Template Week 5 – Operating Systems

Student number: 589871

Assignment 5.1: Unix-like

a) **Find out what the difference is between UNIX and unix-like operating systems?**
A unix-like operating system acts similarly to a UNIX operating system without being a certified version of 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 designed and implemented the original UNIX OS and created the B language.
Dennis Ritchie worked on UNIX, the B language and c language.
Bill Joy worked on the BSD UNIX OS which would later have a descendant FreeBSD which would be the basis for macOS.
Richard Stallman launched the gnu project 1983.
Linus Torvalds made the LINUX kernel in 1991 and GIT in 2005.

c) **What is the philosophy of the GNU movement?**
That the user is free of rights and can freely use, study and or modify their software.

d) **Does Ubuntu as a Linux operating system conform to the philosophy of the GNU movement? Please explain your answer.**
Although all standard provided software is free and the software packages provided are also free. Ubuntu does have a pro license which slightly conflicts with the users freedom.

e) **Find out what is the Windows Subsystem for Linux?**
A windows distribution developed for executing windows processes within linux based operating systems.

f) **Find out, which operating system family belongs to Android, iOS and ChromeOS?**
Android and chromeOS are based of linux and are therefore both UNIX like. IOS is based of macOS which is also a 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 are mostly used for scientific research and analysis. The Japanese government used one to calculate the planets climate change, while other scientists built them for ai research like making a chess computer.

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 super computer build by connecting multiple playstation 3s to eachother as a cheap way to make use of the powerfull cpu's. They where used in scientific research 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/
No, seeing as a raspberry pi isn't very strong. Combining 1050 of them together will not come anywhere near actual super computers. (Also using crtl+f and searching for keywords it does not show up)

e) What CPU architecture is used for the PlayStation 5 and Xbox Series X?
AMD64 (x86) with Zen2 microarchitecture

What operating systems run on these consoles?
Playstation: Orbis OS
Xbox: Xbox System Software (based of windows 10)

What conclusion can you draw from the answer to the previous question?
Microsoft is still sticking with their own operating system even though it wasn't designed for gaming performance. While Sony strives to use a new operating system made for that exact purpose.

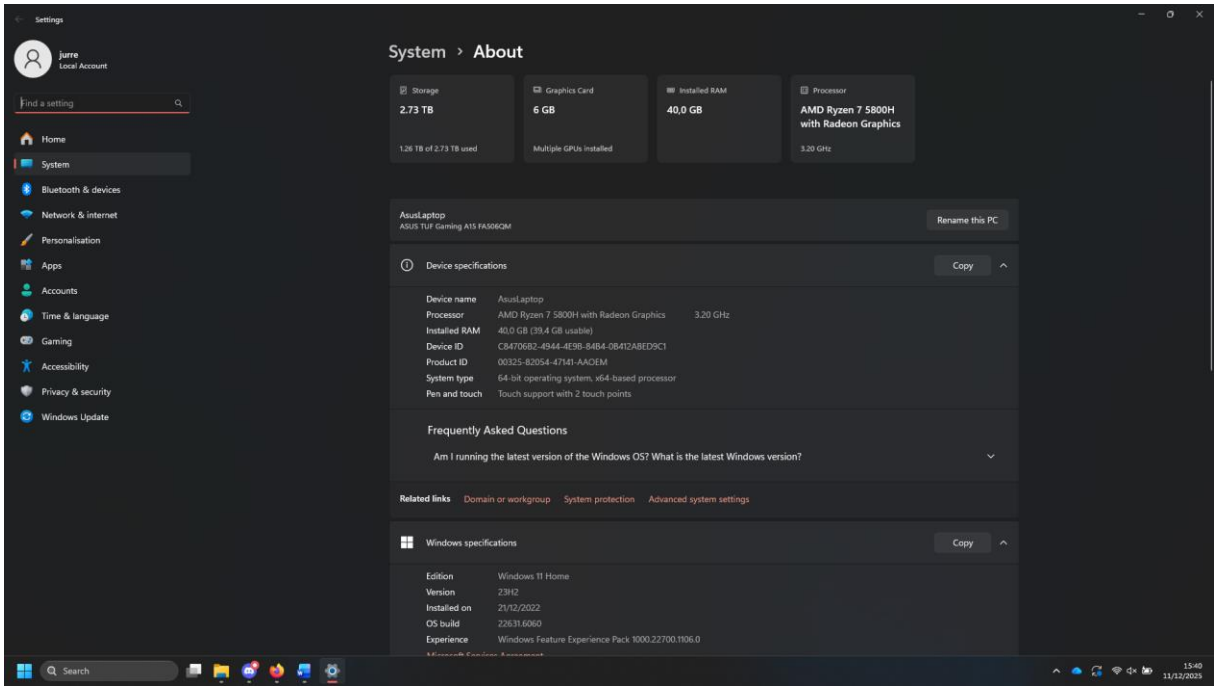
Assignment 5.3: Working with Windows

Take relevant screenshots of the assignments below

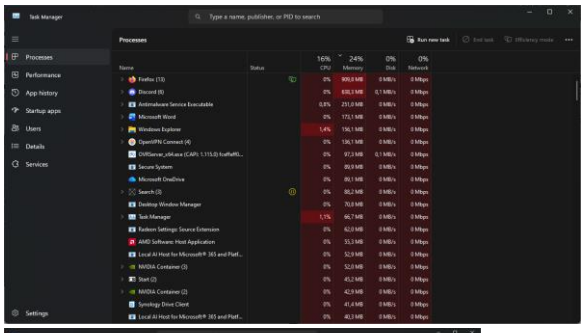
a) Practice for about 10 minutes with the ⊞ keyboard shortcuts combinations, skip the general shortcuts in this exercise. Take a look at which screens are opened.

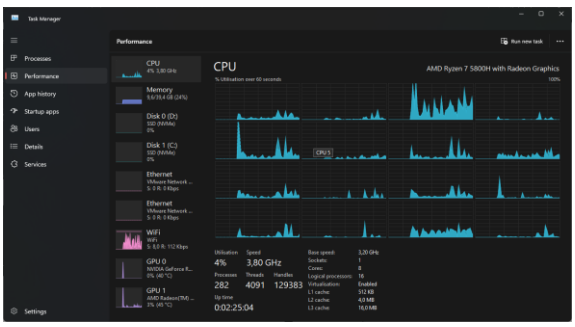
b) **The file explorer can be opened with ⊞ + E, Which key combination could you also use?**
⊞ + R with a target destination

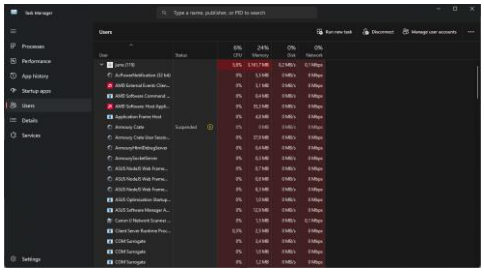
c) Open the system properties with a ⊞ key combination, take a screenshot of the open screen. Paste this screenshot into this template.



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.







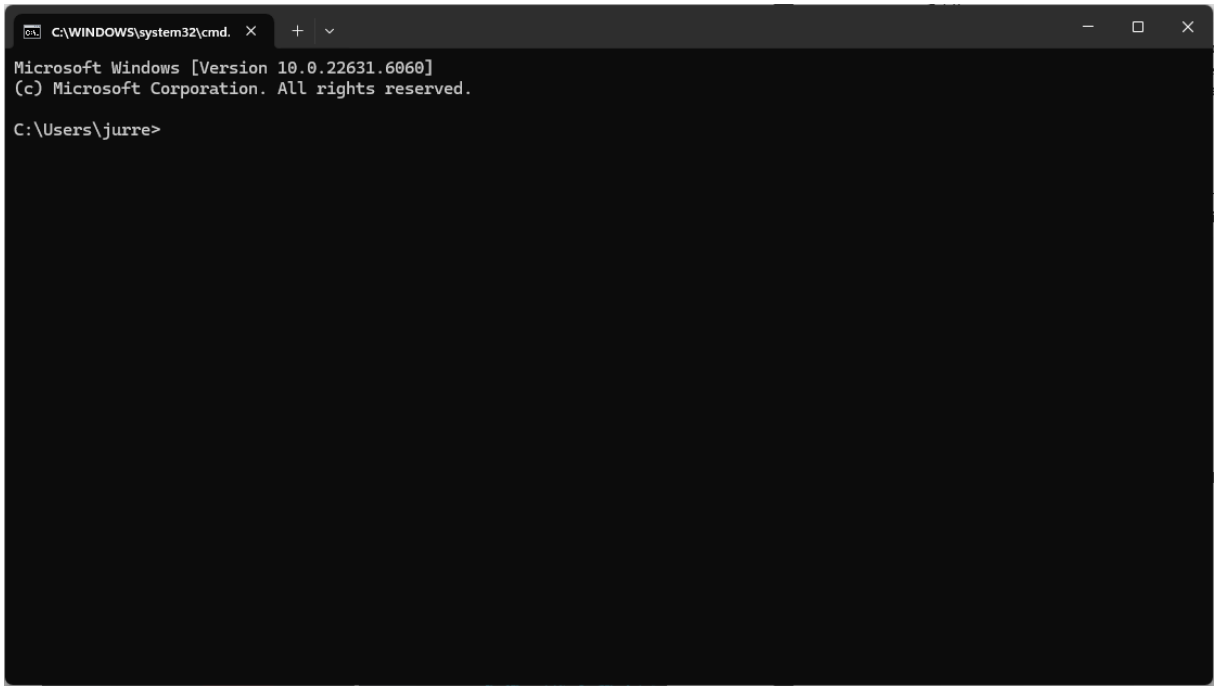
e) If you're giving a PowerPoint presentation and you connect your laptop to a projector, Windows can use the projector as a second screen. For example, you may have Outlook open on your first screen that you don't show over the projector, while the PowerPoint presentation is displayed on the projector,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

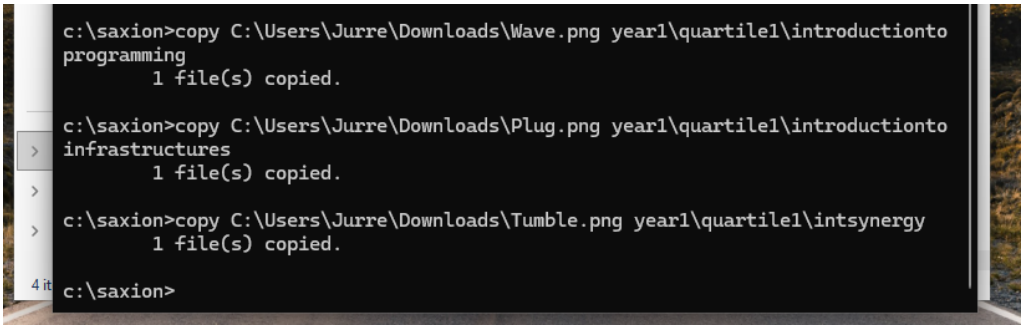
⊞ + L

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.

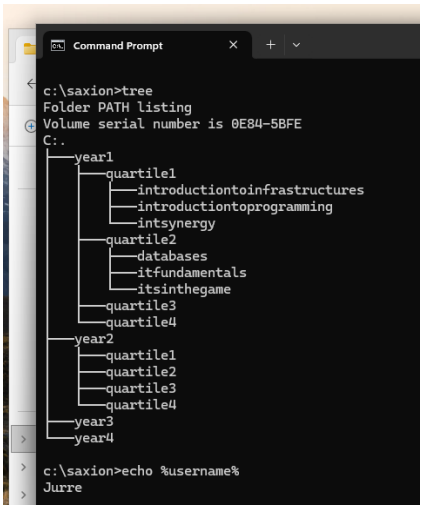


Working in the File Explorer

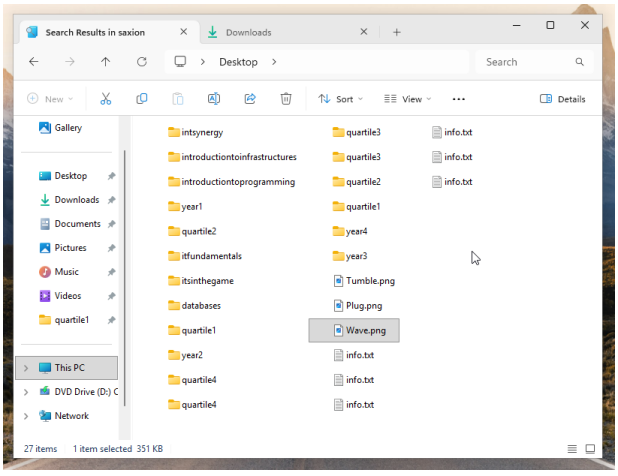
Relevant screenshots **copy** command:

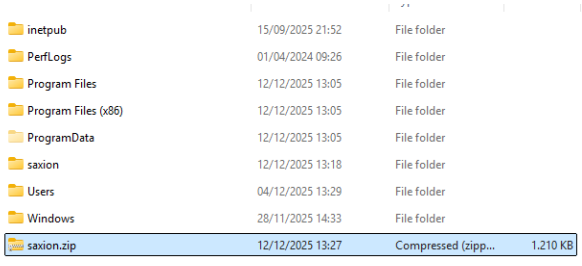


Relevant screenshots **tree** command:



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

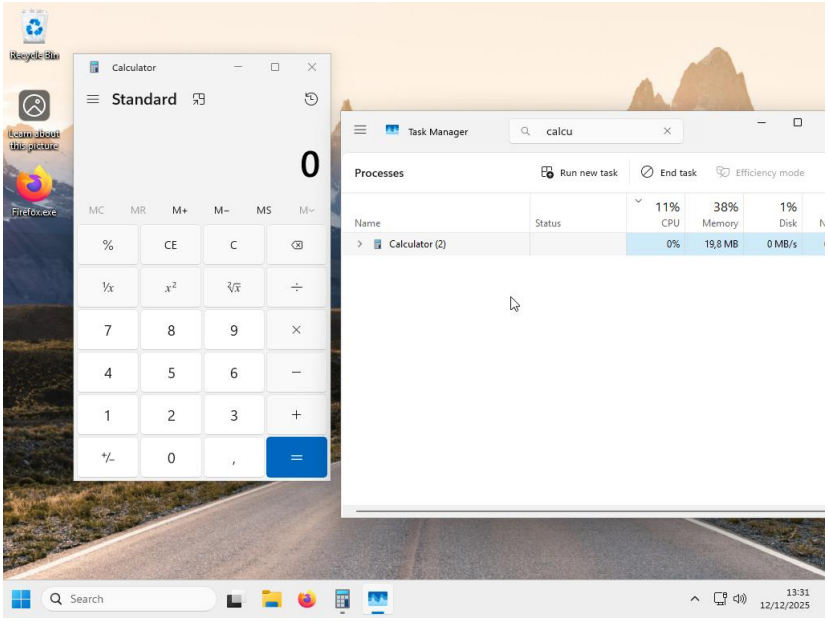




Terminating Processes

Relevant Screenshots Task Manager Window:

Litterally impossible to screenshot closest I can get



Install Software

Relevant screenshots that the following software is installed with winget:

```
C:\Users\Jurre>winget install -e --id Mozilla.Firefox
Found Mozilla Firefox (en-US) [Mozilla.Firefox] Version 146.0
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://download-installer.cdn.mozilla.net/pub/firefox/releases/146.0/win64/en-US/Firefox%20Setup%
20146.0.exe
  82.2 MB / 82.2 MB
Successfully verified installer hash
Starting package install...
Successfully installed
```

```
C:\Users\Jurre>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...
The installer will request to run as administrator. Expect a prompt.
Successfully installed
```

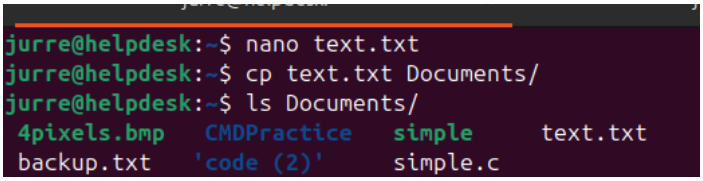
```
C:\Users\Jurre>winget install -e --id WinSCP.WinSCP
Found WinSCP [WinSCP.WinSCP] Version 6.5.5
This application is licensed to you by its owner.
Microsoft is not responsible for, nor does it grant any licenses to, third-party packages.
Downloading https://sourceforge.net/projects/winscp/files/WinSCP/6.5.5/WinSCP-6.5.5-Setup.exe/download
  11.6 MB / 11.6 MB
Successfully verified installer hash
Starting package install...
The installer will request to run as administrator. Expect a prompt.
Successfully installed
```

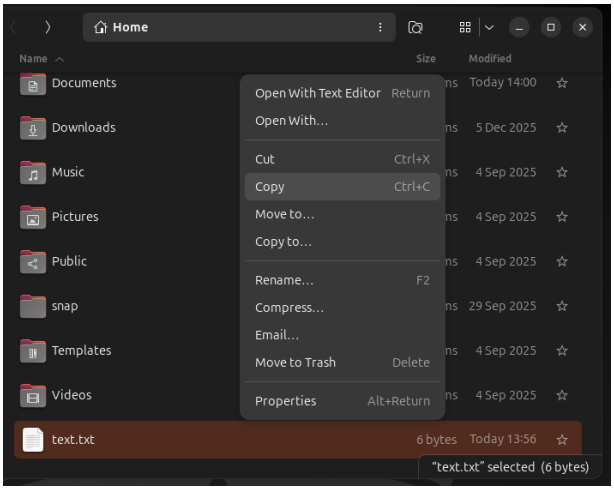
```
C:\Users\Jurre>winget install -e --id Notepad++.Notepad++
Found Notepad++ [Notepad++.Notepad++] Version 8.8.8
This application is licensed to you by its owner.
Microsoft is not responsible for, nor does it grant any licenses to, third-party packages.
Downloading https://github.com/notepad-plus-plus/notepad-plus-plus/releases/download/v8.8.8/npp.8.8.8.Installer.x64.exe
  6.61 MB / 6.61 MB
Successfully verified installer hash
Starting package install...
The installer will request to run as administrator. Expect a prompt.
Successfully installed
```

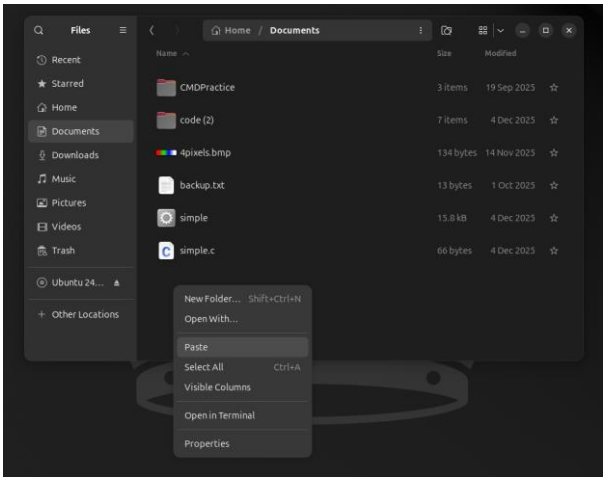
Assignment 5.4: Working with Linux

Relevant screenshots + motivation

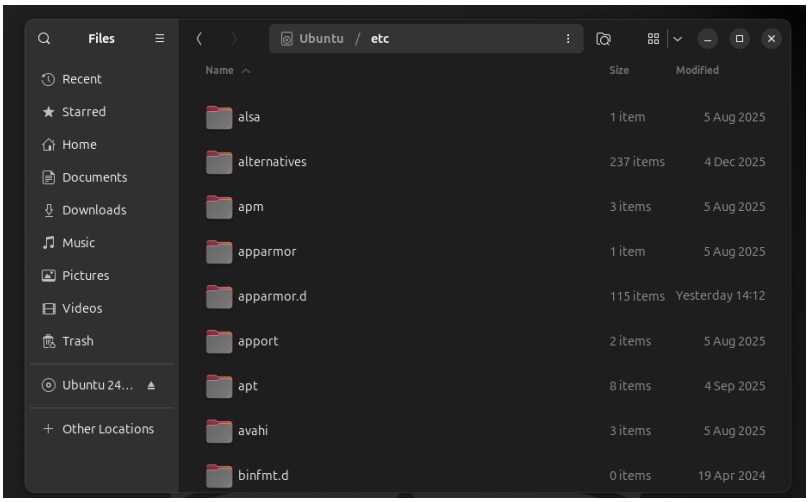
Copy

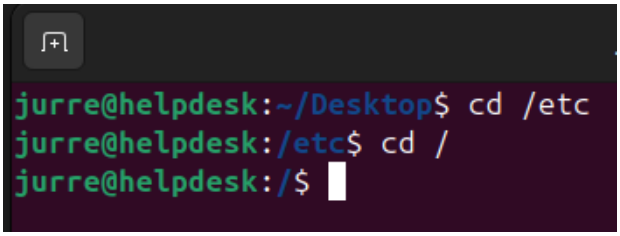






Navigating



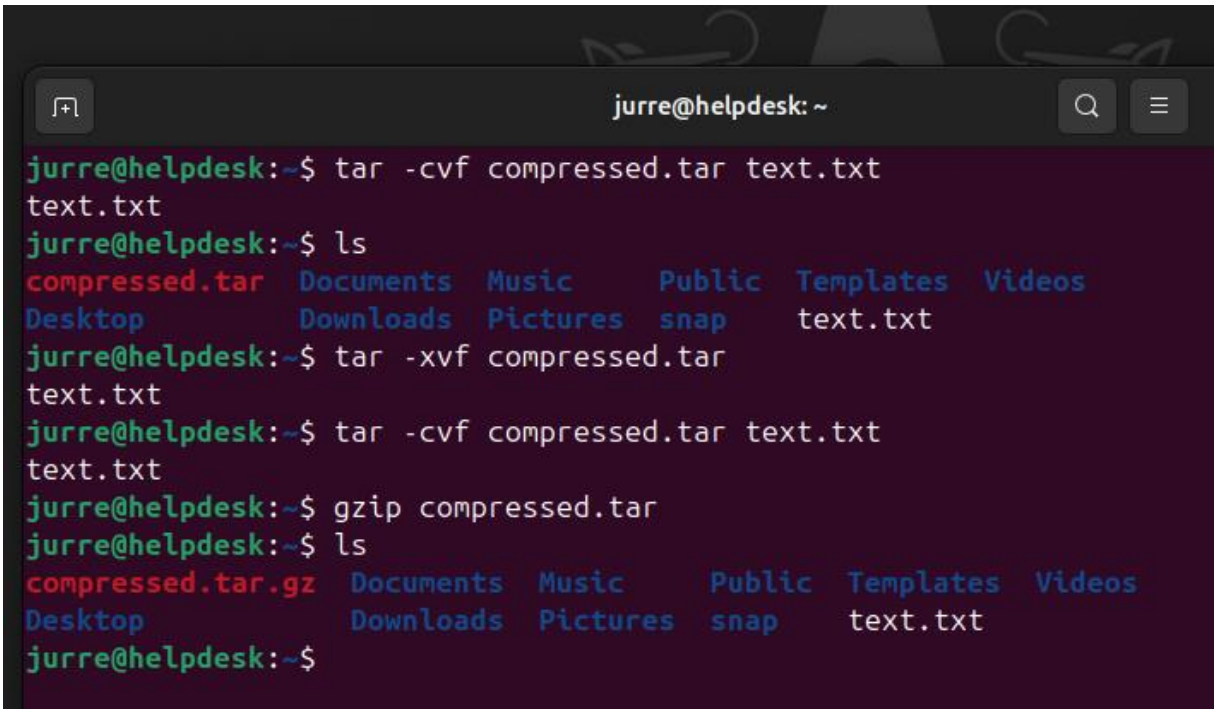


Most significant difference is that you don't have to target specific drives.

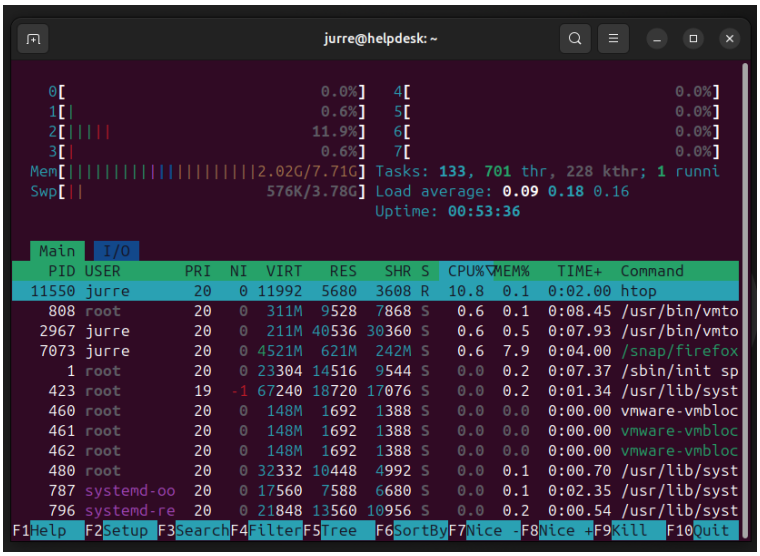
The etc folder holds system and program configurations.

Compression

Compress to tar: tar -cvf compressed.tar text.txt
Uncompress: tar -xvf compressed.tar

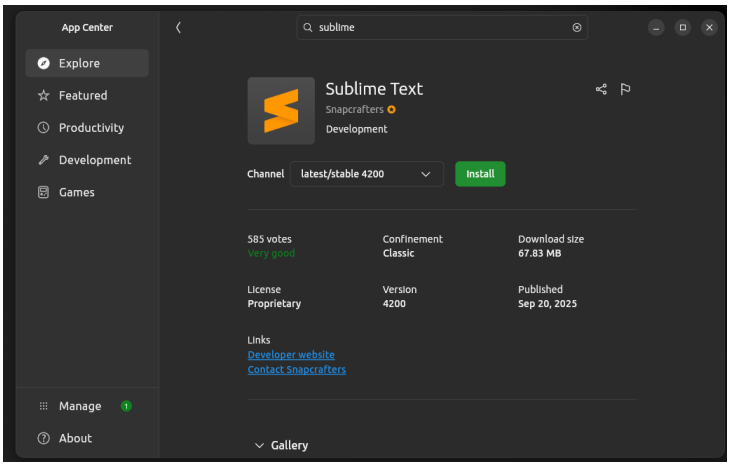


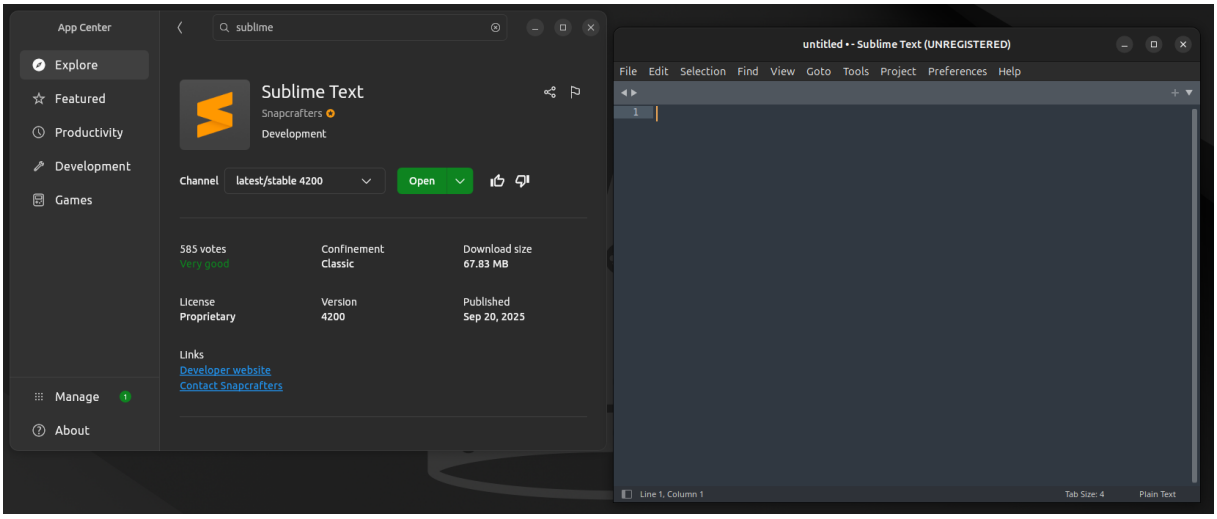
View Processes

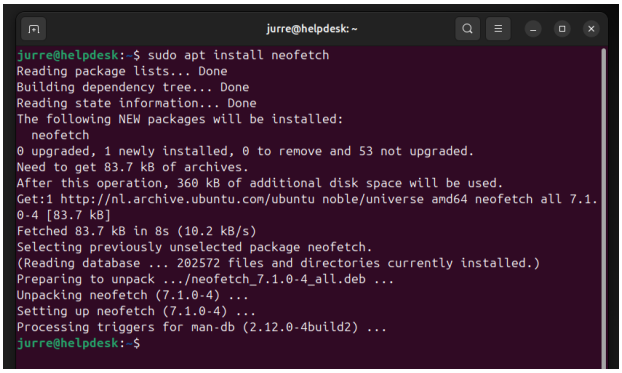


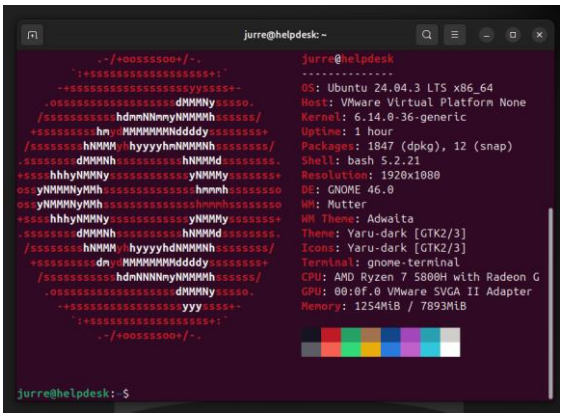
Shows all of the currently running processes and their resource usages.

Install software



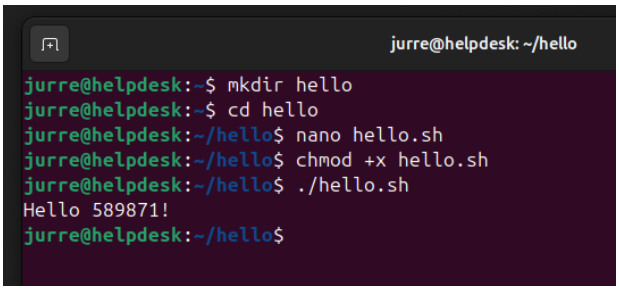


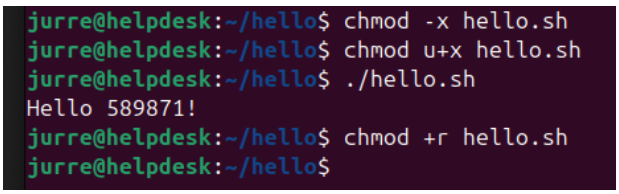




Shows system specifications

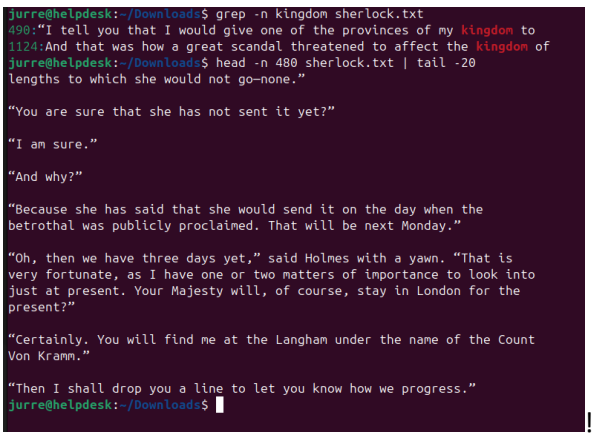
Assignment 5.5: Users and permissions on Linux





Assignment 5.6: View the contents of files

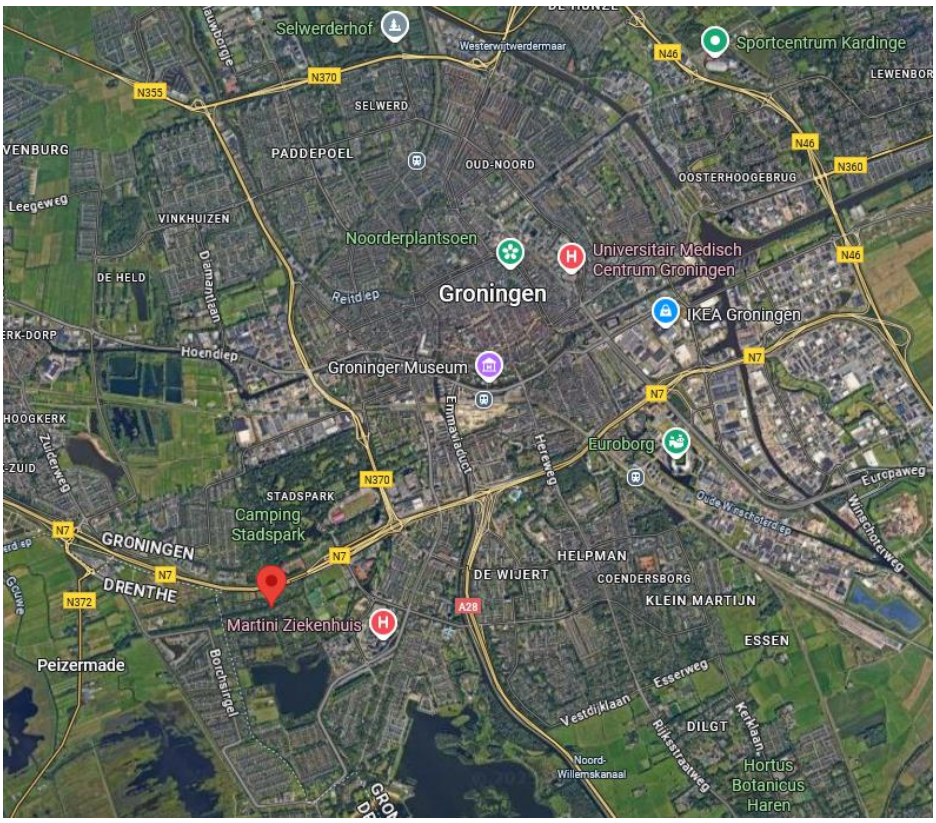
Cat: Shows content of a file inside of the terminal
Wc: Counting file statistics like: rows characters and bytes
Less: Shows file contents in a more readable way then cat
Tail: Shows last lines of a file
Head: Shows first lines of a file
Grep: Search and locate content inside of a file



!NOT FINISHED!

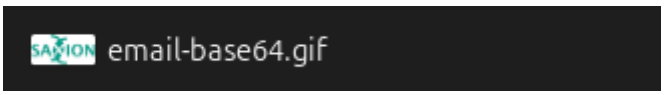
Assignment 5.7: Digital forensics

Captured on a moto g(6) play in Groningen




```
jurre@helpdesk:~/Downloads$ file oldcar
oldcar: JPEG image data, JFIF standard 1.01, aspect ratio, density 1x1, segment length 16, E
xif Standard: [TIFF image data, big-endian, direntries=10, manufacturer=motorola, model=moto
 g(6) play, xresolution=160, yresolution=168, resolutionunit=2, software=aljeter-user 9 PPPS
29.55-35-18-7 6a0d0 release-keys, datetime=2020:11:07 15:08:57, GPS-Data], baseline, precisi
on 8, 4160x3120, components 3
```

```
jurre@helpdesk:~/Downloads$ base64 -d email-base64.txt > email-base64.gif
jurre@helpdesk:~/Downloads$
```



Assignment 5.8: Steganography

```
jurre@helpdesk:~/Downloads$ steghide --extract -sf apple2.jpg
Enter passphrase:
wrote extracted data to "message.txt".
jurre@helpdesk:~/Downloads$ 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.

```
ubuntu@ubuntu:~$ sudo dd if=/dev/nvme0n1 bs=4M status=progress | gzip | ssh jurre@192.168.139.11 "cat > /srv/images/ubuntu2404_vm.img.gz"

The authenticity of host '192.168.139.11 (192.168.139.11)' can't be established.
ED25519 key fingerprint is SHA256:nOZbryH8luJ4iypmo9S6zHa6Lg9NKGd30PCy2Mc91yc.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.139.11' (ED25519) to the list of known hosts.
jurre@192.168.139.11's password:
68694310912 bytes (69 GB, 64 GiB) copied, 1188 s, 57.8 MB/s
16384+0 records in
16384+0 records out
68719476736 bytes (69 GB, 64 GiB) copied, 1190.59 s, 57.7 MB/s
ubuntu@ubuntu:~$
```

```
jurre@omv589871:/srv/images$ ls
ubuntu2404_vm.img.gz
jurre@omv589871:/srv/images$ _
```

- Proof that you can restore the back-up image into an empty VM.

```
ubuntu@ubuntu:~$ ssh jurre@192.168.139.11 "cat /srv/images/ubuntu2404_vm.img.gz" | gzip -d | sudo dd of=/dev/nvme0n1 bs=4M status=progress

The authenticity of host '192.168.139.11 (192.168.139.11)' can't be established.
ED25519 key fingerprint is SHA256:nOZbryH8luJ4iypmo9S6zHa6Lg9NKGd30PCy2Mc91yc.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.139.11' (ED25519) to the list of known hosts.
jurre@192.168.139.11's password:
4065624064 bytes (4.1 GB, 3.8 GiB) copied, 59 s, 68.9 MB/s
dd: error writing '/dev/nvme0n1': No space left on device
0+122967 records in
0+122966 records out
4092600320 bytes (4.1 GB, 3.8 GiB) copied, 59.4253 s, 68.9 MB/s
ubuntu@ubuntu:~$
```