Template Week 5 – Operating Systems

Student number: 562606

Assignment 5.1: Unix-like

a) Find out what the difference is between UNIX and unix-like operating systems?
Unix-like systems are behaving almost the same way as UNIX but are not officially licensed by the original trademarked Unix 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 designed and implemented the original UNIX operating system. Together with Dennis Ritchie they created the first version of UNIX. Bill Joy is the author of the vi text editor and was part of the development of the Berkley Software Distribution version of UNIX and of the improving of the UNIX kernel. Richard Stallman was the founder of the Free Software Movement by planning to develop the GNU operating system. Linus Torvalds is the creator of the Linux kernel.

c) What is the philosophy of the GNU movement?
That computer users have to be free to study the source code of the software they use, share software they create, edit the behaviour of a software and share that modified version.

d) Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement? Please explain your answer.
Users of Ubuntu can access, modify and distribute Ubuntu's software so it pretty much aligns with the GNU movement's philosophy.

e) Find out what is the Windows Subsystem for Linux?
The Windows Subsystem for Linux allows users to run a Linux environment on a Windows machine without the need of a virtual machine.

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

Android and ChromeOS both belong to Linux-based family and iOS to an Unix-based 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
A supercomputer is used by NASA in space vehicle analysis, including studying the Columbia disaster, but also in astrophysics, weather and ocean modeling while the first supercomputer using the Linux operating system was used by the national science and engineering community via the National Science Foundation's National Technology Grid. Intel's Touchstone Delta supercomputer is used for real-time processing of satellite images, and for simulating molecular models in AIDS research, the Earth simulator – to create global climate models, Cray – 1 supercomputer – for the design and simulation of nuclear weapons, and weather forecasting and IBM's Roadrunner supercomputer for modeling the decay of the US nuclear arsenal, analyzing financial data, and rendering 3D medical images in real-time.

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 group of multiple PS 3 consoles networked together which is functioning as a supercomputer. They are used mainly for scientific and medical research and as a way for researchers and students to experiment with parallel computing.

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 for ARM

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/
In my opinion Rasbery Pi does not have a place in the world's top 500 fastest supercomputers because it is made for educational purposes which means that its purpose is clearly different then the supercomputers on that list and they have different CPUs which the Oracle Linux for ARM can't compete with.

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

x86-64 architecture

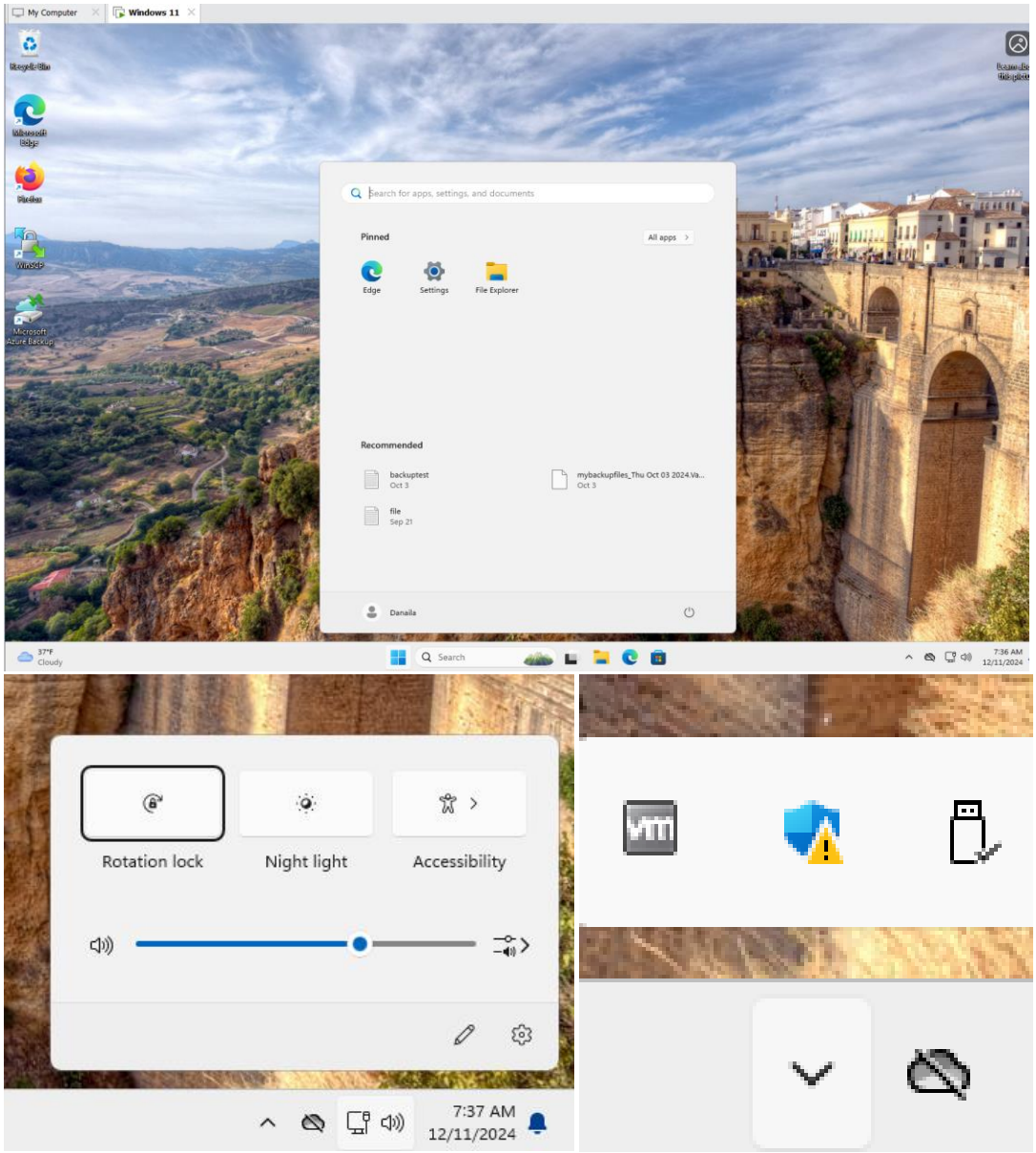
What operating systems run on these consoles?
PlayStation 5 uses Orbis OS and Xbox Series X uses Xbox OS which is based on Windows 10.

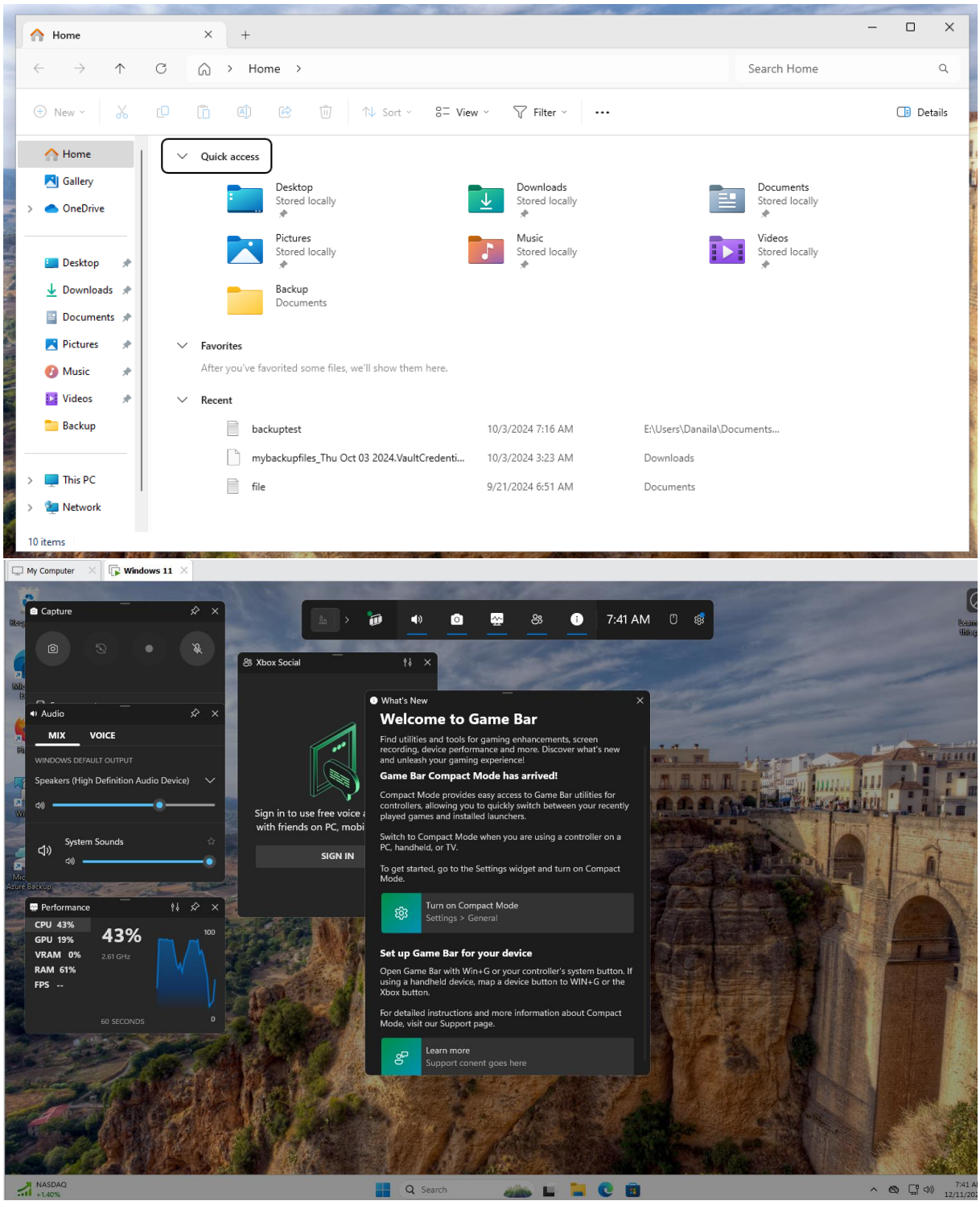
What conclusion can you draw from the answer to the previous question?
Orbis OS is based on Unix and Xbox is based on Windows

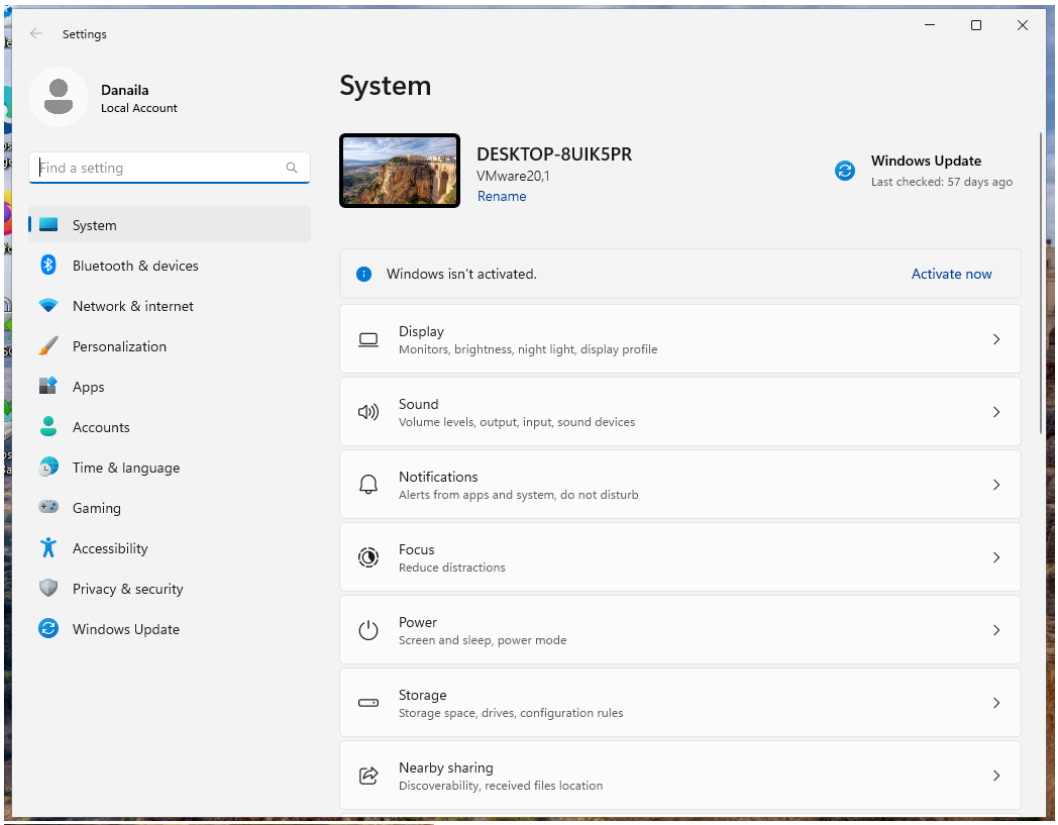
Assignment 5.3: Working with Windows

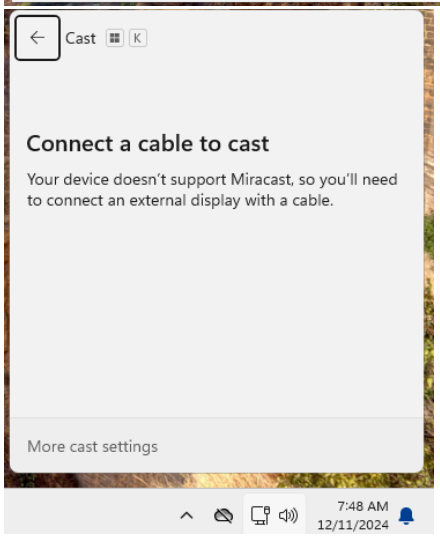
Take relevant screenshots of the assignments below

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.



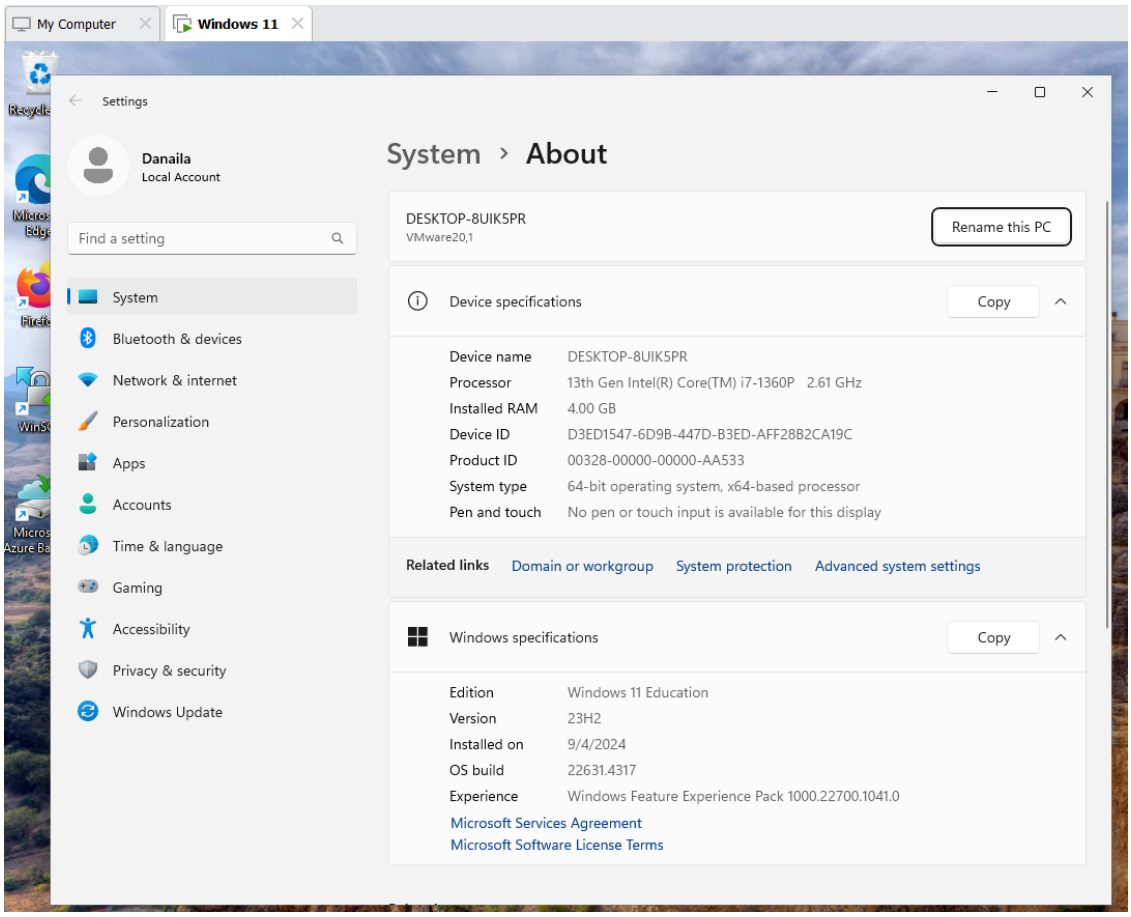

Home
Search Home
New
Sort
View
Filter
Details
Quick access
Desktop
Stored locally
Downloads
Stored locally
Documents
Stored locally
Pictures
Stored locally
Music
Stored locally
Videos
Stored locally
Backup
Documents
Favorites
After you've favorited some files, we'll show them here.
Recent
backuptest
10/3/2024 7:16 AM
E:\Users\Danaila\Documents...
mybackupfiles_Thu Oct 03 2024.VaultCredenti...
10/3/2024 3:23 AM
Downloads
file
9/21/2024 6:51 AM
Documents
10 items
Home
Gallery
OneDrive
Desktop
Downloads
Documents
Pictures
Music
Videos
Backup
This PC
Network
My Computer
Windows 11
Capture
Audio
MIX
VOICE
WINDOWS DEFAULT OUTPUT
Speakers (High Definition Audio Device)
System Sounds
Performance
CPU 43%
GPU 19%
VRAM 0%
RAM 61%
FPS --
43%
2.61 GHz
60 SECONDS
Xbox Social
SIGN IN
7:41 AM
What's New
Welcome to Game Bar
Find utilities and tools for gaming enhancements, screen recording, device performance and more. Discover what's new and unleash your gaming experience!
Game Bar Compact Mode has arrived!
Compact Mode provides easy access to Game Bar utilities for controllers, allowing you to quickly switch between your recently played games and installed launchers.
Switch to Compact Mode when you are using a controller on a PC, handheld, or TV.
To get started, go to the Settings widget and turn on Compact Mode.
Turn on Compact Mode
Settings > General
Set up Game Bar for your device
Open Game Bar with Win+G or your controller's system button. If using a handheld device, map a device button to WIN+G or the Xbox button.
For detailed instructions and more information about Compact Mode, visit our Support page.
Learn more
Support conent goes here
Search



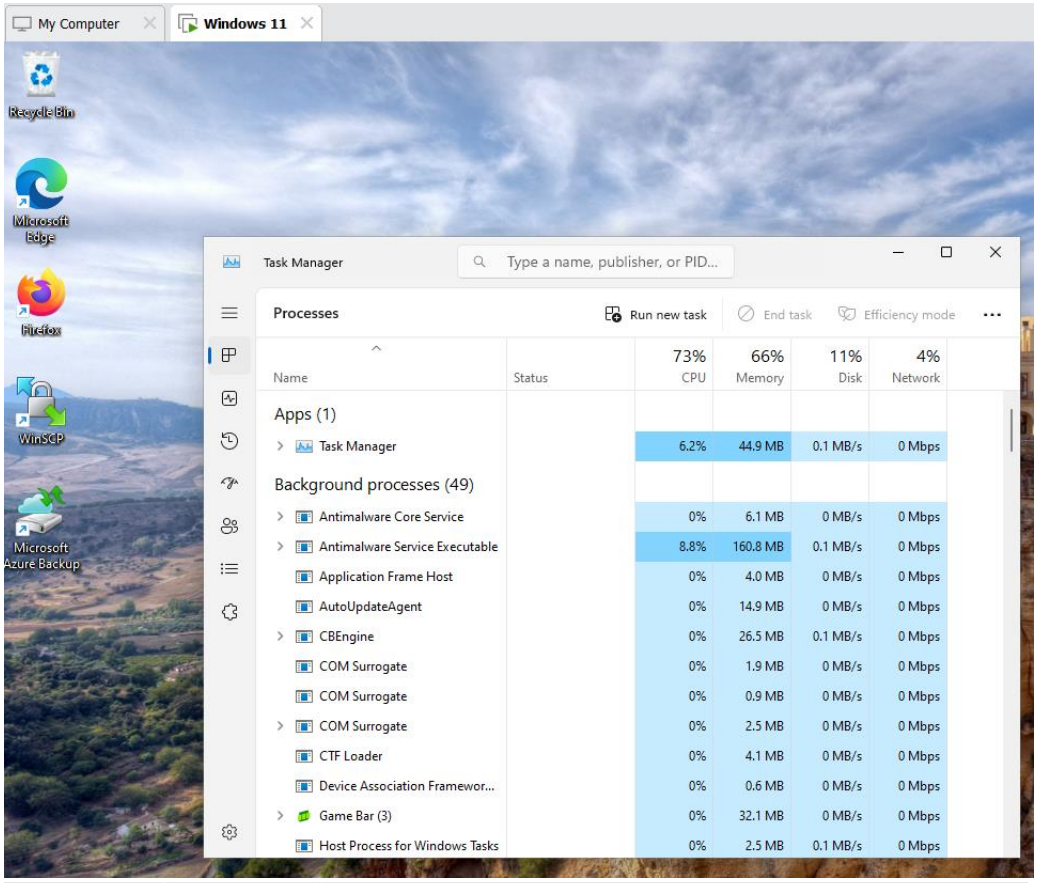


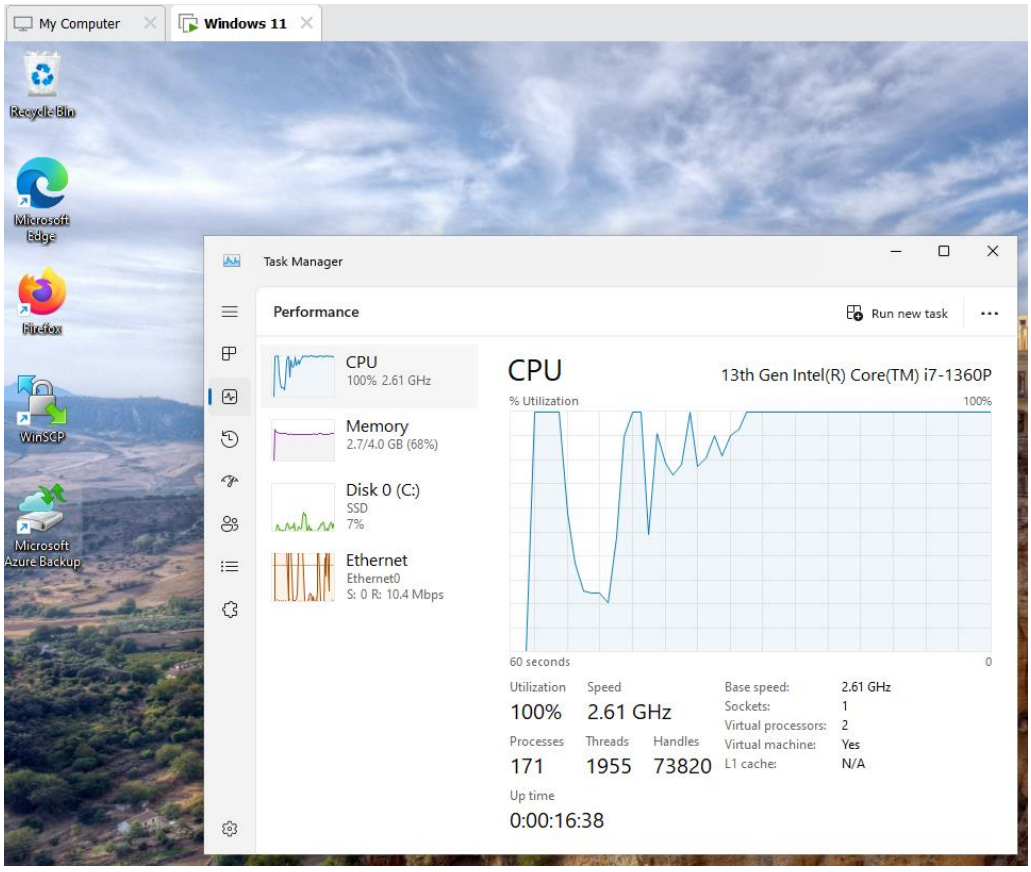
b) The file explorer can be opened with ⊞ + E, Which key combination could you also use?

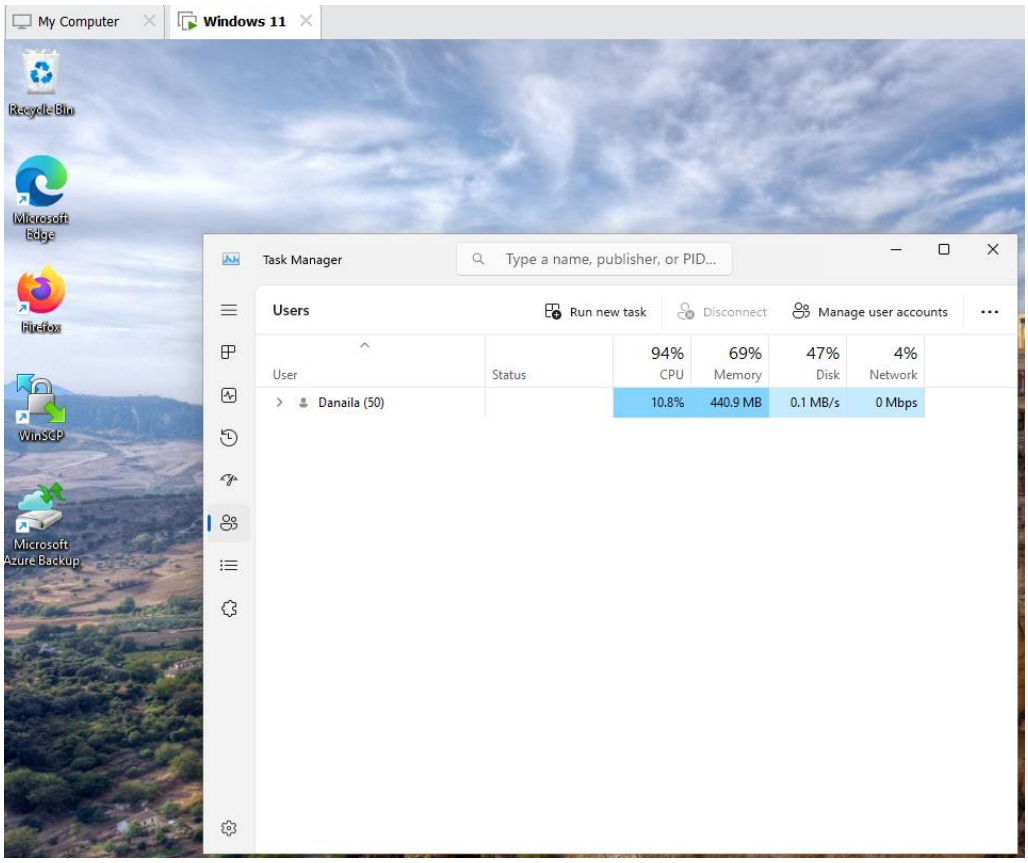
c) Open the system properties with a ⊞ key combination, take a screenshot of the open screen. Paste this screenshot into this template.



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.


My Computer
Windows 11
Recycle Bin
Microsoft Edge
Firefox
WinSCP
Microsoft Azure Backup
Task Manager
Type a name, publisher, or PID...
Processes
Run new task
End task
Efficiency mode
Name
Status
73% CPU
66% Memory
11% Disk
4% Network
Apps (1)
Task Manager 6.2% 44.9 MB 0.1 MB/s 0 Mbps
Background processes (49)
Antimalware Core Service 0% 6.1 MB 0 MB/s 0 Mbps
Antimalware Service Executable 8.8% 160.8 MB 0.1 MB/s 0 Mbps
Application Frame Host 0% 4.0 MB 0 MB/s 0 Mbps
AutoUpdateAgent 0% 14.9 MB 0 MB/s 0 Mbps
CBEngine 0% 26.5 MB 0.1 MB/s 0 Mbps
COM Surrogate 0% 1.9 MB 0 MB/s 0 Mbps
COM Surrogate 0% 0.9 MB 0 MB/s 0 Mbps
COM Surrogate 0% 2.5 MB 0 MB/s 0 Mbps
CTF Loader 0% 4.1 MB 0 MB/s 0 Mbps
Device Association Framewor... 0% 0.6 MB 0 MB/s 0 Mbps
Game Bar (3) 0% 32.1 MB 0 MB/s 0 Mbps
Host Process for Windows Tasks 0% 2.5 MB 0.1 MB/s 0 Mbps


My Computer
Windows 11
Recycle Bin
Microsoft Edge
Firefox
WinSCP
Microsoft Azure Backup
Task Manager
Performance
Run new task
CPU
100% 2.61 GHz
Memory
2.7/4.0 GB (68%)
Disk 0 (C:)
SSD
7%
Ethernet
Ethernet0
S: 0 R: 10.4 Mbps
CPU
13th Gen Intel(R) Core(TM) i7-1360P
% Utilization
100%
60 seconds
0
Utilization
100%
Speed
2.61 GHz
Processes
171
Threads
1955
Handles
73820
Up time
0:00:16:38
Base speed: 2.61 GHz
Sockets: 1
Virtual processors: 2
Virtual machine: Yes
L1 cache: N/A



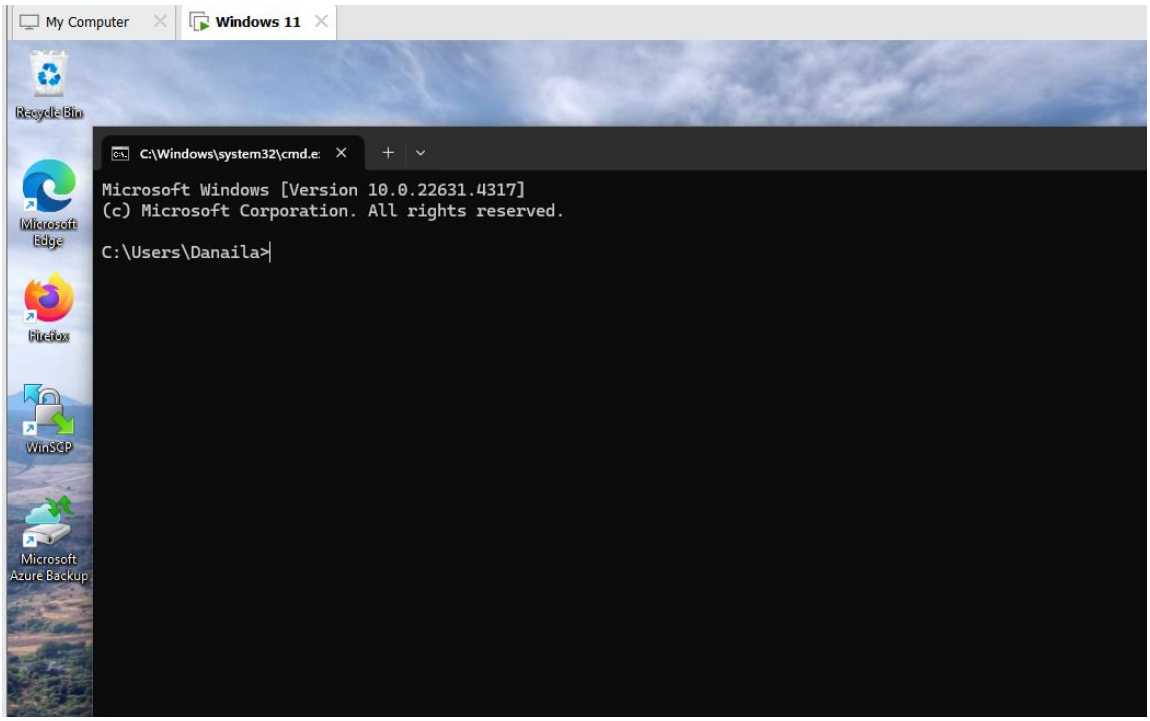
e) If you're giving a PowerPoint presentation and you connect your laptop to a projector, Windows can use the projector as a second screen. For example, you may have Outlook open on your first screen that you don't show over the projector, while the PowerPoint presentation is displayed on the projector,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

Windows key and 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 and 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.

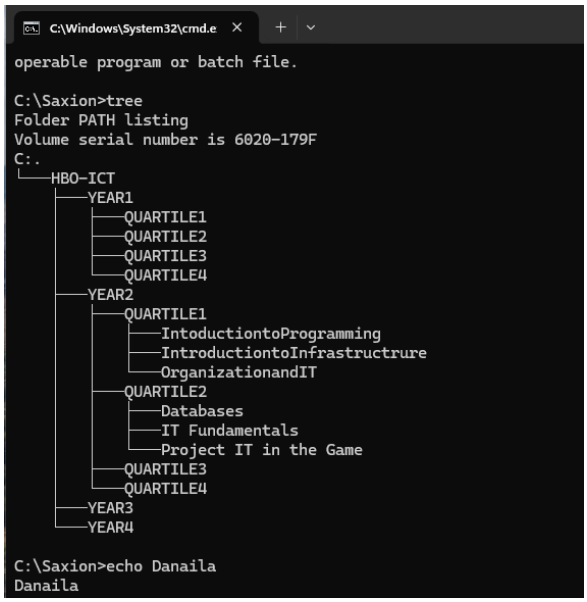


Working in the File Explorer

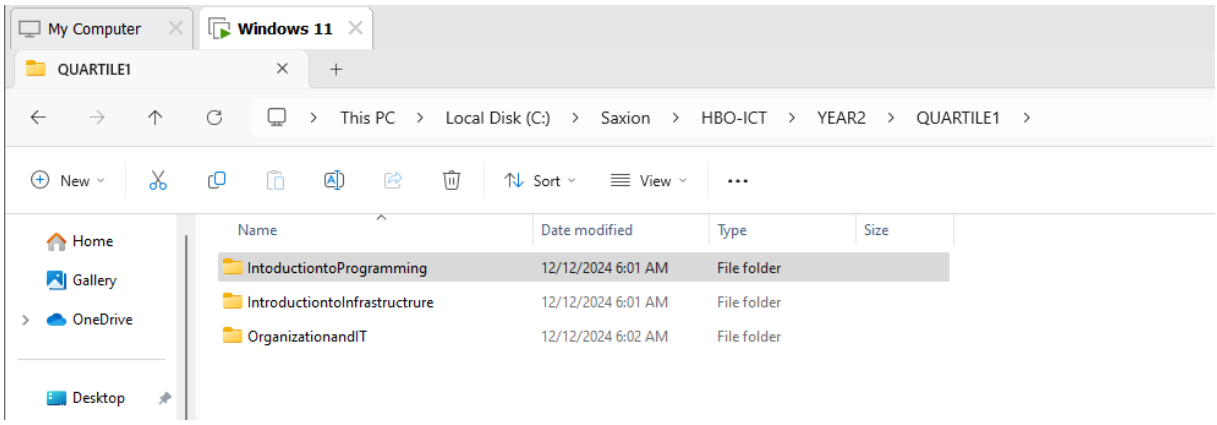
Relevant screenshots **copy** command:

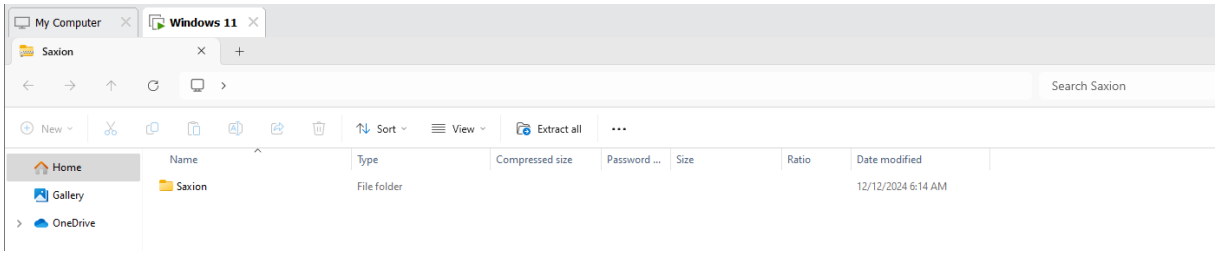
```
C:\Saxion>copy Wave.png HBO-ICT\YEAR1\QUARTILE1\IntroductiontoProgramming
        1 file(s) copied.

C:\Saxion>copy Plug.png HBO-ICT\YEAR1\QUARTILE1\IntroductiontoInfrastructure
        1 file(s) copied.

C:\Saxion>copy Tumble.png HBO-ICT\YEAR1\QUARTILE1\OrganizationandIT
        1 file(s) copied.

C:\Saxion>
```

Relevant screenshots **tree** command:



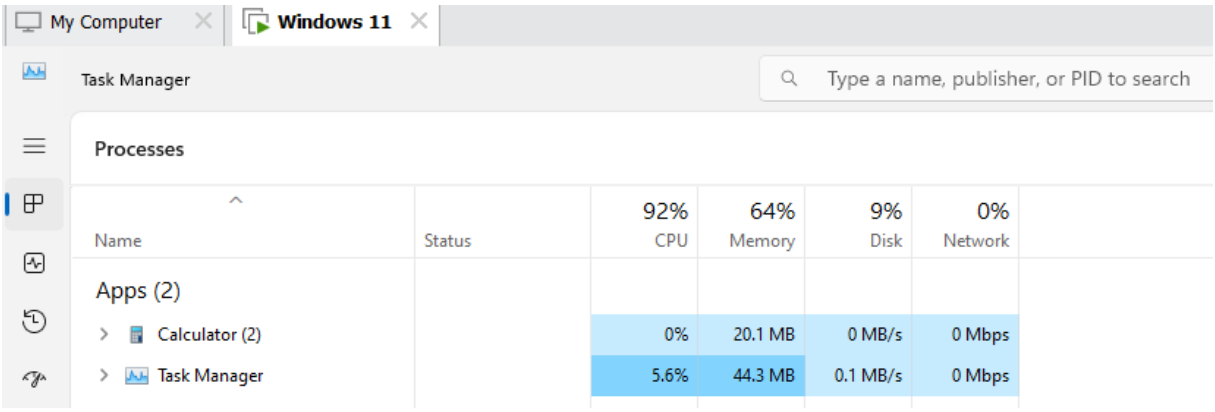
Relevant screenshots in the file explorer of the folder c:\Saxion + created zip file.





Terminating Processes

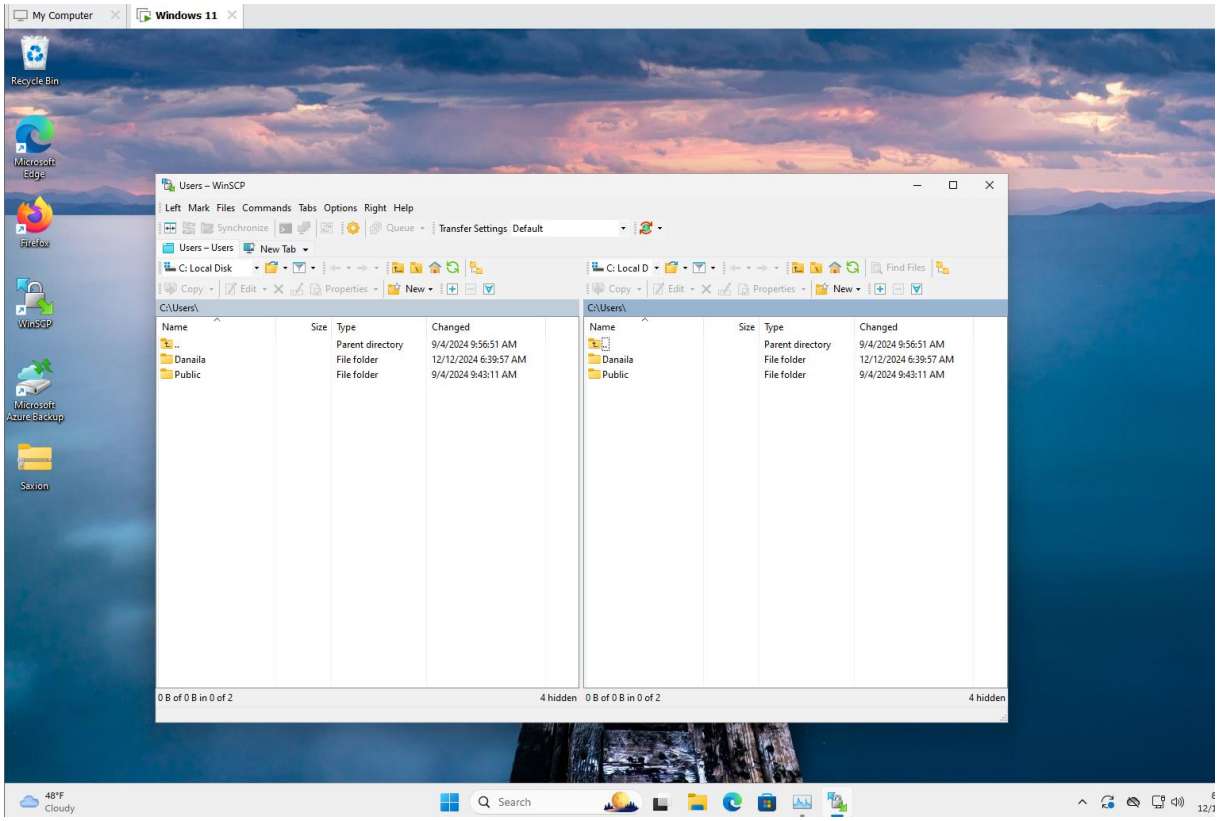
Relevant Screenshots Task Manager Window:



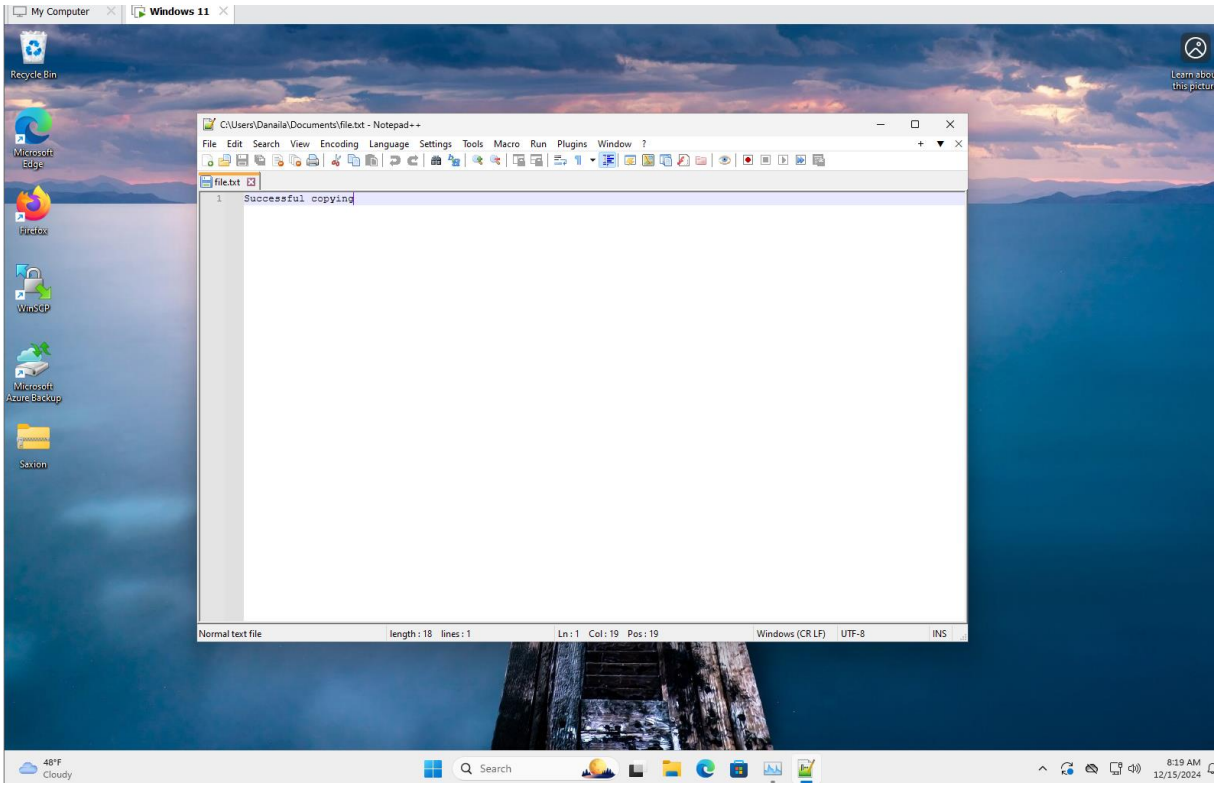
Install Software

Relevant screenshots that the following software is installed:

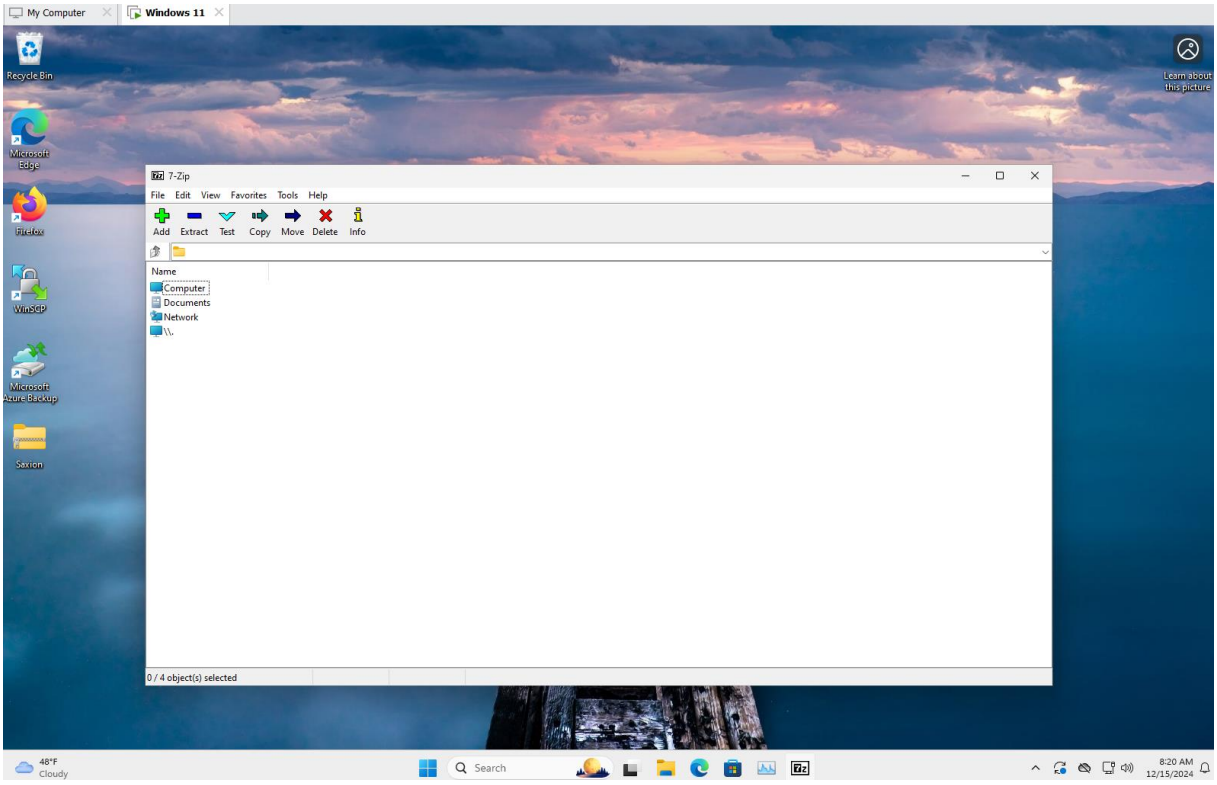
- WinSCP



- Notepad++

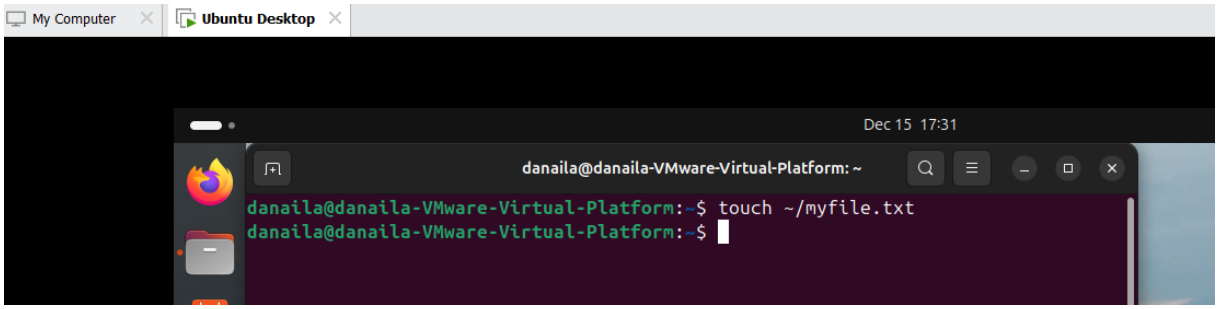

My Computer
Windows 11
Recycle Bin
Microsoft Edge
Firefox
WinSCP
Microsoft Azure Backup
Saxion
C:\Users\Danaila\Documents\file.txt - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
file.txt
1 Successful copying
Normal text file length : 18 lines : 1 Ln : 1 Col : 19 Pos : 19 Windows (CR LF) UTF-8 INS
48°F Cloudy
Search
8:19 AM 12/15/2024

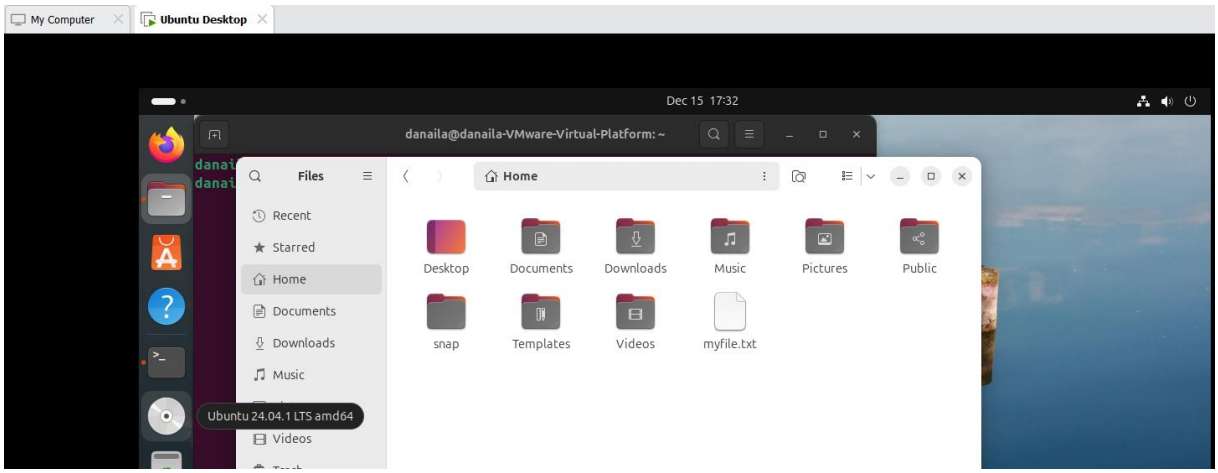
- 7zip

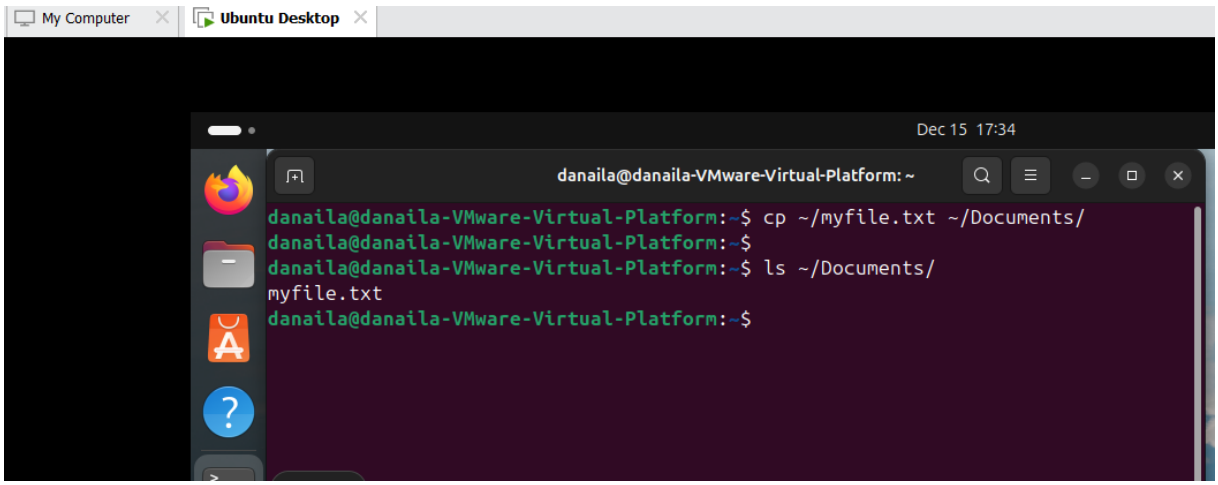

My Computer
Windows 11
Recycle Bin
Microsoft Edge
Firefox
WinSCP
Microsoft Azure Backup
Saxion
7-Zip
File Edit View Favorites Tools Help
Add Extract Test Copy Move Delete Info
Name
Computer
Documents
Network
\\.
0 / 4 object(s) selected
48°F Cloudy
Search
8:20 AM 12/15/2024

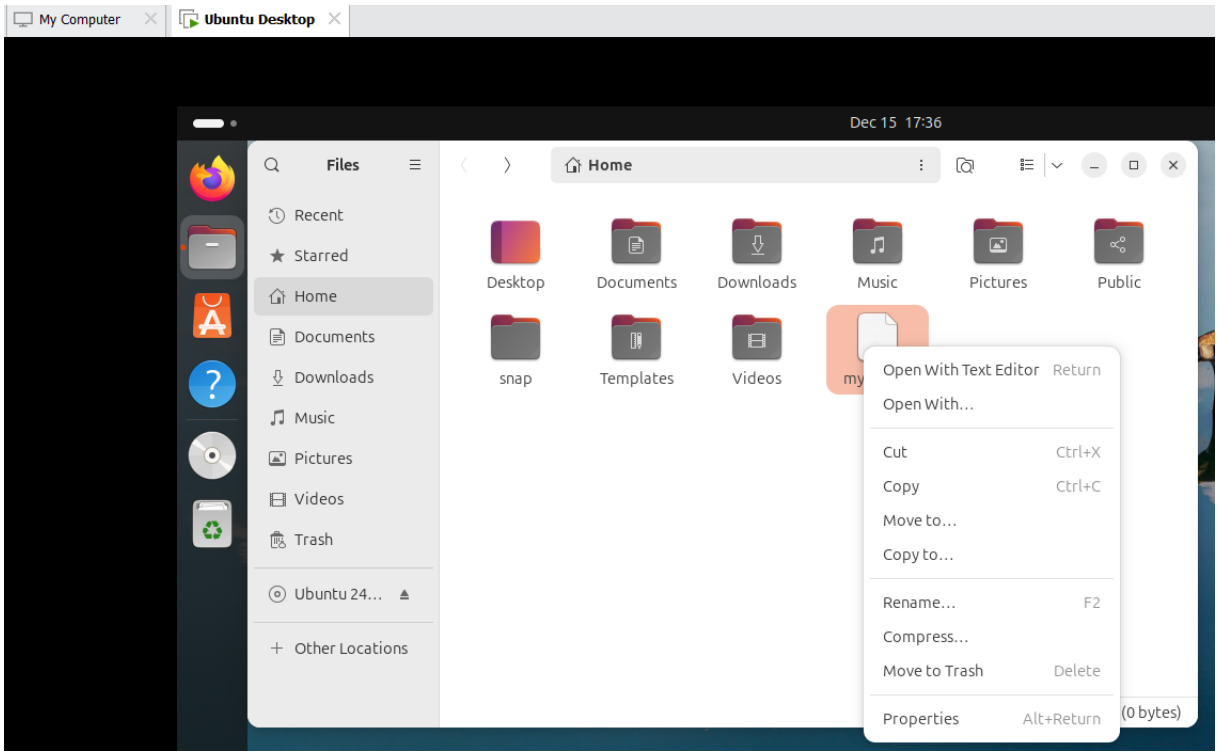
Assignment 5.4: Working with Linux

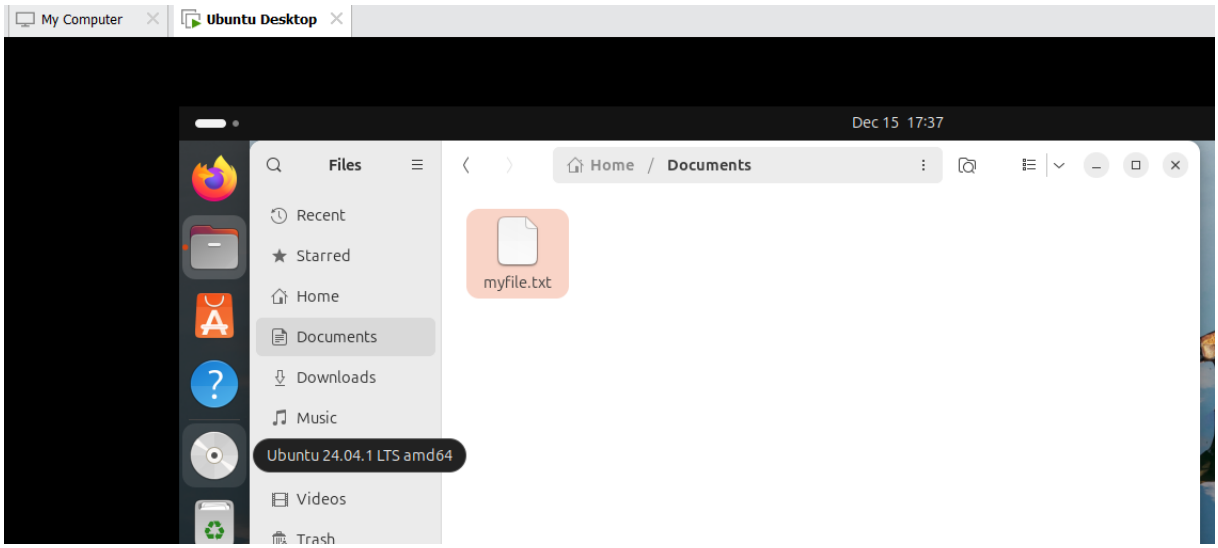
Relevant screenshots + motivation

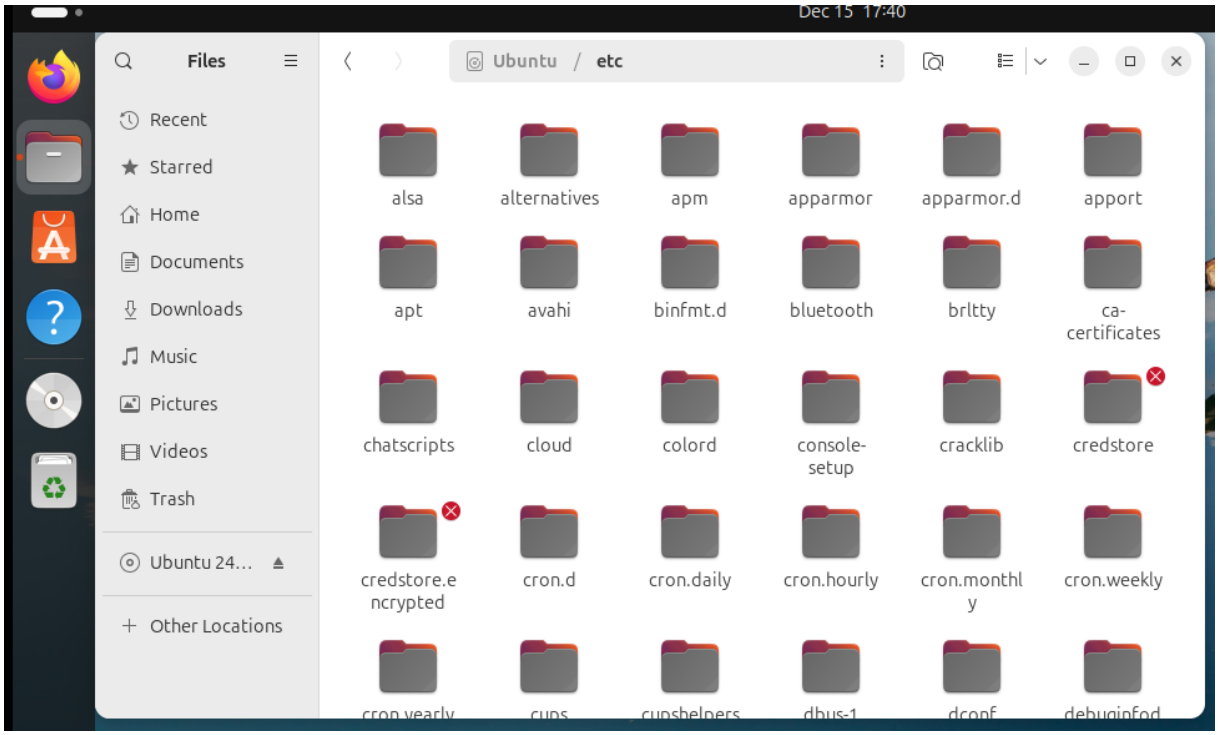


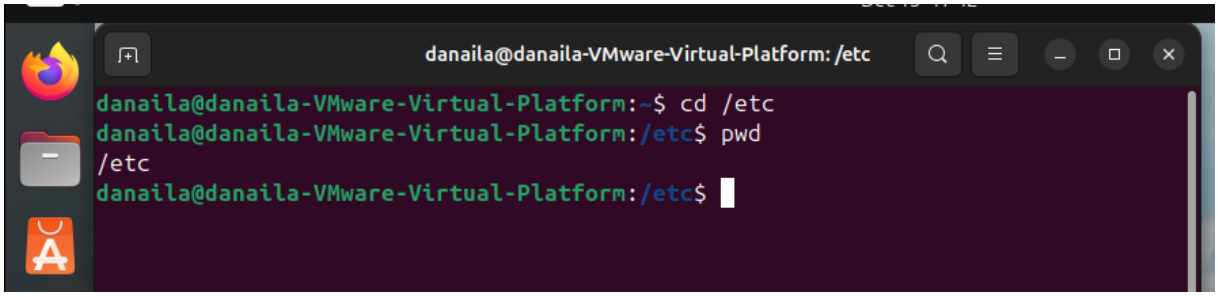


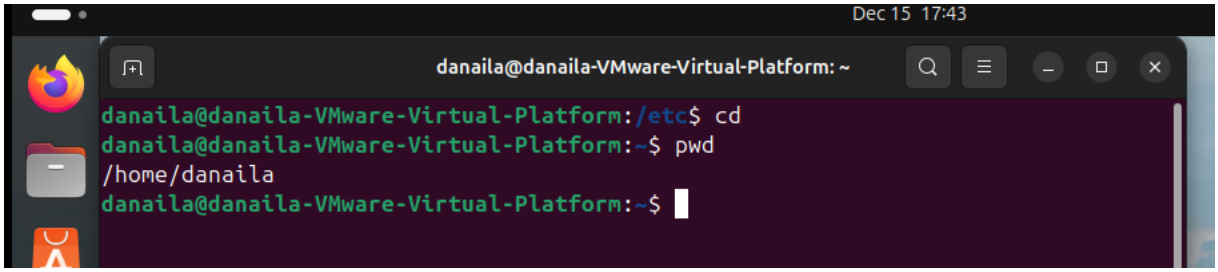



My Computer
Ubuntu Desktop
Dec 15 17:36
Files
Home
Recent
Starred
Home
Documents
Downloads
Music
Pictures
Videos
Trash
Ubuntu 24...
Other Locations
Desktop
Documents
Downloads
Music
Pictures
Public
snap
Templates
Videos
Open With Text Editor Return
Open With...
Cut Ctrl+X
Copy Ctrl+C
Move to...
Copy to...
Rename... F2
Compress...
Move to Trash Delete
Properties Alt+Return
(0 bytes)


My Computer
Ubuntu Desktop
Dec 15 17:37
Files
Home / Documents
Recent
Starred
Home
Documents
Downloads
Music
Ubuntu 24.04.1 LTS amd64
Videos
Trash
myfile.txt

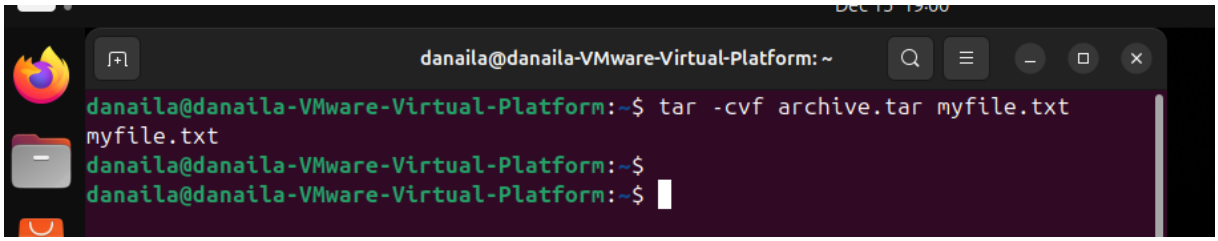


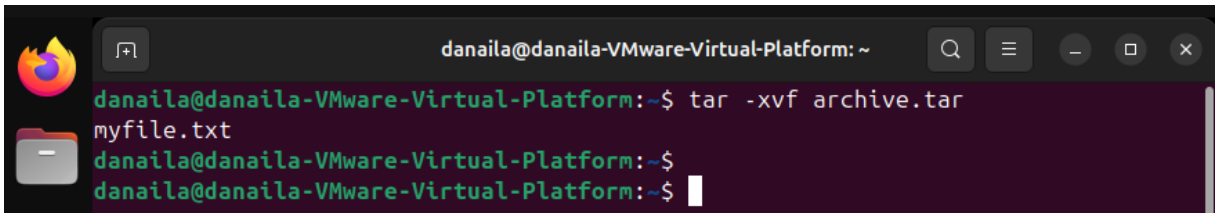


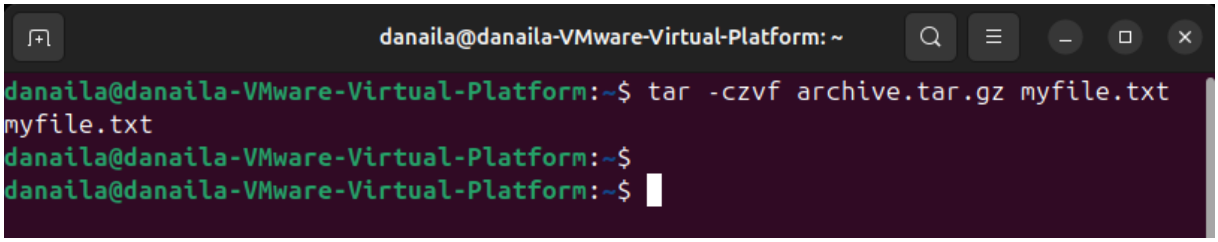


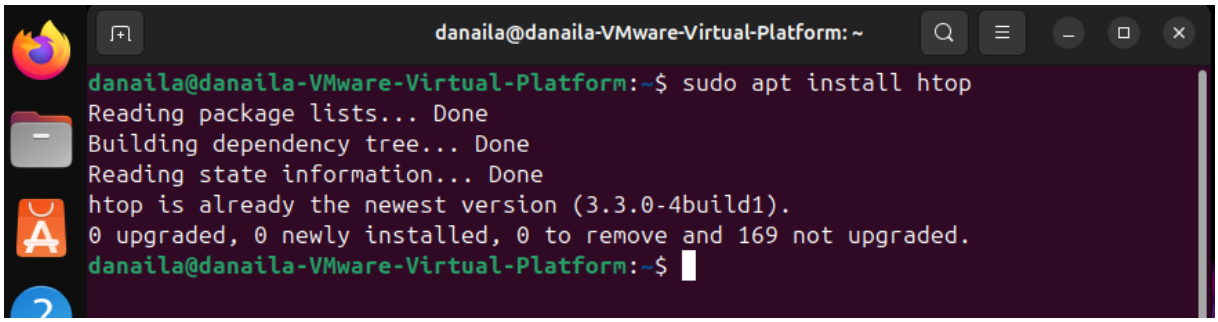
One significant difference in Linux's file structure compared to Windows is that Linux has different directories under the root directory “/” while on Windows the files are stored in different directories on different drives such as D: or C:

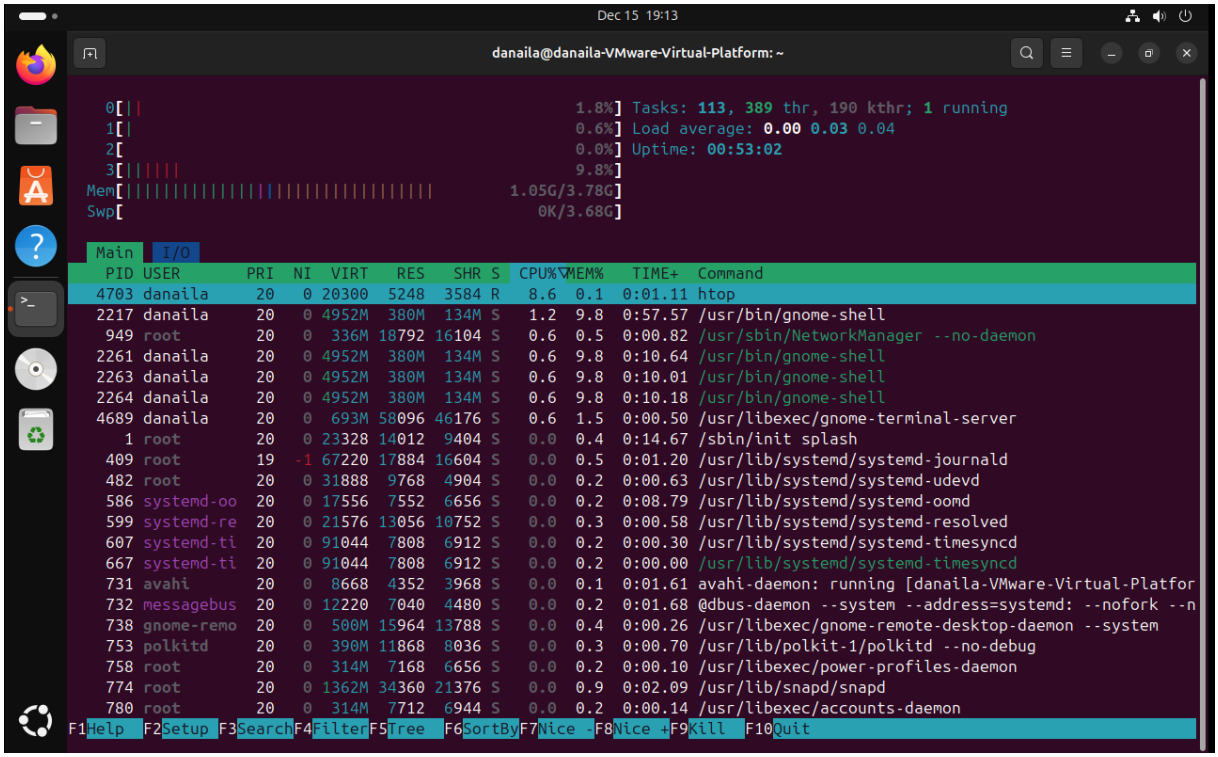
The /etc directory in Linux is used for storing the system configuration files and settings



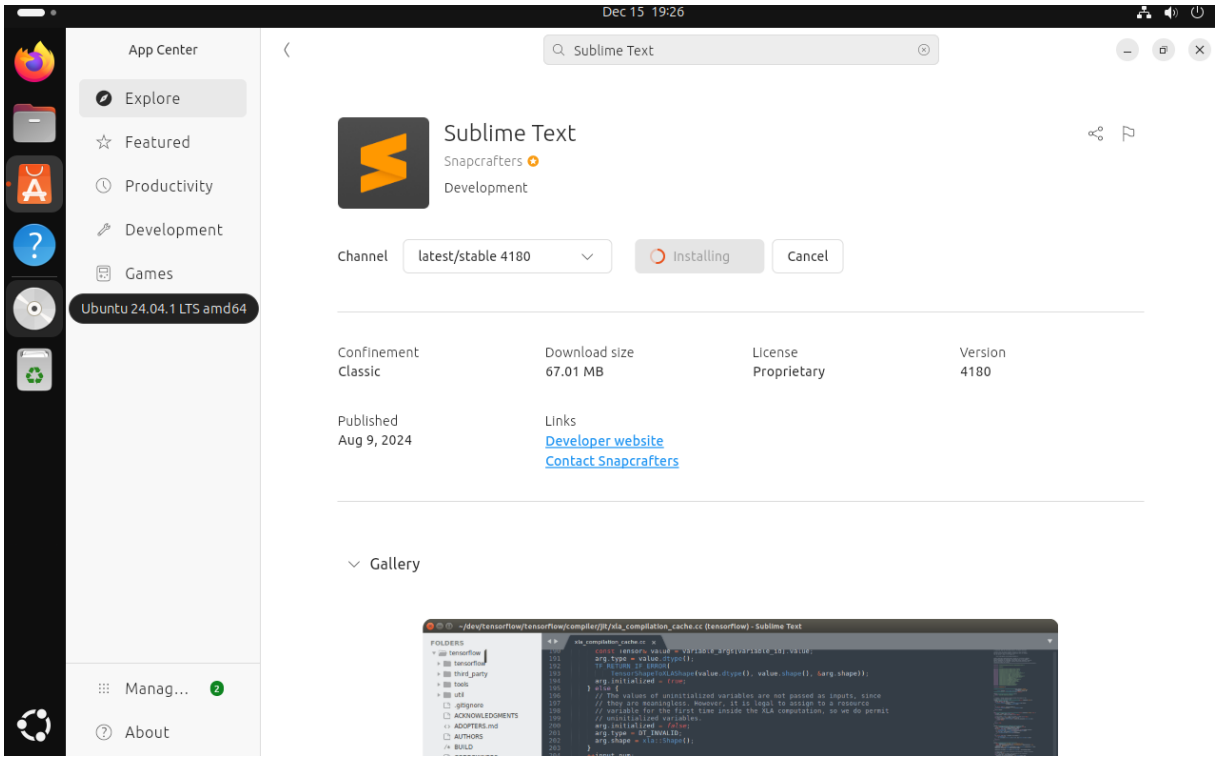


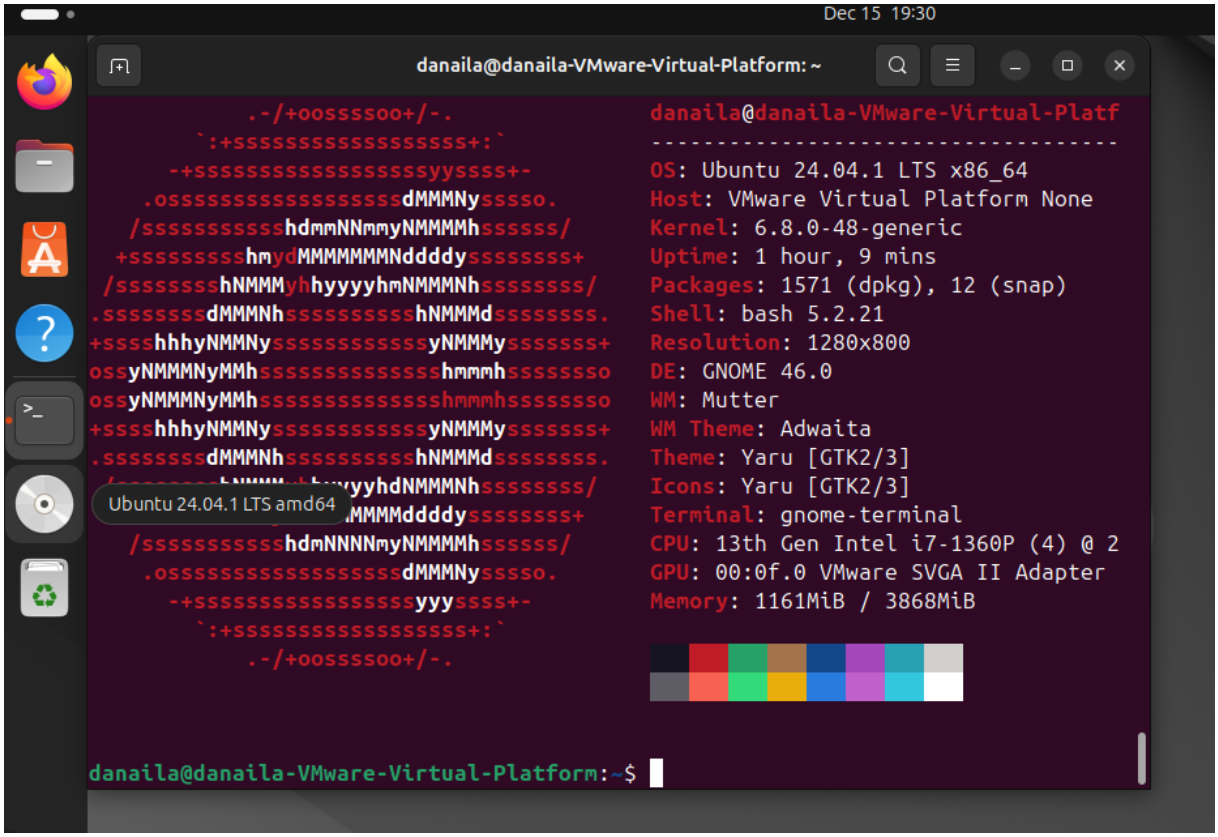






The HTOP application displayes all the processes that are running at the moment on the virtual machine.

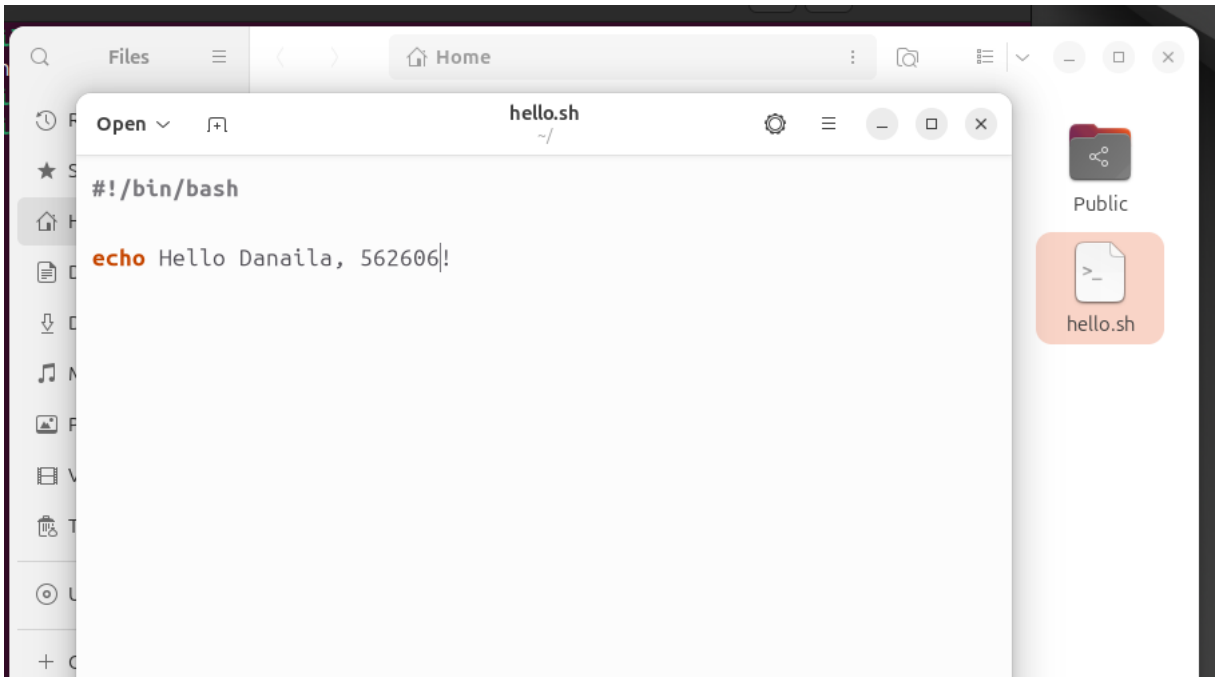




Neofetch displayes information about the installed system with the logo of the Linus distribution.

Assignment 5.5: Users and permissions on Linux

Relevant screenshots + motivation




```
danaila@danaila-VMware-Virtual-Platform:~$ chmod +x ~/hello/hello.sh
danaila@danaila-VMware-Virtual-Platform:~$ ls ~/hello/
hello.sh
danaila@danaila-VMware-Virtual-Platform:~$
```

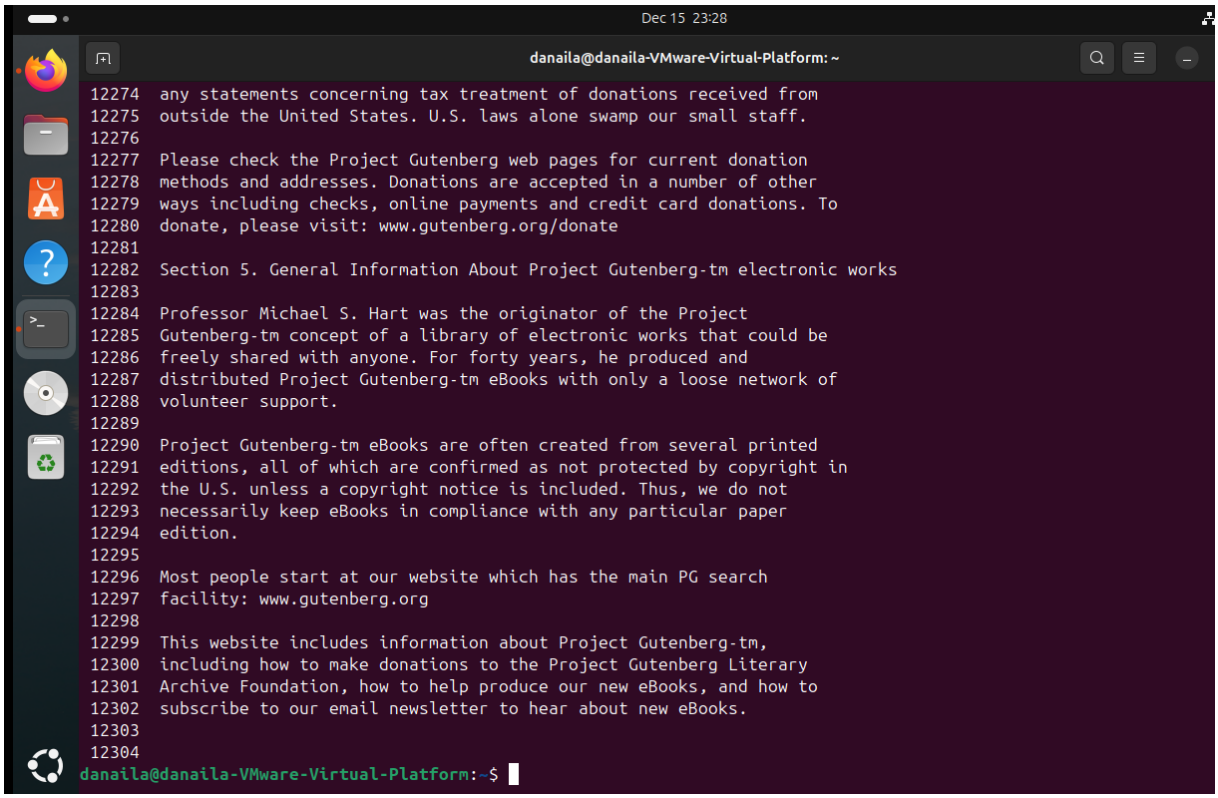
```
danaila@danaila-VMware-Virtual-Platform:~$ cd ~/hello/
danaila@danaila-VMware-Virtual-Platform:~/hello$ ./hello.sh
Hello Danaila, 562606!
danaila@danaila-VMware-Virtual-Platform:~/hello$
```

You can make the file executable only for the logged in user with the command:

chmod u+x hello.sh

Assignment 5.6: View the contents of files

Relevant screenshots + motivation




```
danaila@danaila-VMware-Virtual-Platform:~$ wc -w sherlock.txt
107560 sherlock.txt
danaila@danaila-VMware-Virtual-Platform:~$
```

```
danaila@danaila-VMware-Virtual-Platform:~$ wc -m sherlock.txt
593837 sherlock.txt
danaila@danaila-VMware-Virtual-Platform:~$
```

```
danaila@danaila-VMware-Virtual-Platform: ~
danaila@danaila-VMware-Virtual-Platform:~$ grep -i "kingdom" sherlock.txt
“I tell you that I would give one of the provinces of my kingdom to
And that was how a great scandal threatened to affect the kingdom of
danaila@danaila-VMware-Virtual-Platform:~$ grep -n "kingdom" sherlock.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
danaila@danaila-VMware-Virtual-Platform:~$
```

Assignment 5.7: Digital forensics

Relevant screenshots + motivation

```
danaila@danaila-VMware-Virtual-Platform:~$ exiftool ~/oldcar.jpeg
ExifTool Version Number         : 12.76
File Name                       : oldcar.jpeg
Directory                       : /home/danaila
File Size                       : 2.4 MB
File Modification Date/Time     : 2024:12:16 22:14:01+01:00
File Access Date/Time           : 2024:12:16 22:14:01+01:00
File Inode Change Date/Time     : 2024:12:16 22:14:08+01:00
File Permissions                : -rw-rw-r--
File Type                       : JPEG
File Type Extension             : jpg
MIME Type                       : image/jpeg
JFIF Version                    : 1.01
Exif Byte Order                 : Big-endian (Motorola, MM)
Make                            : motorola
Camera Model Name               : moto g(6) play
```

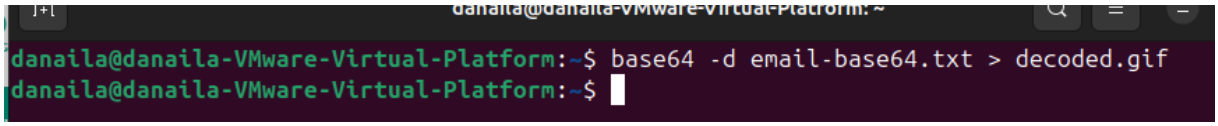

The photo was taken by a Motorola phone.

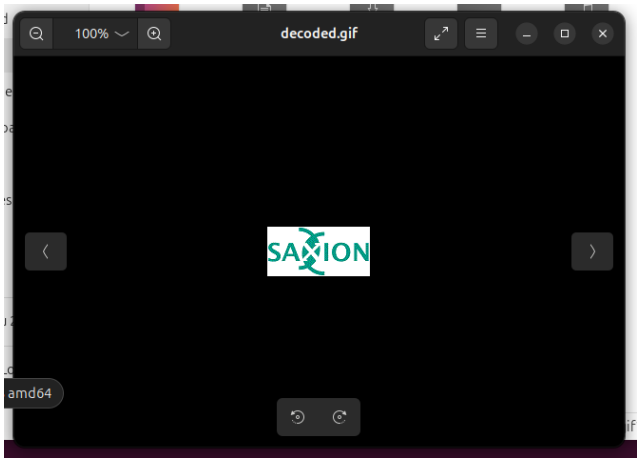
```
GPS Version ID                  : 2.2.0.0
GPS Latitude Ref                : North
GPS Longitude Ref               : East
GPS Altitude Ref                : Above Sea Level
GPS Time Stamp                  : 14:08:57
GPS Map Datum                   : WGS-84
GPS Processing Method           : ASCII
GPS Date Stamp                  : 2020:11:07
Compression                     : JPEG (old-style)
Thumbnail Offset                : 2862
Thumbnail Length                : 59453
Image Width                     : 4160
Image Height                    : 3120
Encoding Process                : Baseline DCT, Huffman coding
Bits Per Sample                 : 8
Color Components                : 3
Y Cb Cr Sub Sampling            : YCbCr4:2:0 (2 2)
Aperture                        : 2.0
Image Size                      : 4160x3120
Megapixels                      : 13.0
Shutter Speed                   : 1/33
Thumbnail Image                 : (Binary data 59453 bytes, use -b option to extract)
GPS Altitude                    : 42 m Above Sea Level
GPS Date/Time                   : 2020:11:07 14:08:57Z
GPS Latitude                    : 53 deg 11' 39.68" N
GPS Longitude                   : 6 deg 32' 12.90" E
Focal Length                    : 3.5 mm
GPS Position                    : 53 deg 11' 39.68" N, 6 deg 32' 12.90" E
```

The photo is taken in Groningen.

```
danaila@danaila-VMware-Virtual-Platform: ~
danaila@danaila-VMware-Virtual-Platform:~$ file oldcar
oldcar: JPEG image data, JFIF standard 1.01, aspect ratio, density 1x1, segment length 16, Exif Standard: [TIFF image da
ta, big-endian, direntries=10, manufacturer=motorola, model=moto g(6) play, xresolution=160, yresolution=168, resolution
unit=2, software=aljeter-user 9 PPPS29.55-35-18-7 6a0d0 release-keys, datetime=2020:11:07 15:08:57, GPS-Data], baseline,
 precision 8, 4160x3120, components 3
```

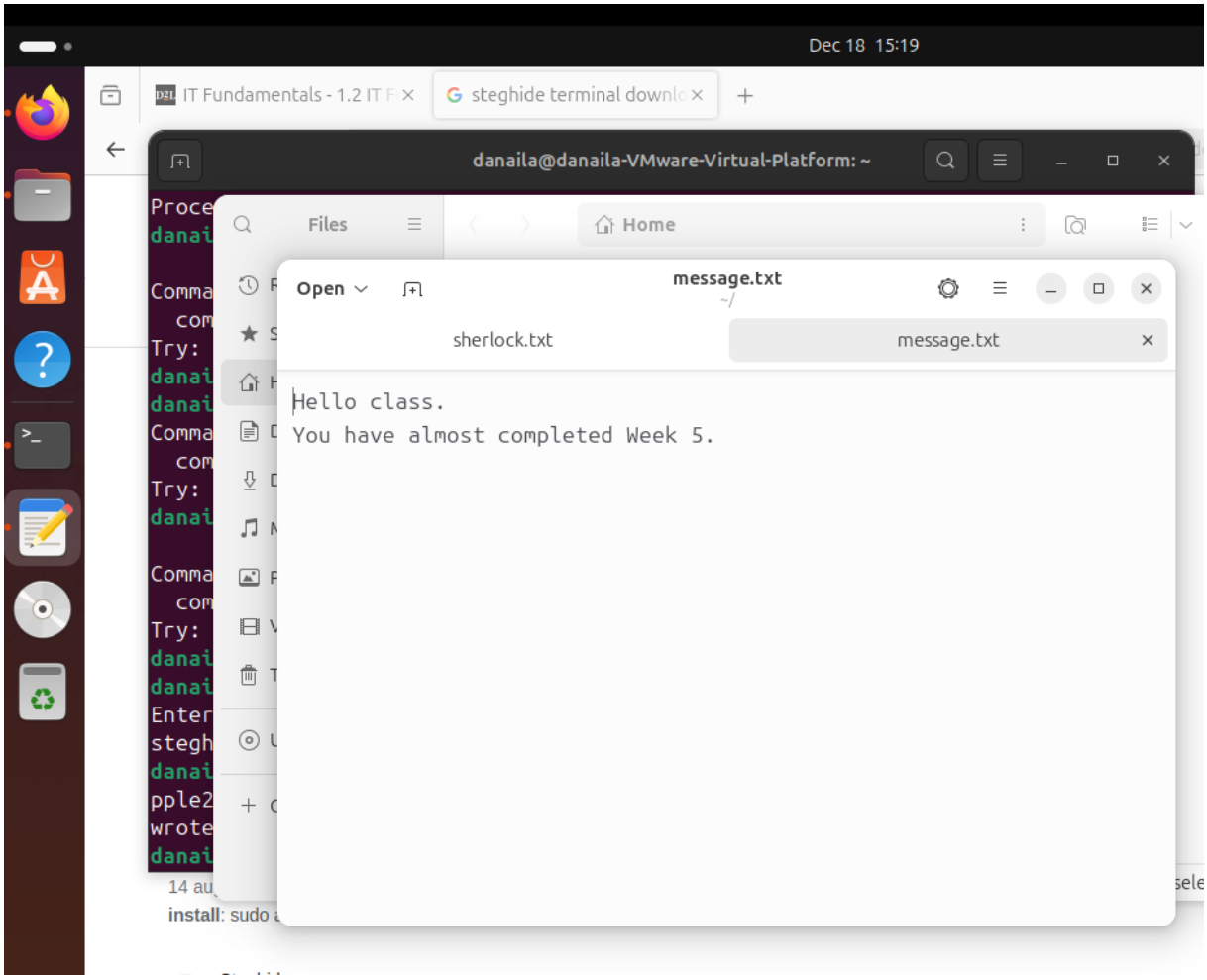
Yes, Ubuntu still considers the photo a jpeg picture even after deleting .jpeg from the name of the file.





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.

Ready? Save this file and export it as a pdf file with the name: **week5.pdf**