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 operating systems require more certifications/have trademarks and are also sometimes not as open source as unix-like operating 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.

Person	Contribution to UNIX and unix-like operating systems	General it impact
Ken Thompson	Co-created UNIX, Thompson shell	OS design, multiuser systems
Dennis Ritchie	Co-created UNIX, created C	Portable software, modern OS design
Bill joy	BSD UNIX, vi editor, TCP/IP implementation	Networking, editors, BSD influence
Richard Stallman	GNU project, GCC, bash, GPL	Free software movement, FOSS foundation
Linus Torvalds	Linux kernel	Open-source OS, global computing impact

c) What is the philosophy of the GNU movement?

The GNU philosophy emphasizes free software, meaning freedom not price. It promotes collaboration, sharing, and transparency in software development.

d) Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement? Please explain your answer.

Ubuntu mostly conforms to the GNU philosophy but not 100%, because of the inclusion of some proprietary components.
Strict GNU advocates might prefer GNU/Linux distributions like Trisquel or Parabola, which avoid proprietary software entirely.

e) Find out what is the Windows Subsystem for Linux?

WSL is a compatibility layer in Windows that allows users to run Linux distributions natively on Windows without using a virtual machine.

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

Android: Linux
Ios: UNIX
ChromeOs: Linux

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 handle problems that regular computers cannot process efficiently, using huge amounts of processing power for simulations, predictions, and complex 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 group of multiple PS3 consoles connected to act as a parallel computing system.

Used for research purposes, like AI experiments at universities.

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/

Even with 1,050 Raspberry Pis, their individual CPU power is tiny compared to real supercomputers using Xeon or AMD EPYC processors.
therefore Oracle's Raspberry Pi cluster would not appear on the Top500 list, because its performance is far below modern high-performance supercomputers.

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

AMD Zen 2 (x86-64)

What operating systems run on these consoles?
PS5: Custom PS5 OS
Xbox Series X: Custom Xbox OS

What conclusion can you draw from the answer to the previous question?

Modern gaming consoles use **desktop-class x86-64 CPUs** instead of specialized supercomputer CPUs.

They run **custom OSes** optimized for gaming, showing that **high-performance computation principles** can be adapted for consumer hardware.

Assignment 5.3: Working with Windows

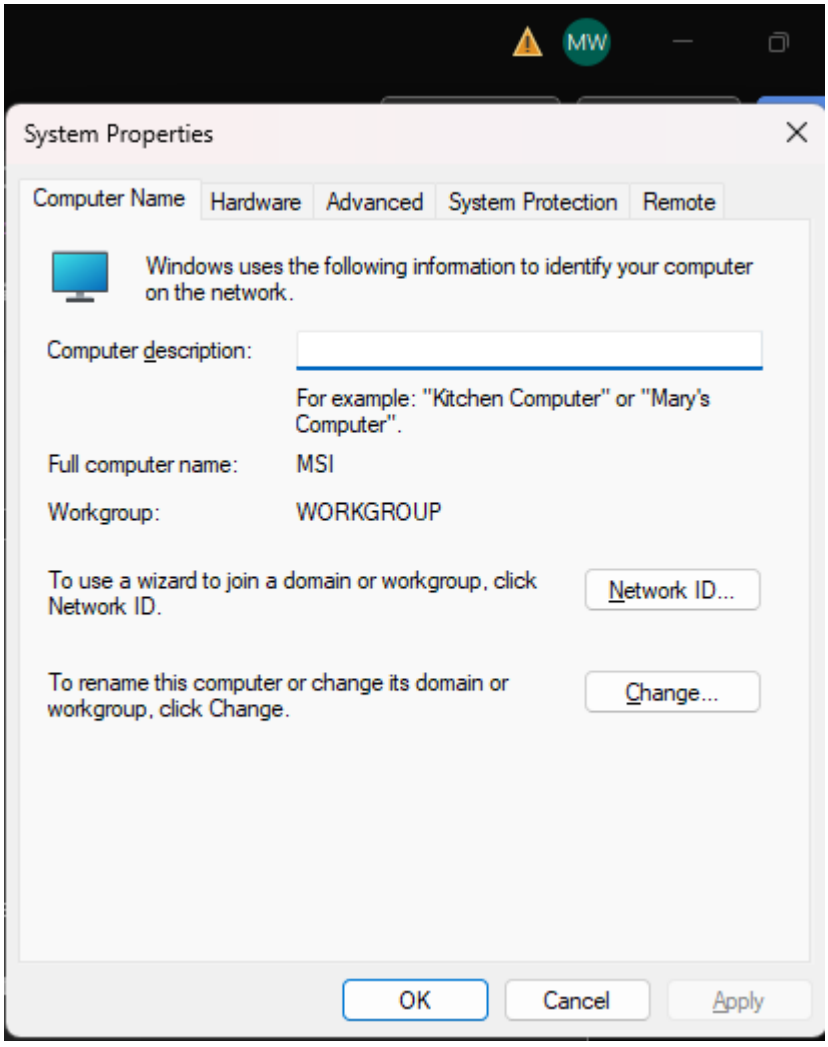
Take relevant screenshots of the assignments below

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.

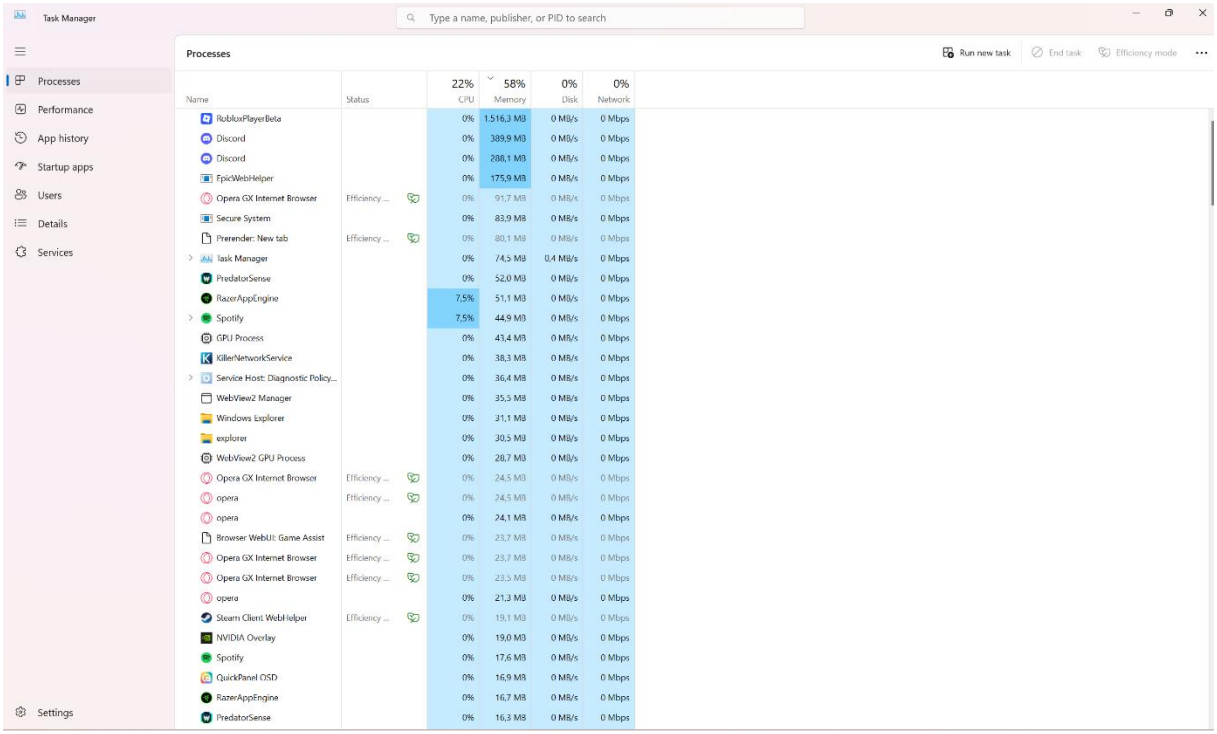
b) The file explorer can be opened with ⊞ + E, Which key combination could you also use?

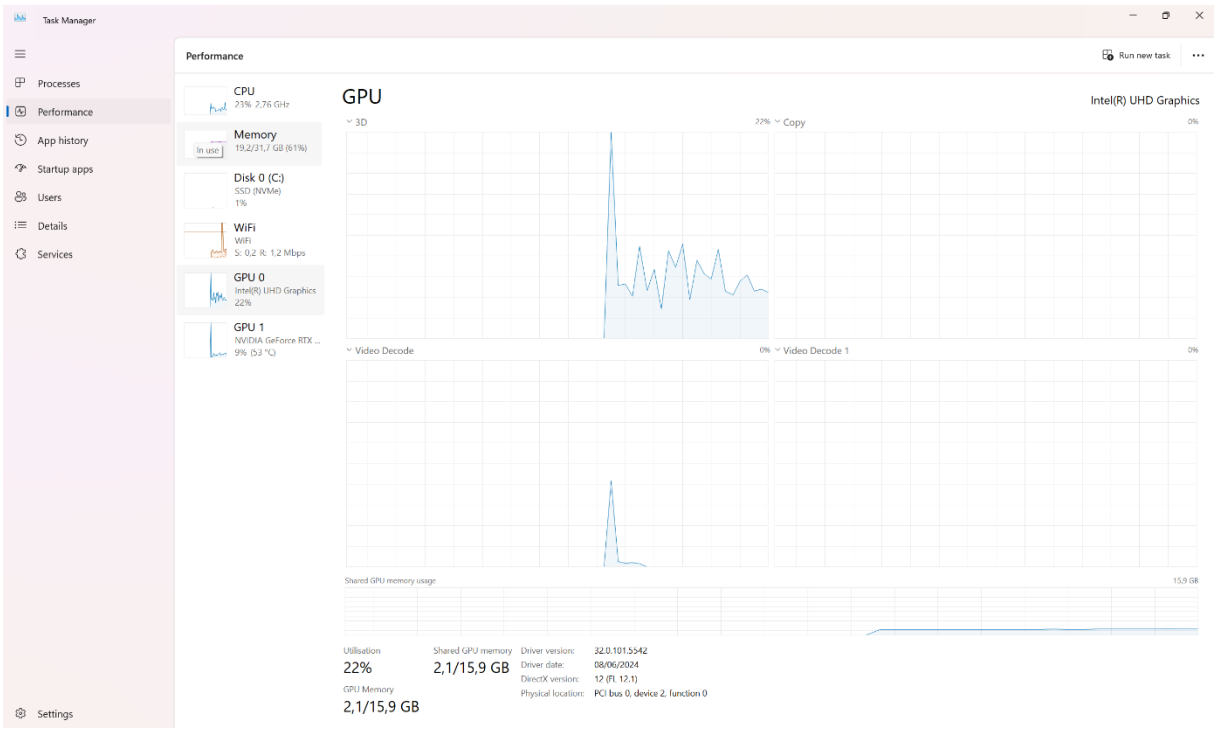
Windows + x and then click e

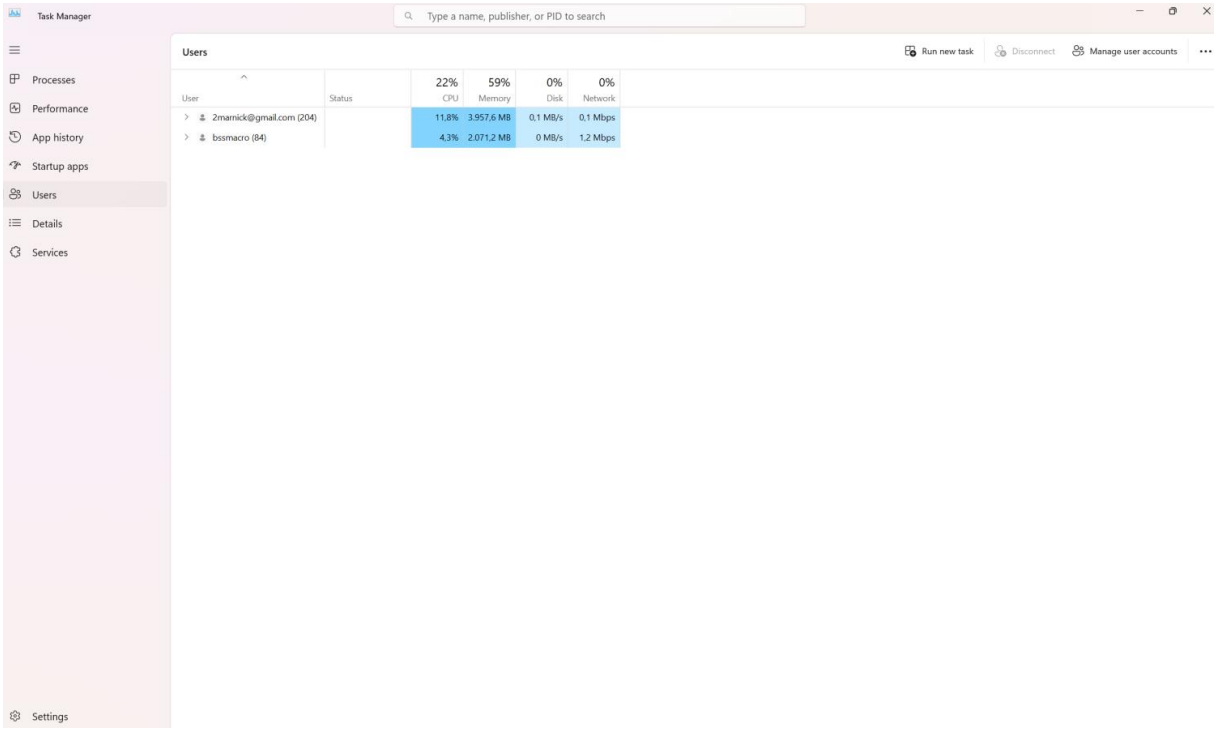
c) Open the system properties with a ⊞ key combination, take a screenshot of the open screen. Paste this screenshot into this template.



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.


Task Manager
Type a name, publisher, or PID to search
Processes
Run new task
End task
Efficiency mode
Processes
Performance
App history
Startup apps
Users
Details
Services
Settings
Name
Status
22% CPU
58% Memory
0% Disk
0% Network
RobloxPlayerBeta 0% 1.516,3 MB 0 MB/s 0 Mbps
Discord 0% 389,9 MB 0 MB/s 0 Mbps
Discord 0% 288,1 MB 0 MB/s 0 Mbps
FpicWebHelper 0% 175,9 MB 0 MB/s 0 Mbps
Opera GX Internet Browser Efficiency ... 0% 91,7 MB 0 MB/s 0 Mbps
Secure System 0% 83,9 MB 0 MB/s 0 Mbps
Prerender: New tab Efficiency ... 0% 80,1 MB 0 MB/s 0 Mbps
Task Manager 0% 74,5 MB 0,4 MB/s 0 Mbps
PredatorSense 0% 52,0 MB 0 MB/s 0 Mbps
RazerAppEngine 7,5% 51,1 MB 0 MB/s 0 Mbps
Spotify 7,5% 44,9 MB 0 MB/s 0 Mbps
GPU Process 0% 43,4 MB 0 MB/s 0 Mbps
KillerNetworkService 0% 38,3 MB 0 MB/s 0 Mbps
Service Host: Diagnostic Policy... 0% 36,4 MB 0 MB/s 0 Mbps
WebView2 Manager 0% 35,5 MB 0 MB/s 0 Mbps
Windows Explorer 0% 31,1 MB 0 MB/s 0 Mbps
explorer 0% 30,5 MB 0 MB/s 0 Mbps
WebView2 GPU Process 0% 28,7 MB 0 MB/s 0 Mbps
Opera GX Internet Browser Efficiency ... 0% 24,5 MB 0 MB/s 0 Mbps
opera Efficiency ... 0% 24,5 MB 0 MB/s 0 Mbps
opera 0% 24,1 MB 0 MB/s 0 Mbps
Browser WebUI: Game Assist Efficiency ... 0% 23,7 MB 0 MB/s 0 Mbps
Opera GX Internet Browser Efficiency ... 0% 23,7 MB 0 MB/s 0 Mbps
Opera GX Internet Browser Efficiency ... 0% 23,5 MB 0 MB/s 0 Mbps
opera 0% 21,3 MB 0 MB/s 0 Mbps
Steam Client WebHelper Efficiency ... 0% 19,1 MB 0 MB/s 0 Mbps
NVIDIA Overlay 0% 19,0 MB 0 MB/s 0 Mbps
Spotify 0% 17,6 MB 0 MB/s 0 Mbps
QuickPanel OSD 0% 16,9 MB 0 MB/s 0 Mbps
RazerAppEngine 0% 16,7 MB 0 MB/s 0 Mbps
PredatorSense 0% 16,3 MB 0 MB/s 0 Mbps


Task Manager
Performance
Run new task
Processes
Performance
App history
Startup apps
Users
Details
Services
Settings
CPU
23% 2,76 GHz
Memory
19,2/31,7 GB (61%)
In use
Disk 0 (C:)
SSD (NVMe)
1%
WiFi
WiFi
S: 0,2 R: 1,2 Mbps
GPU 0
Intel(R) UHD Graphics
22%
GPU 1
NVIDIA GeForce RTX ...
9% (53 °C)
GPU
Intel(R) UHD Graphics
3D
22% Copy
0%
Video Decode
0% Video Decode 1
0%
Shared GPU memory usage
15,9 GB
Utilisation
22%
Shared GPU memory
2,1/15,9 GB
GPU Memory
2,1/15,9 GB
Driver version: 32.0.101.5542
Driver date: 08/06/2024
DirectX version: 12 (FL 12.1)
Physical location: PCI bus 0, device 2, function 0



(screenshots komen qua specs niet overeen met week 3 omdat het een andere laptop is waar ik de screenshots heb gemaakt)

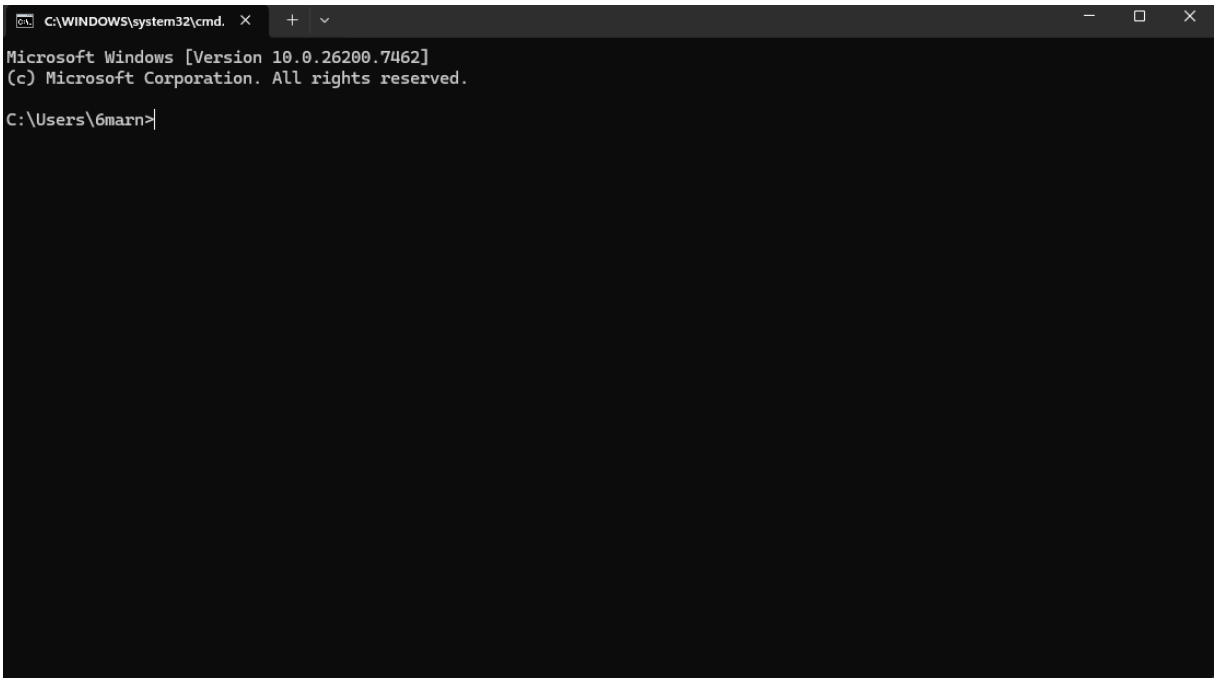
e) If you're giving a PowerPoint presentation and you connect your laptop to a projector, Windows can use the projector as a second screen. For example, you may have Outlook open on your first screen that you don't show over the projector, while the PowerPoint presentation is displayed on the projector,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

Windows 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 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.

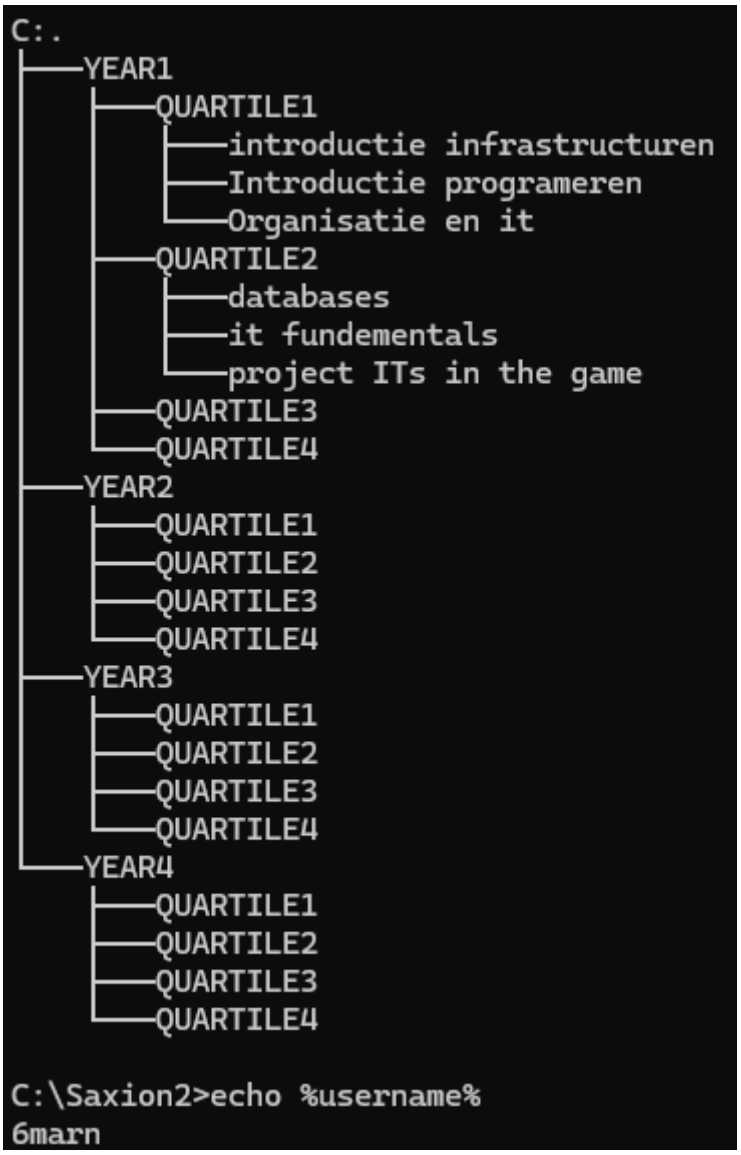


Working in the File Explorer

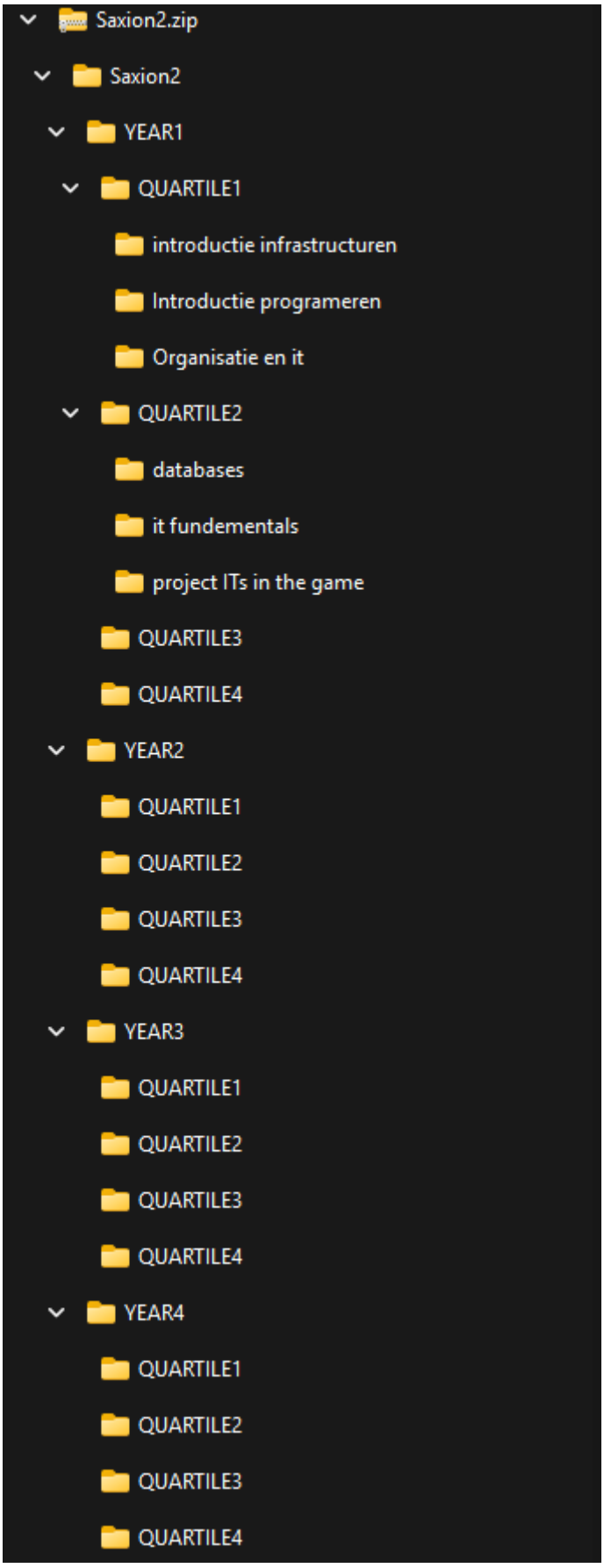
Relevant screenshots **copy** command:

```
C:\Saxion2>copy "C:\Saxion2\Wave.png" "C:\Saxion2\YEAR1\QUARTILE1\introductie programeren\"
        1 file(s) copied.

C:\Saxion2>copy "C:\Saxion2\Plug.png" "C:\Saxion2\YEAR1\QUARTILE1\introductie infrastructuren\"
        1 file(s) copied.

C:\Saxion2>copy "C:\Saxion2\Tumble.png" "C:\Saxion2\YEAR1\QUARTILE1\Organisatie en it\"
        1 file(s) copied.
```

Relevant screenshots **tree** command:



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


Saxion2.zip
Saxion2
YEAR1
QUARTILE1
introductie infrastructuren
Introductie programeren
Organisatie en it
QUARTILE2
databases
it fundementals
project ITs in the game
QUARTILE3
QUARTILE4
YEAR2
QUARTILE1
QUARTILE2
QUARTILE3
QUARTILE4
YEAR3
QUARTILE1
QUARTILE2
QUARTILE3
QUARTILE4
YEAR4
QUARTILE1
QUARTILE2
QUARTILE3
QUARTILE4

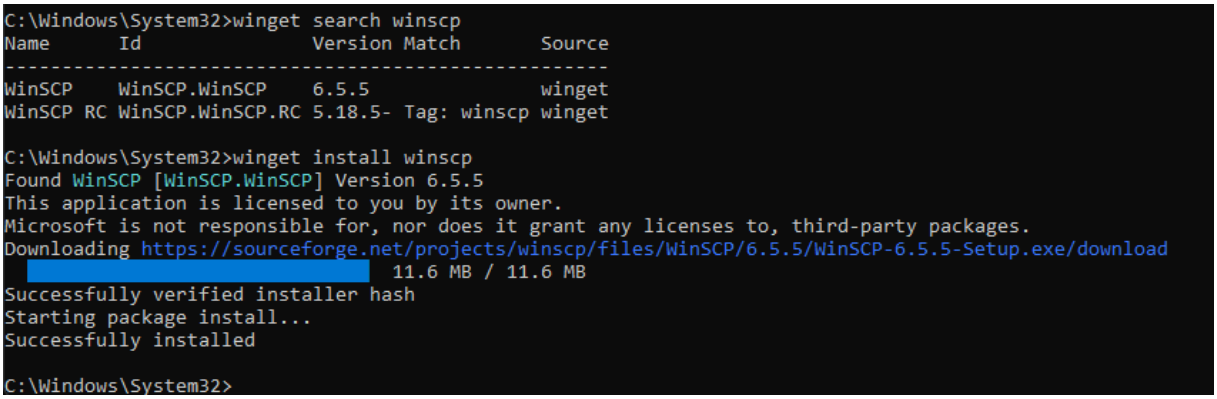
Terminating Processes

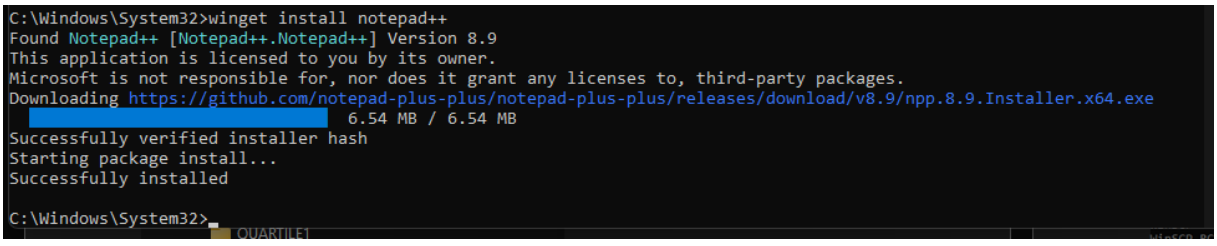
Relevant Screenshots Task Manager Window:

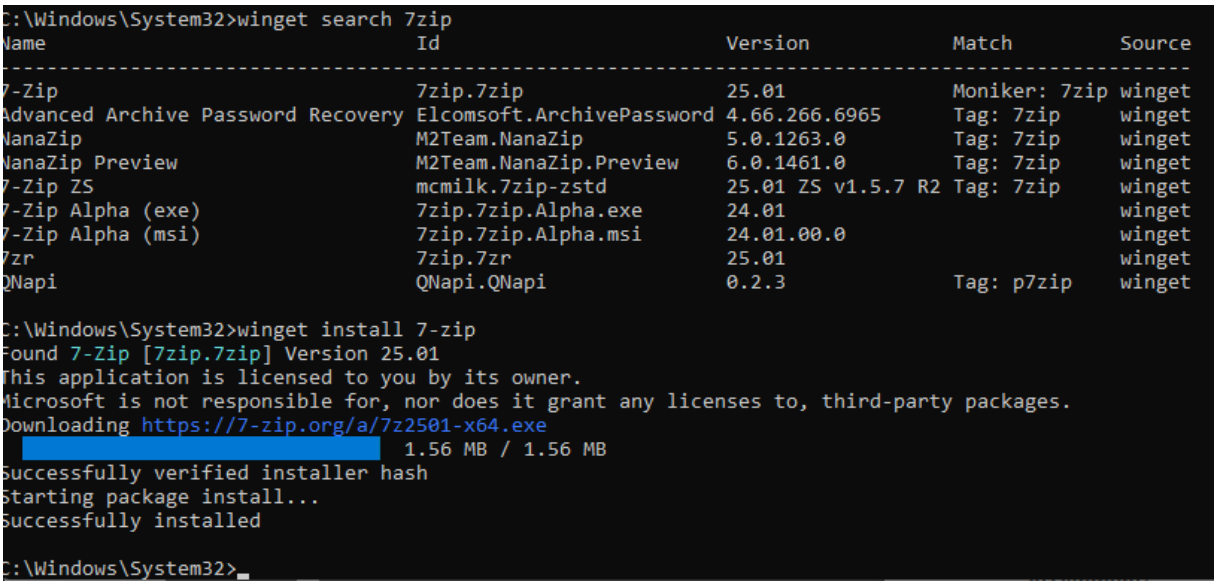
Install Software

Relevant screenshots that the following software is installed with winget:

- WinSCP
- Notepad++
- 7zip

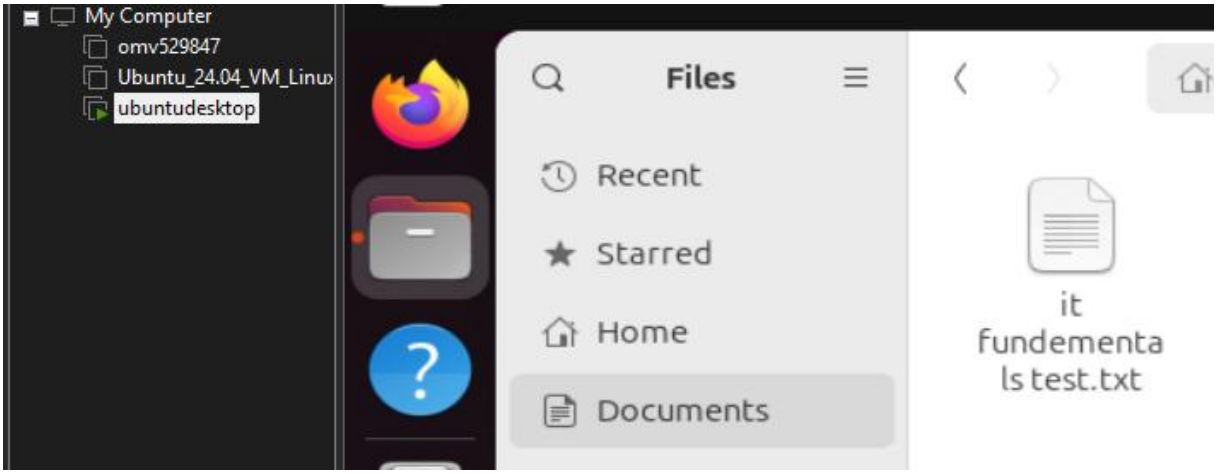


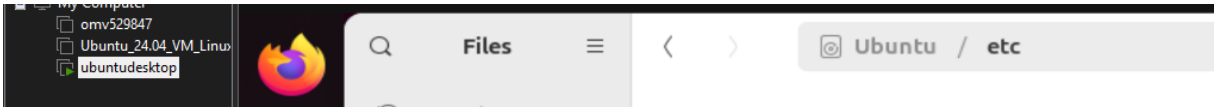


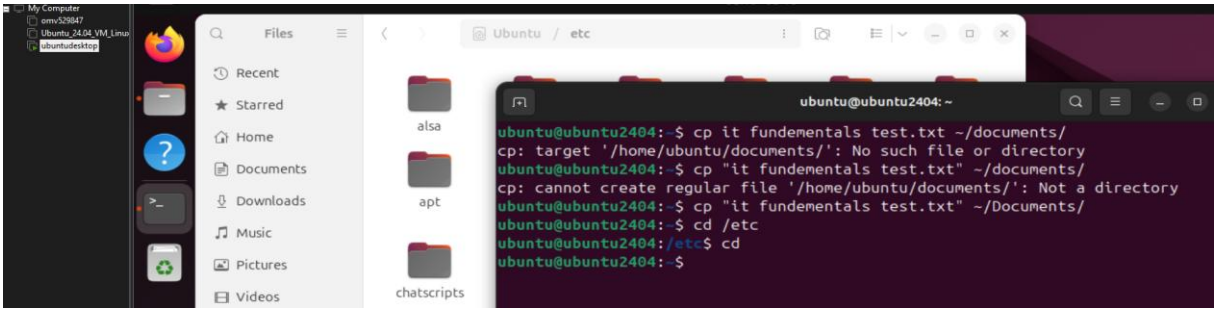

C:\Windows\System32>winget search 7zip
Name Id Version Match Source
7-Zip 7zip.7zip 25.01 Moniker: 7zip winget
Advanced Archive Password Recovery Elcomsoft.ArchivePassword 4.66.266.6965 Tag: 7zip winget
NanaZip M2Team.NanaZip 5.0.1263.0 Tag: 7zip winget
NanaZip Preview M2Team.NanaZip.Preview 6.0.1461.0 Tag: 7zip winget
7-Zip ZS mcmilk.7zip-zstd 25.01 ZS v1.5.7 R2 Tag: 7zip winget
7-Zip Alpha (exe) 7zip.7zip.Alpha.exe 24.01 winget
7-Zip Alpha (msi) 7zip.7zip.Alpha.msi 24.01.00.0 winget
7zr 7zip.7zr 25.01 winget
QNapi QNapi.QNapi 0.2.3 Tag: p7zip winget
C:\Windows\System32>winget install 7-zip
Found 7-Zip [7zip.7zip] Version 25.01
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/7z2501-x64.exe
1.56 MB / 1.56 MB
Successfully verified installer hash
Starting package install...
Successfully installed
C:\Windows\System32>

Assignment 5.4: Working with Linux

Relevant screenshots + motivation







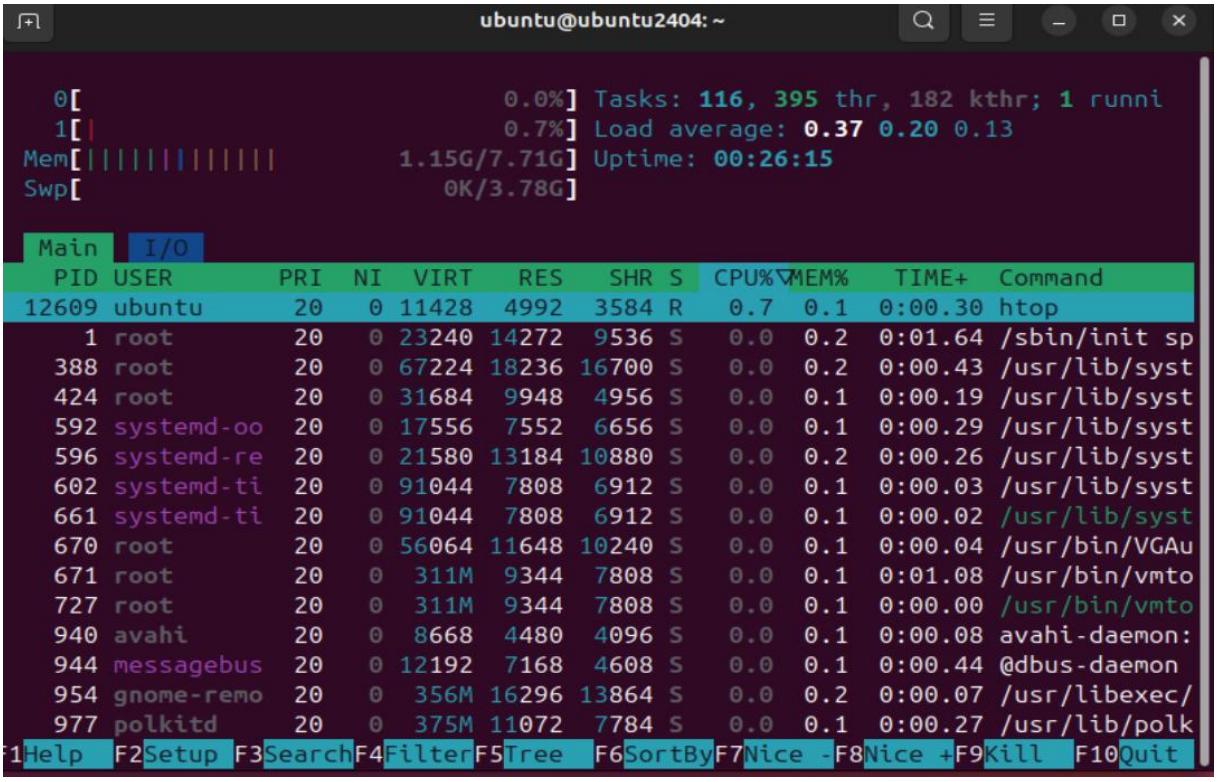
/etc is used for system-wide configuration files

Compress: tar -cvf archive.tar filename.txt

Extract: tar -xvf archive.tar

Compress with tar+gzip: tar -czvf archive.tar.gz filename.txt

```
Hit:4 http://in.archive.ubuntu.com/ubuntu noble-backports InRelease
Get:5 http://in.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1,6
90 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages
[1,510 kB]
Fetched 3,327 kB in 3min 50s (14.5 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
545 packages can be upgraded. Run 'apt list --upgradable' to see them.
W: Failed to fetch http://security.ubuntu.com/ubuntu/dists/noble-security/InRele
ase  Temporary failure resolving 'security.ubuntu.com'
W: Some index files failed to download. They have been ignored, or old ones used
 instead.
ubuntu@ubuntu2404:~$ sudo apt update
Hit:1 http://in.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
545 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@ubuntu2404:~$
```



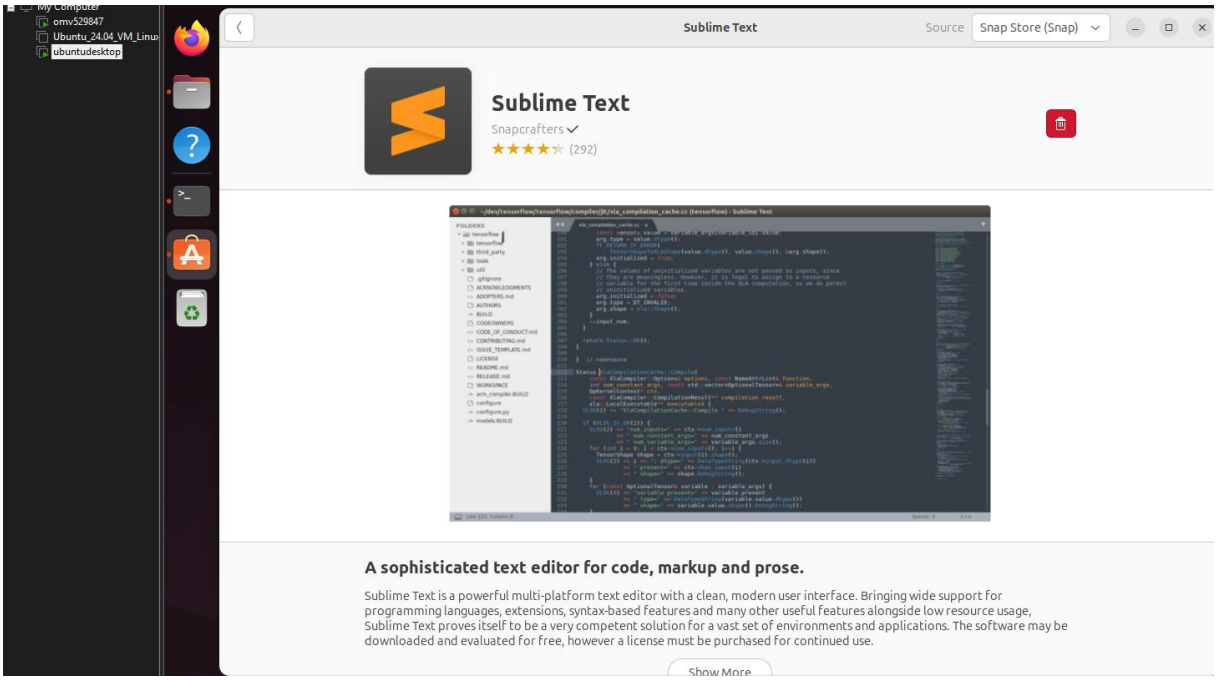
Shows:

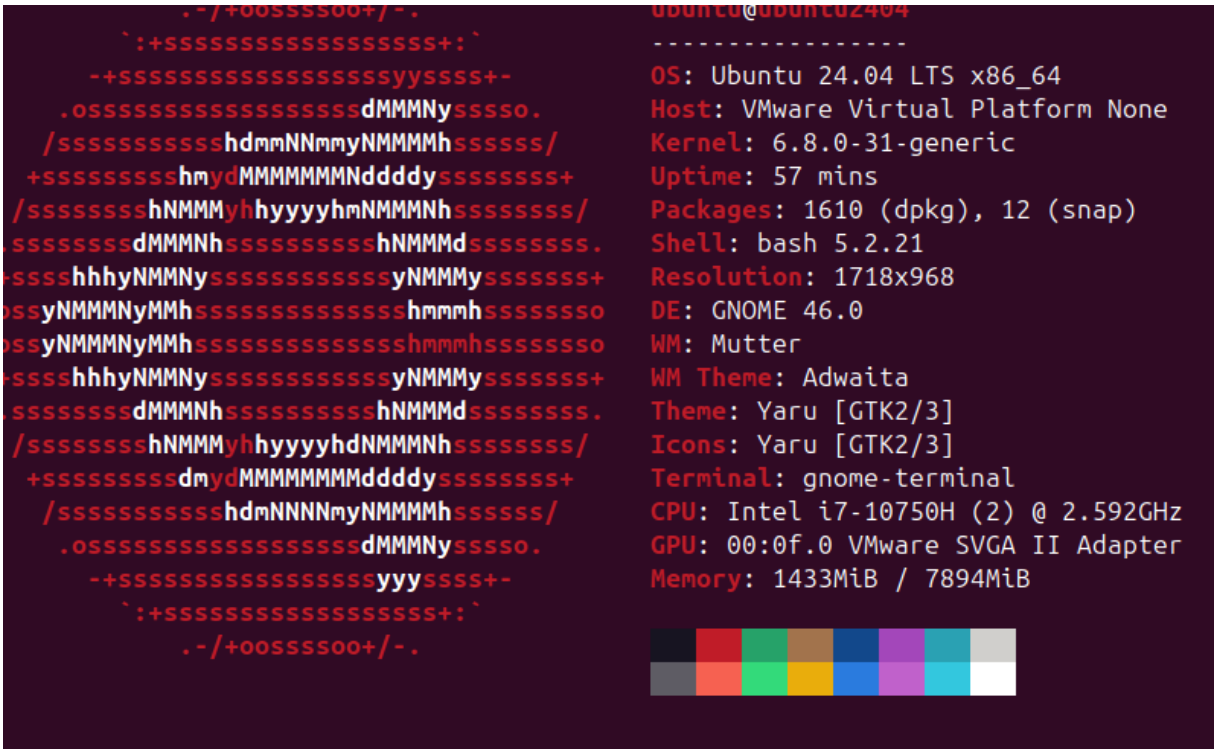
Running processes in real time

CPU and memory usage

Load averages

Users and process IDs (PIDs)





Shows:

Operating system and version

Kernel version

CPU and GPU

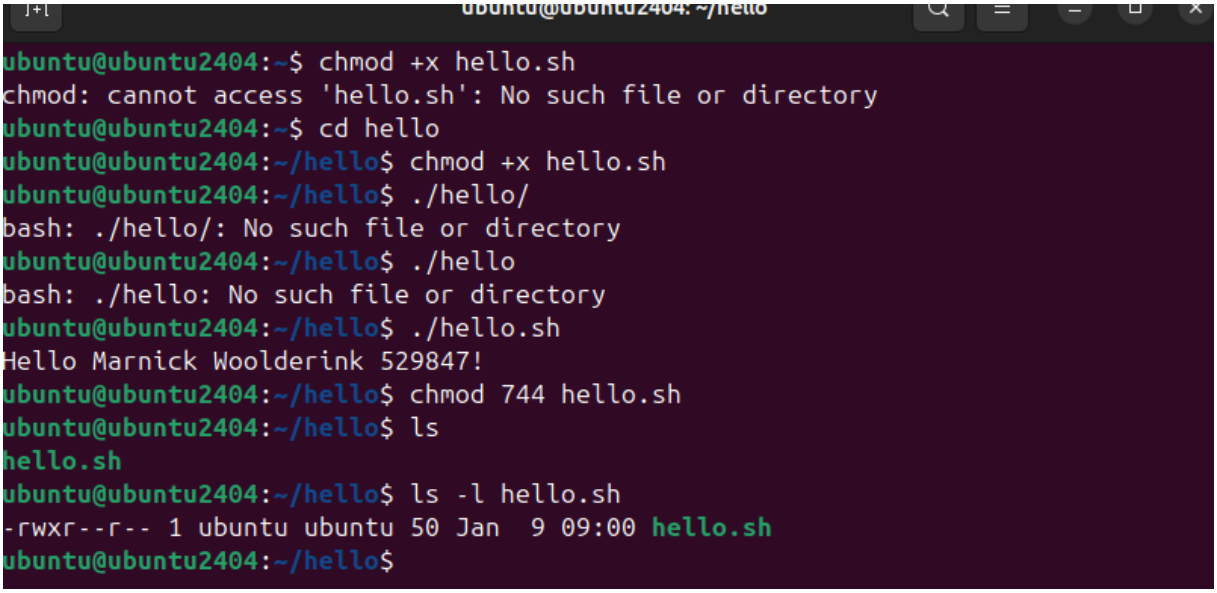
RAM usage

Desktop environment

Hostname

Assignment 5.5: Users and permissions on Linux

Relevant screenshots + motivation



Assignment 5.6: View the contents of files

Relevant screenshots + motivation

Cat laat alle inhoud van een bestand zien

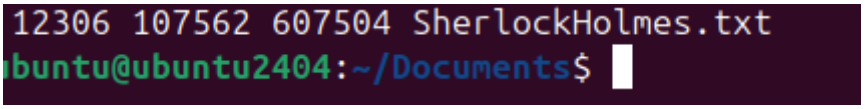
Wc laat het aantal woorden zien

Less laat een bestand pagina voor pagina zien

Tail laat de laatste zin zien

Head laat de eerste zin zien

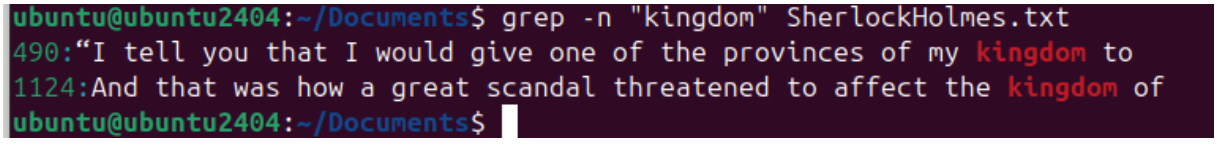
Grep laat je voor woorden zoeken in het bestand



12306 lines

107562 words

607504 characters



Lines 490 and 1124 have the word kingdom

```
ubuntu@ubuntu2404:~/Documents$ grep -n -C 10 "kingdom" SherlockHolmes.txt
480-“Then I shall drop you a line to let you know how we progress.”
481-
482-“Pray do so. I shall be all anxiety.”
483-
484-“Then, as to money?”
485-
486-“You have _carte blanche_.”
487-
488-“Absolutely?”
489-
490:“I tell you that I would give one of the provinces of my kingdom to
491-have that photograph.”
492-
493-“And for present expenses?”
494-
495-The King took a heavy chamois leather bag from under his cloak and laid
496-it on the table.
497-
498-“There are three hundred pounds in gold and seven hundred in notes,” he
499-said.
500-
```

```
1114-
1115-The King stared at him in amazement.
1116-
1117-“Irene’s photograph!” he cried. “Certainly, if you wish it.”
1118-
1119-“I thank your Majesty. Then there is no more to be done in the matter.
1120-I have the honour to wish you a very good morning.” He bowed, and,
1121-turning away without observing the hand which the King had stretched
1122-out to him, he set off in my company for his chambers.
1123-
1124:And that was how a great scandal threatened to affect the kingdom of
1125-Bohemia, and how the best plans of Mr. Sherlock Holmes were beaten by a
1126-woman’s wit. He used to make merry over the cleverness of women, but I
1127-have not heard him do it of late. And when he speaks of Irene Adler, or
1128-when he refers to her photograph, it is always under the honourable
1129-title of _the_ woman.
1130-
1131-
1132-
1133-
1134-II. THE RED-HEADED LEAGUE
```

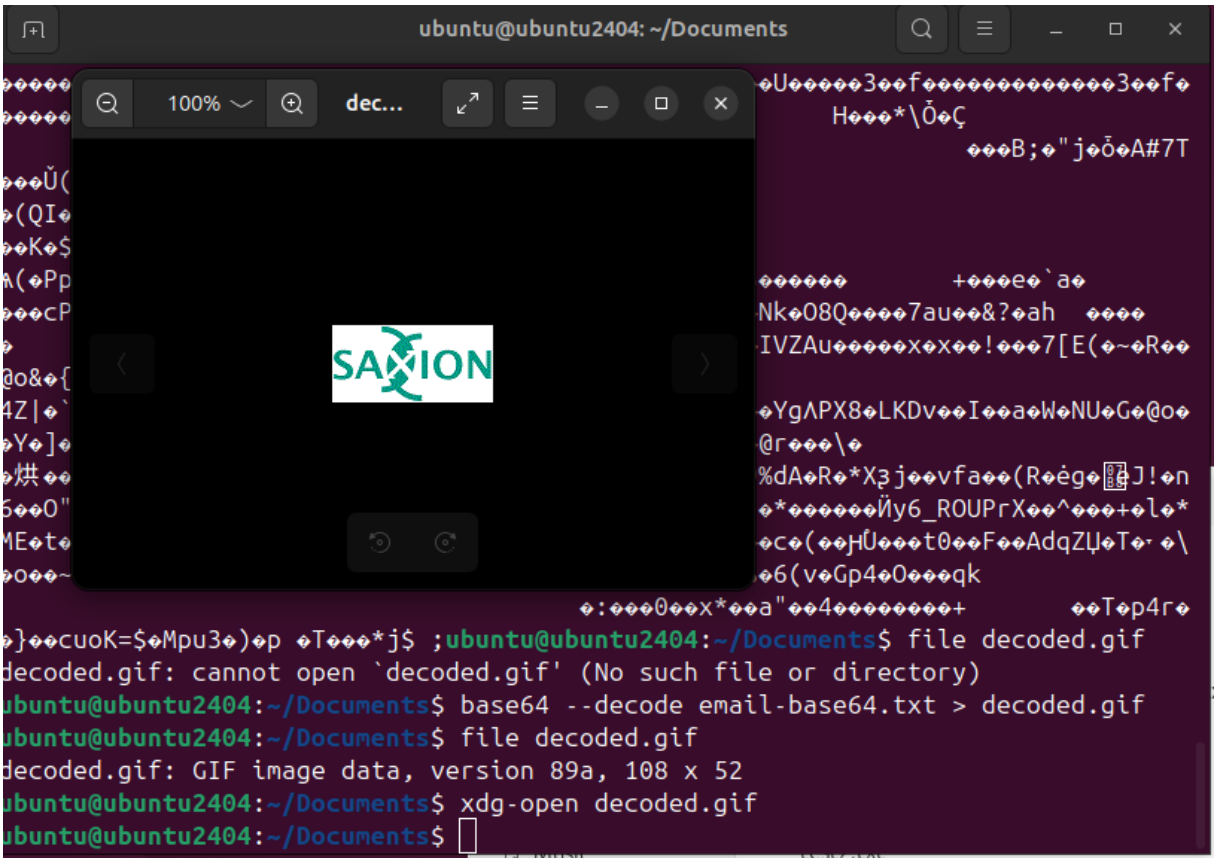
Assignment 5.7: Digital forensics

Relevant screenshots + motivation

```
Manufacturer          |motorola
Model                 |moto g(6) play
```

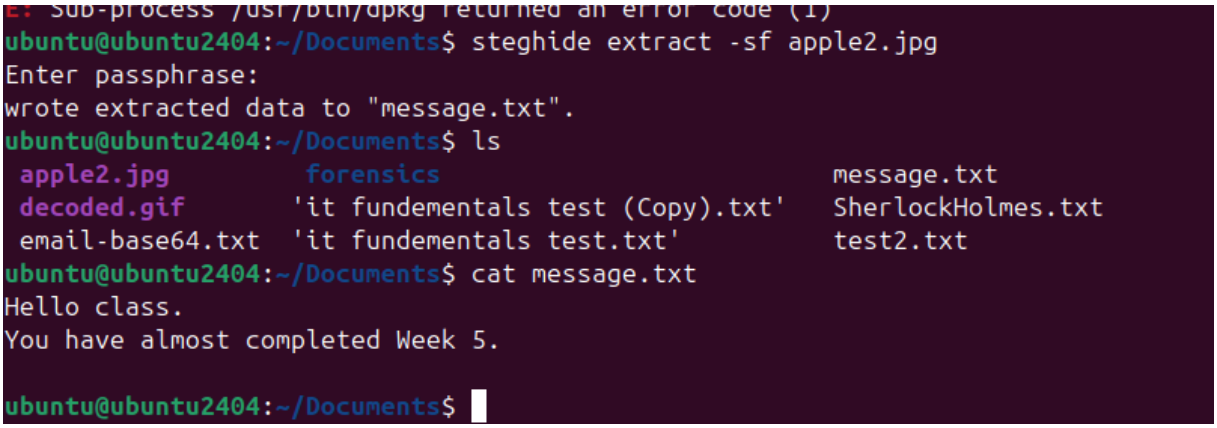
53°11'39.5"N 6°32'12.8"E Groningen

After removing the file extension ubuntu still considered it a file for the exif command



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**