Template Week 5 – Operating Systems

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Assignment 5.1: Unix-like

a) Find out what the difference is between UNIX and unix-like operating systems?
   UNIX is a specific trademarked OS while unix-like refers to OS that behave like UNIX but aren't certified or not directly derived.

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 is one of the creators of UNIX and worked for Bell Labs he also created the B programming language

Dennis Ritchie is the co creator of UNIX and created the C programming language which was influenced by the B programming language.

Bill Joy was one of the main developers of BSD a UNIX variant.

Richard Stallman is the Founder of the GNU project and made tools like GCC a compiler

Linus Torvalds is the creator of the Linux kernal and using and combing GNU tools Linux became a full operating system. He also wrote Git a widely used version control system.

c) What is the philosophy of the GNU movement?
   They Believe that software should be free (as in freedom not in price).
   Their core principles are: "(0) to run the program, (1) to study and change the program in source code form, (2) to redistribute exact copies, and (3) to distribute modified versions."

d) Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement? Please explain your answer.
   Mostly yes as ubunut is based on Linux and uses GNU tools and its open source and free to use. However ubuntu sometimes includes proprietaty drivers(e.g graphics drivers) or software. These of course are optional.

e) Find out what is the Windows Subsystem for Linux?
   Windows Subsystem Linux or WSL for short is Linux environment directly on windows without using a VM. With WSL you can run Linux command line tools its mainly used by developers to work and compile code.

f) Find out, which operating system family belongs to Android, iOS and ChromeOS?
   Android and ChromeOS both belong to the Linux family both use Linux kernel developed by google while iOS belong to Unix or unix-like family and is based on Darwin which comes from BSD UNIX

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 computers desgined to perform massive amounts of calculations far faster than ordinary computers. They are used to solve complex problems where speed and data processing are critical. Like scientific reserach or simulating weather and climate models some are also used for national security and even beat a chess grandmaster

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 PS3 cluster consists of many PS3 consoles connected together to act as a high performance computing cluster because the PS3's CPU was powerful for its time and supported Linux. One famous example of a PS3 cluster is the Condor cluster using 1,760 PS3 it was built by the US air force for radar enhancement and image processing.

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?

    They used 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/
    I mean a Raspberry Pi supercomputer with over 1000 nodes would probably be i the gigaflops far below petaflops thus my assumption is that its not on the list.

e) What CPU architecture is used for the PlayStation 5 and Xbox Series X? They both use AMD zen 2 CPU architecture with 8 cores and 16 threads.
    What operating systems run on these consoles? The PS5 uses a custom Sony Operating System while the Xbox series X uses Microsoft Xbox software, an OS related to Windows but tailored for console
    What conclusion can you draw from the answer to the previous question?
    Even though both consoles use very similar CPU architecture they both run their own proprietary operating system designed for console gaming.

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? Either ⊞ + Shift + E or ⊞ + R and type explorer and enter

c) Open the system properties with a ⊞ key combination, take a screenshot of the open screen. Paste this screenshot into this template. The key is ⊞ + Pause
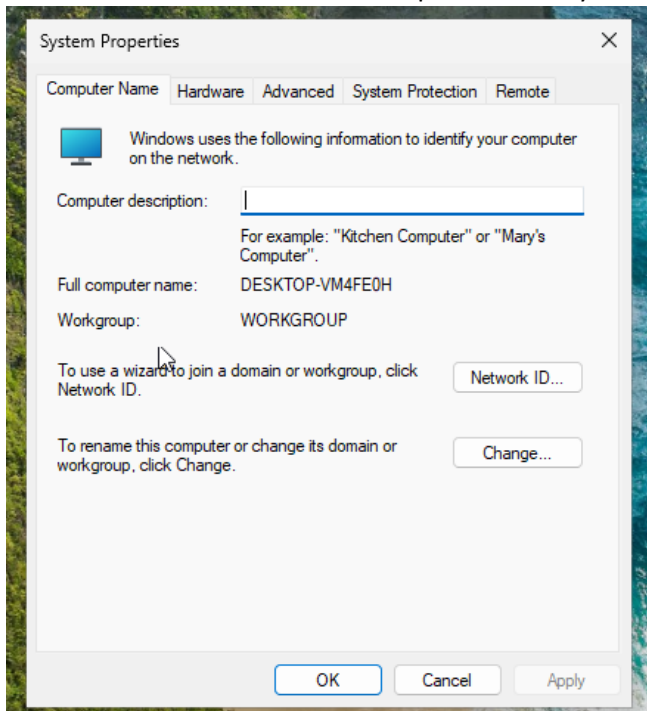
d) Open task manager with a key combination. Take screenshots of the tabs: processes (shows active processes), performance, and users. Place these three screenshots in this template. The key combination is Ctrl +Shift +Esc
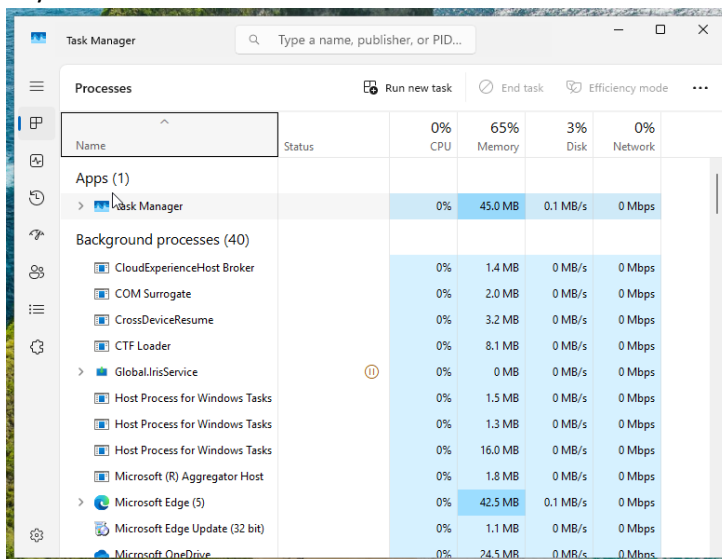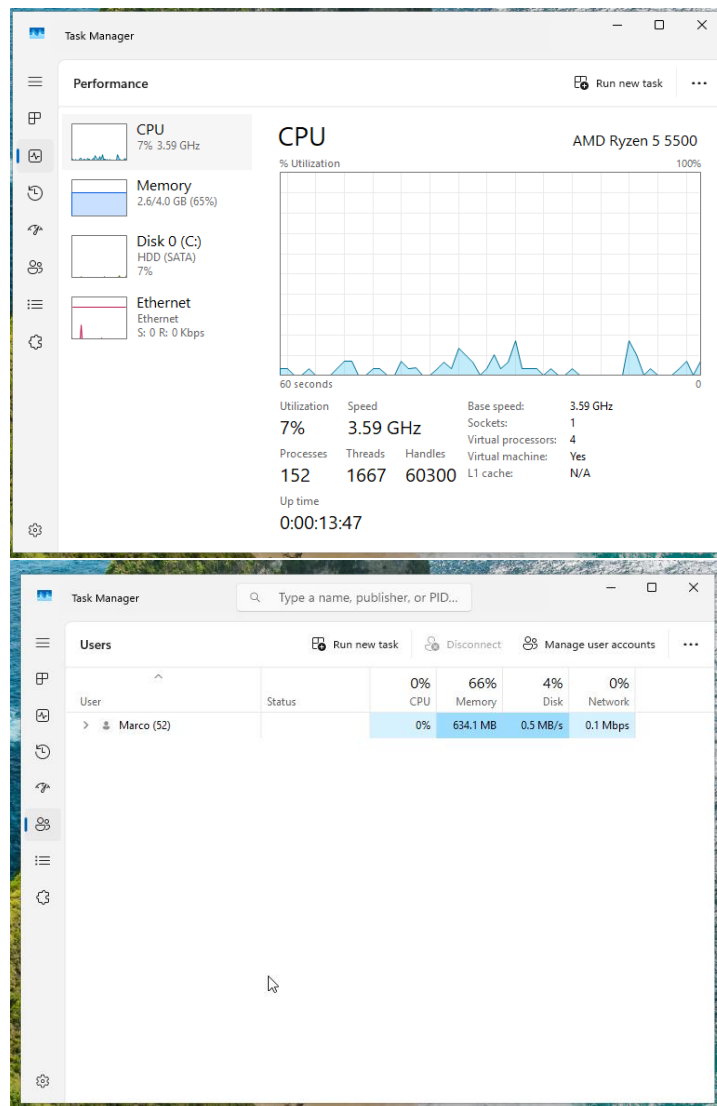
e) If you're giving a PowerPoint presentation and you connect your laptop to a projector, Windows can use the projector as a second screen. For example, you may have Outlook open on your first screen that you don't show over the projector, while the PowerPoint presentation is displayed on the projector, or the second screen. Which key combination should you use for this? ⊞ + 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? ⊞ + 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. ⊞ +R
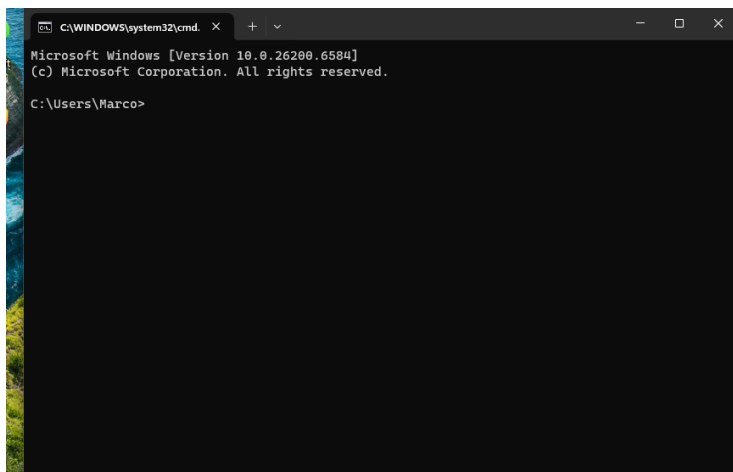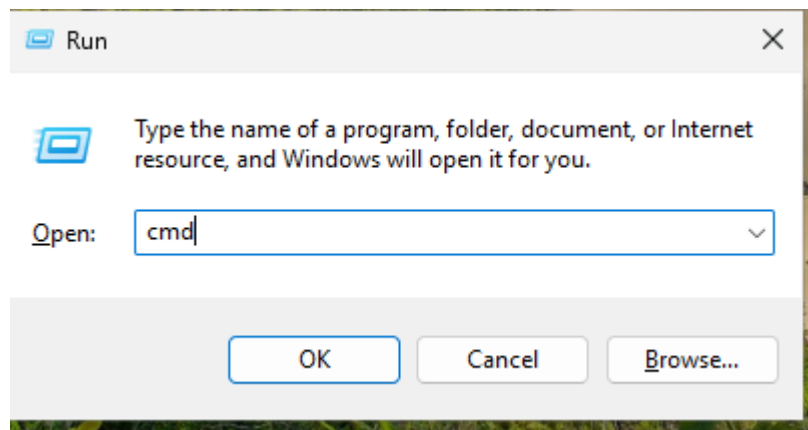
Working in the File Explorer

Relevant screenshots **copy** command:
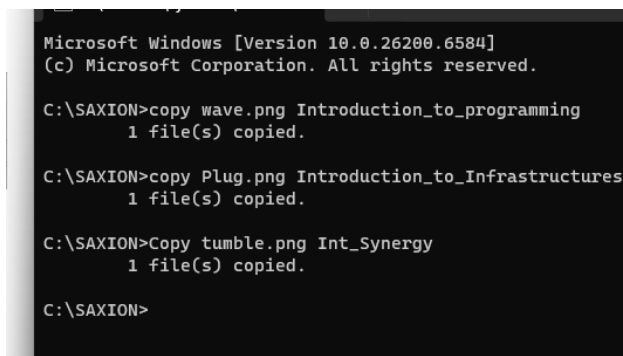
Relevant screenshots **tree** command:
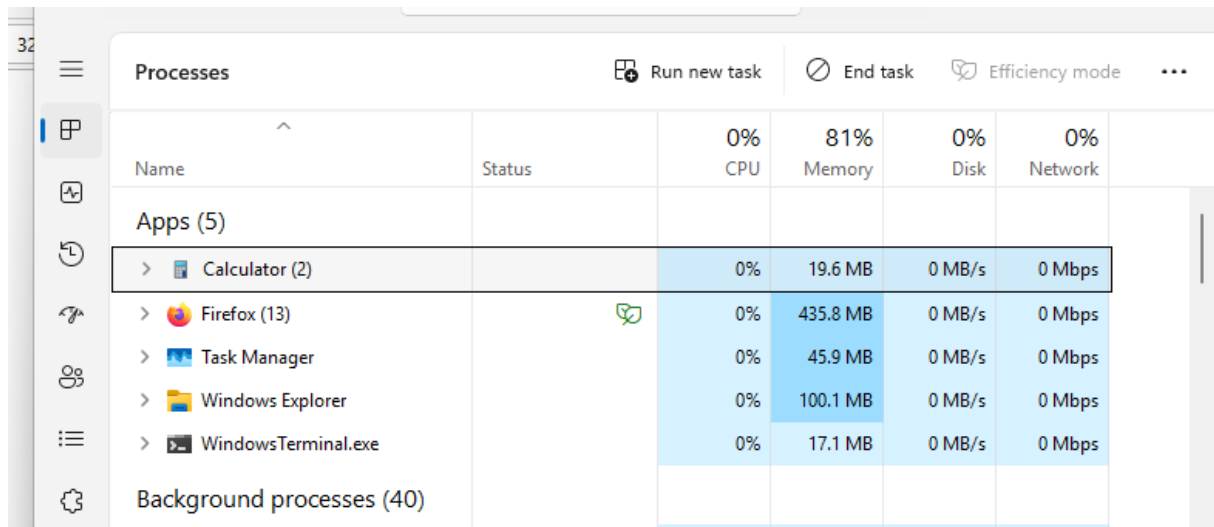
```
C:.
└───HBOICT
    └───YEAR1
        ├───QUARTILE1
        │   ├───Int Synergy
        │   ├───Introduction to Infrastructures
        │   └───Introduction to programming
        ├───QUARTILE2
        │   ├───Databases
        │   ├───IT fundamentals
        │   └───Project its in the game
        ├───QUARTILE3
        └───QUARTILE4
    ├───YEAR2
    │   ├───QUARTILE1
    │   ├───QUARTILE2
    │   ├───QUARTILE3
    │   └───QUARTILE4
    ├───YEAR3
    │   ├───QUARTILE1
    │   ├───QUARTILE2
    │   ├───QUARTILE3
    │   └───QUARTILE4
    └───YEAR4
        ├───QUARTILE1
        ├───QUARTILE2
        ├───QUARTILE3
        └───QUARTILE4

C:\SAXION>echo %username%
Marco

C:\SAXION>
```

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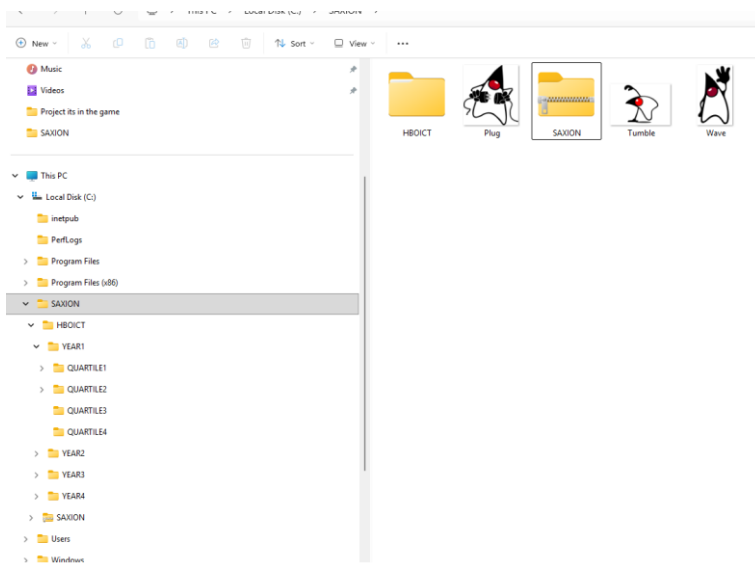
Terminating Processes

Relevant Screenshots Task Manager Window:

Install Software

Relevant screenshots that the following software is installed with winget:

- WinSCP
- Notepad++
- 7zip

Used a different command as the stated ones didnt work.

--id specifies unique package idenrifier in winget and -e stands for exact so it matches the ID exactly

```
C:\Windows\System32>winget install -e --id Notepad++.Notepad++ --source winget
Found Notepad++ [Notepad++.Notepad++] Version 8.9
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/v8.9/npp.8.9.Installer.x64.exe
                              6.54 MB / 6.54 MB
Successfully verified installer hash
Starting package install...
Successfully installed
```

```
C:\Windows\System32>winget install -e --id WinSCP.WinSCP --source winget
Found WinSCP [WinSCP.WinSCP] Version 6.5.5
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://sourceforge.net/projects/winscp/files/WinSCP/6.5.5/WinSCP-6.5.5-Setup.exe/download
                              11.6 MB / 11.6 MB
Successfully verified installer hash
Starting package install...
Successfully installed
```

Assignment 5.4: Working with Linux

Relevant screenshots + motivation

Copying files:
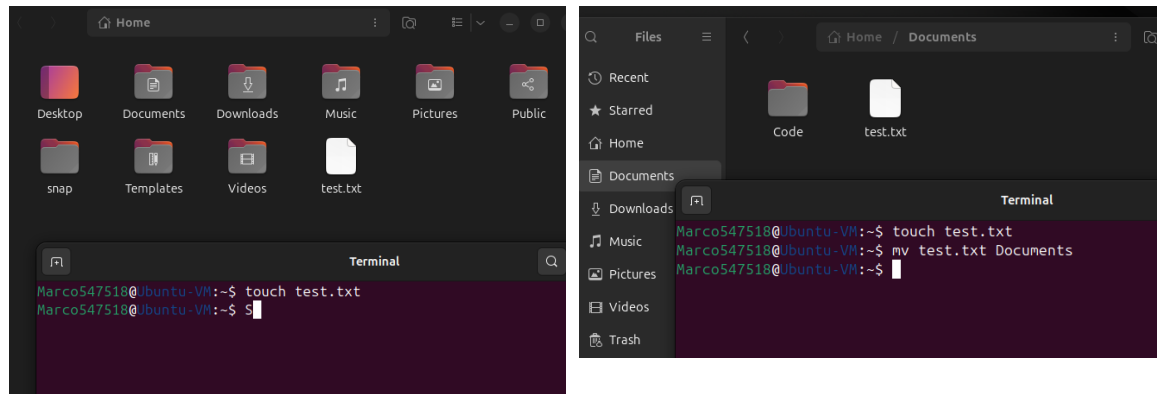
Navigating file structure: Go into etc use cd /etc and go back to home directory with cd ~. Linux has one root directory while windows uses different drives like C: or D: . The /etc directory contains system-wide configuration files for the operating system and installed applications.
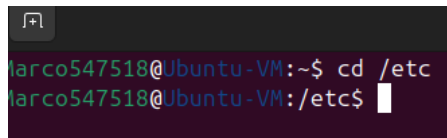
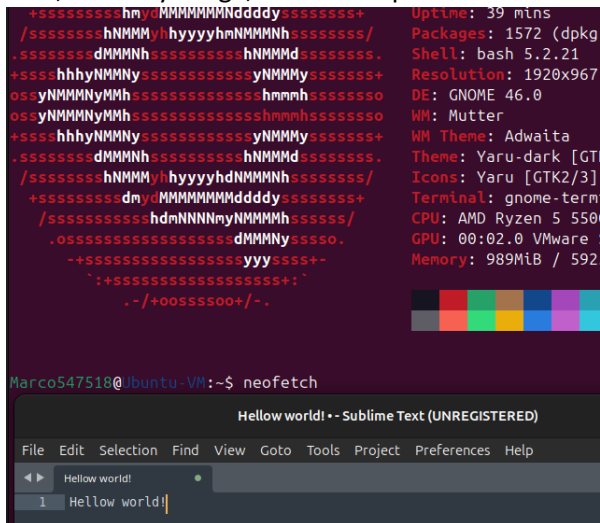Compress files: you can use *tar -cvf* and to unzip use *tar -xvf*
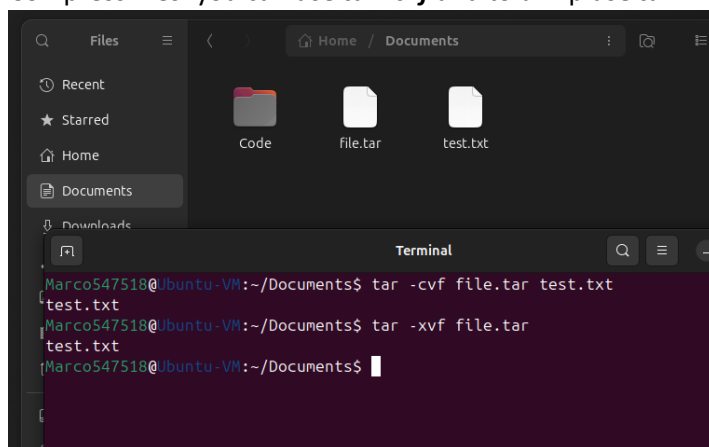
View processes: It appears to be a Linux version of task manager like showing memory usage, cpu usage and what applications are running and using how much resources.

Install software: Neofetch displays system information such as the Linux distribution, kernel version, CPU, memory usage, and desktop environment in a visual format.

Assignment 5.5: Users and permissions on Linux

Used Linux commands to create the directory and files needed to create and run the bash file.

Assignment 5.6: View the contents of files

Commands:

        cat : Displays entire contents of file into terminal

        wc : word count for lines words or characters

        less: opens file in scrollable viewer

        head: shows first line of file // tail : shows last line of file

        grep: Search specific text patterns inside of the file.

```
Marco547518@Ubuntu-VM:~$ wc sherlock.txt
 12304 107560 595123 sherlock.txt
Marco547518@Ubuntu-VM:~$ 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
Marco547518@Ubuntu-VM:~$ grep -B 20 -A 20 kingdom
```

```
Marco547518@Ubuntu-VM:~$ head -n 4566 sherlock.txt | tail -n 20
Pondicherry, seven weeks elapsed between the threat and its fulfilment,
in Dundee it was only some three or four days. Does that suggest
anything?"

"A greater distance to travel."

"But the letter had also a greater distance to come."

"Then I do not see the point."

"There is at least a presumption that the vessel in which the man or
men are is a sailing-ship. It looks as if they always send their
singular warning or token before them when starting upon their mission.
You see how quickly the deed followed the sign when it came from
Dundee. If they had come from Pondicherry in a steamer they would have
arrived almost as soon as their letter. But, as a matter of fact, seven
weeks elapsed. I think that those seven weeks represented the
difference between the mail-boat which brought the letter and the
sailing vessel which brought the writer."
```

Assignment 5.7: Digital forensics

Brand and phone type is a Motorolla g6 play

```
Make                                    : motorola
Camera Model Name                       : moto g(6) play
```

The GPS location of the photo was taken in Deventer Netherlands

```
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
```
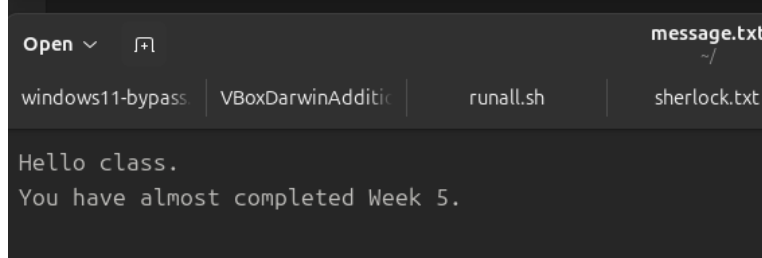
Does Ubuntu still consider it to be a jpg file? **Yes it still does**
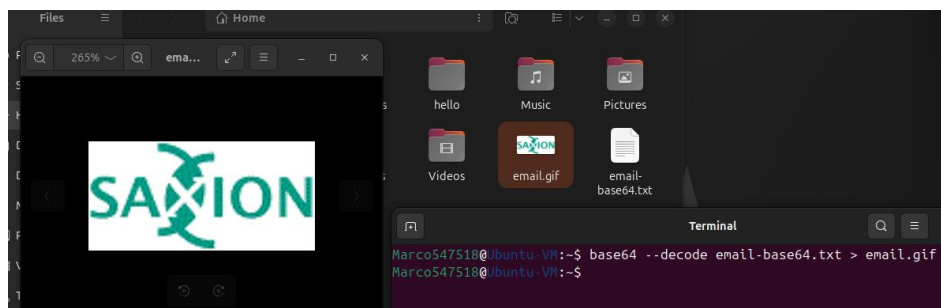
Assignment 5.8: Steganography

Relevant screenshots + motivation
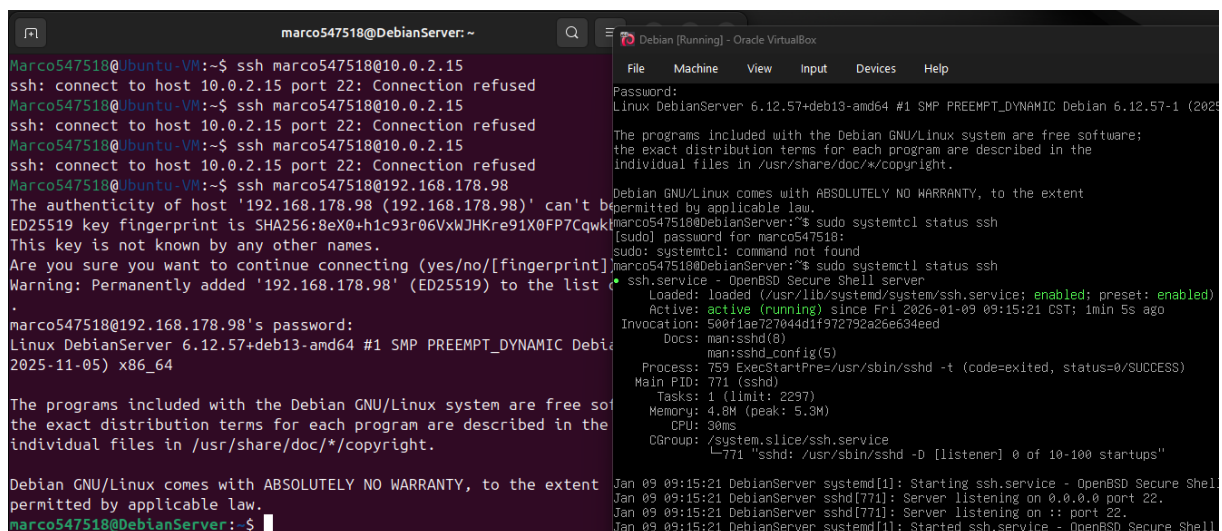
Assignment 5.9: Capture disk images

Make relevant screenshots + motivation:

- Proof that the Debian 13 server stored a back-up image of the Ubuntu 24.04 Desktop VM.
- Proof that you can restore the back-up image into an empty VM.

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