Template Week 5 – Operating Systems

Student number:582840

Assignment 5.1: Unix-like

a) Find out what the difference is between UNIX and unix-like operating systems?
Unix is een OS die is ontwikkeld in 1970 voor stabiliteit en veiligheid. Unix-like systemen zijn erop gebaseerd maar niet precies unix

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 de eerste developer die UNIX heeft gemaakt.
Dennis Ritchie is de maker van de programmeer taal C.
Richard Stallman was een activist die wou dat alle software gratis was om te gebruiken, verspreiden en aan te passen.
Linus Torvalds is de vinder van linux. Hij heeft de eerste linux kernel geschreven. Nu word linux ondersteunt door duizenden software developers maar Linus is nog steeds een belangrijke schakel in de ontwikkeling. Linus is ook de eerste ontwikkelaar van GIT maar dit heeft die later afgestaan.

c) What is the philosophy of the GNU movement?
Gebruikers moeten vrijheid hebben wat ze kunnen doen op hun computer. Dat software altijd gratis moet zijn om te gebruiken en aan te passen.

d) Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement? Please explain your answer.
Ja want Ubuntu is opensource en heeft een licentie die toestaat dat elke gebruiker het programma mag aanpassen en gratis mag gebruiken.

e) Find out what is the Windows Subsystem for Linux?
WSL is een stukje software dat een soort virtuele machine opstart die geintegeerd in windows is om linux te draaien. Kan worden gebruikt voor software ontwikkeling voor linux maar ook testen van server applicaties.

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

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 worden meestal gebruikt voor complexe taken. Zoals weersvoorspellingen, klimaat onderzoek, berekeningen voor nasa en modelering

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?
Dit waren meerdere PlayStation 3s aan elkaar gekoppeld om gebruik te maken van de snelle CPU van de PlayStation 3 voor die tijd. Om een snellere computer te maken dan op dat moment mogelijk was.

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/
Nee het is niet snel genoeg.

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?
Een AMD Zen 2 dus CISC processer. Beide draaien een custom OS waarvan de playstation gebaseerd is op een FreeBSD 11 kernel. En de xbox gebaseerd is op windows.

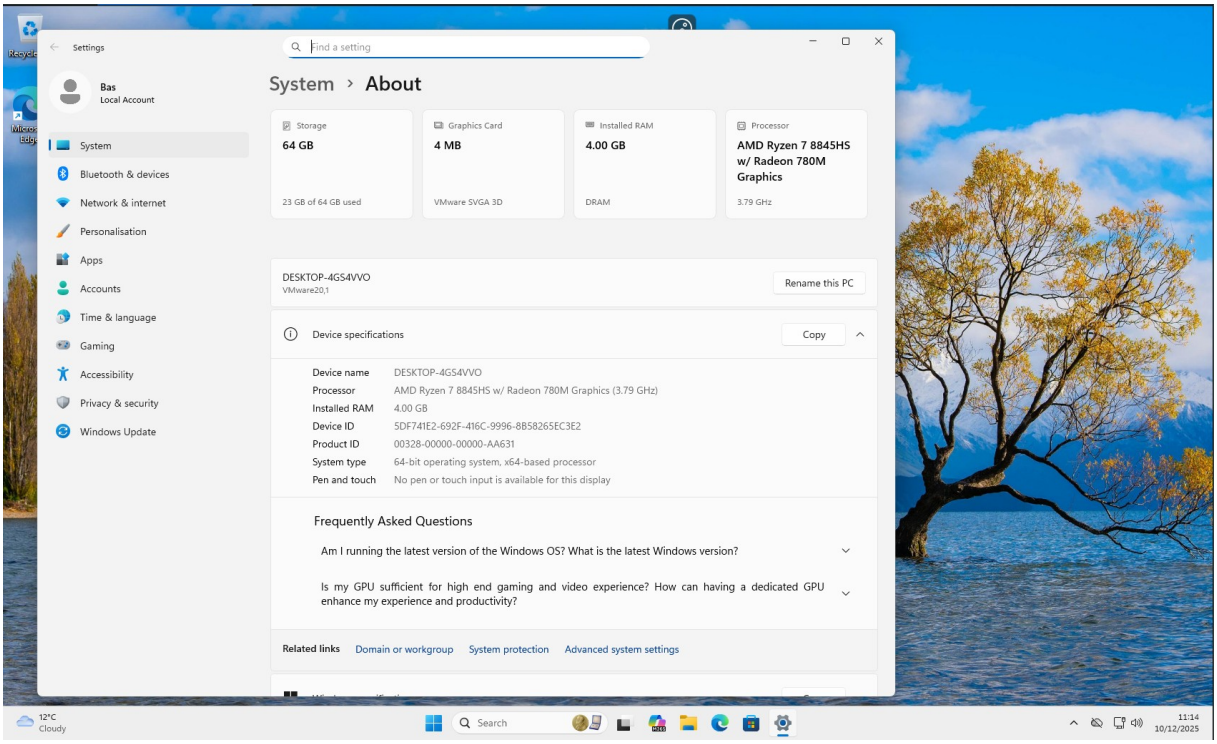
Assignment 5.3: Working with Windows

Take relevant screenshots of the assignments below

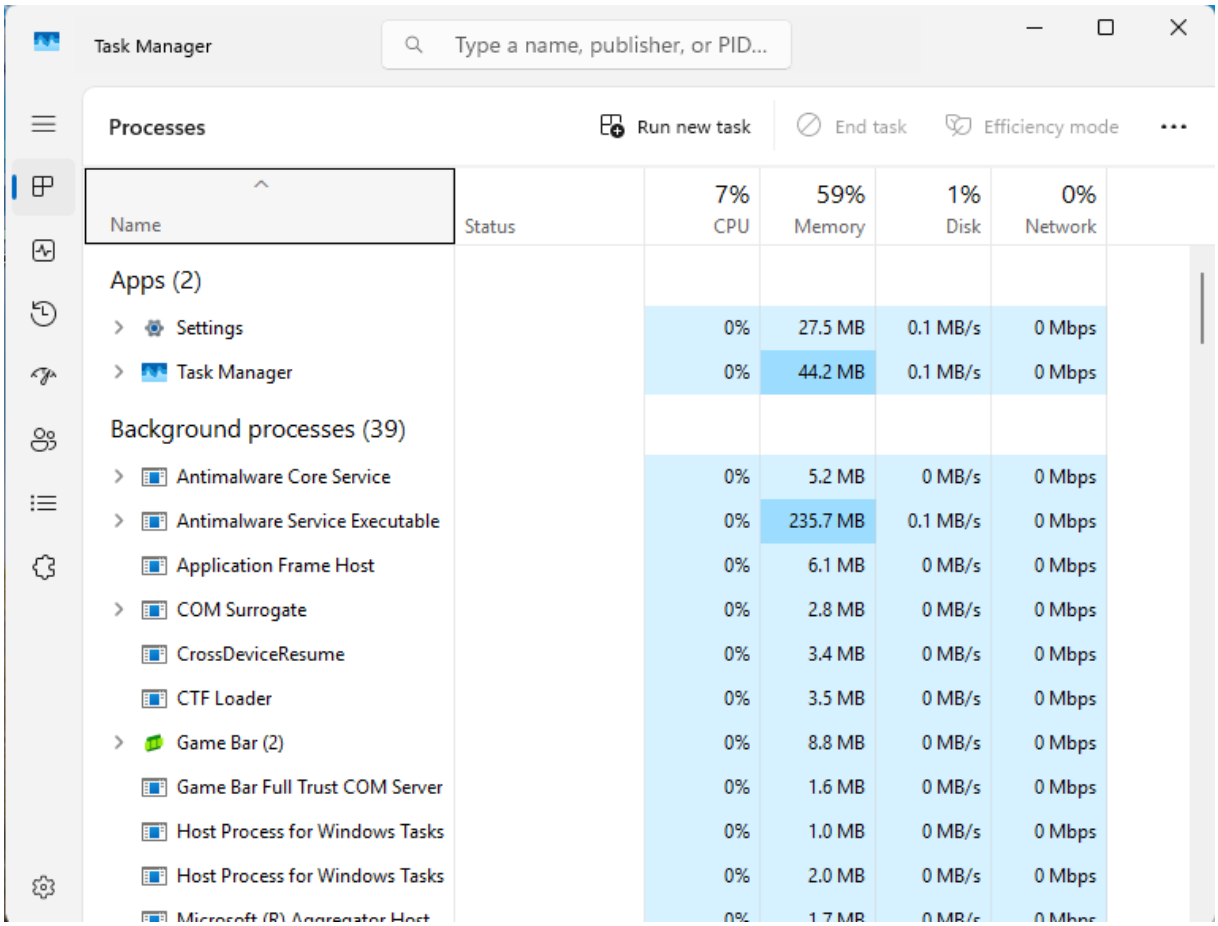
a) Practice for about 10 minutes with the W keyboard shortcuts combinations, skip the general shortcuts in this exercise. Take a look at which screens are opened.

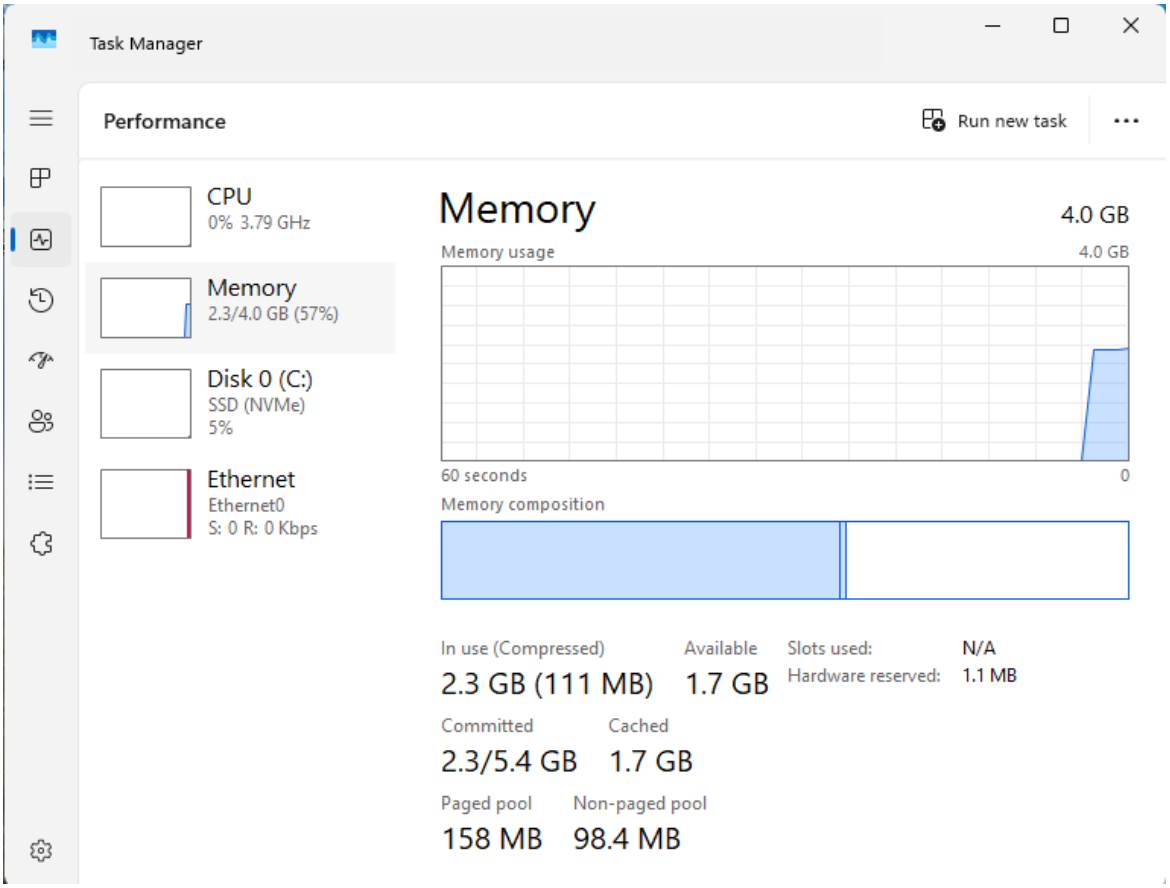
b) The file explorer can be opened with W + E, Which key combination could you also use?
Win+1 als je file explorer op plek 1 in je taakbalk staat.

c) Open the system properties with a W 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.

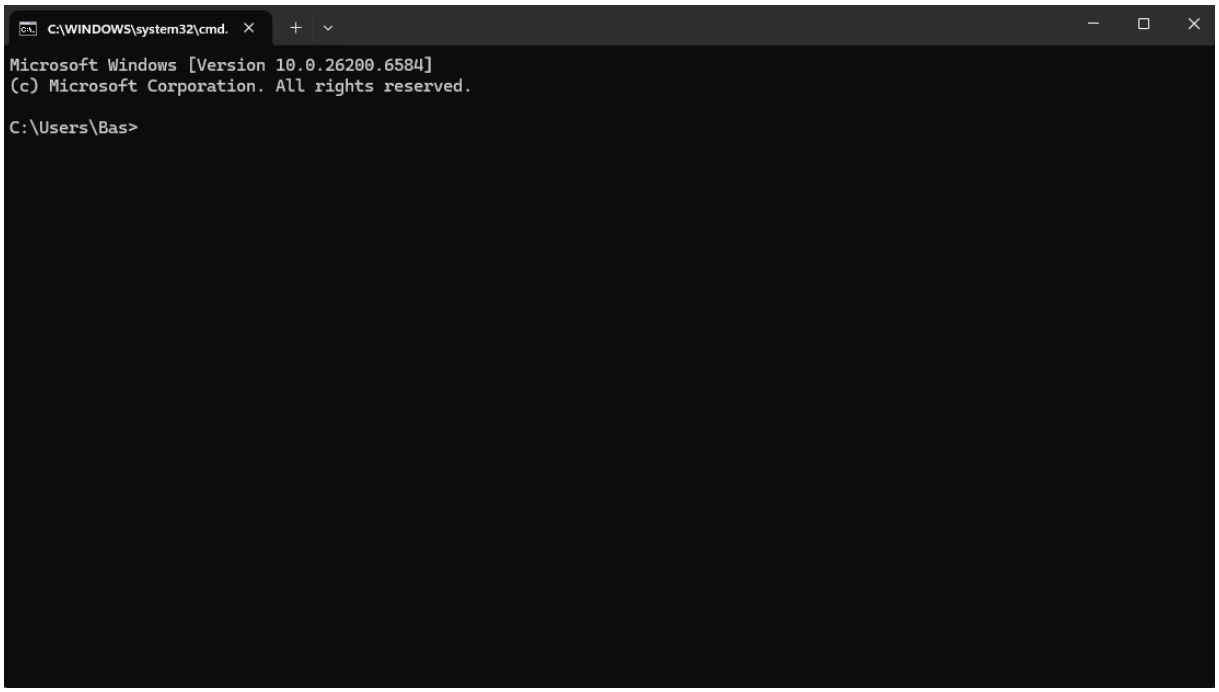




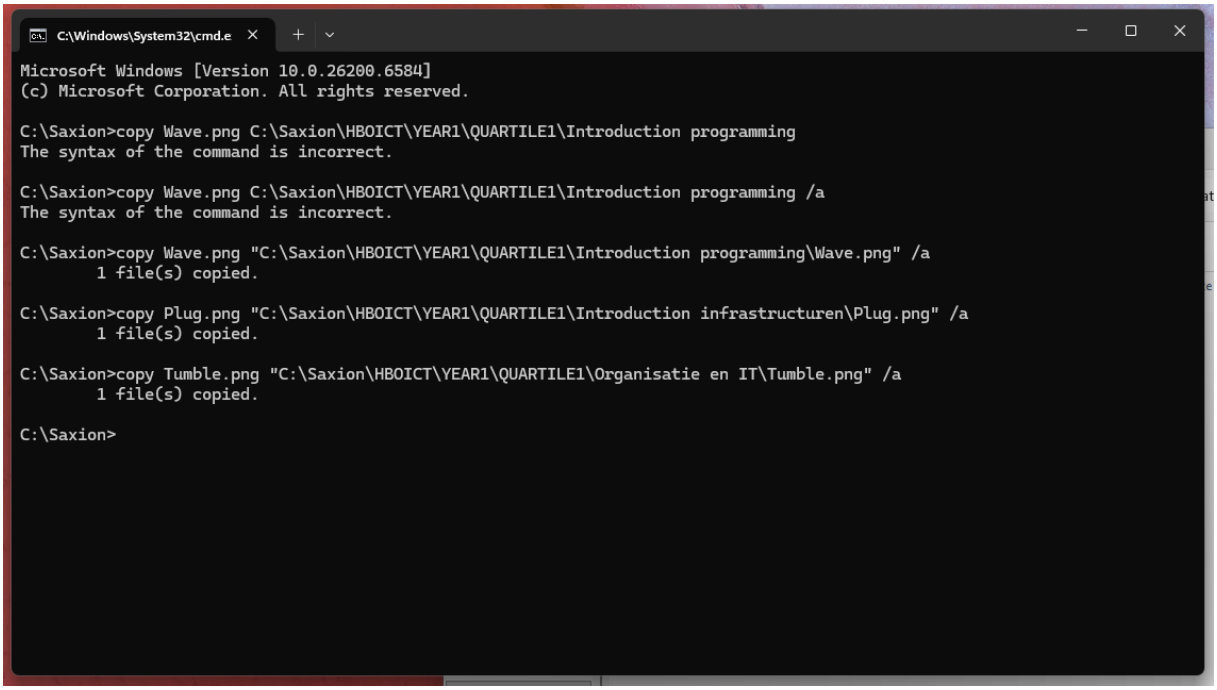
e) If you're giving a PowerPoint presentation and you connect your laptop to a projector, Windows can use the projector as a second screen. For example, you may have Outlook open on your first screen that you don't show over the projector, while the PowerPoint presentation is displayed on the projector,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

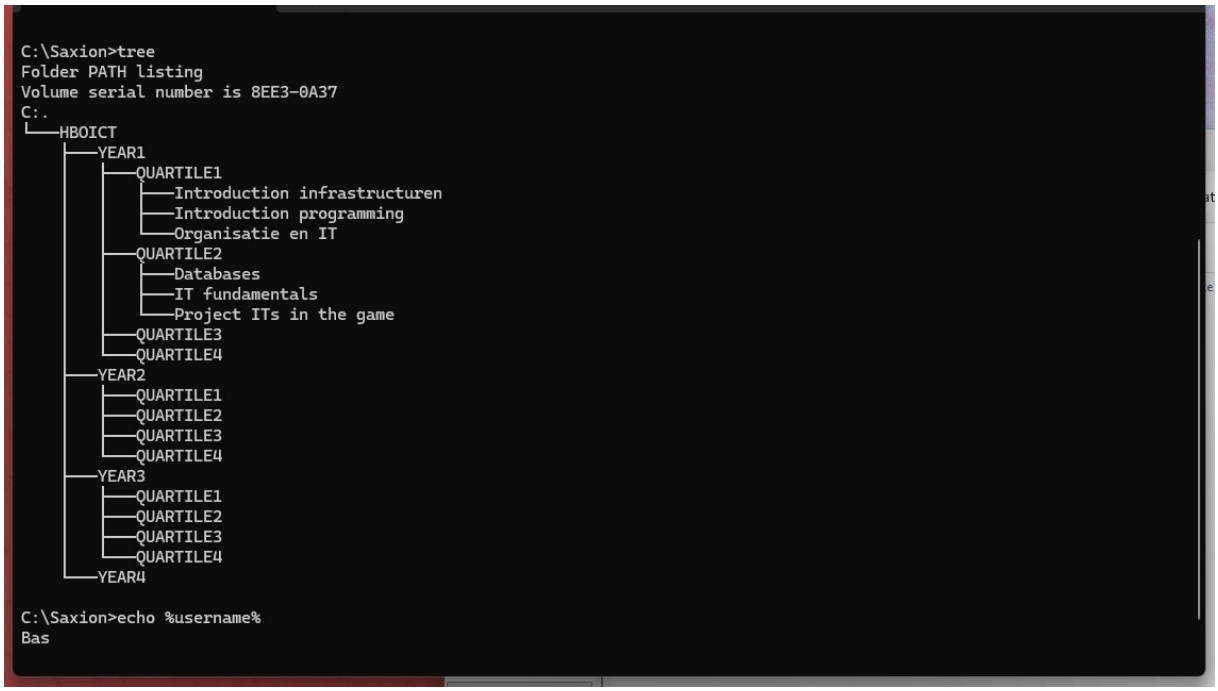


Working in the File Explorer

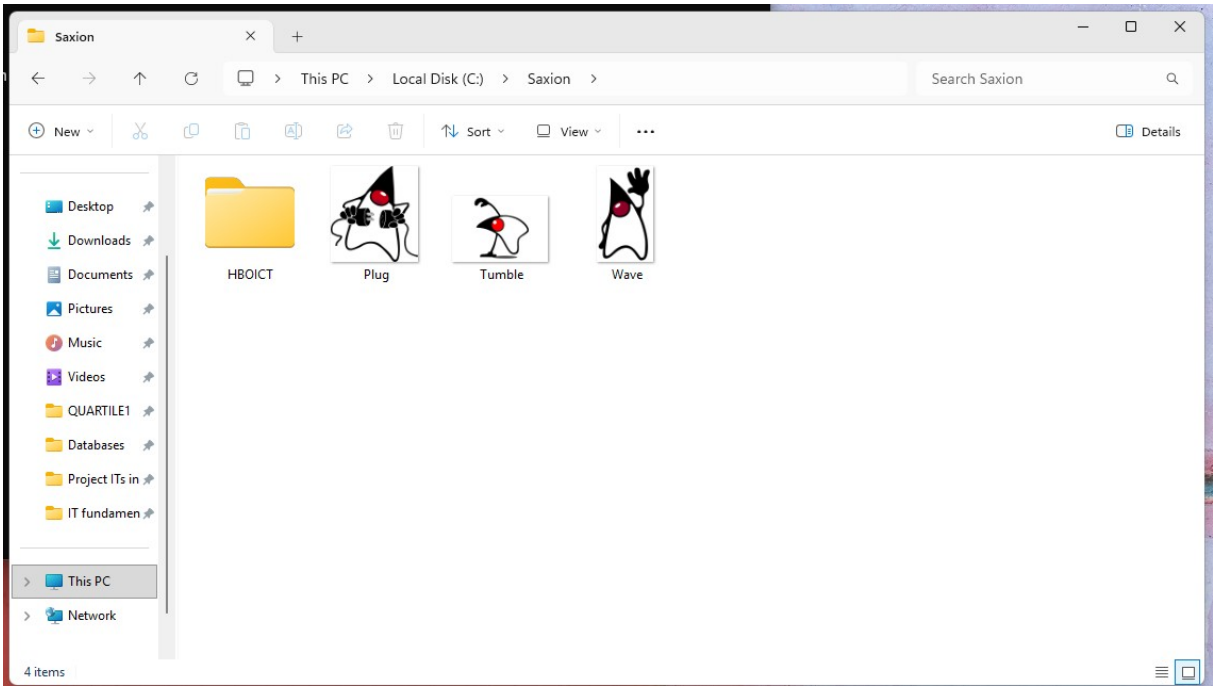


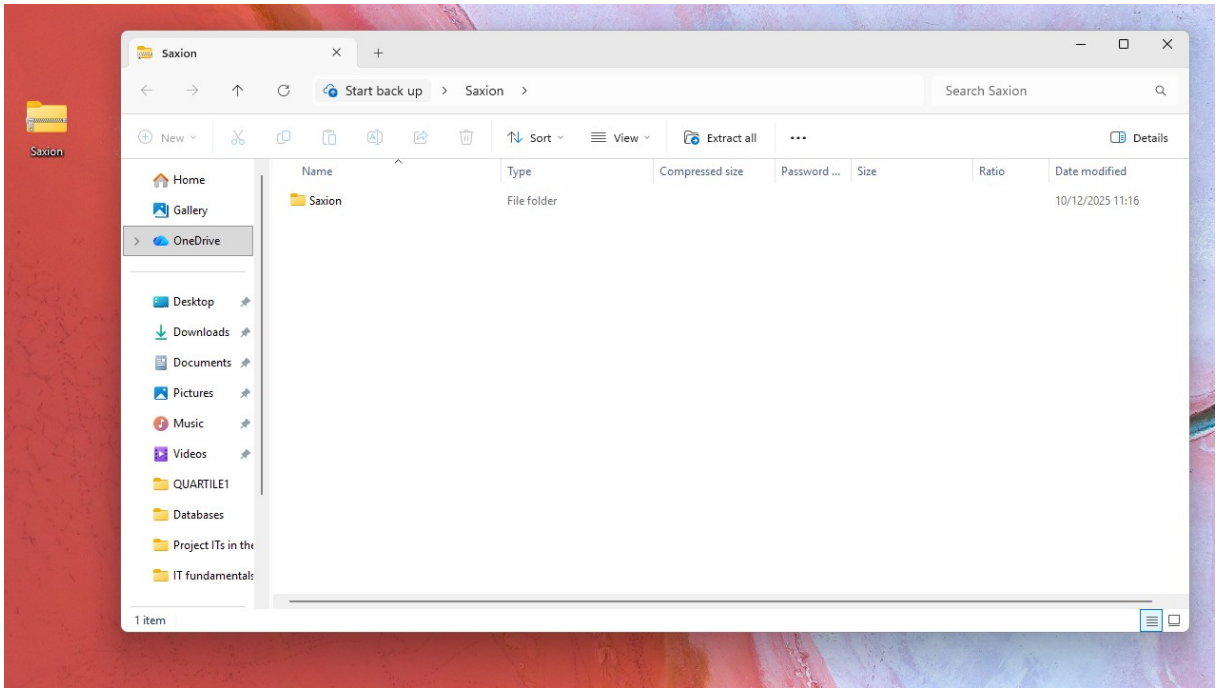
Relevant screenshots **copy** command:

Relevant screenshots **tree** command:


C:\Saxion>tree
Folder PATH listing
Volume serial number is 8EE3-0A37
C:.
└───HBOICT
    ├───YEAR1
    │   ├───QUARTILE1
    │   │   ├───Introduction infrastructuren
    │   │   ├───Introduction programming
    │   │   └───Organisatie en IT
    │   ├───QUARTILE2
    │   │   ├───Databases
    │   │   ├───IT fundamentals
    │   │   └───Project ITs in the game
    │   ├───QUARTILE3
    │   └───QUARTILE4
    ├───YEAR2
    │   ├───QUARTILE1
    │   ├───QUARTILE2
    │   ├───QUARTILE3
    │   └───QUARTILE4
    ├───YEAR3
    │   ├───QUARTILE1
    │   ├───QUARTILE2
    │   ├───QUARTILE3
    │   └───QUARTILE4
    └───YEAR4
C:\Saxion>echo %username%
Bas

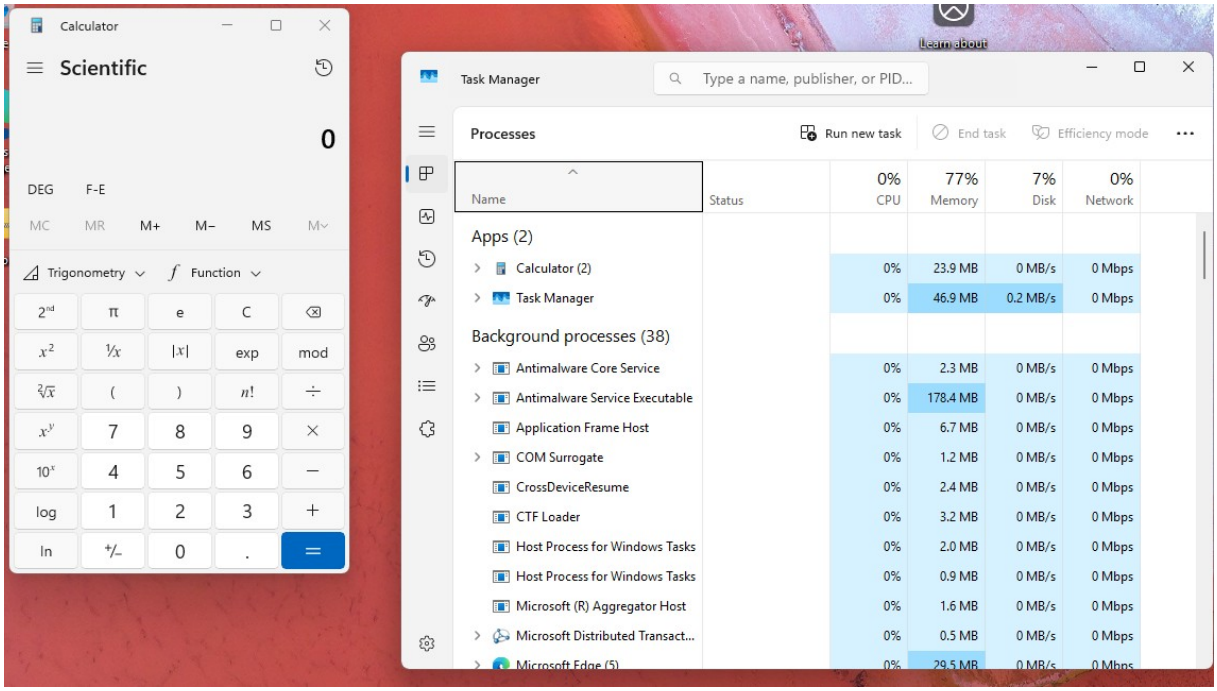
Relevant screenshots in the file explorer of the folder c:\Saxion + created zip file.





Terminating Processes

Relevant Screenshots Task Manager Window:



Install Software

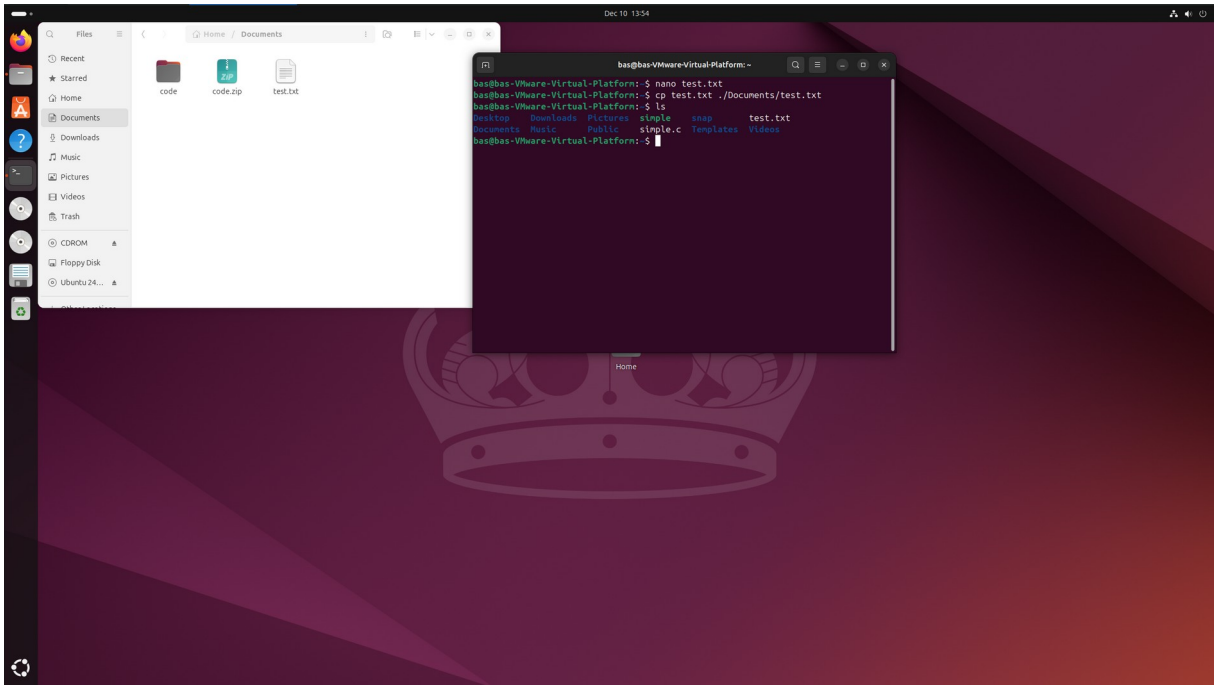
Relevant screenshots that the following software is installed with winget:

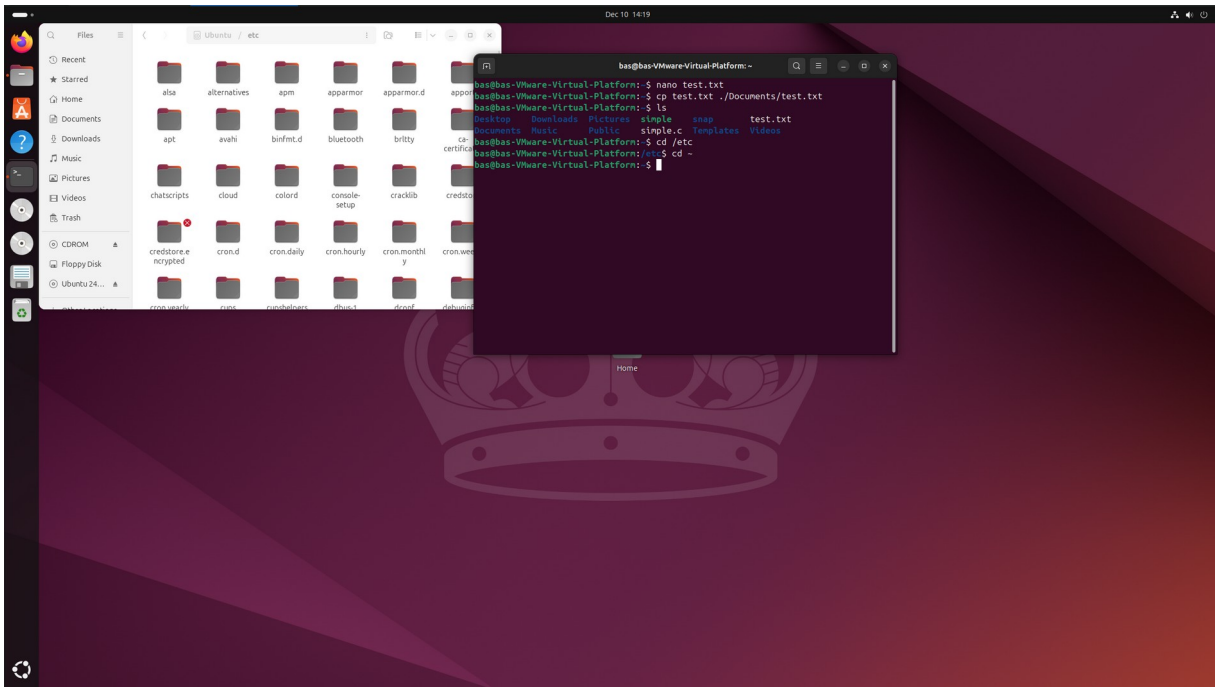
- WinSCP
- Notepad++
- 7zip

```
C:\Users\Bas>winget list
Name                                   Id                                       Version             Available     Source
-----------------------------------------------------------------------------------------------------------------------
7-Zip 25.01 (x64)                      7zip.7zip                                25.01                             winget
Notepad++ (64-bit x64)                 Notepad++.Notepad++                      8.8.8                             winget
VMware Tools                           ARP\Machine\X64\{64171BD0-863E-4DDE-8D… 12.5.0.24276846
Microsoft Edge                         Microsoft.Edge                           143.0.3650.75                     winget
Microsoft Visual C++ 2015-2022 Redist… Microsoft.VCRedist.2015+.x86             14.40.33810.0       14.50.35719.0 winget
Microsoft Visual C++ 2015-2022 Redist… Microsoft.VCRedist.2015+.x64             14.40.33810.0       14.50.35719.0 winget
Microsoft OneDrive                     Microsoft.OneDrive                       25.216.1104.0002                  winget
WinSCP 6.5.5                           WinSCP.WinSCP                            6.5.5                             winget
Microsoft Clipchamp                    MSIX\Clipchamp.Clipchamp_4.4.10420.0_x… 4.4.10420.0
Microsoft Teams                        Microsoft.Teams                          25306.804.4102.7193               winget
AV1 Video Extension                    MSIX\Microsoft.AV1VideoExtension_2.0.6… 2.0.6.0
AVC Encoder Video Extension            MSIX\Microsoft.AVCEncoderVideoExtensio… 1.1.21.0
Windows Application Compatibility Enh… MSIX\Microsoft.ApplicationCompatibilit… 1.2401.10.0
Microsoft News                         MSIX\Microsoft.BingNews_1.0.2.0_x64__8… 1.0.2.0
Microsoft Bing                         MSIX\Microsoft.BingSearch_1.1.37.0_x64… 1.1.37.0
MSN Weather                            MSIX\Microsoft.BingWeather_3.2.10.0_x6… 3.2.10.0
App Installer                          Microsoft.AppInstaller                   1.27.349.0          1.27.350.0    winget
Xbox                                   MSIX\Microsoft.GamingApp_2512.1001.31.… 2512.1001.31.0
Get Help                               MSIX\Microsoft.GetHelp_10.2409.32612.0… 10.2409.32612.0
HEIF Image Extension                   MSIX\Microsoft.HEIFImageExtension_1.2.… 1.2.20.0
HEVC Video Extensions from Device Man… MSIX\Microsoft.HEVCVideoExtension_2.4.… 2.4.39.0
MPEG-2 Video Extension                 MSIX\Microsoft.MPEG2VideoExtension_1.2… 1.2.10.0
Microsoft Edge                         MSIX\Microsoft.MicrosoftEdge.Stable_14… 140.0.3485.66
Microsoft 365 Copilot                  MSIX\Microsoft.MicrosoftOfficeHub_19.2… 19.2512.33091.0
Solitaire & Casual Games               MSIX\Microsoft.MicrosoftSolitaireColle… 4.22.3190.0
Microsoft Sticky Notes                 MSIX\Microsoft.MicrosoftStickyNotes_4.… 4.0.6105.0
Microsoft .Net Native Framework Packa… MSIX\Microsoft.NET.Native.Framework.2.… 2.2.29512.0
Microsoft .Net Native Framework Packa… MSIX\Microsoft.NET.Native.Framework.2.… 2.2.29512.0
Microsoft .Net Native Runtime Package… MSIX\Microsoft.NET.Native.Runtime.2.2_… 2.2.28604.0
Microsoft .Net Native Runtime Package… MSIX\Microsoft.NET.Native.Runtime.2.2_… 2.2.28604.0
Outlook for Windows                    MSIX\Microsoft.OutlookForWindows_1.202… 1.2025.1111.100
Paint                                  MSIX\Microsoft.Paint_11.2509.441.0_x64… 11.2509.441.0
Power Automate                         MSIX\Microsoft.PowerAutomateDesktop_1.… 1.0.2046.0
Raw Image Extension                    MSIX\Microsoft.RawImageExtension_2.5.5… 2.5.5.0
Snipping Tool                          MSIX\Microsoft.ScreenSketch_11.2510.31… 11.2510.31.0
Windows Security                       MSIX\Microsoft.SecHealthUI_1000.29429.… 1000.29429.1000.0
Microsoft Engagement Framework         MSIX\Microsoft.Services.Store.Engageme… 10.0.23012.0
Microsoft Engagement Framework         MSIX\Microsoft.Services.Store.Engageme… 10.0.23012.0
Start Experiences App                  MSIX\Microsoft.StartExperiencesApp_1.1… 1.179.4.0
Store Experience Host                  MSIX\Microsoft.StorePurchaseApp_22509.… 22509.1401.1.0
Microsoft To Do                        MSIX\Microsoft.Todos_0.148.3611.0_x64_… 0.148.3611.0
Microsoft.UI.Xaml.2.8                  Microsoft.UI.Xaml.2.8                    8.2501.31001.0                    winget
Microsoft.UI.Xaml.2.8                  Microsoft.UI.Xaml.2.8                    8.2501.31001.0                    winget
Microsoft Visual C++ 2015 UWP Desktop… Microsoft.VCLibs.Desktop.14              14.0.33728.0                      winget
Microsoft Visual C++ 2015 UWP Desktop… Microsoft.VCLibs.Desktop.14              14.0.33728.0                      winget
Microsoft Visual C++ 2015 UWP Runtime… MSIX\Microsoft.VCLibs.140.00_14.0.3351… 14.0.33519.0
Microsoft Visual C++ 2015 UWP Runtime… MSIX\Microsoft.VCLibs.140.00_14.0.3351… 14.0.33519.0
VP9 Video Extensions                   MSIX\Microsoft.VP9VideoExtensions_1.2.… 1.2.12.0
Web Media Extensions                   MSIX\Microsoft.WebMediaExtensions_2.1.… 2.1.20.0
WebP Image Extension                   MSIX\Microsoft.WebpImageExtension_1.2.… 1.2.10.0
Widgets Platform Runtime               MSIX\Microsoft.WidgetsPlatformRuntime_… 1.6.14.0
Dev Home                               MSIX\Microsoft.Windows.DevHome_0.1700.… 0.1700.597.0
Microsoft Photos                       MSIX\Microsoft.Windows.Photos_2025.111… 2025.11110.18001.0
Windows Clock                          MSIX\Microsoft.WindowsAlarms_1.1.61.0_… 1.1.61.0
WindowsAppRuntime.1.5                  MSIX\Microsoft.WindowsAppRuntime.1.5_5… 5001.373.1736.0
WindowsAppRuntime.1.5                  MSIX\Microsoft.WindowsAppRuntime.1.5_5… 5001.373.1736.0
WindowsAppRuntime.1.6                  MSIX\Microsoft.WindowsAppRuntime.1.6_6… 6000.519.329.0
WindowsAppRuntime.1.6                  MSIX\Microsoft.WindowsAppRuntime.1.6_6… 6000.519.329.0
WindowsAppRuntime.1.7                  MSIX\Microsoft.WindowsAppRuntime.1.7_7… 7000.676.1651.0
WindowsAppRuntime.1.7                  MSIX\Microsoft.WindowsAppRuntime.1.7_7… 7000.676.1651.0
WindowsAppRuntime.1.8                  MSIX\Microsoft.WindowsAppRuntime.1.8_8… 8000.675.1142.0
WindowsAppRuntime.1.8                  MSIX\Microsoft.WindowsAppRuntime.1.8_8… 8000.675.1142.0
Windows Calculator                     MSIX\Microsoft.WindowsCalculator_11.25… 11.2508.4.0
Windows Camera                         MSIX\Microsoft.WindowsCamera_2025.2510… 2025.2510.2.0
Feedback Hub                           MSIX\Microsoft.WindowsFeedbackHub_1.25… 1.2510.14102.0
Windows Notepad                        MSIX\Microsoft.WindowsNotepad_11.2508.… 11.2508.38.0
Windows Sound Recorder                 MSIX\Microsoft.WindowsSoundRecorder_1.… 1.1.47.0
Microsoft Store                        MSIX\Microsoft.WindowsStore_22510.1401… 22510.1401.4.0
Windows Terminal                       Microsoft.WindowsTerminal                1.23.12811.0                      winget
Windows Package Manager Source (winge… MSIX\Microsoft.Winget.Source_2025.1210… 2025.1210.1312.51
Xbox TCUI                              MSIX\Microsoft.Xbox.TCUI_1.23.28005.0_… 1.23.28005.0
Game Bar                               MSIX\Microsoft.XboxGamingOverlay_7.325… 7.325.11061.0
Xbox Identity Provider                 MSIX\Microsoft.XboxIdentityProvider_12… 12.110.15002.0
Game Speech Window                     MSIX\Microsoft.XboxSpeechToTextOverlay… 1.111.30001.0
Phone Link                             MSIX\Microsoft.YourPhone_0.25102.64.0_… 0.25102.64.0
Windows Media Player                   MSIX\Microsoft.ZuneMusic_11.2510.7.0_x… 11.2510.7.0
Quick Assist                           MSIX\MicrosoftCorporationII.QuickAssis… 2.0.35.0
Windows Web Experience Pack            MSIX\MicrosoftWindows.Client.WebExperi… 525.31002.150.0
Cross Device Experience Host           MSIX\MicrosoftWindows.CrossDevice_0.25… 0.25102.46.0
Notepad++                              MSIX\NotepadPlusPlus_1.0.0.0_neutral__… 1.0.0.0
```

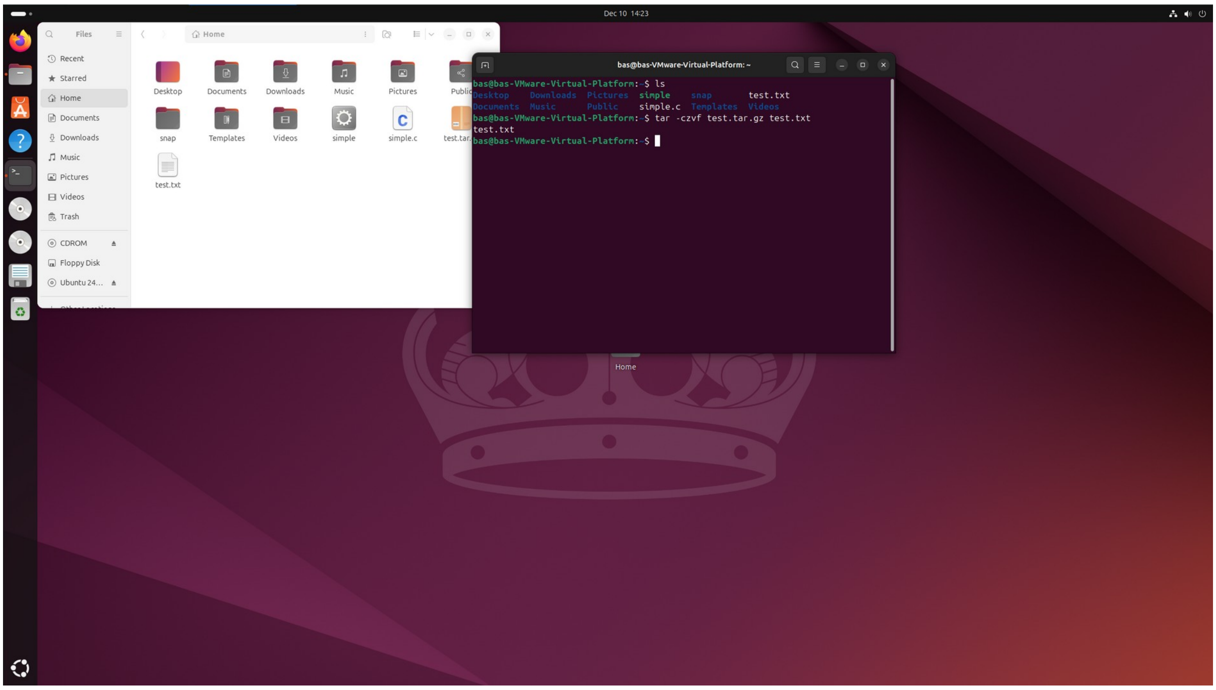
Assignment 5.4: Working with Linux

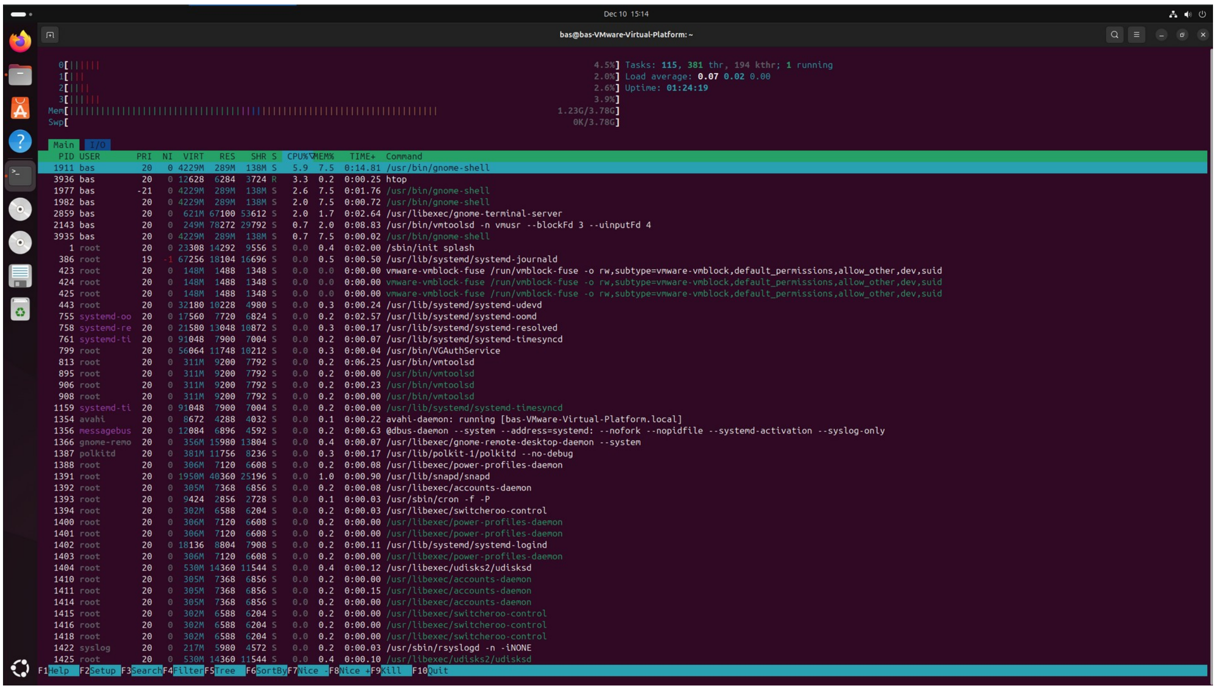
Relevant screenshots + motivation

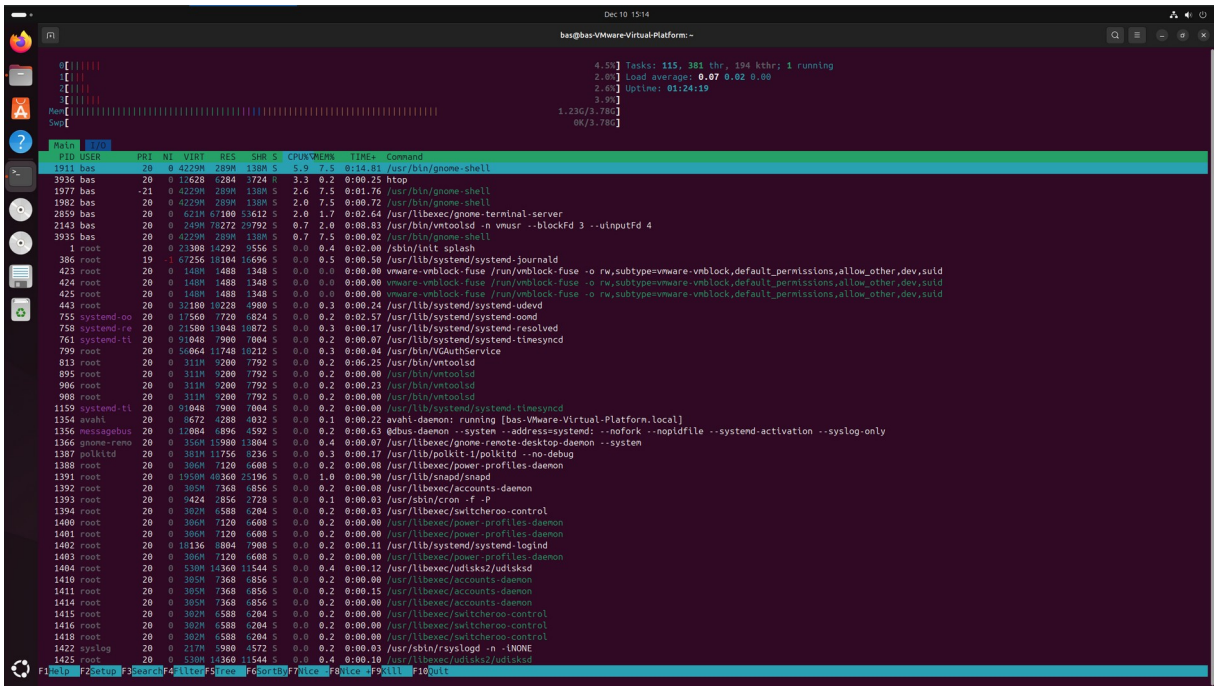




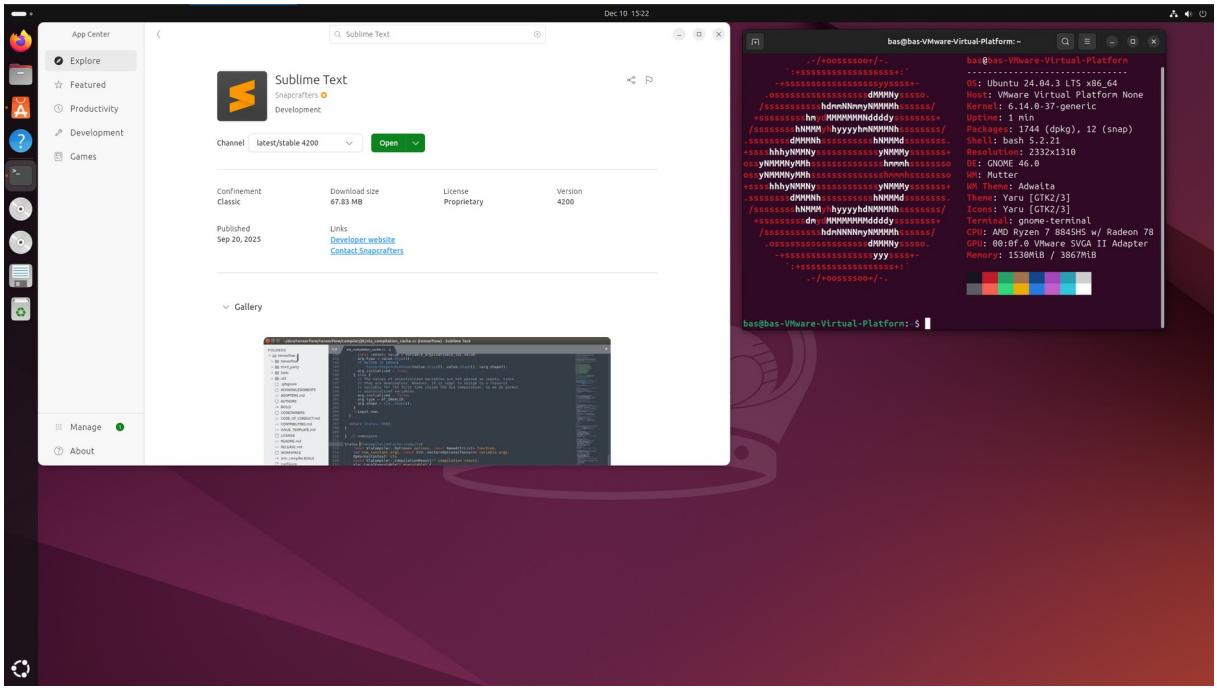
Het verschil met windows en linux is dat windows elke schijf toevoegd als een extra letter en linux alle schijven in een boom structuur heeft en schijven worden gemount op specifieke plekken.


Dec 10 14:23
Files
Home
Recent
Starred
Home
Documents
Downloads
Music
Pictures
Videos
Trash
CDROM
Floppy Disk
Desktop
Documents
Downloads
Music
Pictures
snap
Templates
Videos
simple
simple.c
test.txt
bas@bas-VMware-Virtual-Platform: ~
bas@bas-VMware-Virtual-Platform:~$ ls
Desktop Downloads Pictures simple snap test.txt
Documents Music Public simple.c Templates Videos
bas@bas-VMware-Virtual-Platform:~$ tar -czvf test.tar.gz test.txt
test.txt
bas@bas-VMware-Virtual-Platform:~$
Home


Dec 10 15:14
bas@bas-VMware-Virtual-Platform: ~
Tasks: 115, 381 thr, 194 kthr; 1 running
Load average: 0.07 0.02 0.00
Uptime: 01:24:19
Main I/O
PID USER PRI NI VIRT RES SHR S CPU% MEM% TIME+ Command
F1Help F2Setup F3Search F4Filter F5Tree F6SortBy F7Nice - F8Nice + F9Kill F10Quit



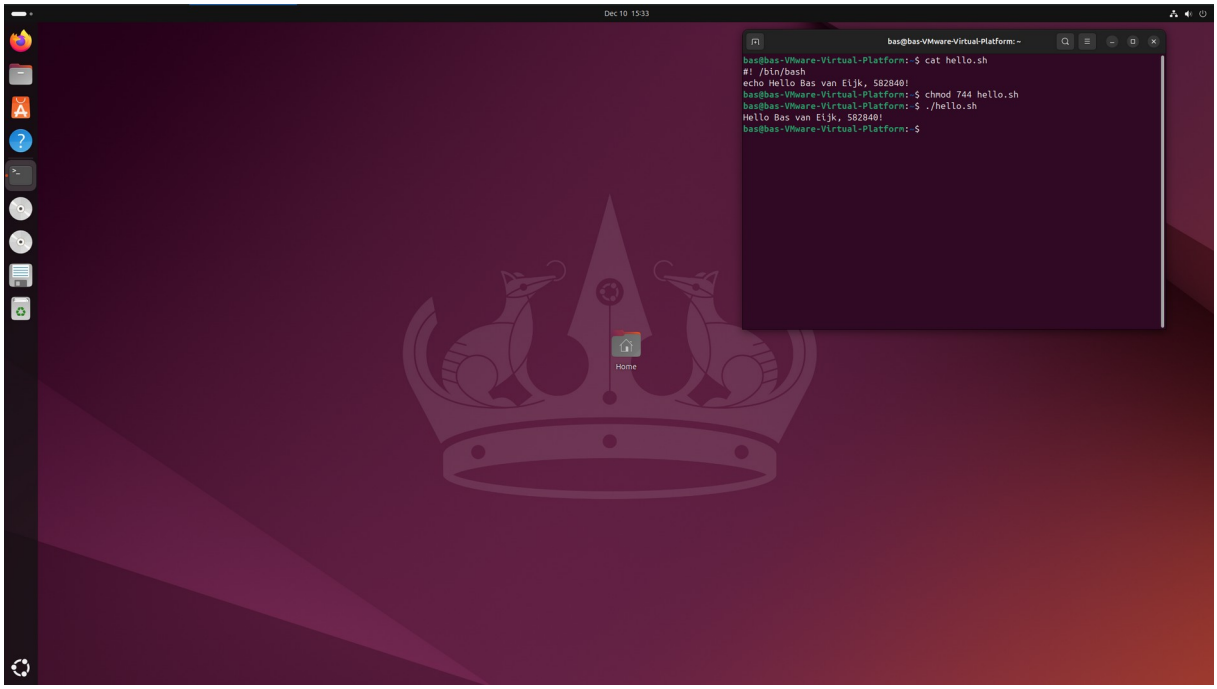
Deze applicatie laat zien welke processen nu op de computer draait en hoeveel resources het gebruikt.



Neofetch laat zien wat de hardware is van je computer. En laat je distro van linux zien.

Assignment 5.5: Users and permissions on Linux

Relevant screenshots + motivation



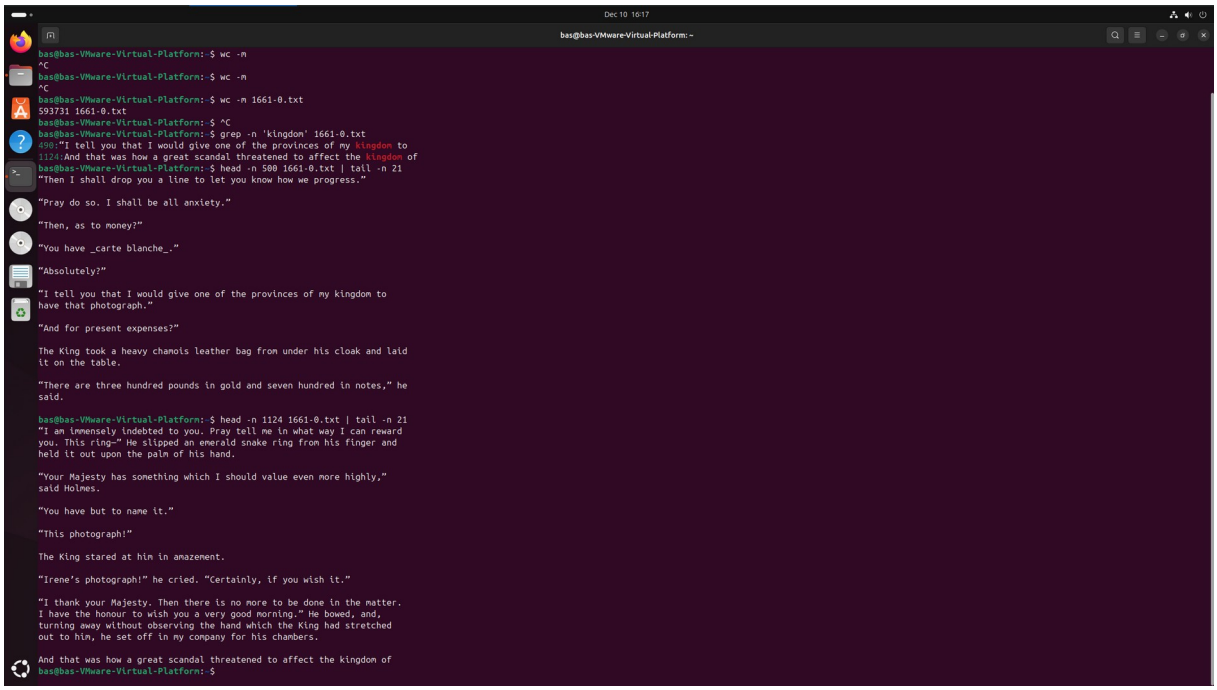
Assignment 5.6: View the contents of files

Relevant screenshots + motivation

Cat: Laat de inhoud van het bestand zien.
Wc: Dit command telt hoeveel lijnen, woorden, characters en bytes.
Tail: Laat standaard de laatste 10 lijnen zien van een file. Kan aangepast worden naar meer lijnen.
Head: Laat de eerste paar lijnen aan de bovenkant van het bestand zien. Standaard 10 lijnen maar kan aangepast worden.
Grep: Kan je zoeken in het bestand en krijg je terug waar het staat.

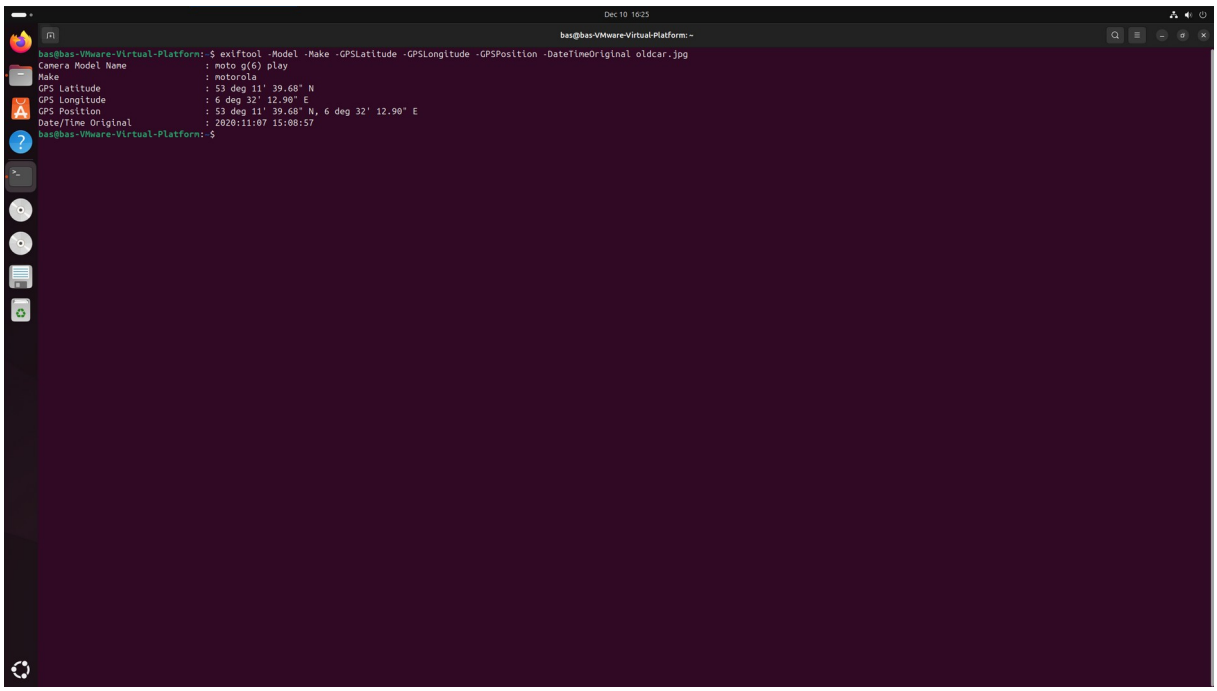
Aantal lijnen: 12306
Aantal woorden: 107562
Aantal characters: 593731

Waar kingdom staat: 490 en 1124

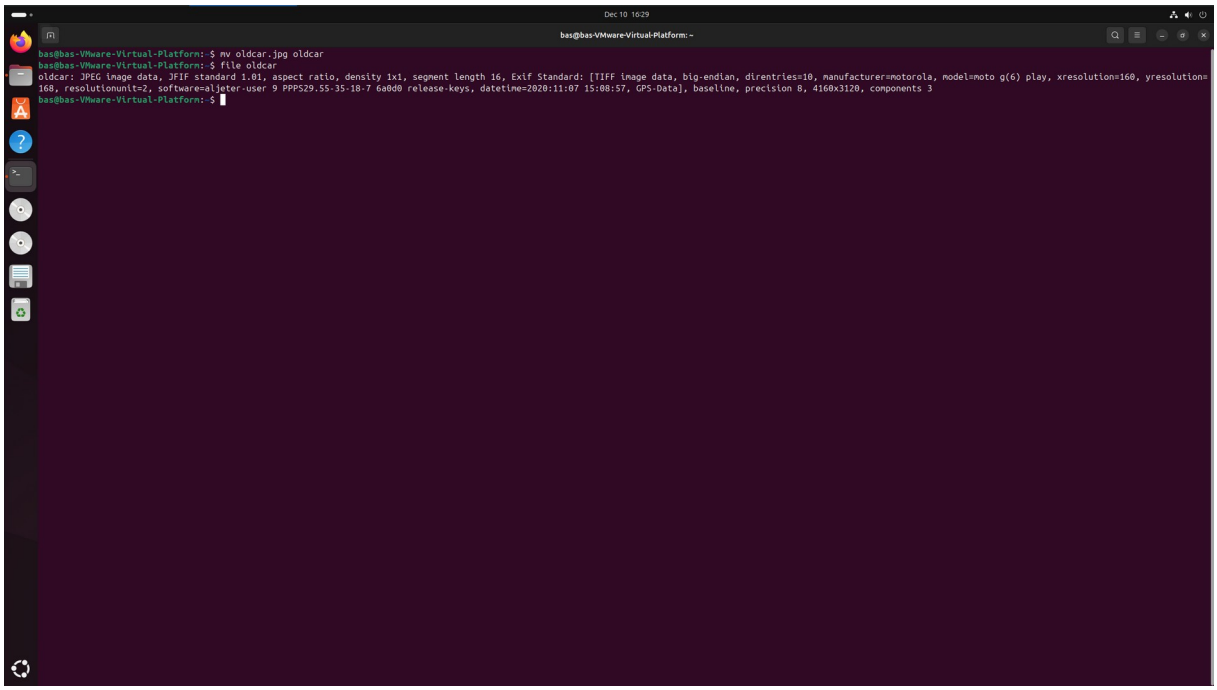


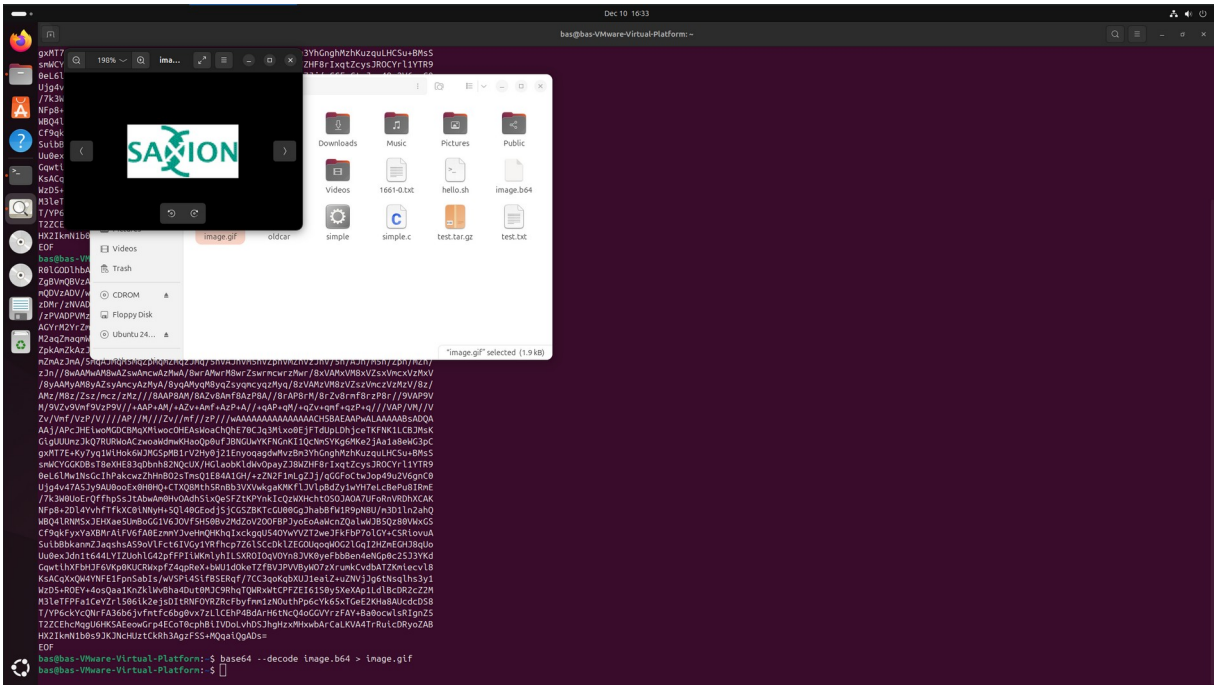
Assignment 5.7: Digital forensics

Relevant screenshots + motivation



Deze foto is genomen in Recht in belgie.





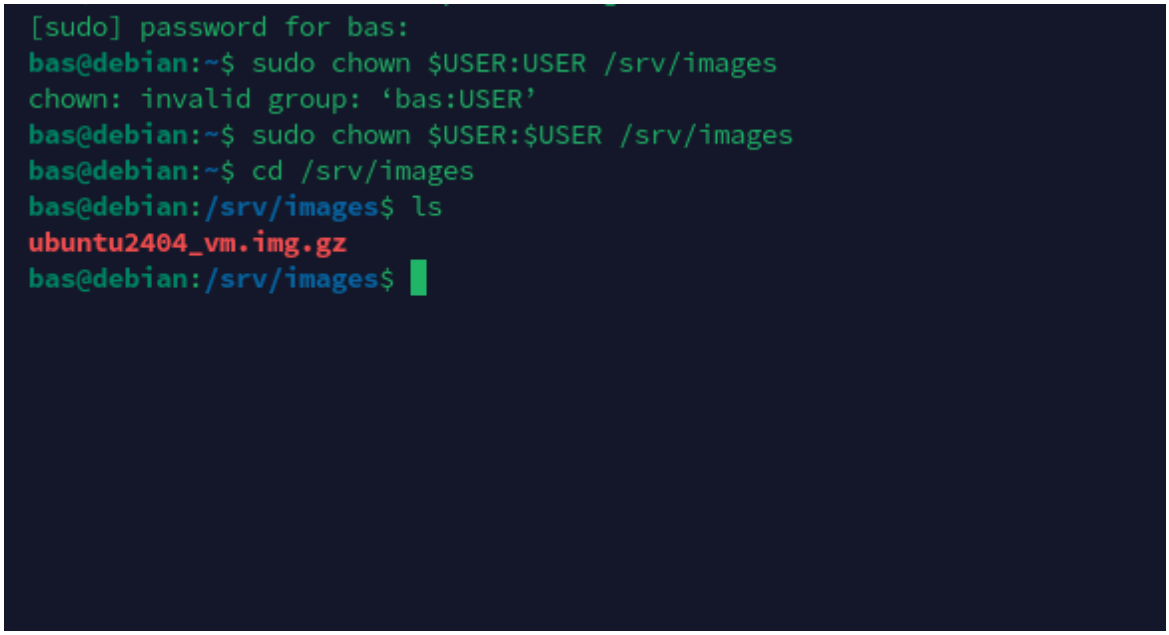
Assignment 5.8: Steganography

Relevant screenshots + motivation

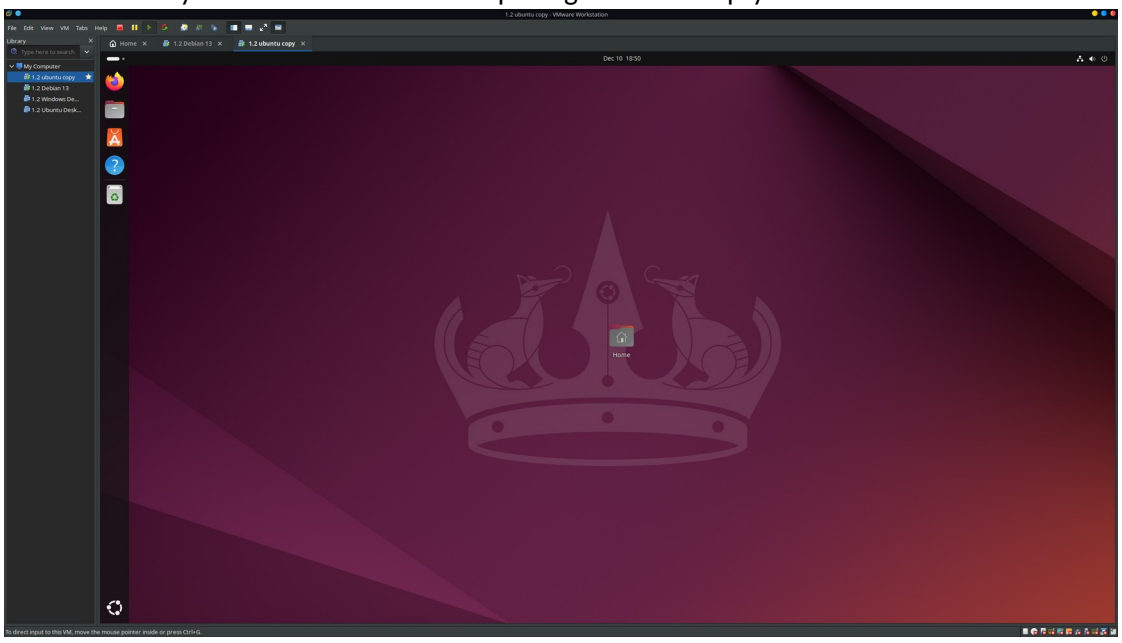
Assignment 5.9: Capture disk images

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**