

Template Week 5 – Operating Systems

Student number:

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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 certified operating system. Unix-like operating systems are inspired by 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

Played rol in creation of unix operating system with Dennis Ritchie. Played rol in creation of original b programming language which c was inspired by.

Dennis Ritchie

Played rol in creation of unix operating system with Ken Thompson. Played rol in creation of c programming language.

Bill Joy

Developed the berkeley software distribution unix. Played role in creation of sunos operating system.

Richard Stallman

Founded the gnu project. Played role in creation of gcc.

Linus Torvalds

Played role in creation of linux operstion system. Linux is used by many technological devices.

- c) What is the philosophy of the GNU movement?

Founded by Richard Stallman. Advocates free software. Has 4 layers of freedom.

- d) Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement?

Please explain your answer.

Partially conform to gnu. Supports free software but includes proprietary software

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

It is a compatibility layer developed by windows to allow users to run linux on windows without using virtual machine.

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

Android: linux

Ios : bsd


Chrome os: 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>
Supercomputes are used for processing complex calculations and high amount of data at high speed. Playes role in ai, cryptography, scientific simulations, weather forecasting, molecular research and more.
- 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?
It is used for scientific research, distributed computing, ai and education.
- 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
- 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/>
Doesn't meet performance requirements.
- e) What CPU architecture is used for the PlayStation 5 and Xbox Series X?
- f) Amd
What operating systems run on these consoles?
Playstation 5: orbit os
Xbox series x: xbox ox
What conclusion can you draw from the answer to the previous question?
Playstation 5 and xbox series x use custom operating system.


Assignment 5.3: Working with Windows

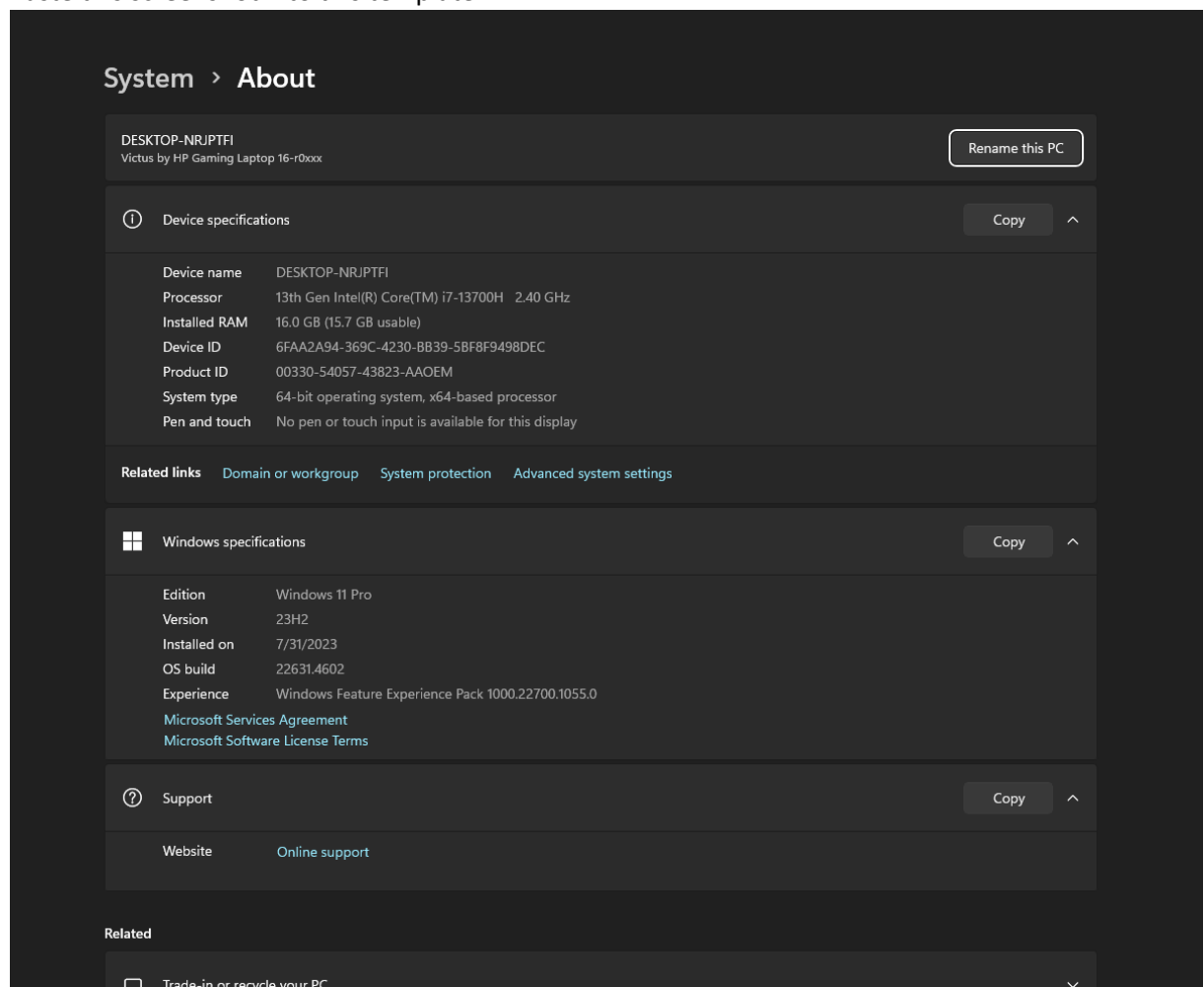
Take relevant screenshots of the assignments below

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.

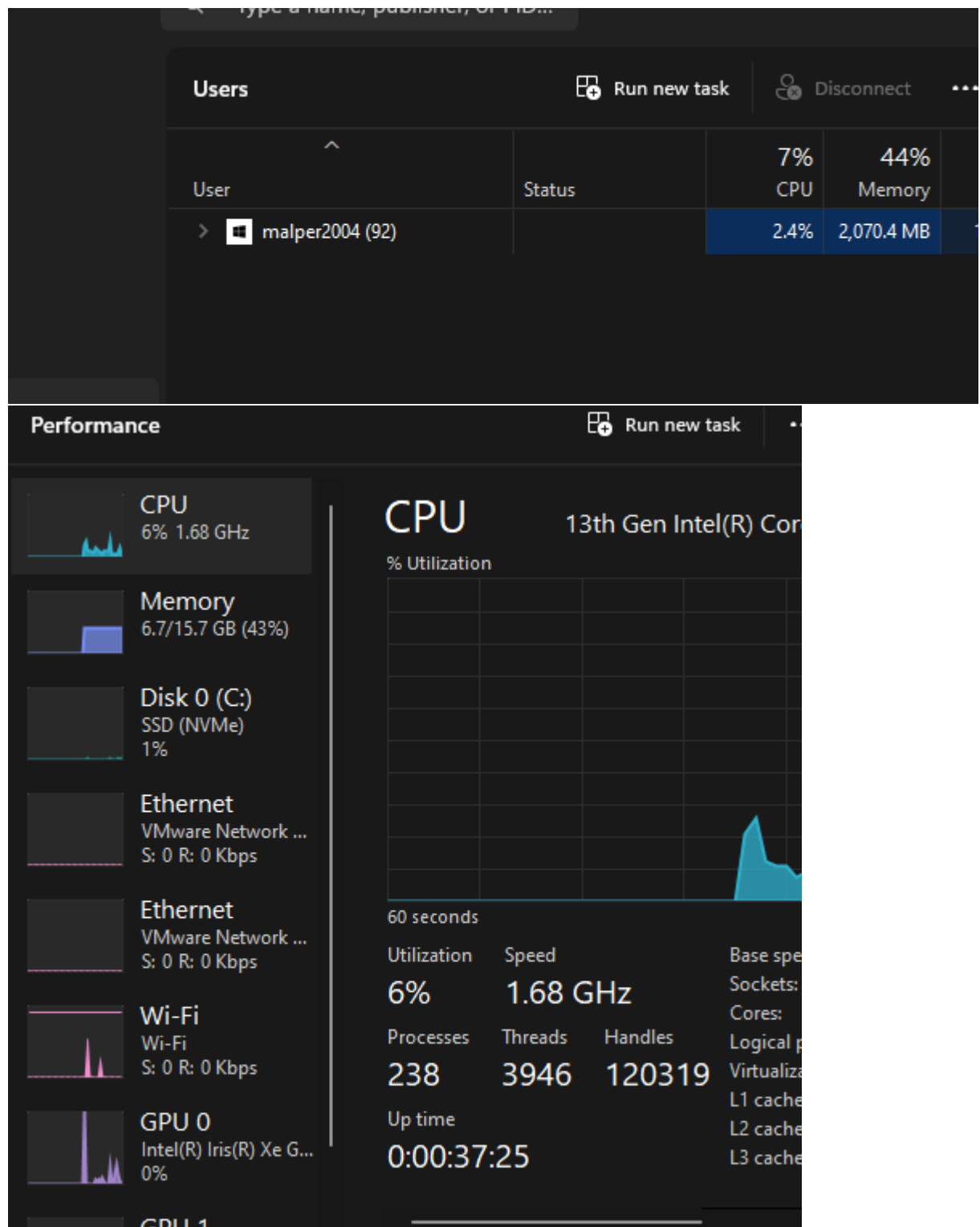
b) The file explorer can be opened with  + E, Which key combination could you also use?

 + X

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.



Processes		Run new task	End task	...
Name	Status	12% CPU	42% Memory	
Apps (4)				
> Microsoft Word		0%	118.2 MB	
Settings		0%	46.7 MB	
> Task Manager		0.1%	77.1 MB	
> Windows Explorer		0%	176.7 MB	
Background processes (100)				
> 64-bit Synaptics Pointing Enh...		0%	0.9 MB	
> AppHelperCap.exe		0.8%	11.9 MB	
Application Frame Host		0%	6.9 MB	
Artificial Intelligence (AI) Host...		0%	18.5 MB	
> Avira Optimizer Host (32 bit)		0%	0.9 MB	
Avira Security (32 bit)		0.1%	1.9 MB	
> Avira Security (32 bit)		0.1%	16.7 MB	
Canva		0%	9.4 MB	

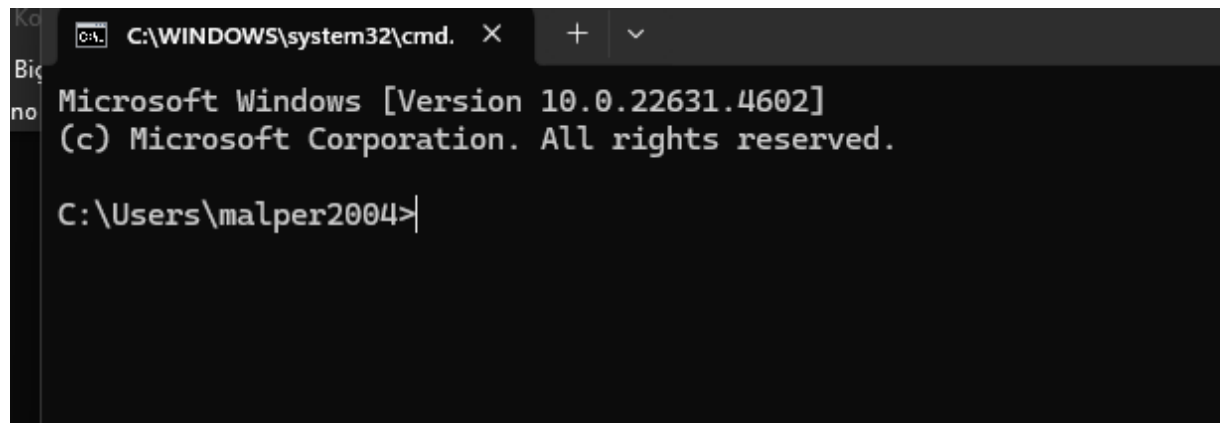
- e) If you're giving a PowerPoint presentation and you connect your laptop to a projector, Windows can use the projector as a second screen. For example, you may have Outlook open on your first screen that you don't show over the projector, while the PowerPoint presentation is displayed on the projector,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



```
C:\WINDOWS\system32\cmd. X + v
Microsoft Windows [Version 10.0.22631.4602]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malper2004>
```

Working in the File Explorer

Relevant screenshots **copy** command:

```
C:\Saxion>copy "C:\Users\malper2004\Downloads\Tumble.png" "C:\Saxion\Year1\Quartile1\organisatie it\"
1 file(s) copied.

C:\Saxion>copy "C:\Users\malper2004\Downloads\Wave.png" "C:\Saxion\Year1\Quartile1\introductie programmeren\"
1 file(s) copied.

C:\Saxion>copy "C:\Users\malper2004\Downloads\Plug.png" "C:\Saxion\Year1\Quartile1\introductie infrastructuren\"
1 file(s) copied.
```

Relevant screenshots **tree** command:

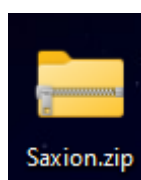
```
C:\Windows\System32\cmd.e  X  +  v

Quartile1
├── introductie infrastructuren
├── introductie programmeren
└── organisatie it
Quartile2
├── database
├── it fundamentals
└── 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%
malper2004

C:\Saxion>
```

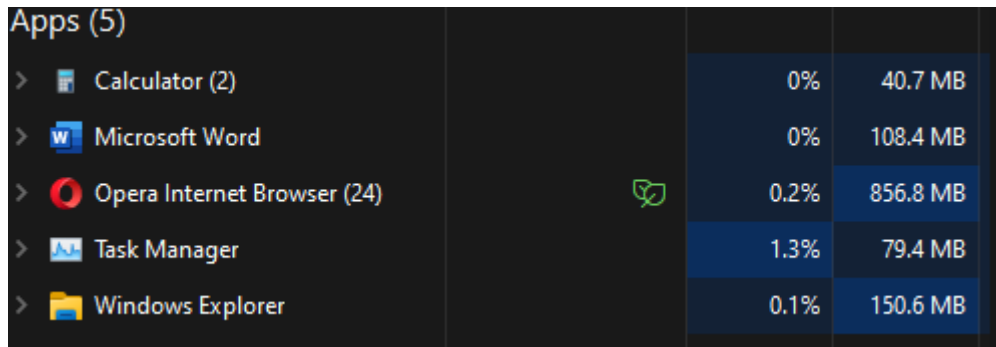
Relevant screenshots in the file explorer of the folder c:\Saxion + created zip file.



Het is niet mogelijk op c zip te maken. Hij vraagt het op desktop.

Terminating Processes

Relevant Screenshots Task Manager Window:



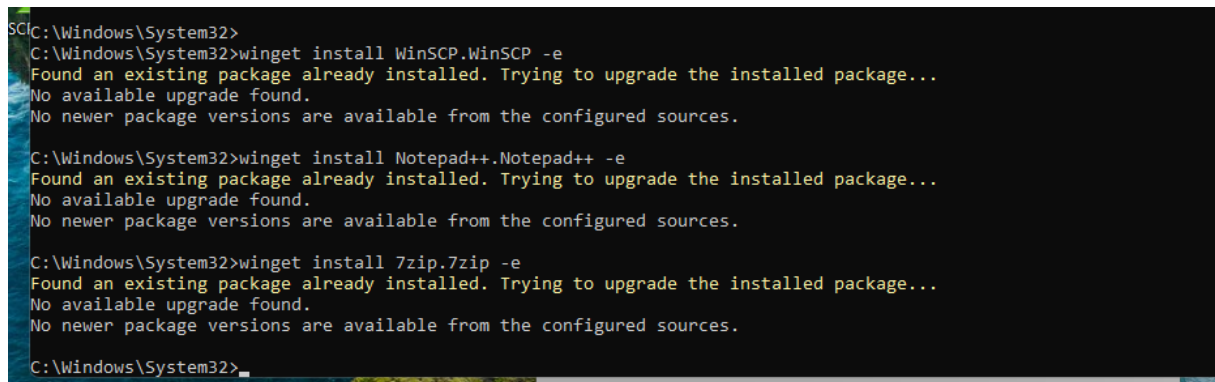
The screenshot shows the Windows Task Manager window with the 'Apps' tab selected. It lists five running applications: Calculator (2), Microsoft Word, Opera Internet Browser (24), Task Manager, and Windows Explorer. The CPU usage is 0.2% and the memory usage is 150.6 MB. The Task Manager icon is highlighted with a green box.

App	CPU	Private
Calculator (2)	0%	40.7 MB
Microsoft Word	0%	108.4 MB
Opera Internet Browser (24)	0.2%	856.8 MB
Task Manager	1.3%	79.4 MB
Windows Explorer	0.1%	150.6 MB

Install Software

Relevant screenshots that the following software is installed:

- WinSCP
- Notepad++
- 7zip



```
C:\Windows\System32>
C:\Windows\System32>winget install WinSCP.WinSCP -e
Found an existing package already installed. Trying to upgrade the installed package...
No available upgrade found.
No newer package versions are available from the configured sources.

C:\Windows\System32>winget install Notepad++.Notepad++ -e
Found an existing package already installed. Trying to upgrade the installed package...
No available upgrade found.
No newer package versions are available from the configured sources.

C:\Windows\System32>winget install 7zip.7zip -e
Found an existing package already installed. Trying to upgrade the installed package...
No available upgrade found.
No newer package versions are available from the configured sources.

C:\Windows\System32>
```


Assignment 5.4: Working with Linux

Relevant screenshots + motivation

Linux has a file system with a single root directory. Windows has multiple roots.

```
malper2004@infra:~$ tar -cf archive.tar textfile.txt
malper2004@infra:~$
```

```
malper2004@infra:/etc$ cd ~
malper2004@infra:~$
```

```
malper2004@infra:~$ cd /etc
malper2004@infra:/etc$
```

```
malper2004@infra:~$ cp ~/textfile.txt ~/Documents/
malper2004@infra:~$
```

```
malper2004@infra:~$ echo "This is a text file." > textfile.txt
malper2004@infra:~$
```

```
malper2004@infra:~$ sudo apt install -y neofetch
[sudo] password for malper2004:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
```

The screenshot shows a terminal window with system statistics at the top and the htop process viewer below. The system statistics include: Tasks: 119, 459 thr, 191 kthr; 1 runni; Load average: 0.03 0.13 0.20; Mem: 1.42G/3.78G; Uptime: 00:14:29; Swp: 0K/1.92G. The htop process viewer shows a table of running processes with columns for PID, USER, PRI, NI, VIRT, RES, SHR, S, CPU%, MEM%, TIME+, and Command. The processes listed include htop (PID 3841, USER malper2004) and various system processes (PIDs 3430, 1, 456, 505, 512, 513, 514, 528, 532, 534, 535, 536, 537, 538) running as root.

PID	USER	PRI	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME+	Command
3841	malper2004	20	0	8896	5120	3584	R	1.3	0.1	0:00.11	htop
3430	malper2004	20	0	680M	56684	44608	S	0.7	1.4	0:01.71	/usr/libexec/
1	root	20	0	23256	14120	9384	S	0.0	0.4	0:01.47	/sbin/init
456	root	19	-1	50844	17792	16256	S	0.0	0.4	0:00.35	/usr/lib/syst
505	root	RT	0	346M	27392	8704	S	0.0	0.7	0:00.09	/sbin/multipa
512	root	20	0	148M	1548	1280	S	0.0	0.0	0:00.00	vmware-vmbloc
513	root	20	0	148M	1548	1280	S	0.0	0.0	0:00.00	vmware-vmbloc
514	root	20	0	148M	1548	1280	S	0.0	0.0	0:00.00	vmware-vmbloc
528	root	20	0	346M	27392	8704	S	0.0	0.7	0:00.00	/sbin/multipa
532	root	20	0	32188	10308	4932	S	0.0	0.3	0:00.27	/usr/lib/syst
534	root	RT	0	346M	27392	8704	S	0.0	0.7	0:00.00	/sbin/multipa
535	root	RT	0	346M	27392	8704	S	0.0	0.7	0:00.00	/sbin/multipa
536	root	RT	0	346M	27392	8704	S	0.0	0.7	0:00.00	/sbin/multipa
537	root	RT	0	346M	27392	8704	S	0.0	0.7	0:00.06	/sbin/multipa
538	root	RT	0	346M	27392	8704	S	0.0	0.7	0:00.00	/sbin/multipa

```
malper2004@infra:~$ sudo apt update && sudo apt install -y htop
[sudo] password for malper2004:
Ign:1 http://nl.archive.ubuntu.com/ubuntu noble InRelease
Ign:2 http://security.ubuntu.com/ubuntu noble-security InRelease
Ign:3 http://nl.archive.ubuntu.com/ubuntu noble-updates InRelease
malper2004@infra:~$ tar -czf archive.tar.gz textfile.txt
malper2004@infra:~$
```

```
malper2004@infra:~$ tar -xf archive.tar
malper2004@infra:~$
```

```
mat2004@mat2004-VMware-Virtual-Platform: ~
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for desktop-file-utils (0.27-2build1) ...
mat2004@mat2004-VMware-Virtual-Platform:~$ neofetch

      .-/+oosssso+/-.
      `:+ssssssssssssss++:`
      -+ssssssssssssssyyssss+-
      .ossssssssssssssdMMMNysssso.
      /ssssssssssshdmmNNmmyNMMMhssssss/
      +ssssssssshmydMMMMMMMMddddyssssssss+
      /sssssssshNMMMyhhyyyhNMMMNhssssssss/
      .ssssssssdMMMNhssssssssshNMMMdssssssss.
      +ssssshhhyNMMNysssssssssssyNMMMyssssssss+
      ossyNMMMNyMMhssssssssssshmmhssssssso
      ossyNMMMNyMMhssssssssssshmmhssssssso
      +ssssshhhyNMMNysssssssssssyNMMMyssssssss+
      .ssssssssdMMMNhssssssssshNMMMdssssssss.
      /sssssssshNMMMyhhyyyhdNMMMNhssssssss/
      +ssssssssdmydMMMMMMMMddddyssssssss+
      /ssssssssssshdmmNNNNmyNMMMhssssss/
      .ossssssssssssssdMMMNysssso.
      -+ssssssssssssssyyssss+-
      `:+ssssssssssssss++:`
      .-/+oosssso+/-.

OS: Ubuntu 24.04.1 LTS x86_64
Host: VMware Virtual Platform
Kernel: 6.8.0-50-generic
Uptime: 2 mins
Packages: 1818 (dpkg), 11 (snap)
Shell: bash 5.2.21
Resolution: 1718x920
DE: GNOME 46.0
WM: Mutter
WM Theme: Adwaita
Theme: Yaru [GTK2/3]
Icons: Yaru [GTK2/3]
Terminal: gnome-terminal
CPU: 13th Gen Intel i7-13700
GPU: 00:0f.0 VMware SVGA II Adapter
Memory: 1063MiB / 3868MiB
```

Assignment 5.5: Users and permissions on Linux

Relevant screenshots + motivation

```
mat2004@mat2004-VMware-Virtual-Platform:~$ mkdir ~/hello
echo -e "#!/bin/bash\nnecho Hello Mehmet Alper Tas, student number 545676!" > ~/hello/hello.sh
mat2004@mat2004-VMware-Virtual-Platform:~$ ~/hello/hello.sh
Hello Mehmet Alper Tas, student number 545676!
mat2004@mat2004-VMware-Virtual-Platform:~$ chmod 744 ~/hello/hello.sh
mat2004@mat2004-VMware-Virtual-Platform:~$ chmod +x ~/hello/hello.sh
```

Assignment 5.6: View the contents of files

Relevant screenshots + motivation

```
mat2004@mat2004-VMware-Virtual-Platform:~$ grep -n "kingdom" SherlockHolmes.txt
| awk 'BEGIN{FS=":"}{print $1}' | while read line; do
    head -n $((line+10)) SherlockHolmes.txt | tail -n 20
done

"Pray do so. I shall be all anxiety."

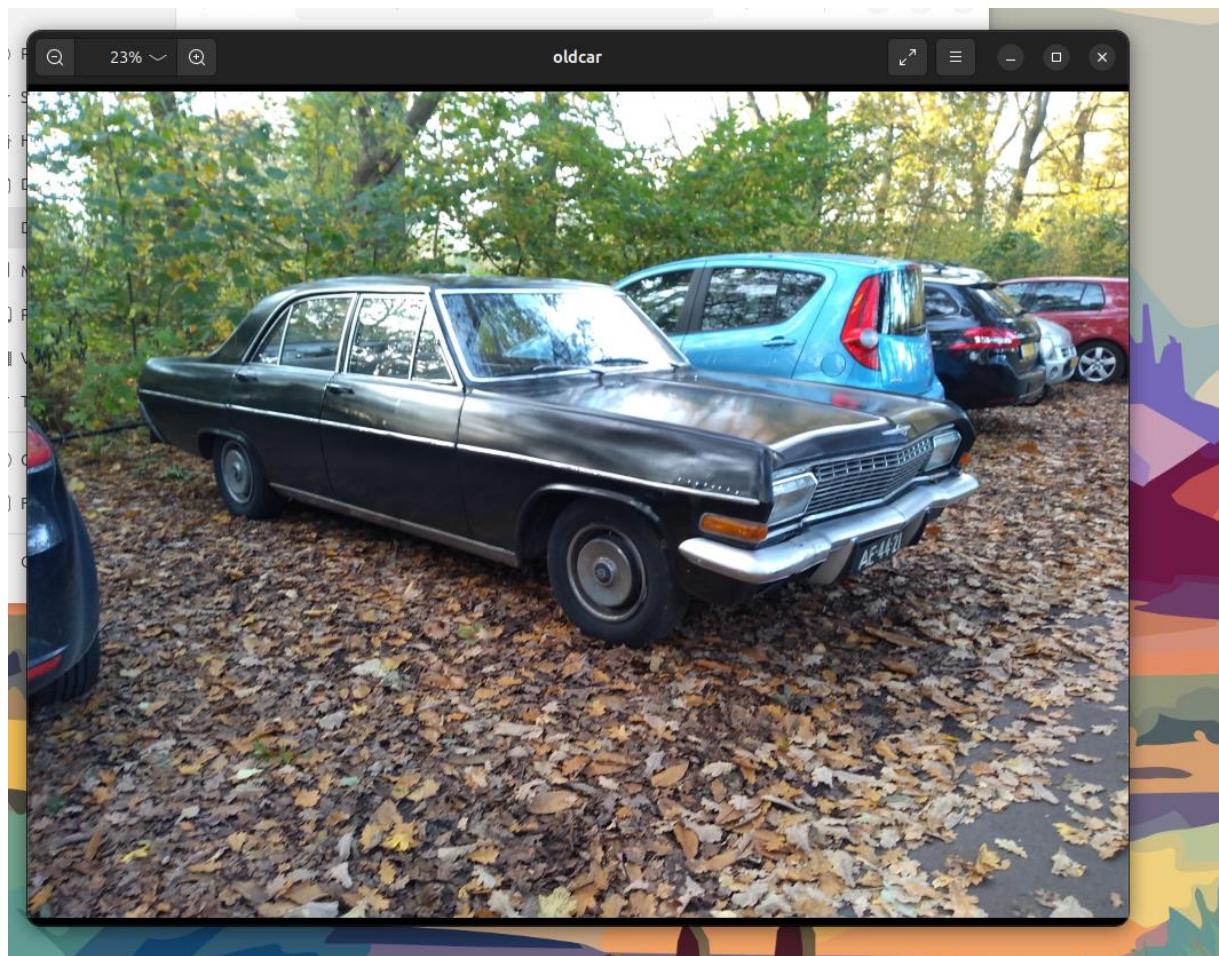
"Then, as to money?"

"You have _carte blanche_."

"Absolutely?"

"I tell you that I would give one of the provinces of my kingdom to
mat2004@mat2004-VMware-Virtual-Platform:~$ grep -n "kingdom" SherlockHolmes.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
mat2004@mat2004-VMware-Virtual-Platform:~$ wc SherlockHolmes.txt
12306 107562 607504 SherlockHolmes.txt
```

Assignment 5.7: Digital forensics




```
Custom Rendered      |Normal process
Exposure Mode        |Auto exposure
White Balance        |Auto white balance
Digital Zoom Ratio   |1.00
Scene Capture Type   |Standard
Contrast              |Normal
Saturation            |Low saturation
Sharpness            |Soft
GPS Tag Version       |2.2.0.0
North or South Latit|N
Latitude             |53, 11, 39.6794
East or West Longitu|E
Longitude            | 6, 32, 12.9018
Altitude Reference    |Sea level
Altitude              |42.066
GPS Time (Atomic Clo|14:08:57.00
Geodetic Survey Data|WGS-84
Name of GPS Processi|ASCII
GPS Date              |2020:11:07
Interoperability Ind|R98
Interoperability Ver|0100
-----+-----
EXIF data contains a thumbnail (59453 bytes).
mat2004@mat2004-VMware-Virtual-Platform:~$
```

Exif Version	Exif Version 2.2
Date and Time (Original)	2020:11:07 15:08:57
Date and Time (Digitized)	2020:11:07 15:08:57
Components Configuration	Y Cb Cr -
Shutter Speed	5.05 EV (1/33 sec.)
Aperture	2.00 EV (f/2.0)
Brightness	-1.00 EV (1.71 cd/m ²)
Exposure Bias	0.00 EV
Maximum Aperture Value	2.00 EV (f/2.0)
Metering Mode	Center-weighted average
Flash	Flash did not fire, auto mode
Focal Length	3.5 mm
Maker Note	1719 bytes undefined data
FlashPixVersion	FlashPix Version 1.0
Color Space	sRGB
Pixel X Dimension	4160
Pixel Y Dimension	3120
Scene Type	Directly photographed
Custom Rendered	Normal process
Exposure Mode	Auto exposure
White Balance	Auto white balance
Digital Zoom Ratio	1.00
Scene Capture Type	Standard
Contrast	Normal

```
mat2004@mat2004-VMware-Virtual-Platform:~$ exif ~/Downloads/oldcar.jpg
EXIF tags in '/home/mat2004/Downloads/oldcar.jpg' ('Motorola' byte order):
-----+-----
Tag                |Value
-----+-----
Manufacturer       |motorola
Model              |moto g(6) play
X-Resolution       |72
Y-Resolution       |72
Resolution Unit    |Inch
Software           |aljetter-user 9 PPPS29.55-35-18-7 6a0d0 release-keys
Date and Time      |2020:11:07 15:08:57
YCbCr Positioning  |Centered
Compression        |JPEG compression
X-Resolution       |72
Y-Resolution       |72
Resolution Unit    |Inch
Exposure Time      |1/33 sec.
F-Number           |f/2.0
Exposure Program   |Normal program
ISO Speed Ratings  |64
Exif Version       |Exif Version 2.2
Date and Time (Orig|2020:11:07 15:08:57
Date and Time (Digit|2020:11:07 15:08:57
```

Assignment 5.8: Steganography

Relevant screenshots + motivation

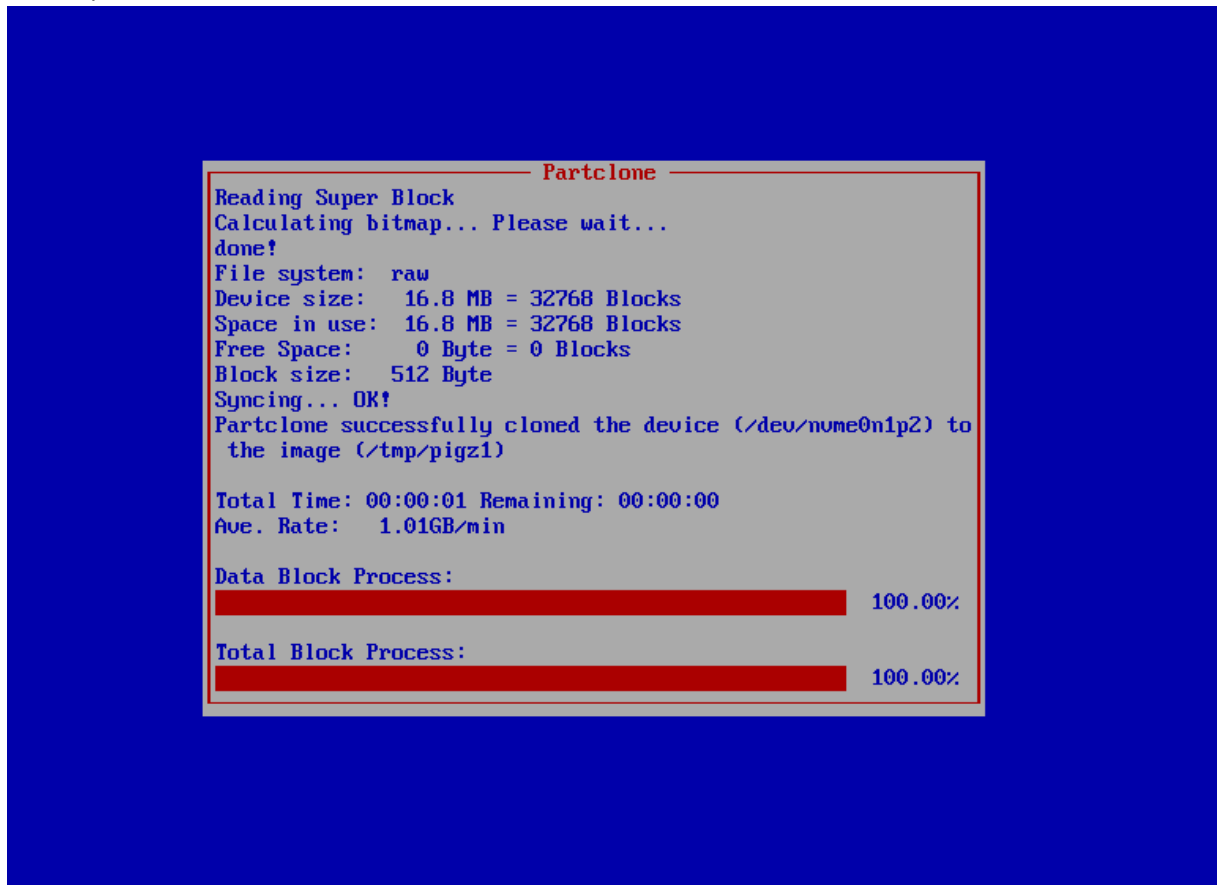
```
mat2004@mat2004-VMware-Virtual-Platform:~$ base64 -d ~/email-base64.txt > ~/output.gif
mat2004@mat2004-VMware-Virtual-Platform:~$ xdg-open ~/output.gif
mat2004@mat2004-VMware-Virtual-Platform:~$

mat2004@mat2004-VMware-Virtual-Platform:~/Downloads$ steghide extract -sf apple2.jpg
Enter passphrase:
wrote extracted data to "message.txt".
mat2004@mat2004-VMware-Virtual-Platform:~/Downloads$
mat2004@mat2004-VMware-Virtual-Platform:~/Downloads$ cat message.txt
Hello class.
You have almost completed Week 5.
```

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.



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