

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 an officially certified operating system, meanwhile unix-like isn't officially certified
- 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

Co-creator of UNIX. and laid the foundation for modern operating systems.

Dennis Ritchie

Co-creator of UNIX and creator of the C programming language. enabling portable systems software.

Bill Joy

Developer of BSD UNIX and creator of tools like *vi*.

Richard Stallman

Founder of the GNU project and the Free Software Movement.

Linus Torvalds

Creator of the Linux kernel. making free UNIX-like operating systems widely available.

- c) What is the philosophy of the GNU movement?
the belief that users should have control over the software they use.
- d) Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement?
Please explain your answer.
Yes, because Ubuntu uses GNU/Linux and open-source software.
- e) Find out what is the Windows Subsystem for Linux?
The Windows Subsystem for Linux (WSL) lets developers install a Linux distribution (such as Ubuntu, OpenSUSE, Kali, Debian, Arch Linux, etc) and use Linux applications, utilities, and Bash command-line tools directly on Windows, unmodified, without the overhead of a traditional virtual machine or dualboot setup.
- f) Find out, which operating system family belongs to Android, iOS and ChromeOS?

Android → Linux | iOS → UNIX (BSD) | ChromeOS → Linux

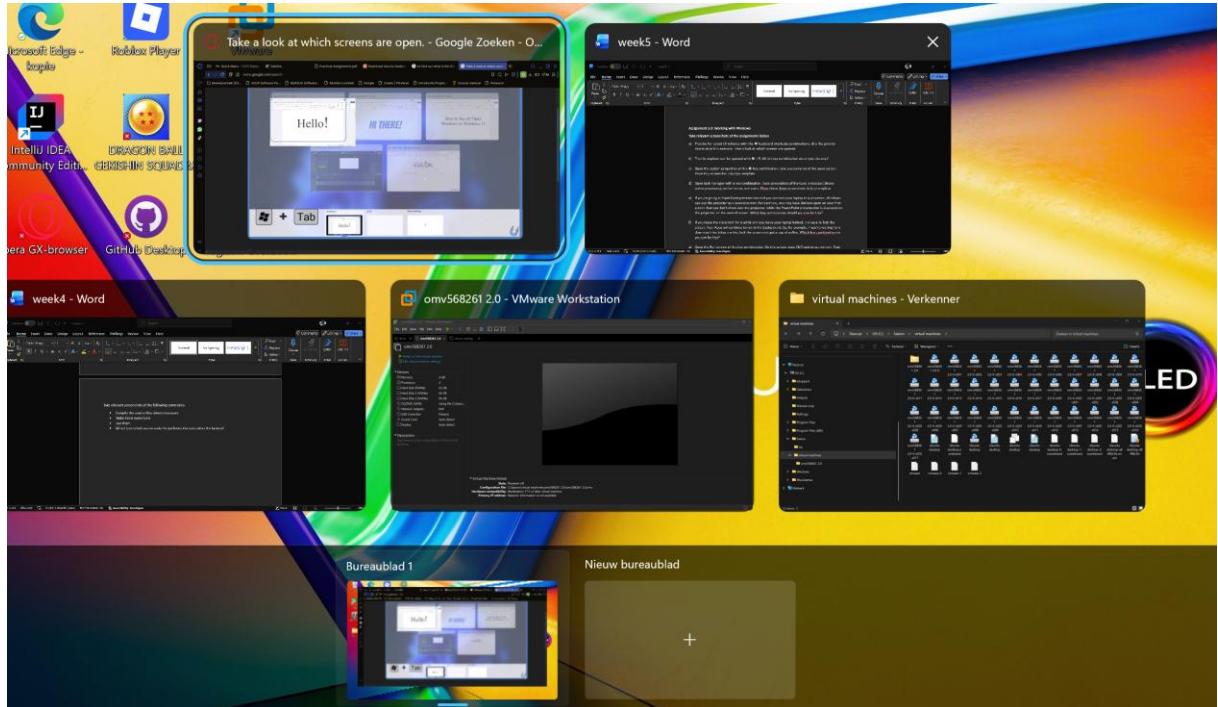
Assignment 5.2: Supercomputers and gameconsoles

- 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 are extremely powerful computers used for tasks that require huge amounts of calculation and data processing. They are used in areas such as weather forecasting, climate modeling, scientific research, aerodynamics, nuclear simulations, and complex engineering tasks. These systems can solve mathematical models and run simulations much faster than regular computers, making them essential for research and high-priority scientific work.
- 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 computer system made by connecting multiple PS3 game consoles together to work as a computing cluster. Researchers took advantage of the PS3's powerful **IBM Cell processor** to run scientific and parallel computing tasks at low cost. These clusters were used for things like astrophysics simulations, gravitational physics research, and other scientific calculations that need high performance.
- 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 Autonomous Linux
- 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/>
- No.** The Top500 list ranks the world's fastest supercomputers, which are high-performance machines with massive computing power. A Raspberry Pi cluster—even with hundreds or thousands of nodes—does not have performance close to those professional systems, so it would not be listed among the Top500.
- 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?
- 64-bit x86-64AMD
- PS5 → UNIX/BSD based
- XBOX → Windows-based OS

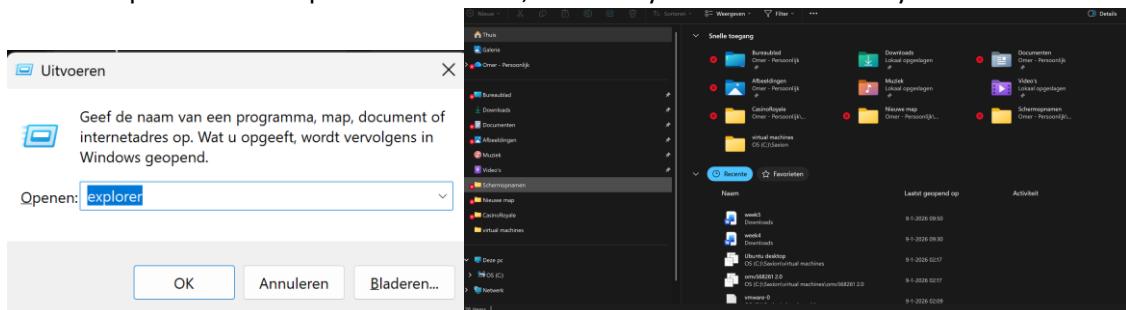
Assignment 5.3: Working with Windows

Take relevant screenshots of the assignments below

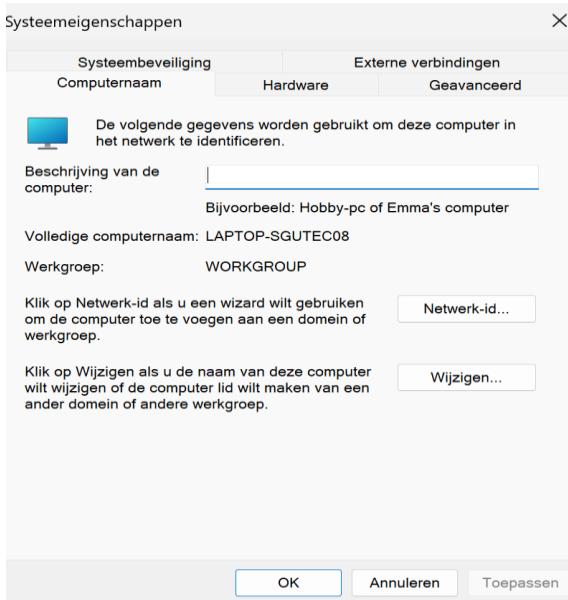
- a) Practice for about 10 minutes with the **Windows** keyboard shortcuts combinations, skip the general shortcuts in this exercise. Take a look at which screens are opened.



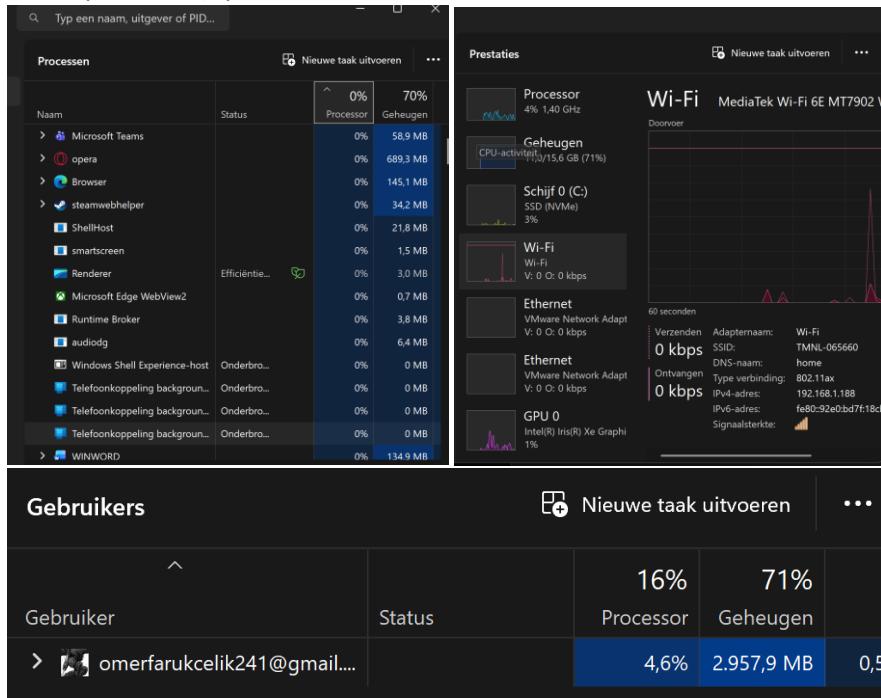
- b) The file explorer can be opened with **Windows + E**, Which key combination could you also use?



- c) Open the system properties with a **Windows** 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?
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.



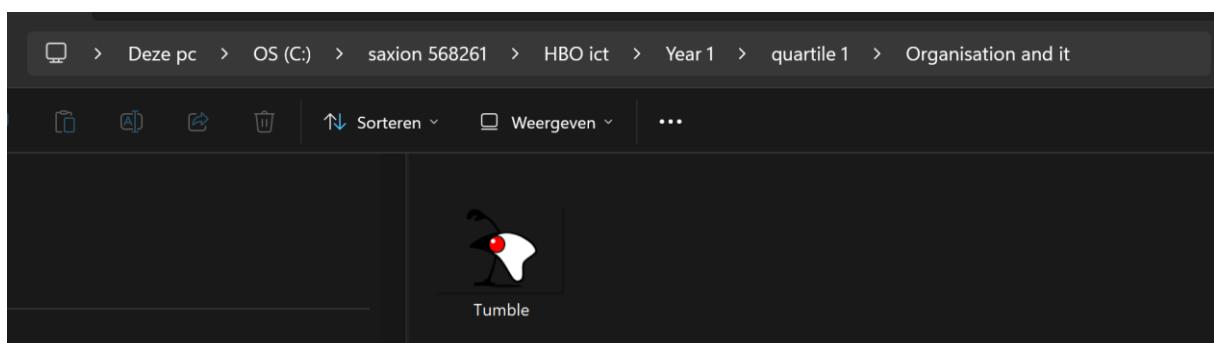
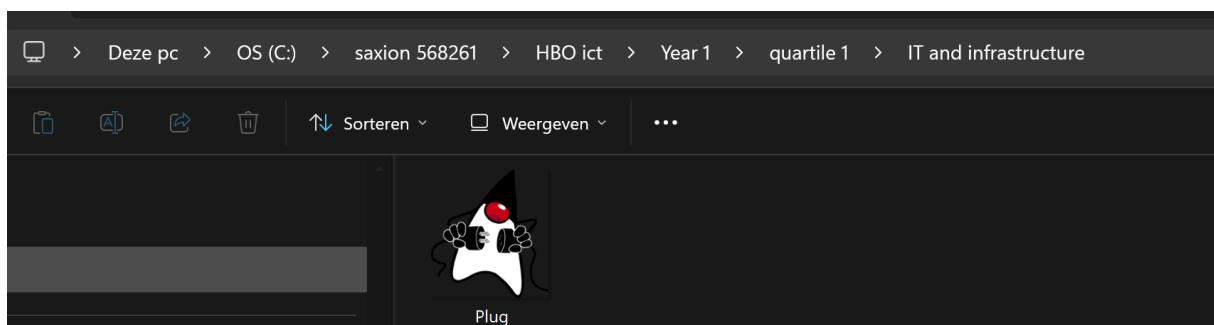
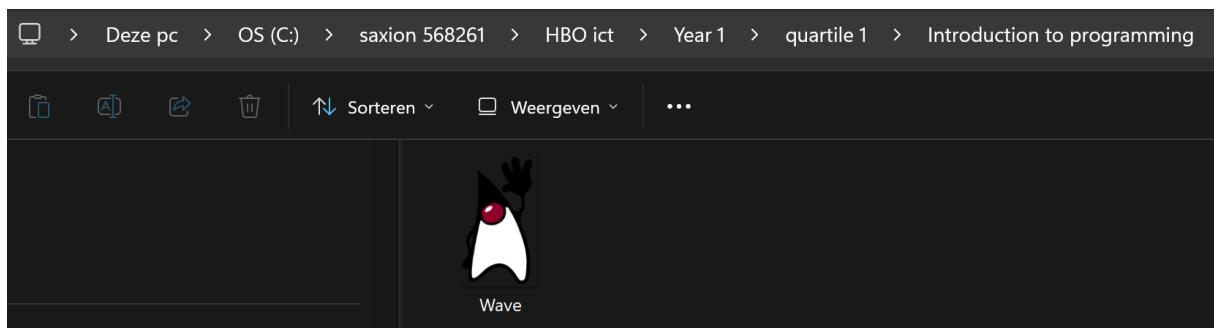
A screenshot of a Windows Command Prompt window. The title bar says 'C:\WINDOWS\system32\cmd.' and the window content shows:

```
Microsoft Windows [Version 10.0.26200.7462]
(c) Microsoft Corporation. Alle rechten voorbehouden.

C:\Users\omerkf>
```

Working in the File Explorer

Relevant screenshots **copy** command:



Relevant screenshots **tree** command:

```

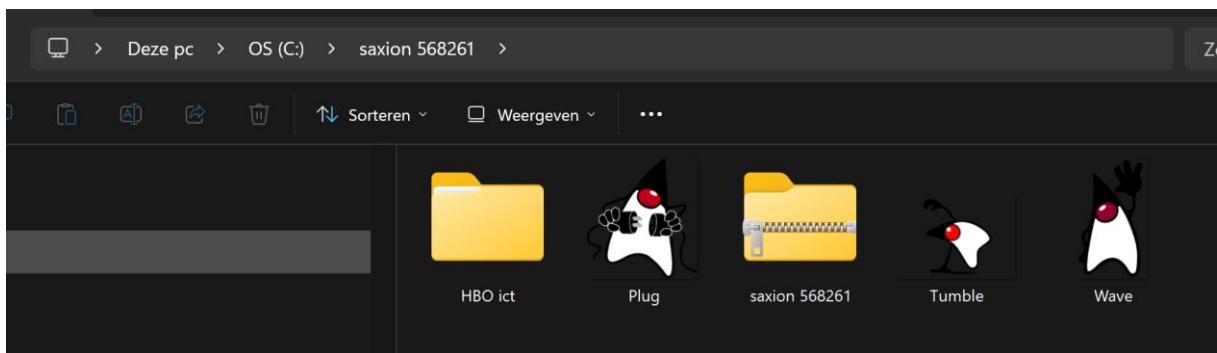
C:.
└─HBO ict
    ├─Year 1
    │  ├─quartile 1
    │  ├─quartile 2
    │  ├─quartile 3
    │  └─quartile 4
    ├─Year 2
    │  ├─quartile 1
    │  ├─quartile 2
    │  ├─quartile 3
    │  └─quartile 4
    ├─Year 3
    │  ├─quartile 1
    │  ├─quartile 2
    │  ├─quartile 3
    │  └─quartile 4
    └─Year 4
        ├─quartile 1
        ├─quartile 2
        ├─quartile 3
        └─quartile 4

C:\saxion 568261>echo %username%
omerf

C:\saxion 568261>

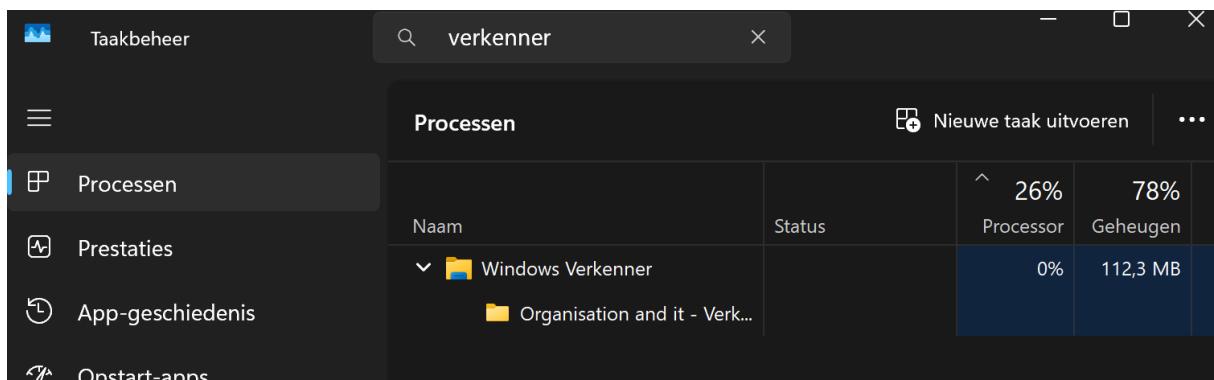
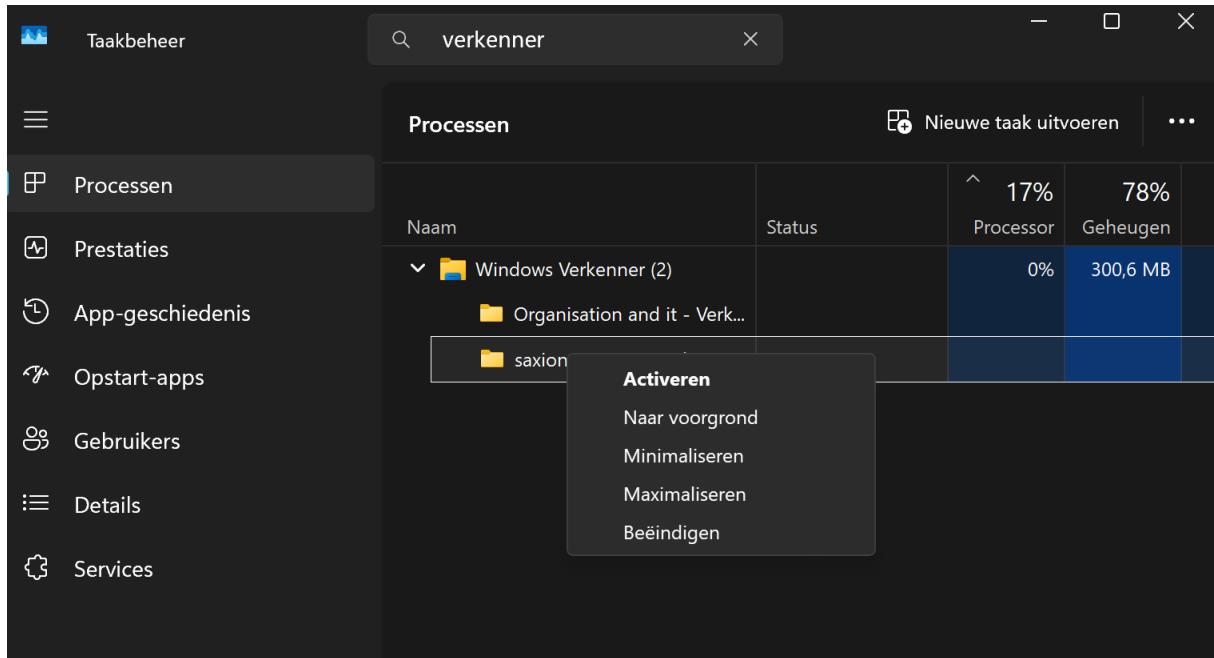
```

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

```
C:\Windows\System32>winget install -e --id WinSCP.WinSCP
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
/dl
[Progress Bar] 11.6 MB / 11.6 MB
Successfully verified installer hash
Starting package install...
Successfully installed
```

- Notepad++

```
C:\Windows\System32>winget install -e --id Notepad++.Notepad++
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
```

- 7zip

```
C:\Windows\System32>winget install -e --id 7zip.7zip
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
```

Assignment 5.4: Working with Linux

Relevant screenshots + motivation

Assignment 5.5: Users and permissions on Linux

Relevant screenshots + motivation

```
omer@ubuntu568261:~/Desktop$ mkdir -p ~/hello
nano ~/hello/hello.sh
omer@ubuntu568261:~/Desktop$ chmod +x ~/hello/hello.sh
omer@ubuntu568261:~/Desktop$ ./hello.sh
bash: ./hello.sh: No such file or directory
omer@ubuntu568261:~/Desktop$ cd ~/hello
omer@ubuntu568261:~/hello$ ls -l
total 4
-rwxrwxr-x 1 omer omer 40 Jan  9 15:52 hello.sh
omer@ubuntu568261:~/hello$ chmod +x hello.sh
omer@ubuntu568261:~/hello$ ./hello.sh
Hello Omer, 568261>!
omer@ubuntu568261:~/hello$ chmod 744 ~/hello/hello.sh
omer@ubuntu568261:~/hello$
```

By creating `hello.sh` and changing its permissions with `chmod`, I learned how to control who can execute or view a file. This helped me understand the importance of Linux file permissions and security in a multi-user environment.

Assignment 5.6: View the contents of files

Relevant screenshots + motivation

```
omer@ubuntu568261:~/documents$ grep -C 10 "kingdom" SherlockHolmes.txt
"Then I shall drop you a line to let you know how we progress."
```

"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 have that photograph."

"And for present expenses?"

The King took a heavy chamois leather bag from under his cloak and laid it on the table.

"There are three hundred pounds in gold and seven hundred in notes," he said.

--

The King stared at him in amazement.

"Irene's photograph!" he cried. "Certainly, if you wish it."

"I thank your Majesty. Then there is no more to be done in the matter. I have the honour to wish you a very good morning." He bowed, and, turning away without observing the hand which the King had stretched out to him, he set off in my company for his chambers.

And that was how a great scandal threatened to affect the **kingdom** of Bohemia, and how the best plans of Mr. Sherlock Holmes were beaten by a woman's wit. He used to make merry over the cleverness of women, but I have not heard him do it of late. And when he speaks of Irene Adler, or when he refers to her photograph, it is always under the honourable title of the woman.

II. THE RED-HEADED LEAGUE

Assignment 5.7: Digital forensics

Relevant screenshots + motivation

```
omer@ubuntu568261:~/documents$ exiftool oldcar.jpg
ExifTool Version Number      : 12.76
File Name                   : oldcar.jpg
Directory                   : .
File Size                   : 2.4 MB
File Modification Date/Time : 2026:01:08 21:11:42+01:00
File Access Date/Time       : 2026:01:08 21:11:42+01:00
File Inode Change Date/Time: 2026:01:08 21:11:42+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
X Resolution                 : 72
Y Resolution                 : 72
Resolution Unit              : inches
Software                     : aljeter-user 9 PPPS29.55-35-18-7 6a0d0 release-keys
Modify Date                  : 2020:11:07 15:08:57
Y Cb Cr Positioning         : Centered
Exposure Time                : 1/33
F Number                      : 2.0
Exposure Program             : Program AE
ISO                          : 64
Exif Version                 : 0220
Date/Time Original           : 2020:11:07 15:08:57
Create Date                  : 2020:11:07 15:08:57
Components Configuration     : Y, Cb, Cr, -
Shutter Speed Value          : 1/33
Aperture Value               : 2.0
Brightness Value              : -1
Exposure Compensation        : 0
Max Aperture Value           : 2.0
Metering Mode                 : Center-weighted average
Flash                         : Auto, Did not fire
Focal Length                  : 3.5 mm
Build Number                  : PPPS29.55-35-18-7
Sensor                        : BACK,mot_s5k3l8
Manufacture Date              : 140ct2018
Flashpix Version              : 0100
```

Assignment 5.8: Steganography

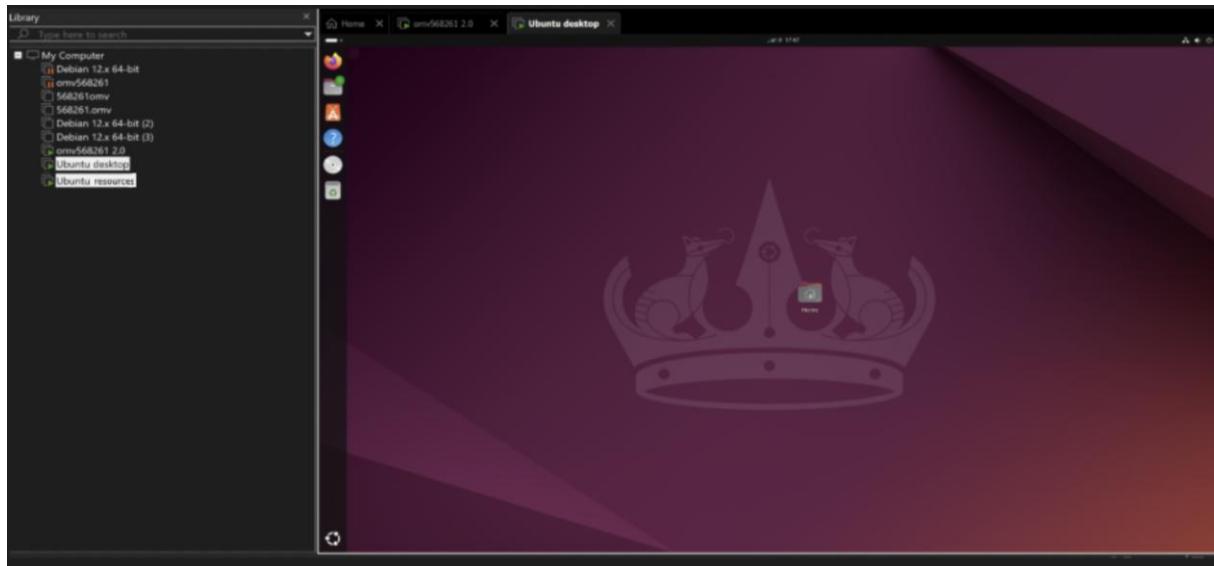
Relevant screenshots + motivation

```
omer@ubuntu568261: ~/Downloads$ cd
omer@ubuntu568261: ~$ cd Documents/
omer@ubuntu568261: ~/Documents$ ls
omer@ubuntu568261: ~/Documents$ stegnlae extract -sf apple2
Enter passphrase:
wrote extracted data to "message.txt".
omer@ubuntu568261: ~/Documents$ ls oldcar.jpg text.txt
Enter passphrase:
apple2.jpg code hello message.txt oldcar.jpg text.txt
omer@ubuntu568261: ~/Documents$ cat message.txt
Hello class.
You have almost completed Week 5.
```

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.



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