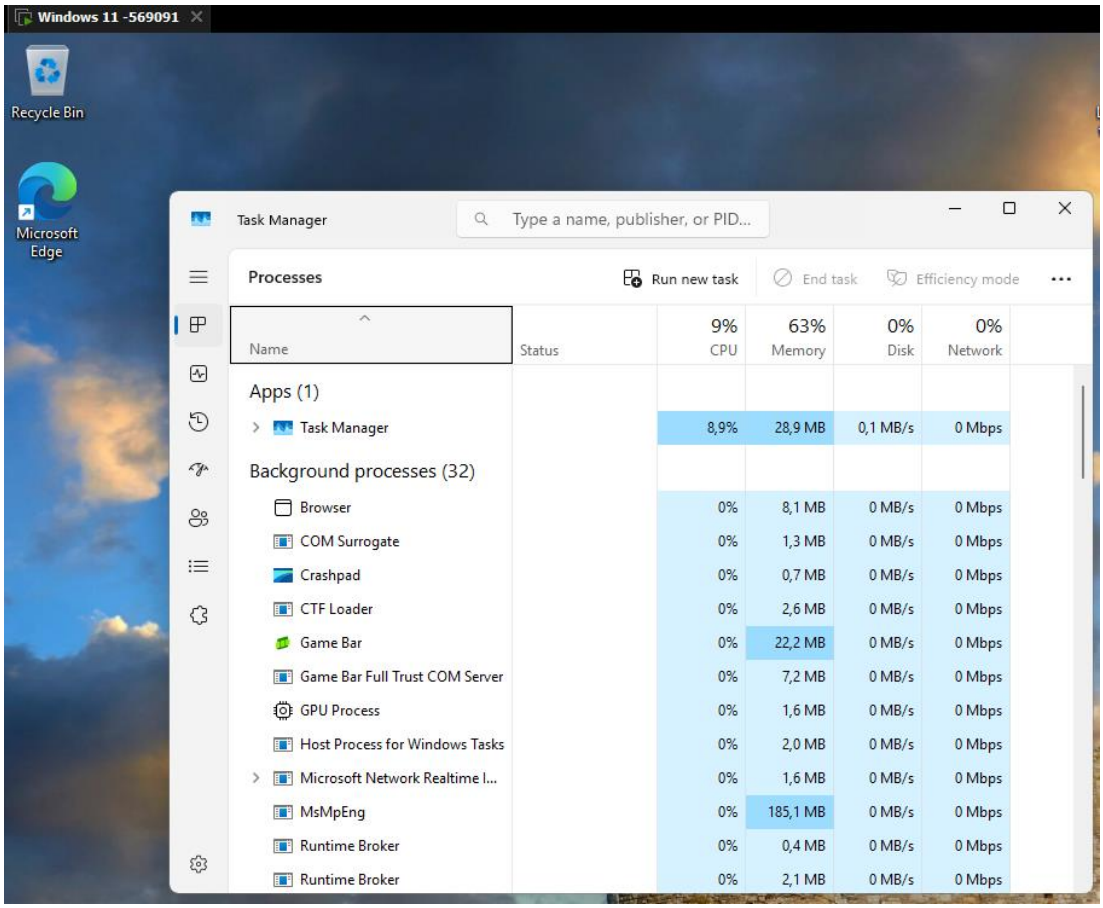
c) Open the system properties with a ⊞ key combination, take a screenshot of the open screen. Paste this screenshot into this template.

- **Key Combination**: ⊞ **+ Pause** opens System Properties.

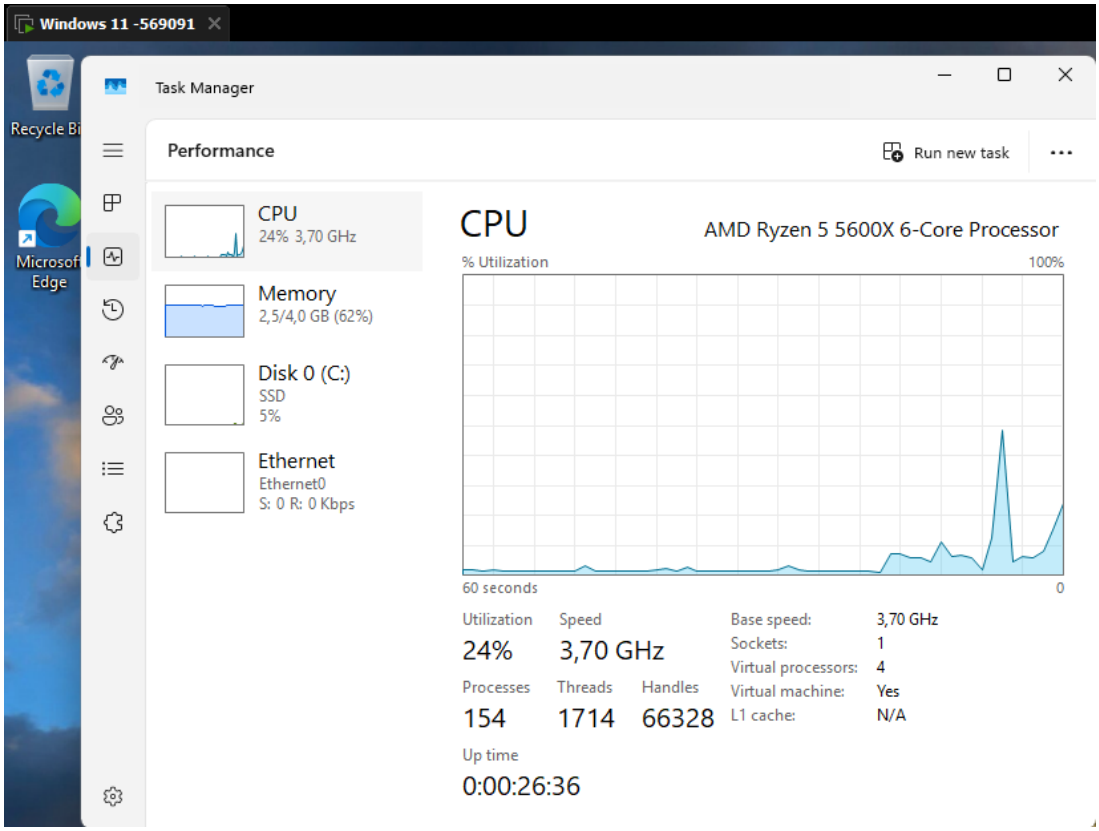


d) Open task manager with a key combination. Take screenshots of the tabs: processes (shows active processes), performance, and users. Place these three screenshots in this template.

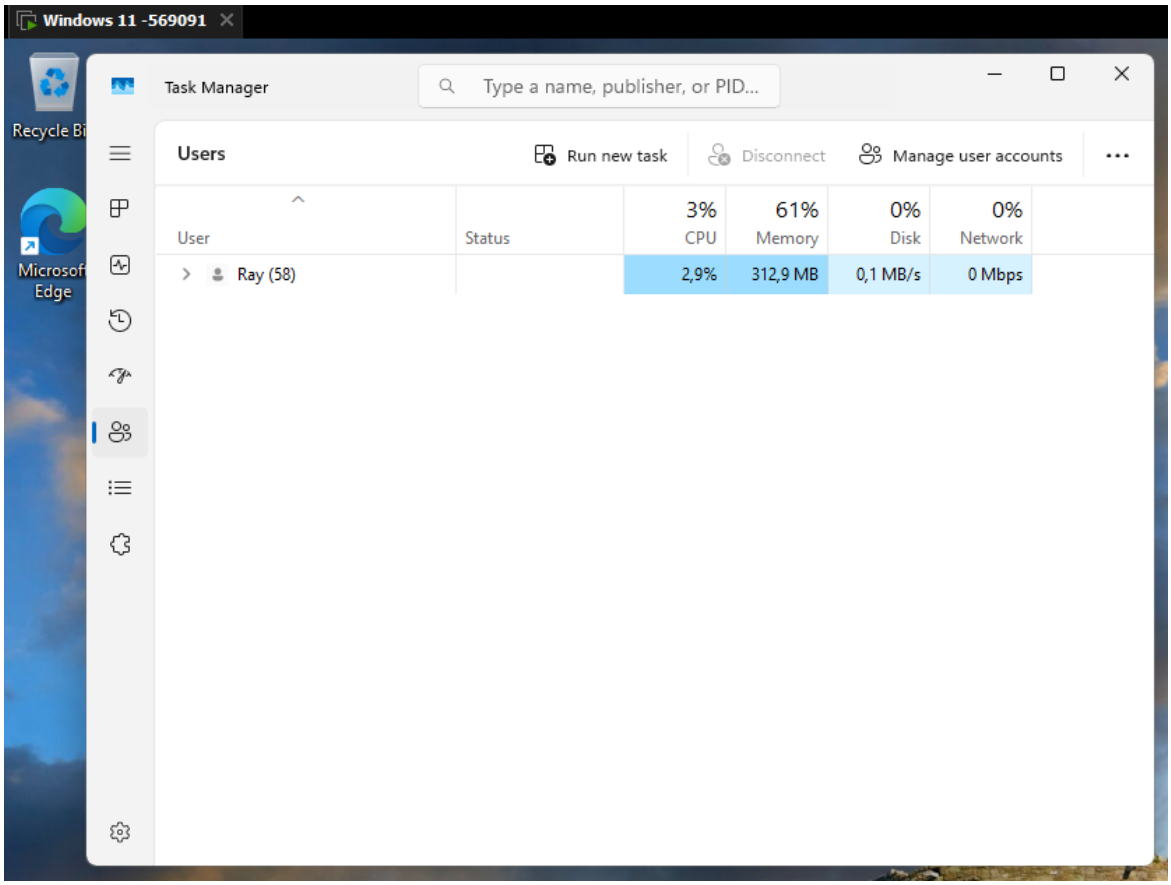
- **Key Combination**: Use **Ctrl + Shift + Esc** to open Task Manager.
- **Screenshots**:
  1. **Processes**: Shows active processes.



2. **Performance**: Displays CPU, memory, and disk usage. (doesn't seem to detect the GPU in the VM, probably cause the drivers aren't installed)



3. **Users**: Displays logged-in users.



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?

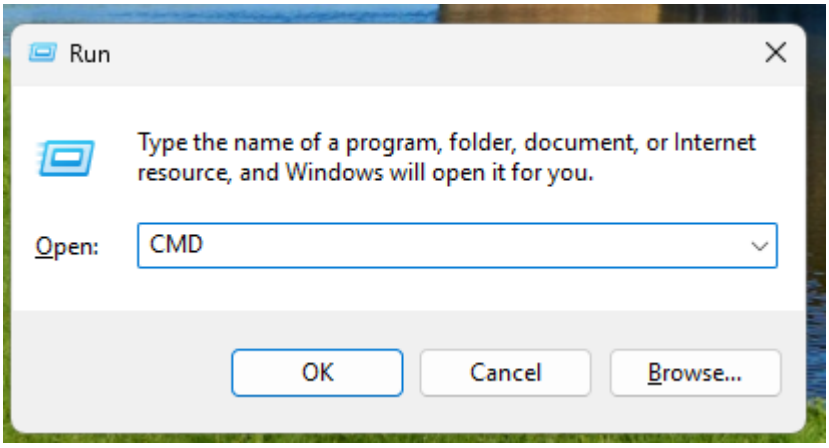
- **Key Combination**: Use ⊞ **+ P** to switch to projector mode and choose the appropriate display configuration. (This looks slightly different on Windows 10, alternatively you can adjust the settings in more detail by going to the display settings.)

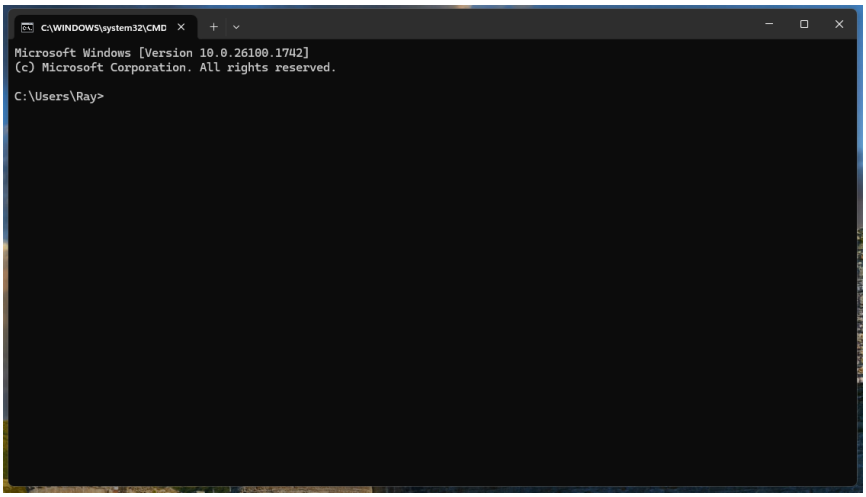
f) If you leave the classroom for a while and you leave your laptop behind, it is wise to lock the screen. Your Apps will continue to run in the background. So, for example, if you're waiting for a download that takes a while, lock the screen and get a cup of coffee. Which key combination do you use for this?

- **Key Combination**: ⊞ **+ L** locks the screen. (also locked host machine?)

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.

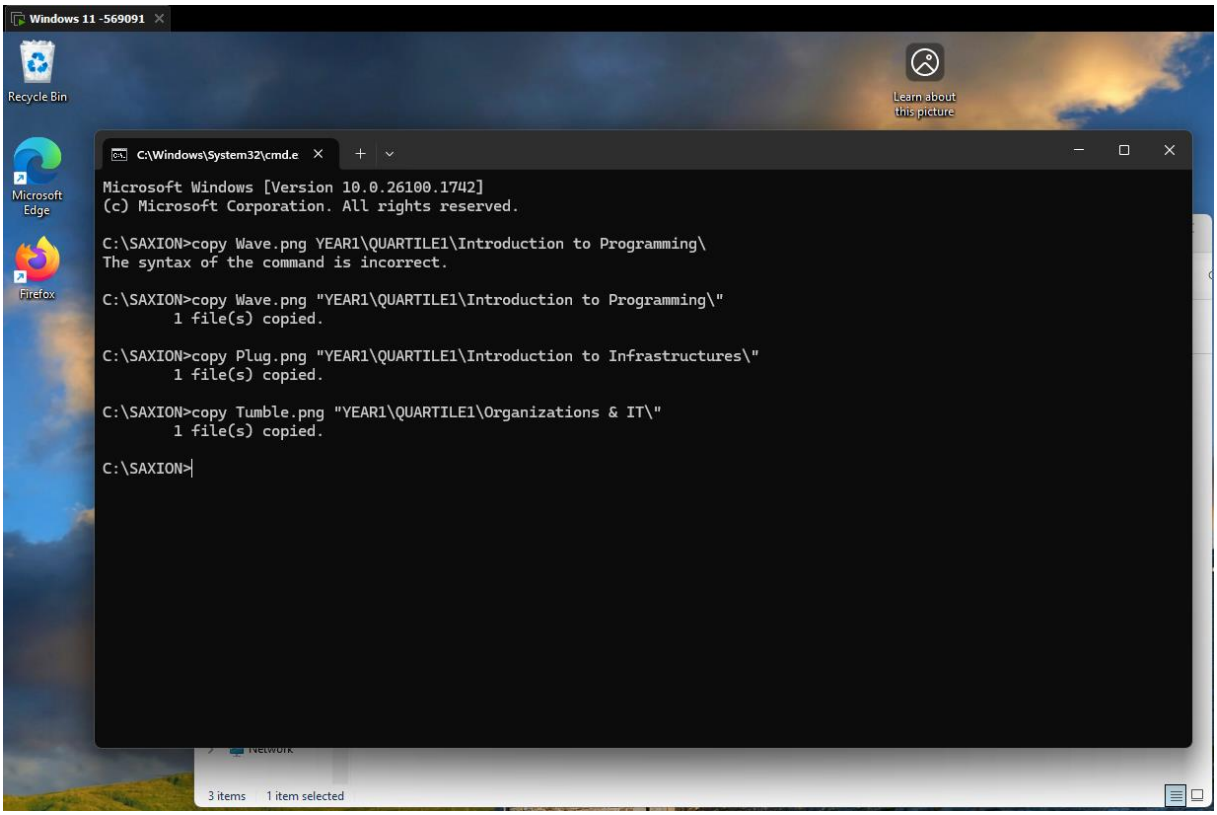
- **Key Combination**: ⊞ **+ R** to open the Run screen.



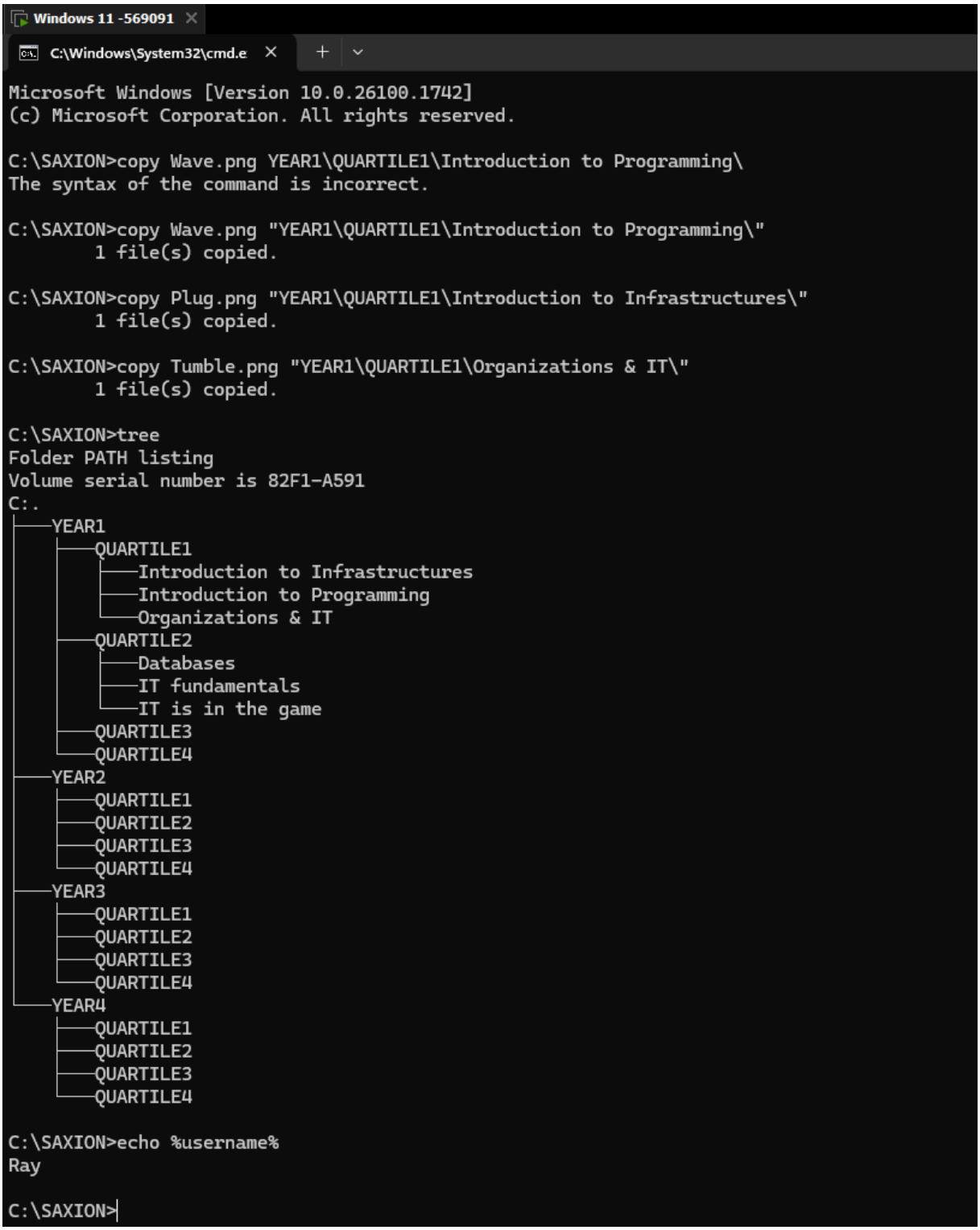


Working in the File Explorer

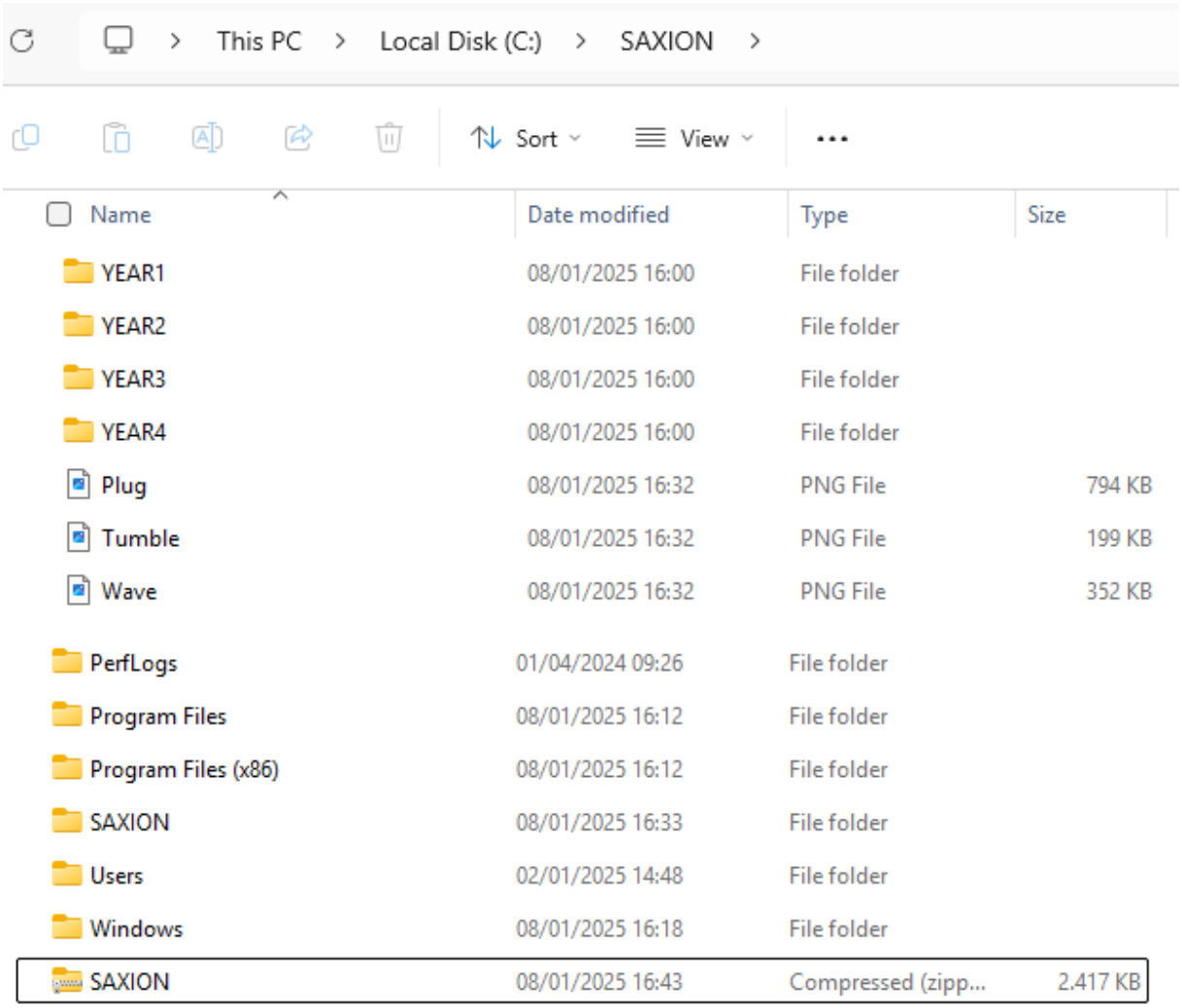
Relevant screenshots **copy** command:



Relevant screenshots **tree** command:

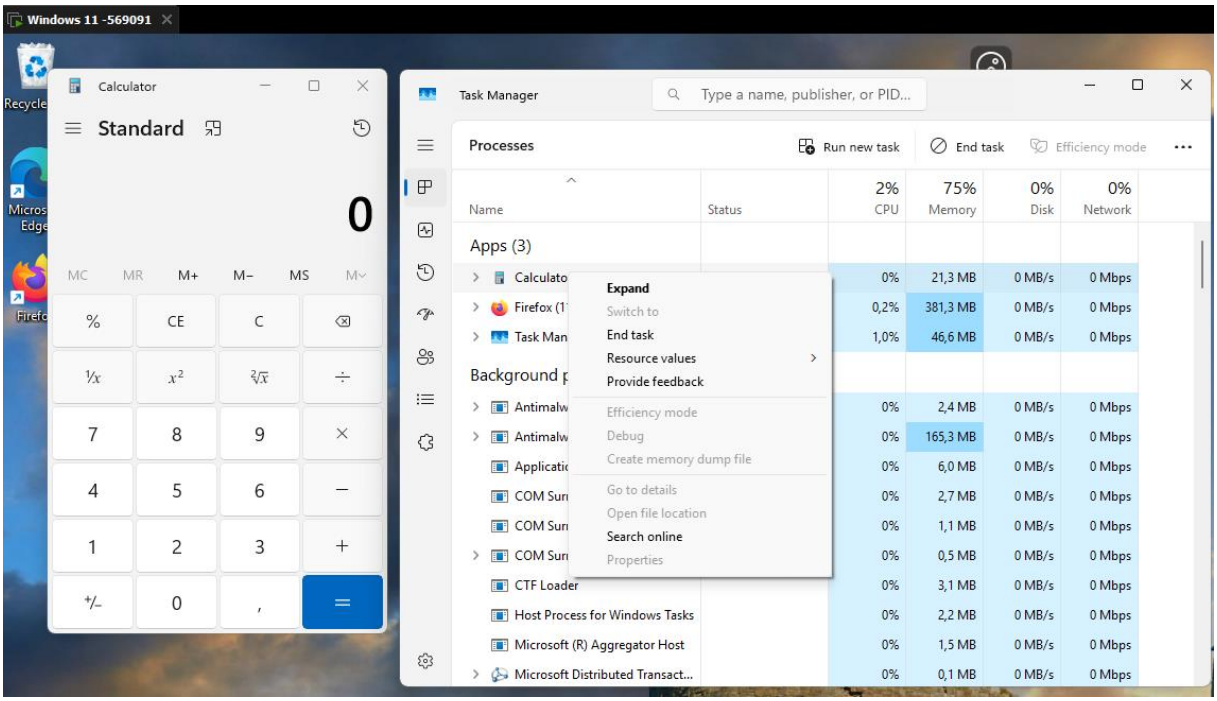


Relevant screenshots in the file explorer of the folder c:\Saxion + created zip file.



Terminating Processes

Relevant Screenshots Task Manager Window:



Install Software

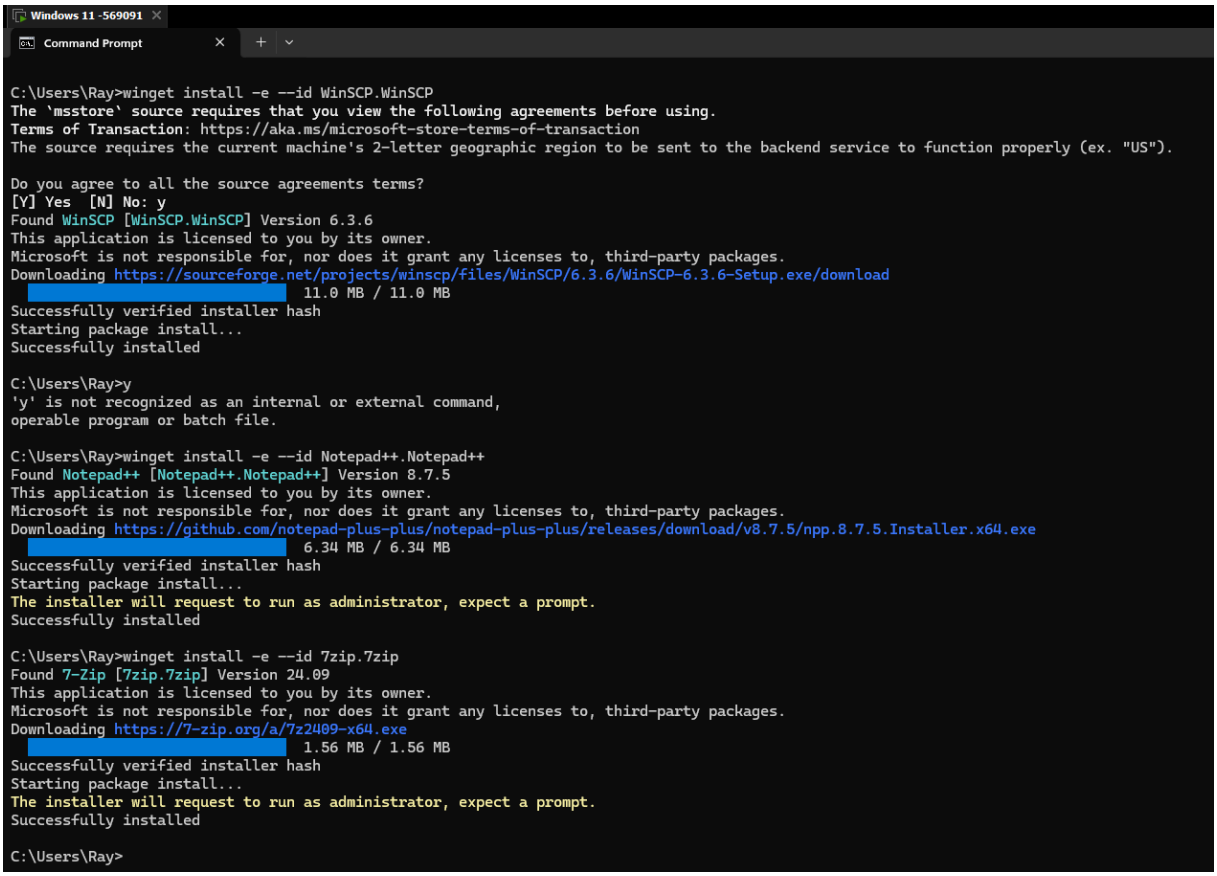
Relevant screenshots that the following software is installed:

- WinSCP
- Notepad++
- 7zip

winget install -e --id WinSCP.WinSCP

winget install -e --id Notepad++.Notepad++

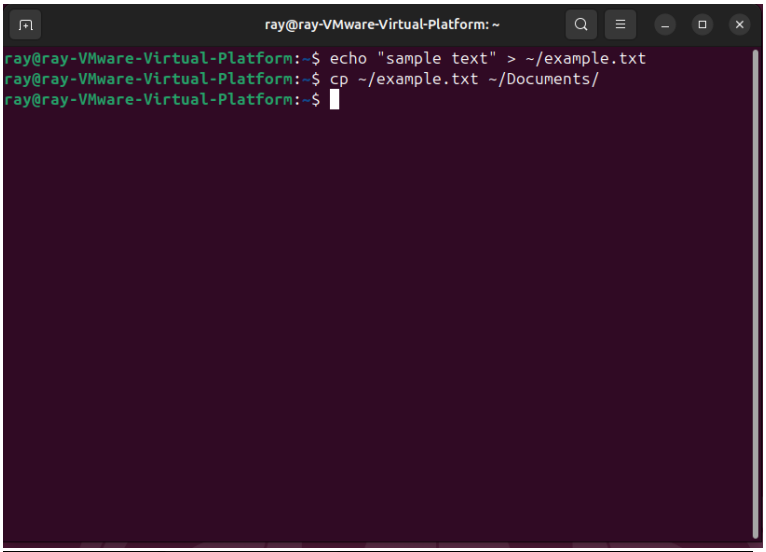
winget install -e --id 7zip.7zip

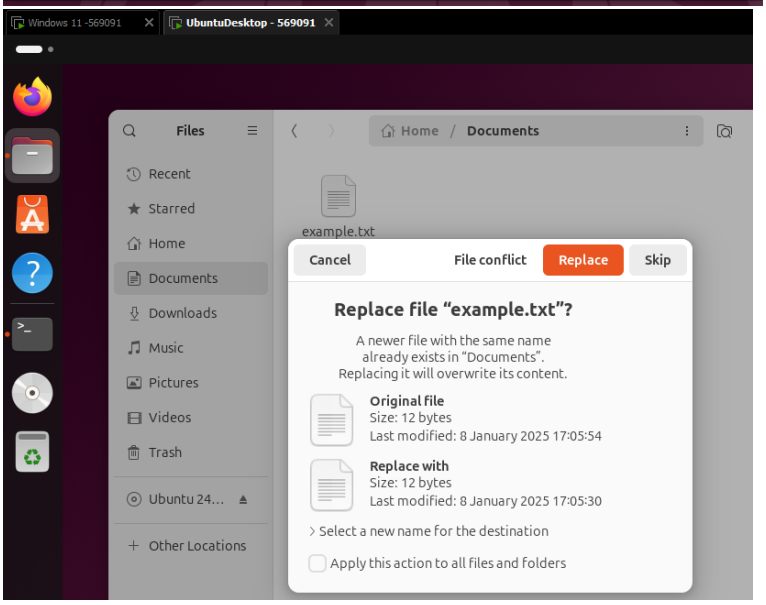

Windows 11 -569091
Command Prompt
C:\Users\Ray>winget install -e --id WinSCP.WinSCP
The `msstore` source requires that you view the following agreements before using.
Terms of Transaction: https://aka.ms/microsoft-store-terms-of-transaction
The source requires the current machine's 2-letter geographic 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\Ray>y
'y' is not recognized as an internal or external command,
operable program or batch file.
C:\Users\Ray>winget install -e --id 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\Ray>winget install -e --id 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
C:\Users\Ray>

Assignment 5.4: Working with Linux

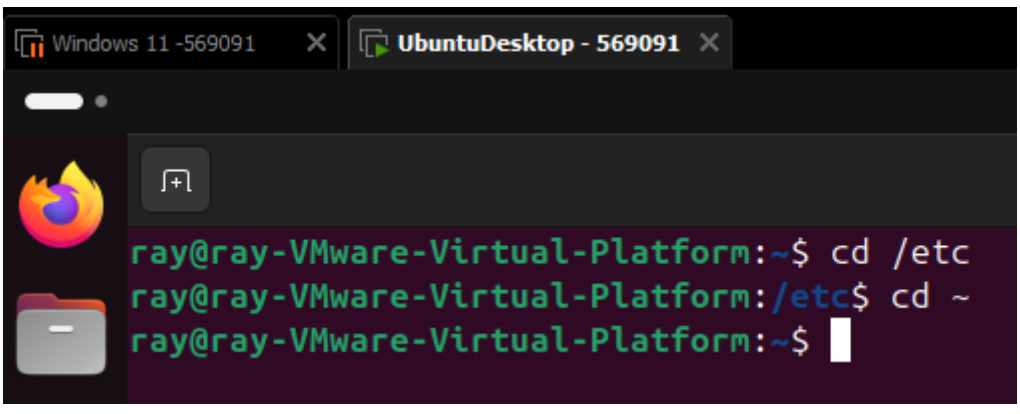
Relevant screenshots + motivation

• Copying files





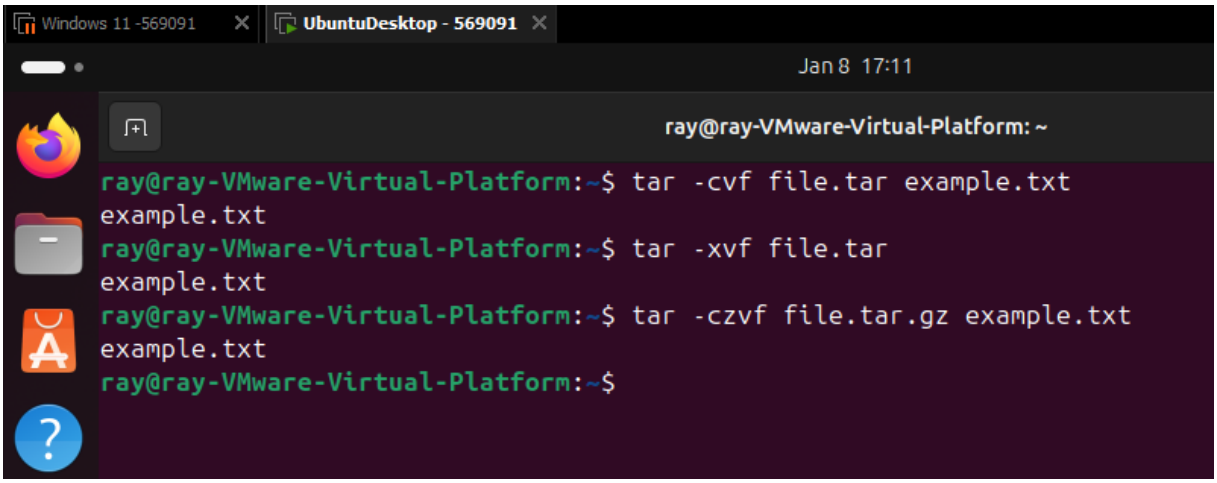
• Navigating the file structure



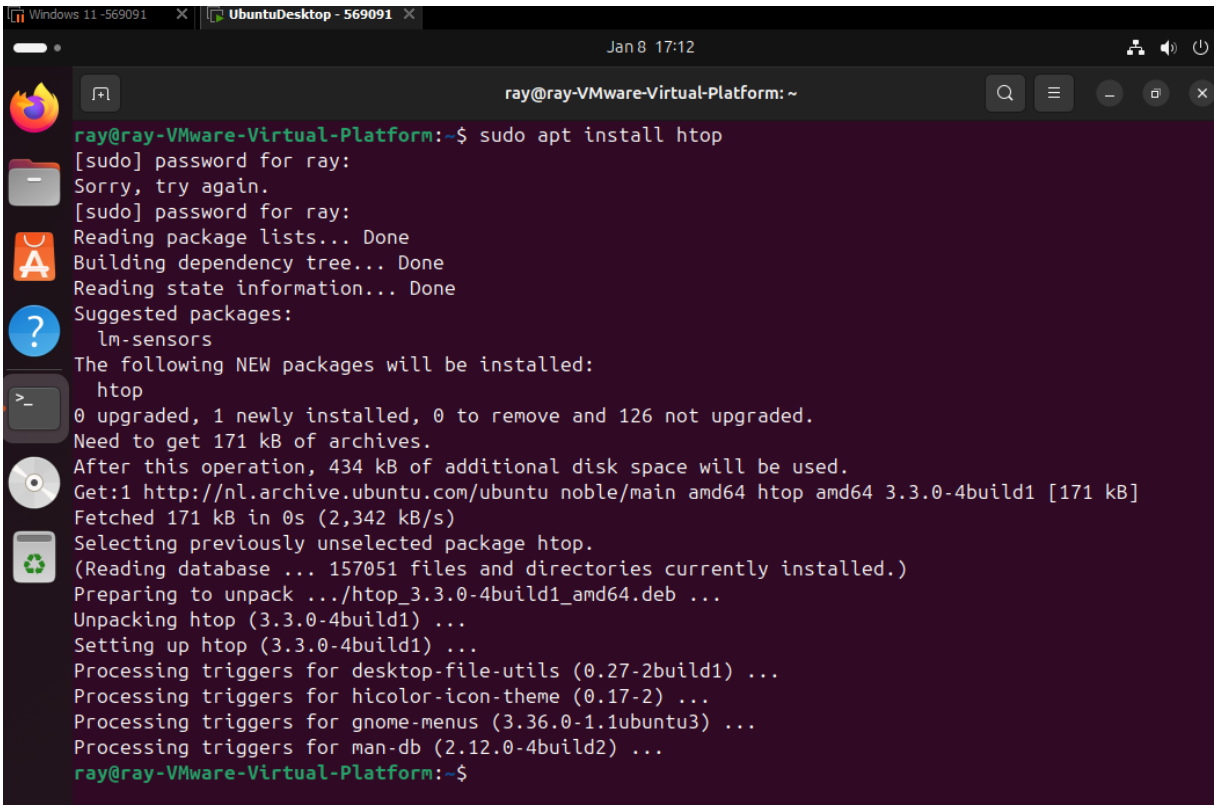
Linux uses a unified directory structure; everything starts from /. Windows uses drive letters like C:\.

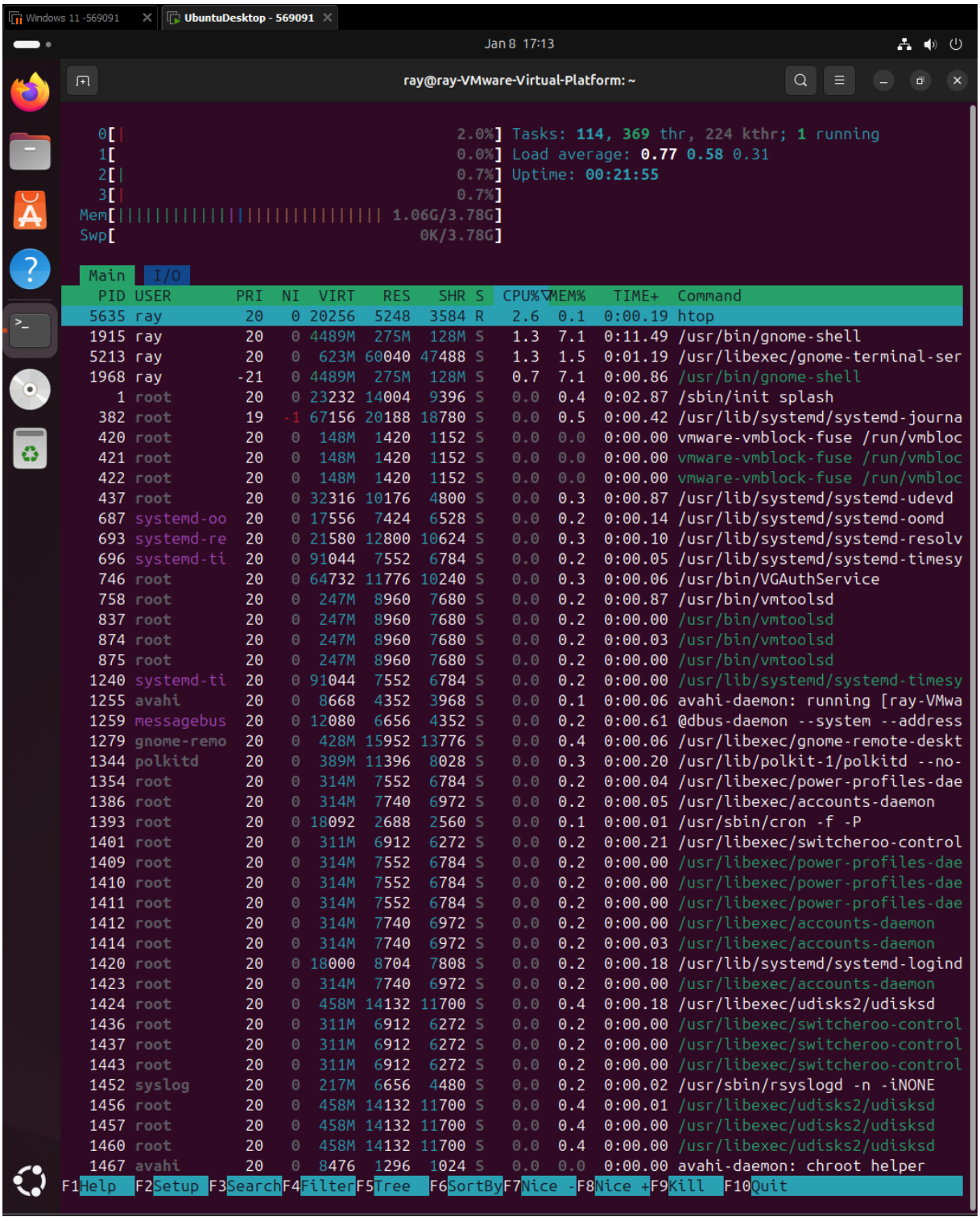
The /etc directory in Linux and Unix systems is used to store system configuration files. It contains settings and configuration files for the operating system and installed applications.

• Compress files



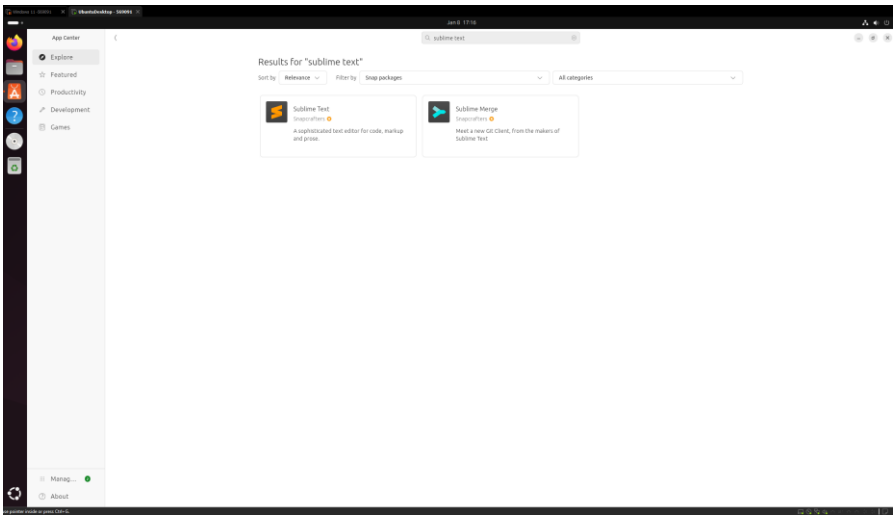
• View processes

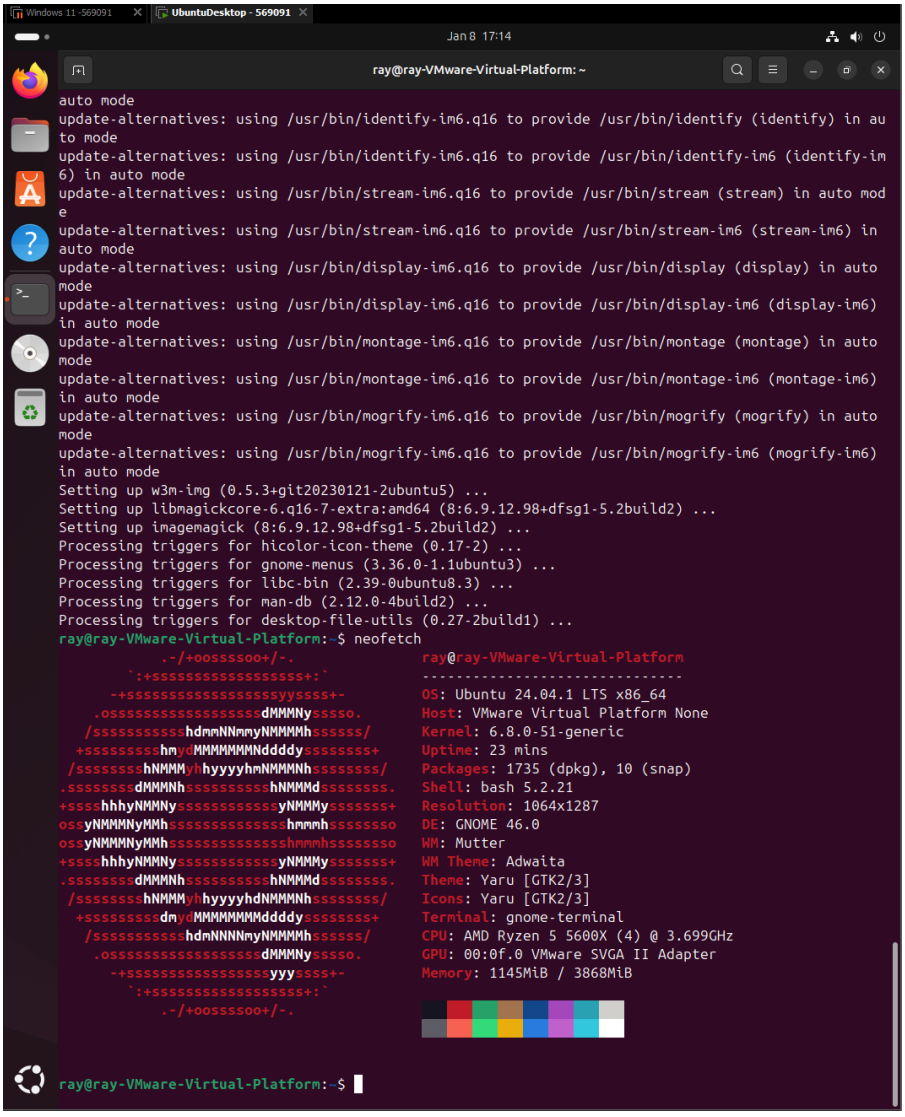




What htop shows: Real-time system metrics, resource usage, and process management.

• Install Software

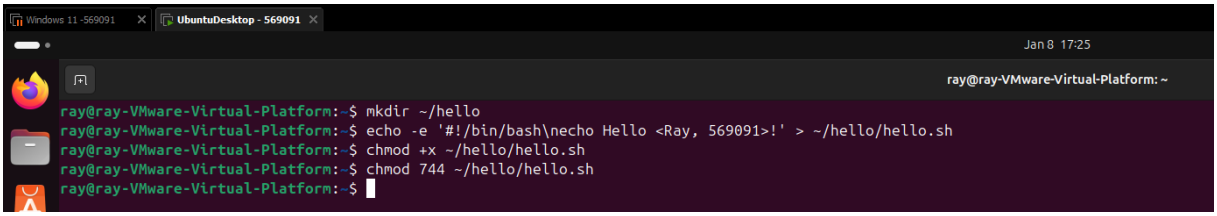




What neofetch shows: System information (OS, kernel, memory, etc.).

Assignment 5.5: Users and permissions on Linux

Relevant screenshots + motivation

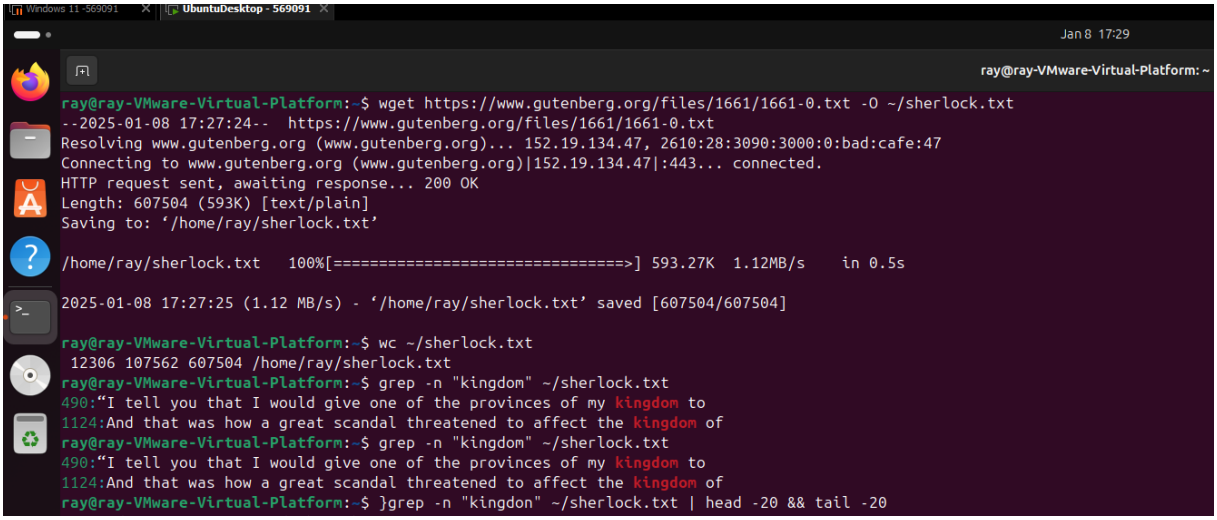


Assignment 5.6: View the contents of files

Relevant screenshots + motivation

Commands:

- cat: Display file contents.
- wc: Count lines, words, and characters.
- less: View file contents interactively.
- tail: View last lines.
- head: View first lines.
- grep: Search for patterns.



Last one should've been: **grep -n "kingdom" ~/sherlock.txt | head -20 && tail -20**

Assignment 5.7: Digital forensics

Relevant screenshots + motivation

sudo apt install libimage-exiftool-perl

exiftool ~/Downloads/oldcar.jpg

Findings:

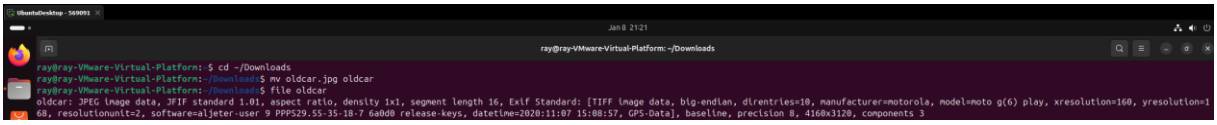
Phone brand: Motorola

GPS coordinates: 53 deg 11' 39.68" N, 6 deg 32' 12.90" E,

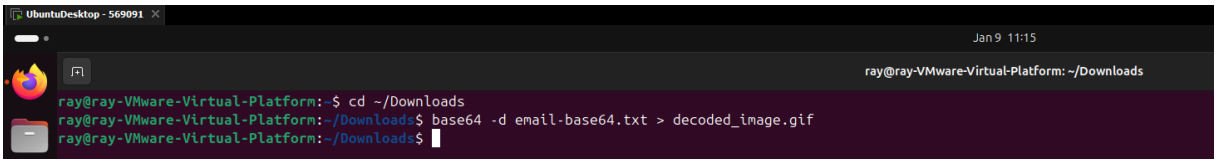
Or 53°11'39.7"N 6°32'12.9"E,

Or 53.1943556, 6.5369167

city location: Groningen

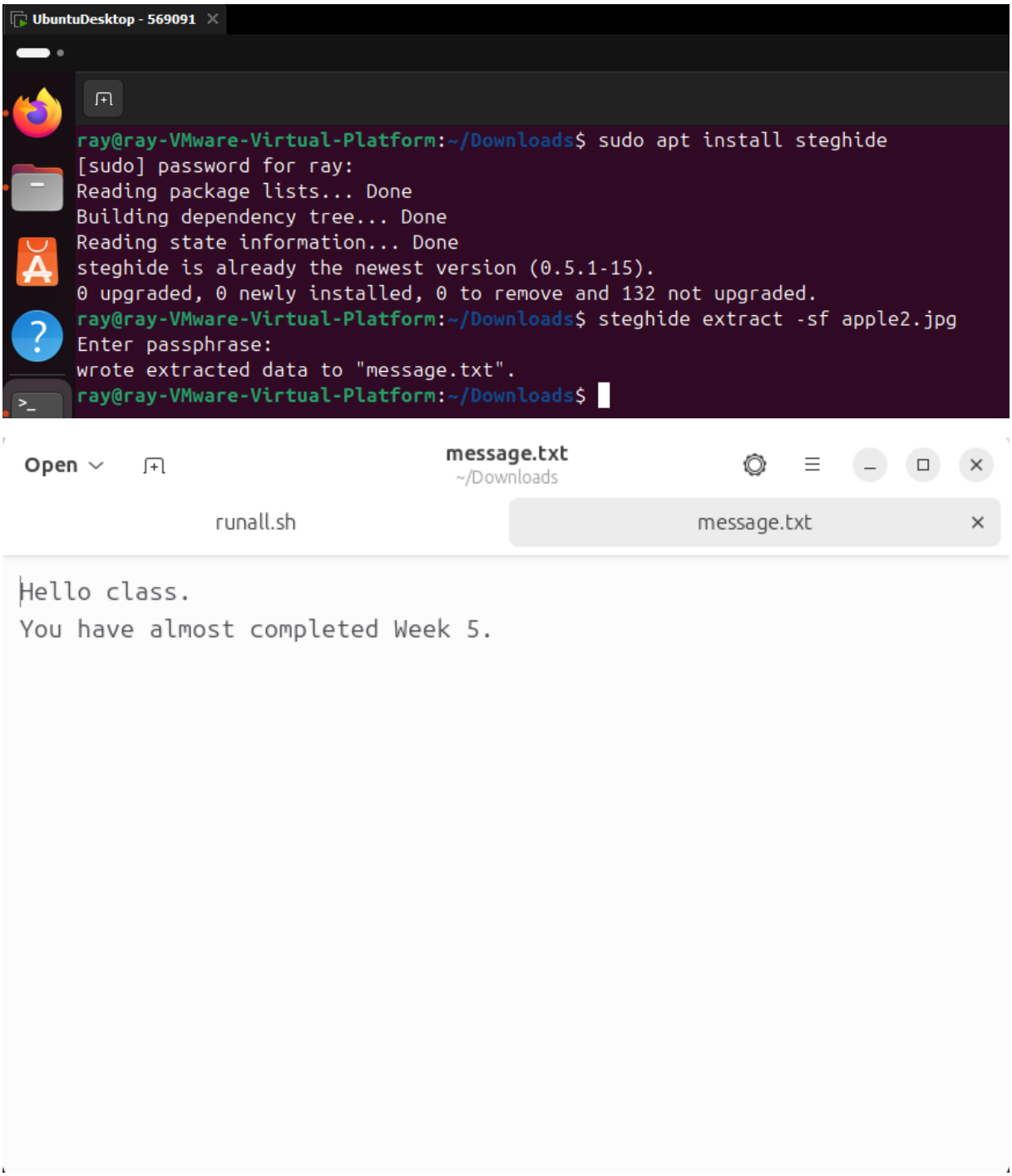


nano email-base64.txt (then copy paste the text in)

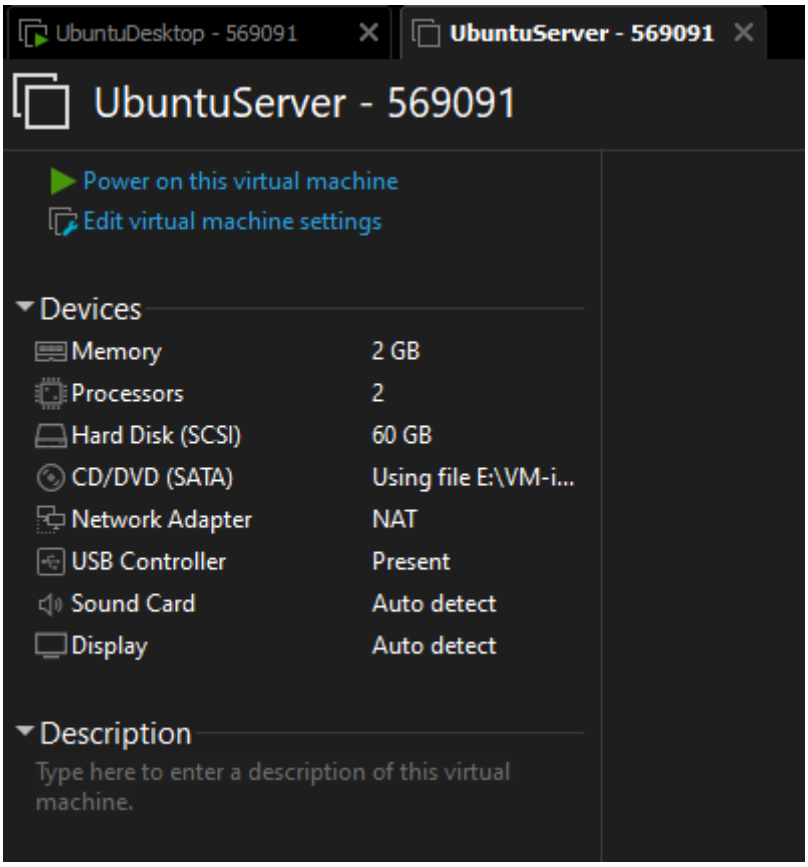


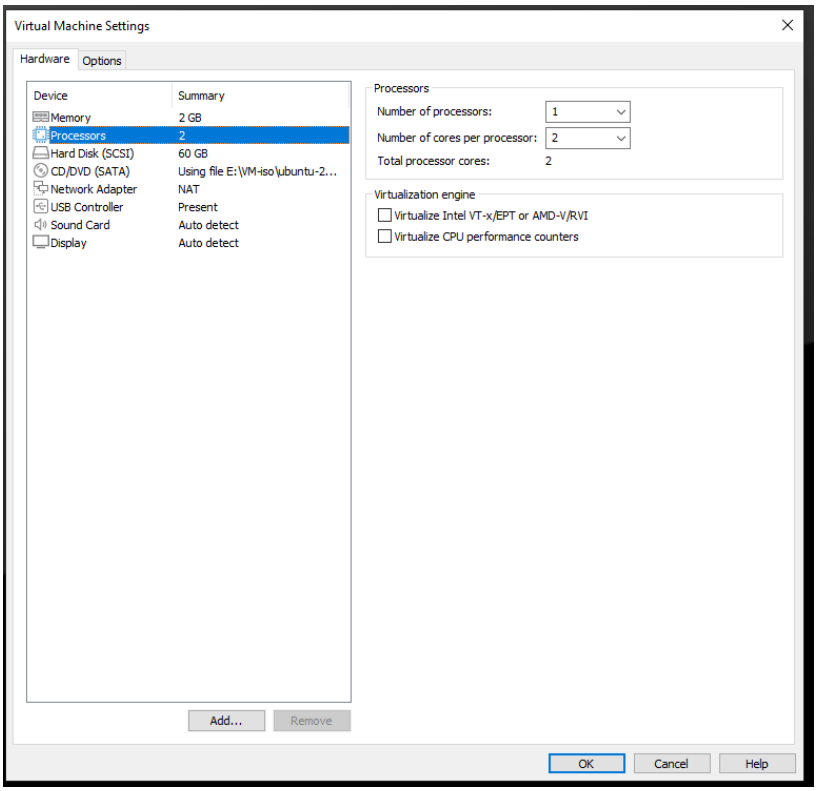
Assignment 5.8: Steganography

Relevant screenshots + motivation



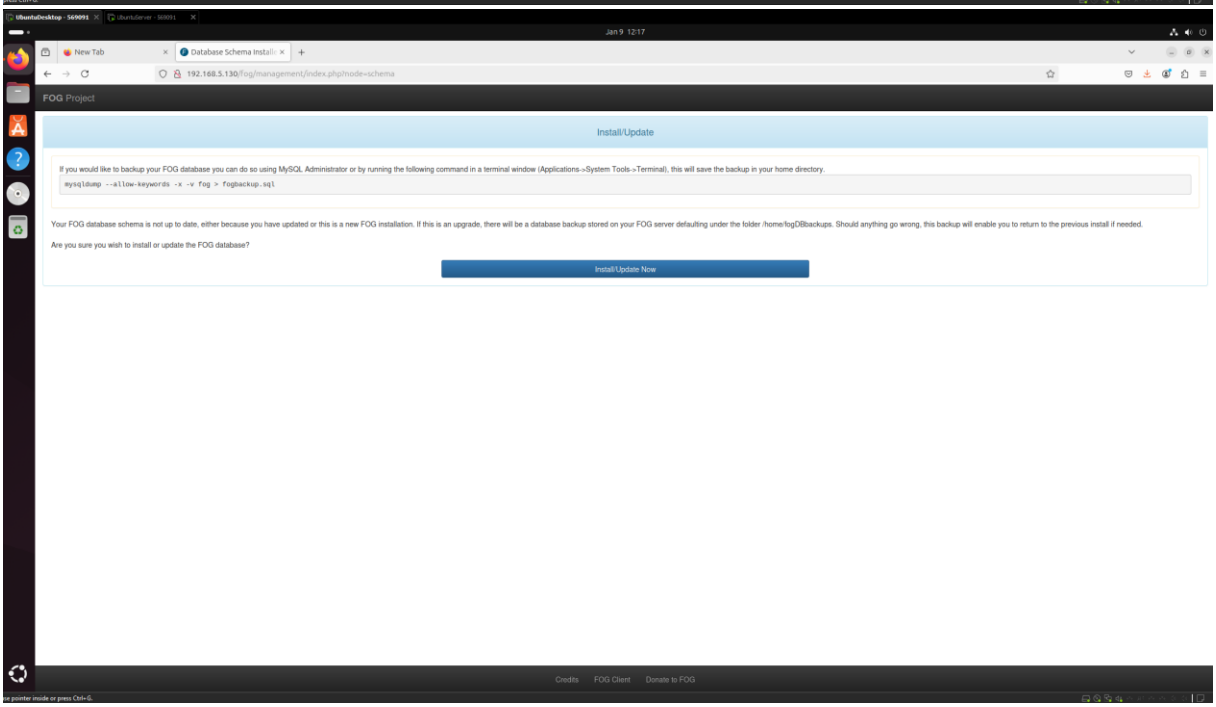
Bonus point assignment – week 5

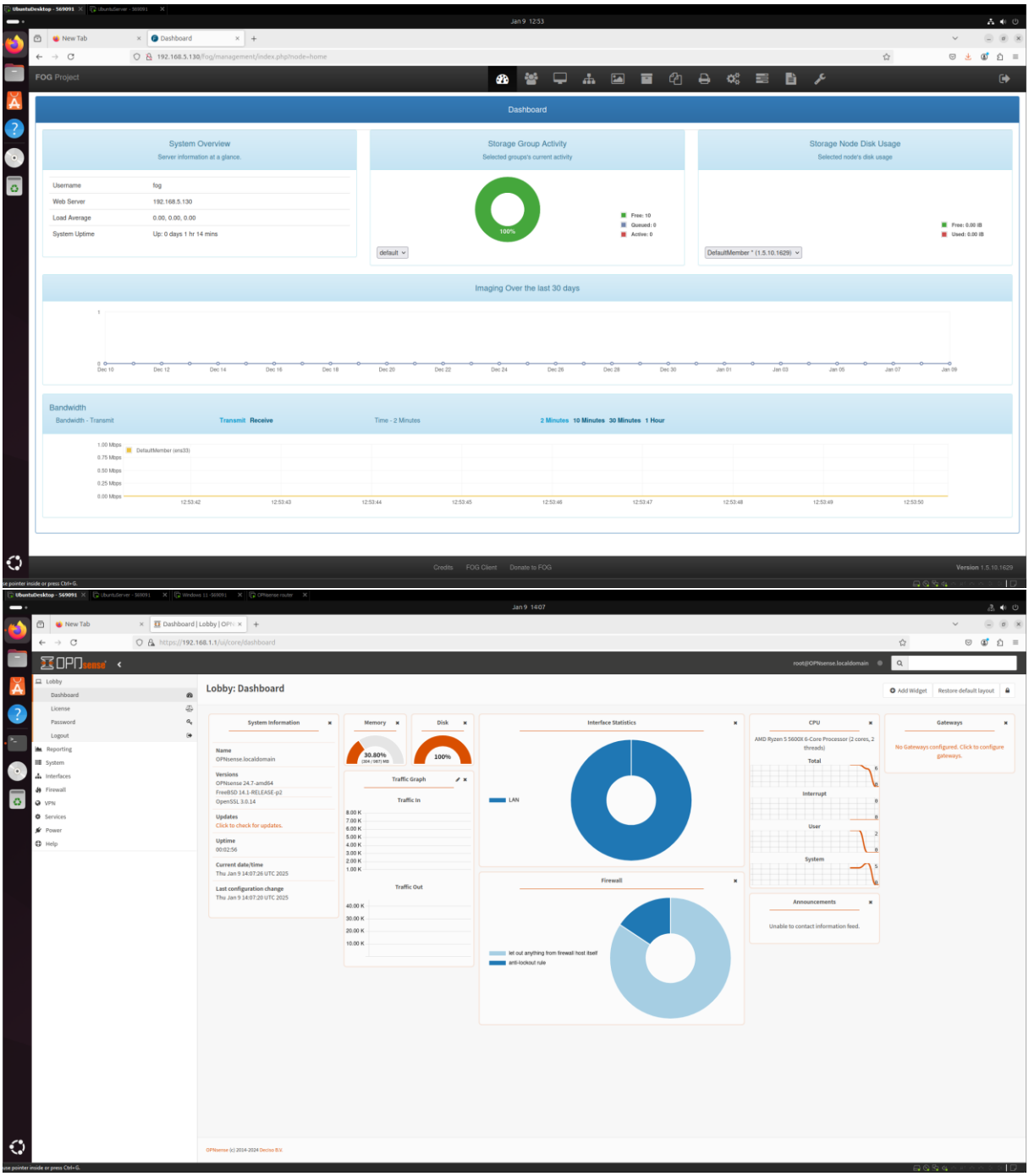

UbuntuDesktop - 569091
UbuntuServer - 569091
UbuntuServer - 569091
Power on this virtual machine
Edit virtual machine settings
Devices
Memory 2 GB
Processors 2
Hard Disk (SCSI) 60 GB
CD/DVD (SATA) Using file E:\VM-i...
Network Adapter NAT
USB Controller Present
Sound Card Auto detect
Display Auto detect
Description
Type here to enter a description of this virtual machine.

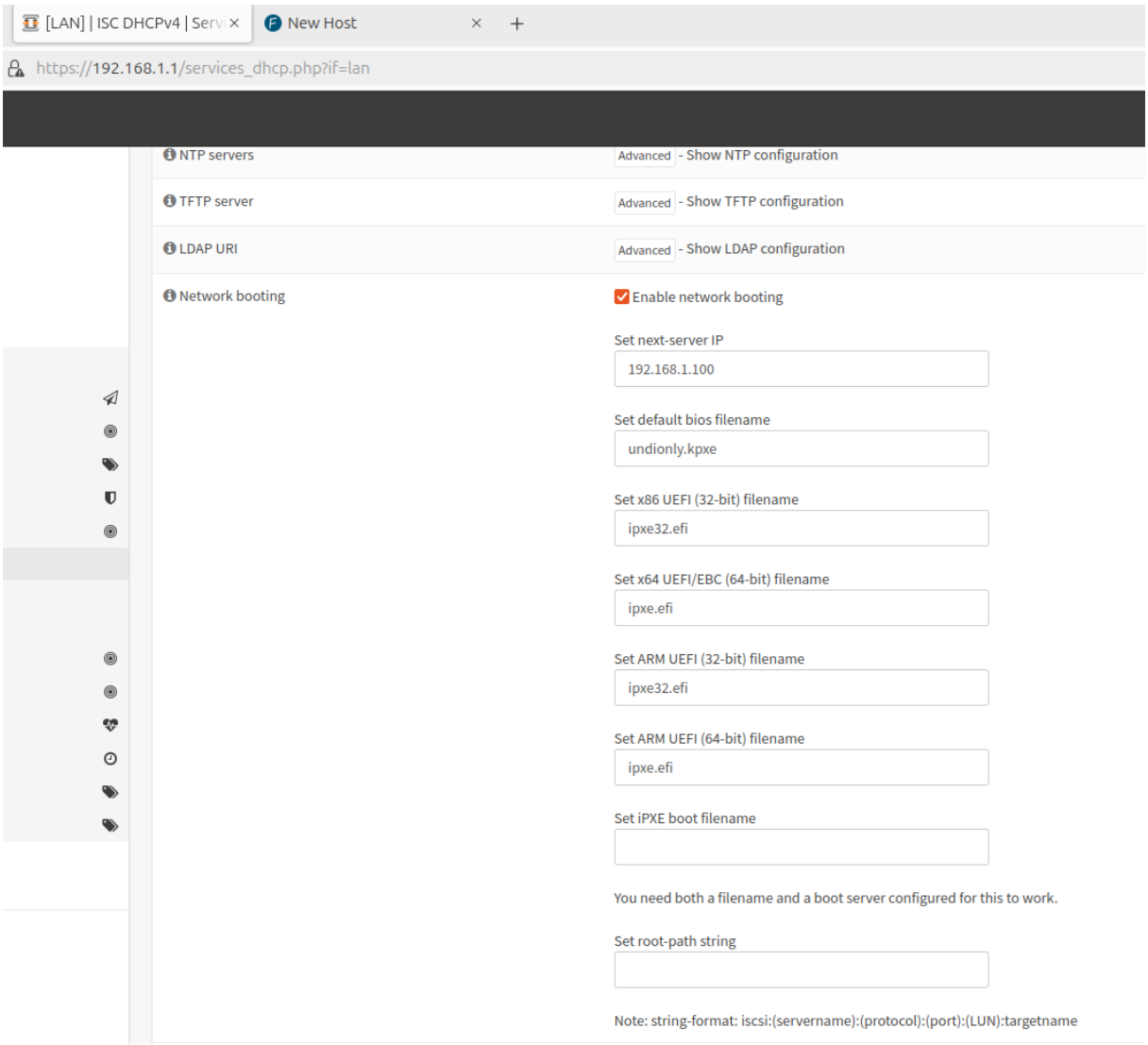

Virtual Machine Settings
Hardware
Options
Device
Summary
Memory 2 GB
Processors 2
Hard Disk (SCSI) 60 GB
CD/DVD (SATA) Using file E:\VM-iso\ubuntu-2...
Network Adapter NAT
USB Controller Present
Sound Card Auto detect
Display Auto detect
Add...
Remove
Processors
Number of processors: 1
Number of cores per processor: 2
Total processor cores: 2
Virtualization engine
Virtualize Intel VT-x/EPT or AMD-V/RVI
Virtualize CPU performance counters
OK
Cancel
Help

Make relevant screenshots + motivation:

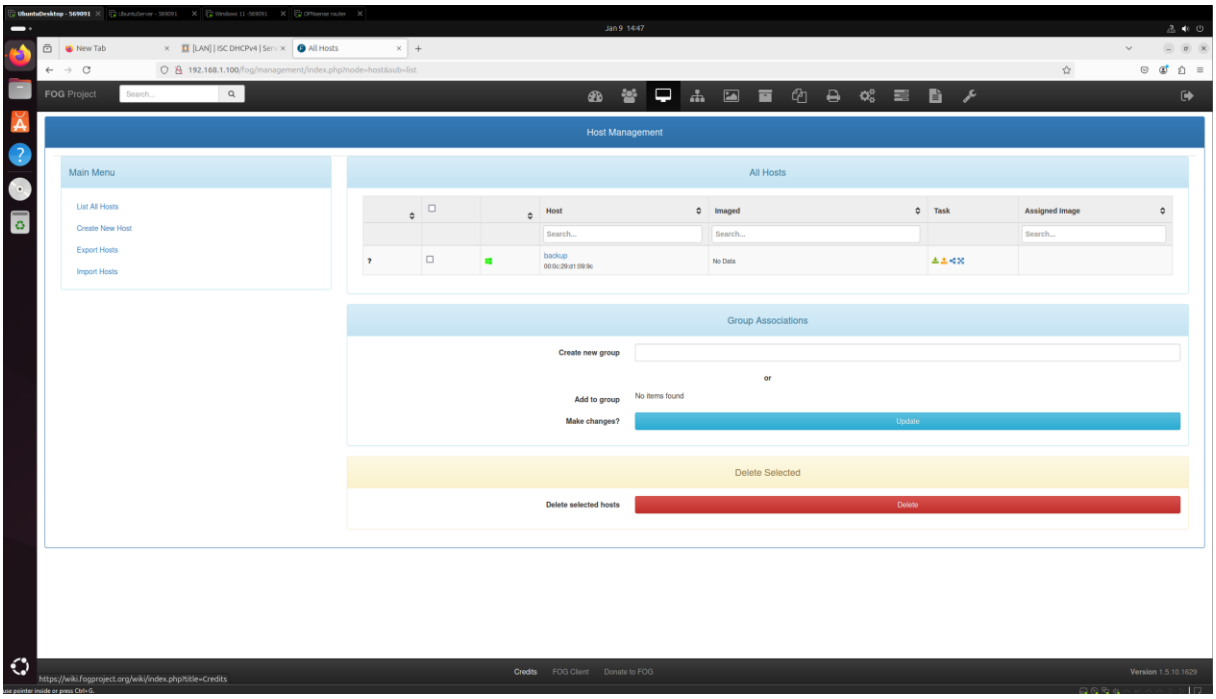
- Proof that the FOG server is installed and is functioning correctly.




FOG Project
Dashboard
System Overview
Server information at a glance.
Username
fog
Web Server
192.168.5.130
Load Average
0.00, 0.00, 0.00
System Uptime
Up: 0 days 1 hr 14 mins
Storage Group Activity
Selected groups's current activity
Storage Node Disk Usage
Selected node's disk usage
Imaging Over the last 30 days
Bandwidth
Bandwidth - Transmit
Transmit
Receive
Time - 2 Minutes
2 Minutes
10 Minutes
30 Minutes
1 Hour
Credits
FOG Client
Donate to FOG
Version 1.5.10.1629
OPNsense
Lobby: Dashboard
Add Widget
Restore default layout
System Information
Name
OPNsense.localdomain
Versions
Updates
Uptime
Current date/time
Last configuration change
Memory
Disk
Traffic Graph
Traffic In
Traffic Out
Interface Statistics
LAN
Firewall
CPU
AMD Ryzen 5 5600X 6-Core Processor (2 cores, 2 threads)
Total
Interrupt
User
System
Gateways
No Gateways configured. Click to configure gateways.
Announcements
Unable to contact information feed.



- Proof that the FOG server has made a back-up of the Windows11 VM or the Ubuntu 24.04 Desktop VM.



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