

Template Week 5 – Operating Systems

Student number: 564530

Assignment 5.1: Unix-like

- a) Find out what the difference is between UNIX and unix-like operating systems?

A company owns Unix; thus it is a commercial product. On the other hand, Unix like systems are open-source and mostly free to use.

- 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.

Those are creators of different UNIX like systems.

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

The **GNU Movement** was initiated in 1983 by **Richard Stallman** with the creation of the **GNU Project**. Its philosophy is rooted in the principles of **software freedom**, emphasizing that users should have control over the software they use. The movement is a foundational part of the **Free Software Movement**. In this philosophy, the software must not be primarily free of costs, but rather give you a freedom to use it as you wish.

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

Ubuntu partially conforms to the philosophy of the GNU movement:

- It promotes free and open-source software to a significant extent.
- However, its inclusion of proprietary software and focus on practical usability over strict adherence to free software principles sets it apart from the ideals of the GNU movement.

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

The **Windows Subsystem for Linux (WSL)** is a compatibility layer developed by Microsoft that allows users to run a **Linux environment** directly on Windows without the need for a separate virtual machine or dual-boot setup. It enables Windows users to access Linux tools, applications, and workflows seamlessly within the Windows operating system

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

Unix like system, and also UNIX.

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>

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?

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

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 hardware is too bad, so logically it does not fit into that category.

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?

CPU Architecture of the PlayStation 5 and Xbox Series X


- **PlayStation 5:**
 - The PlayStation 5 uses a custom AMD Zen 2 CPU with 8 cores and 16 threads, running at a variable frequency up to 3.5 GHz.
 - The CPU is based on the x86-64 architecture (commonly used in PCs).
 - Uses custom Sony OS.
- **Xbox Series X:**
 - The Xbox Series X also features a custom AMD Zen 2 CPU with 8 cores and 16 threads, running at up to 3.8 GHz.
 - Like the PlayStation 5, it is based on the x86-64 architecture.
 - Uses a customized version of Windows 10/11.

Assignment 5.3: Working with Windows

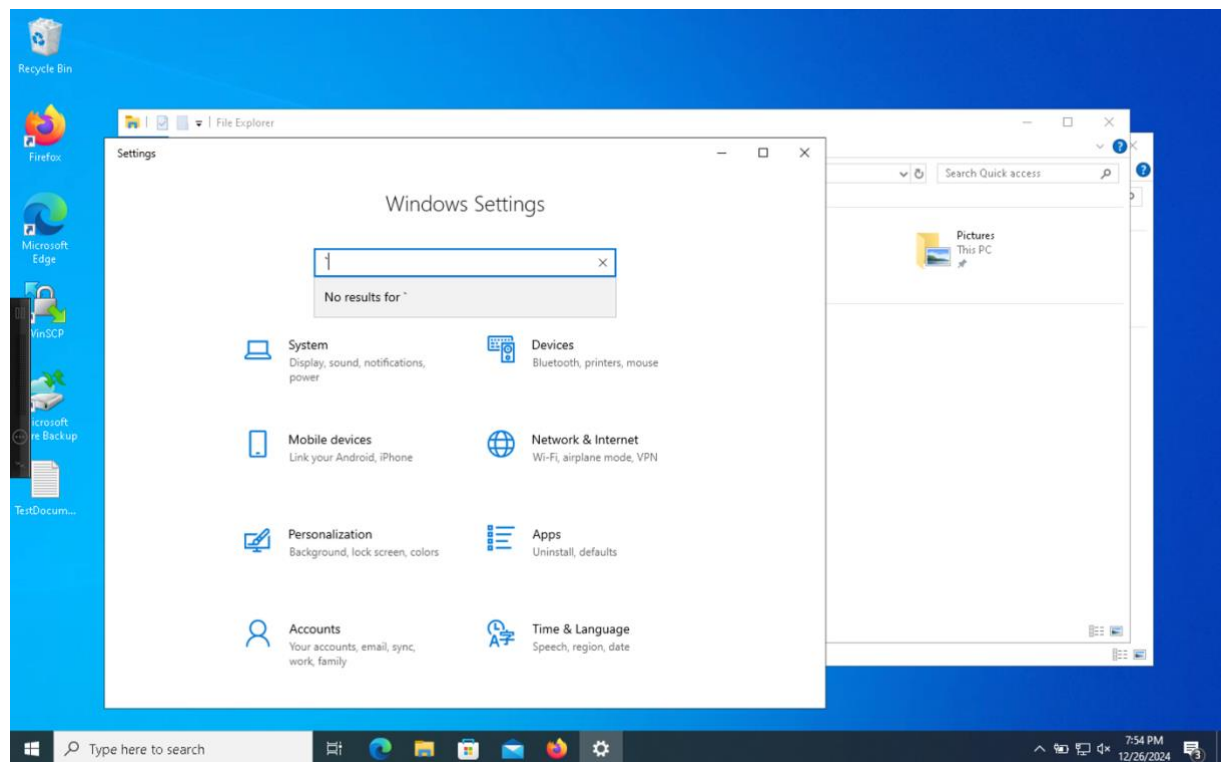
Take relevant screenshots of the assignments below

- 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?

To open the File Explorer in Windows, you typically use the Windows Key + E combination. Another way to open it is by using the search function: press Windows Key and start typing "File Explorer," then hit Enter when it appears in the search results. You could also use the Windows Key + X shortcut to open the Quick Link menu and select "File Explorer" from there.

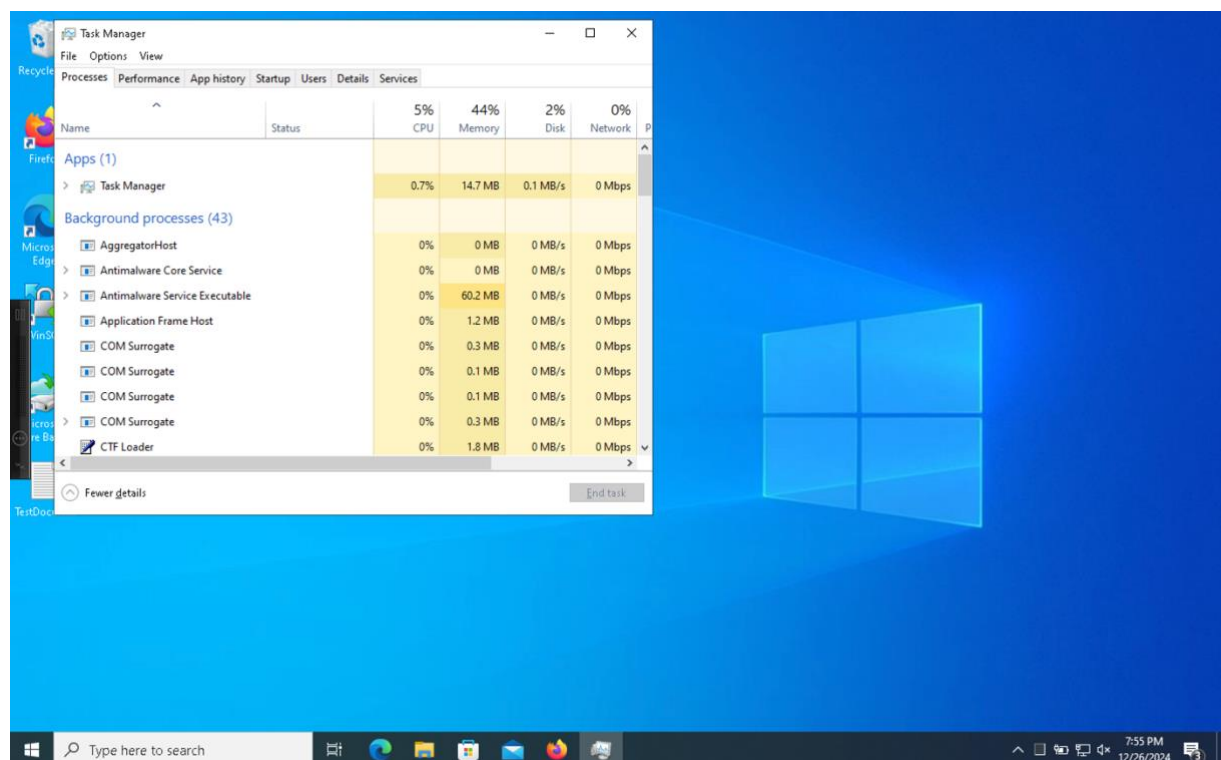
- c) Open the system properties with a  key combination, take a screenshot of the open screen. Paste this screenshot into this template.

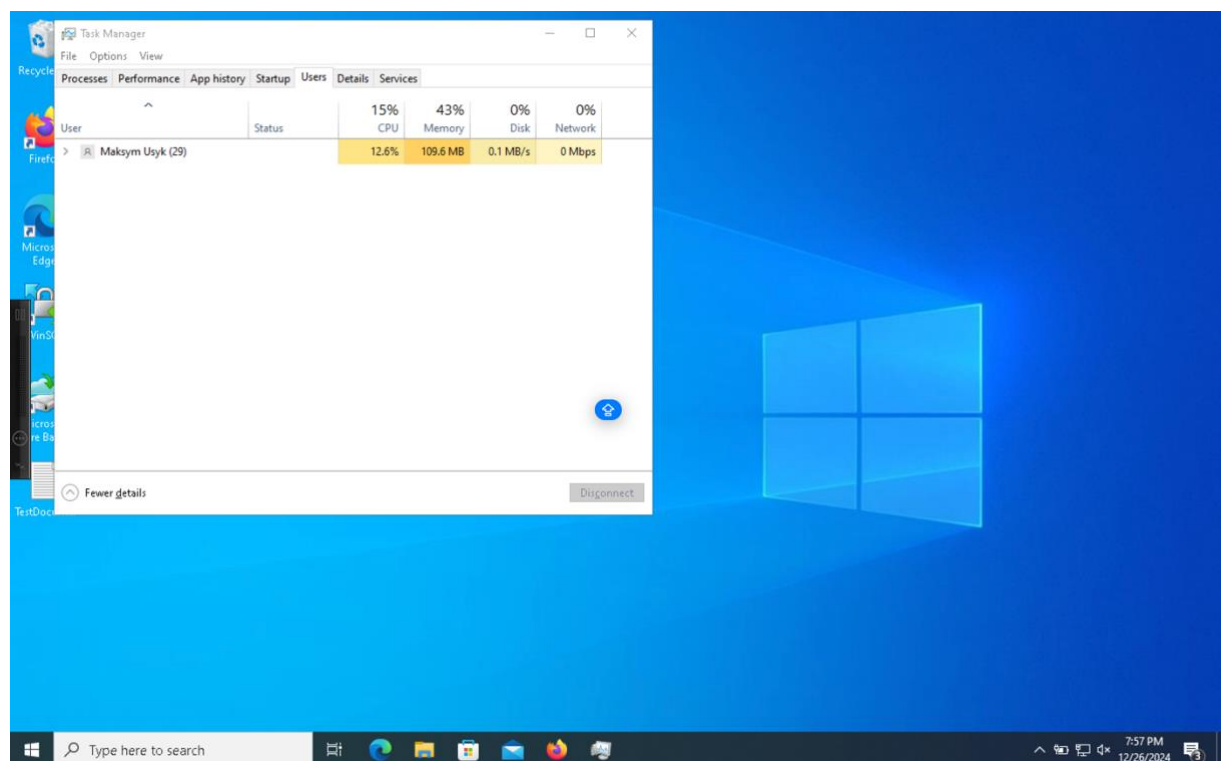
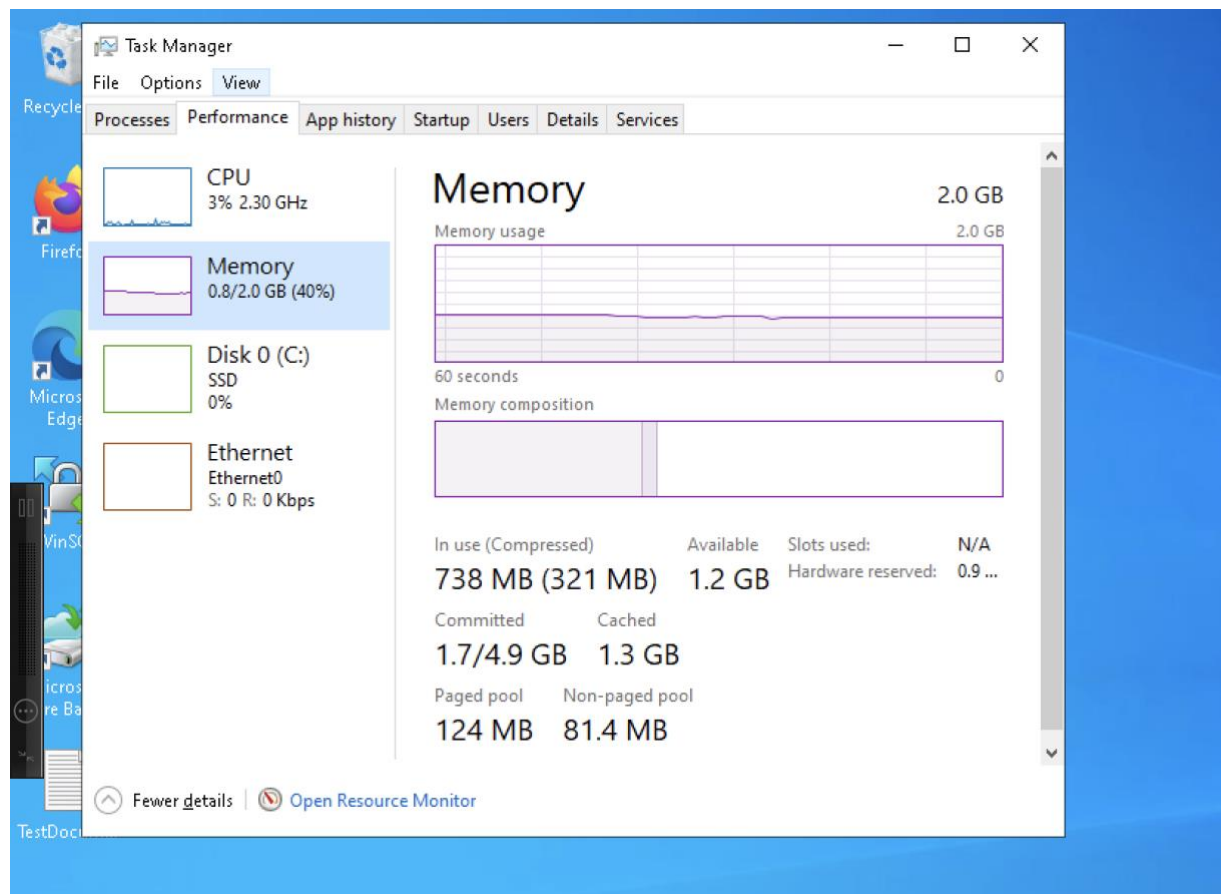
Windows + I



- 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.

CTR + SHIFT + ESC





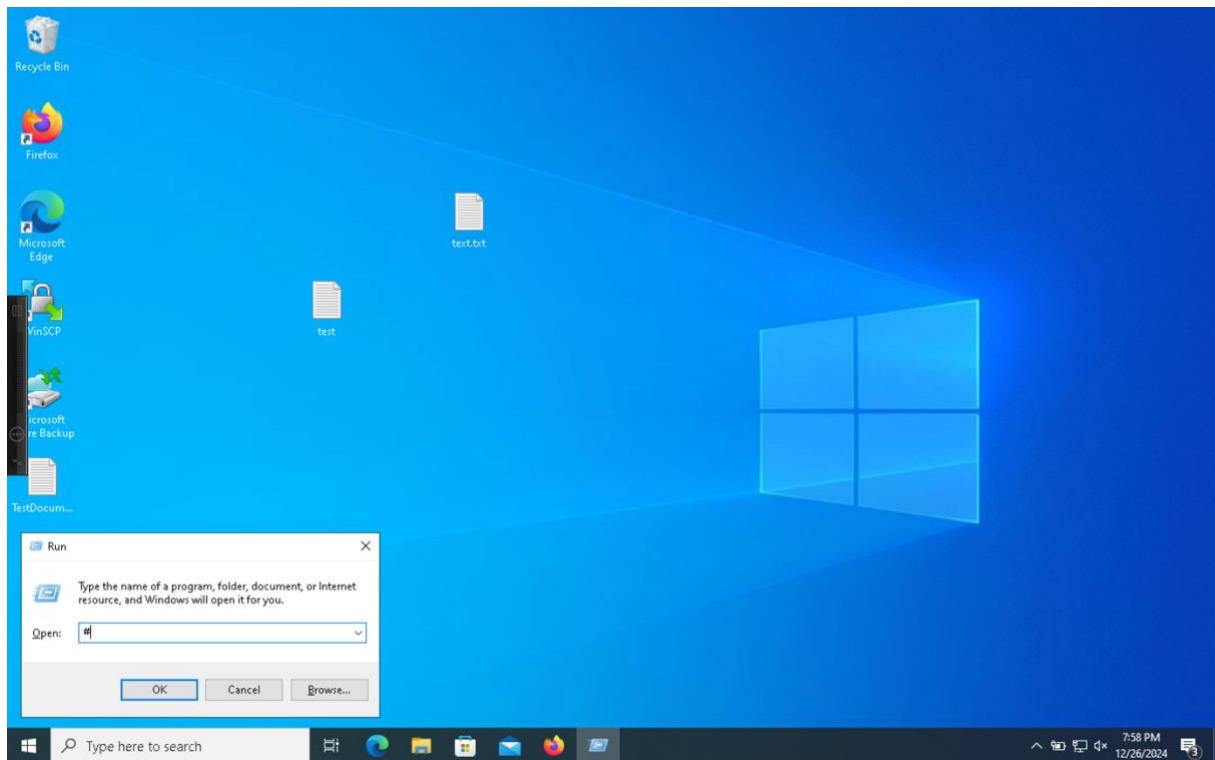
- e) If you're giving a PowerPoint presentation and you connect your laptop to a projector, Windows can use the projector as a second screen. For example, you may have Outlook open on your first screen that you don't show over the projector, while the PowerPoint presentation is displayed on the projector,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

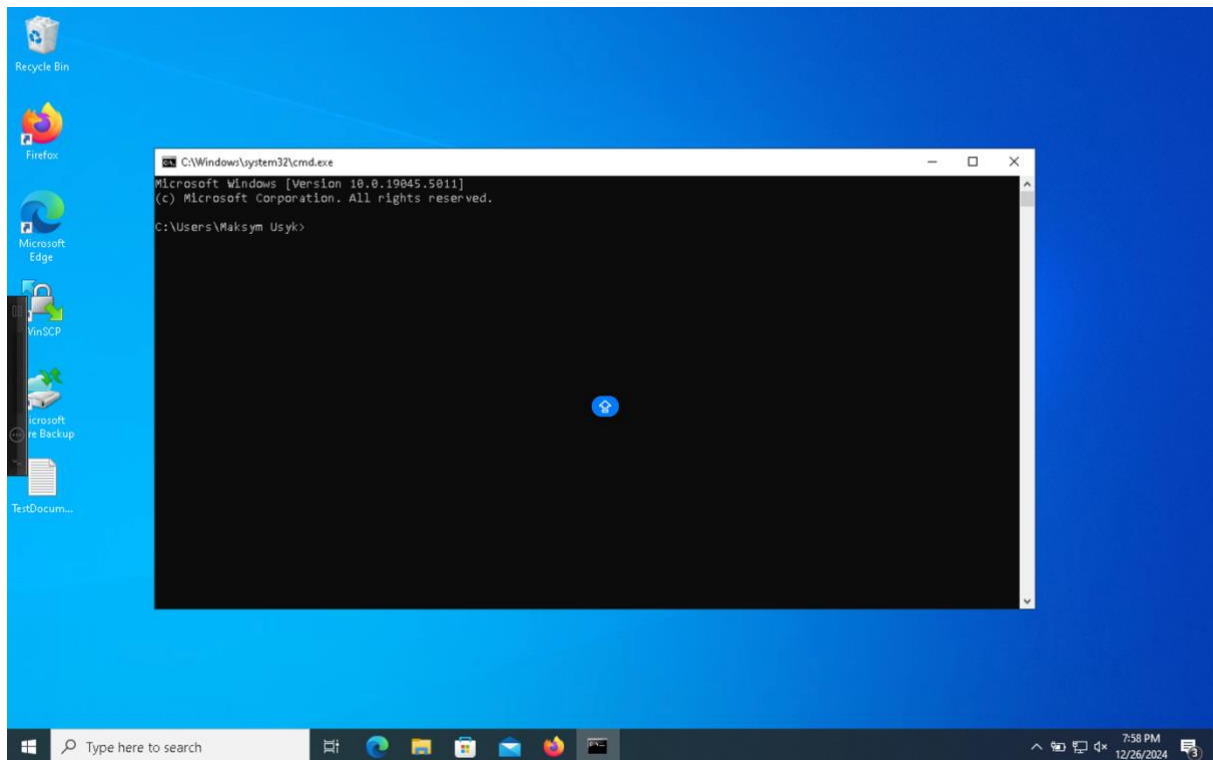
WINDOWS + P

- 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:\SAXION>copy "C:\Users\Maksym Usyk\Downloads\Plugin.png" "HBO-ICT\YEAR1"
Overwrite HBO-ICT\YEAR1\Plugin.png? (Yes/No/All): All
1 file(s) copied.

C:\SAXION>copy "C:\Users\Maksym Usyk\Downloads\Plugin.png HBO-ICT\YEAR1\QUARTILE1\INTRODUCTION TO INFRASTRUCTURES"
The system cannot find the path specified.

C:\SAXION>copy "C:\Users\Maksym Usyk\Downloads\Plugin.png" "HBO-ICT\YEAR1\QUARTILE1\INTRODUCTION TO INFRASTRUCTURES"
1 file(s) copied.

C:\SAXION>copy "C:\Users\Maksym Usyk\Downloads\Wave.png" "HBO-ICT\YEAR1\QUARTILE1\INTRODUCTION TO PROGRAMMING"
1 file(s) copied.

C:\SAXION>copy "C:\Users\Maksym Usyk\Downloads\Tumble.png" "HBO-ICT\YEAR1\QUARTILE1\ORGANISATION&IT"
1 file(s) copied.

C:\SAXION>
```

Relevant screenshots **tree** command:

```
C:\SAXION>echo %Maksym Usyk%  
%Maksym Usyk%
```

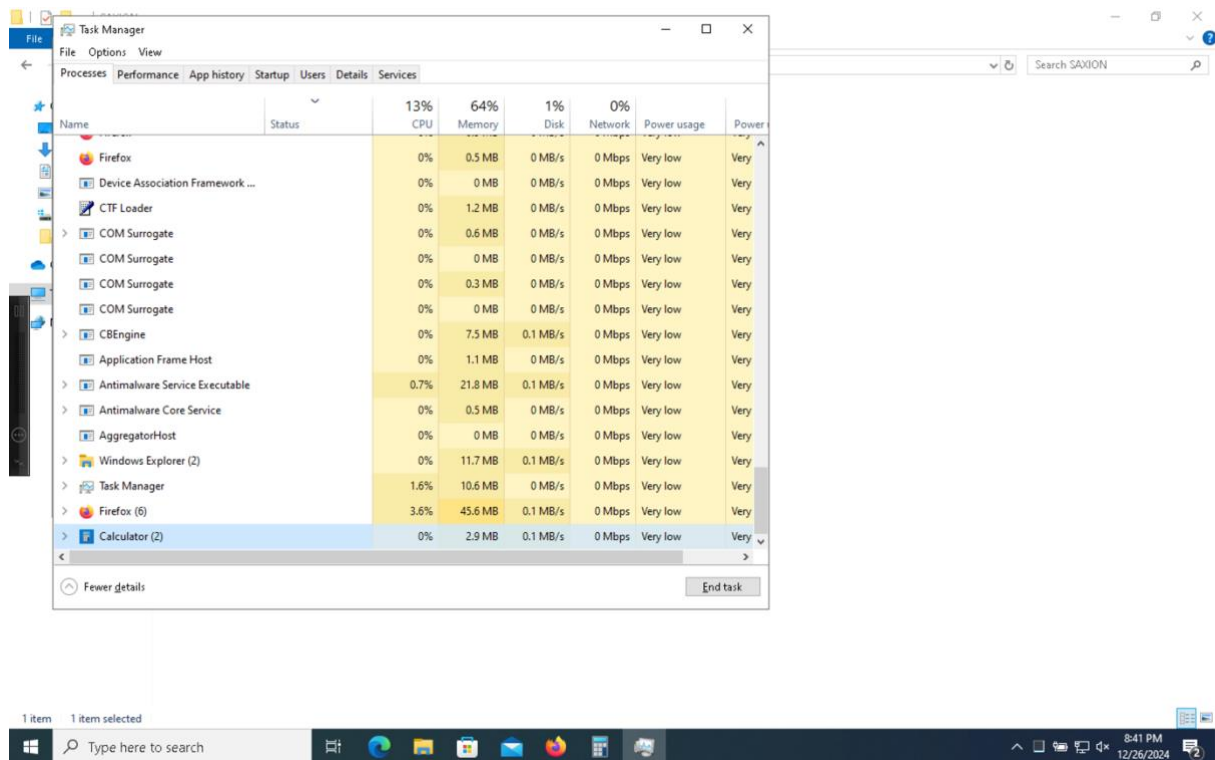
```
C:\SAXION>_
```

```
Folder PATH listing  
Volume serial number is C246-6B89  
C:..  
├──HBO-ICT  
│   ├──YEAR1  
│   │   ├──QUARTILE1  
│   │   │   ├──INTRODUCTION TO INFRASTRUCTURES  
│   │   │   ├──INTRODUCTION TO PROGRAMMING  
│   │   │   └──ORGANISATION&IT  
│   │   ├──QUARTILE2  
│   │   ├──QUARTILE3  
│   │   └──QUARTILE4  
│   ├──YEAR2  
│   │   ├──QUARTILE1  
│   │   ├──QUARTILE2  
│   │   ├──QUARTILE3  
│   │   └──QUARTILE4  
│   ├──YEAR3  
│   └──YEAR4  
C:\SAXION>
```

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

Terminating Processes

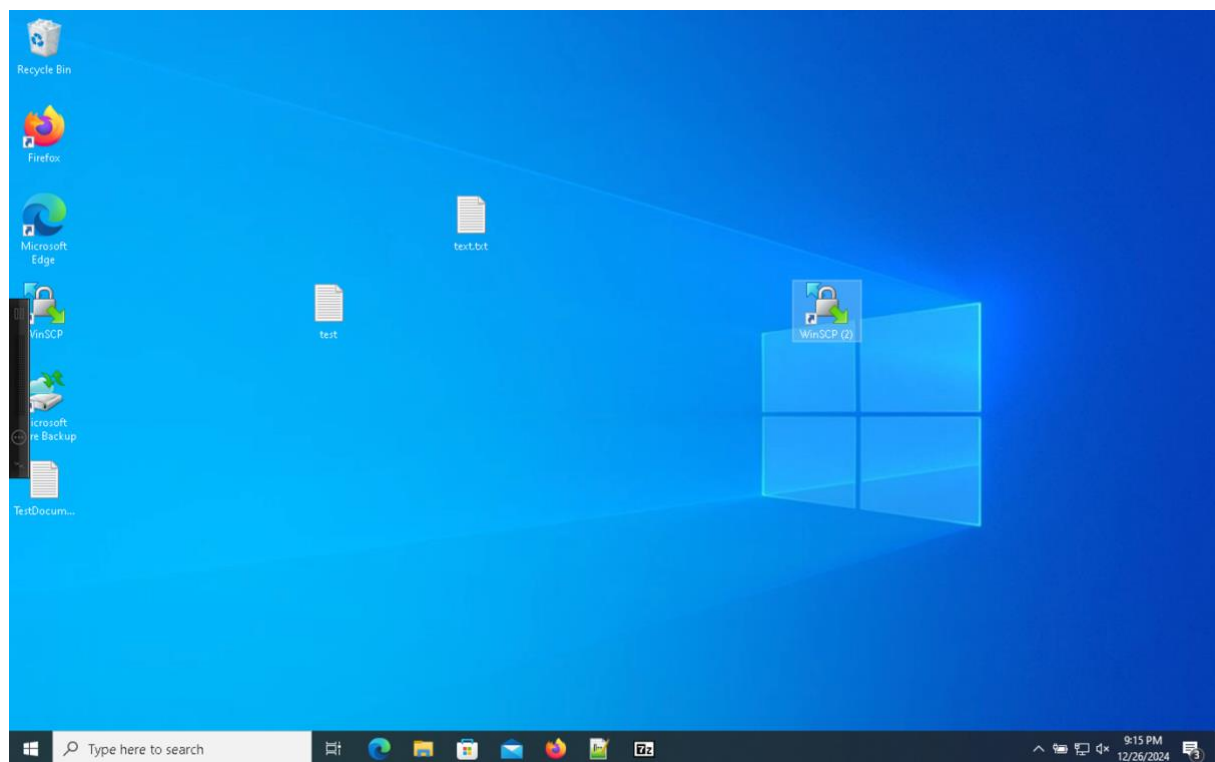
Relevant Screenshots Task Manager Window:



Install Software

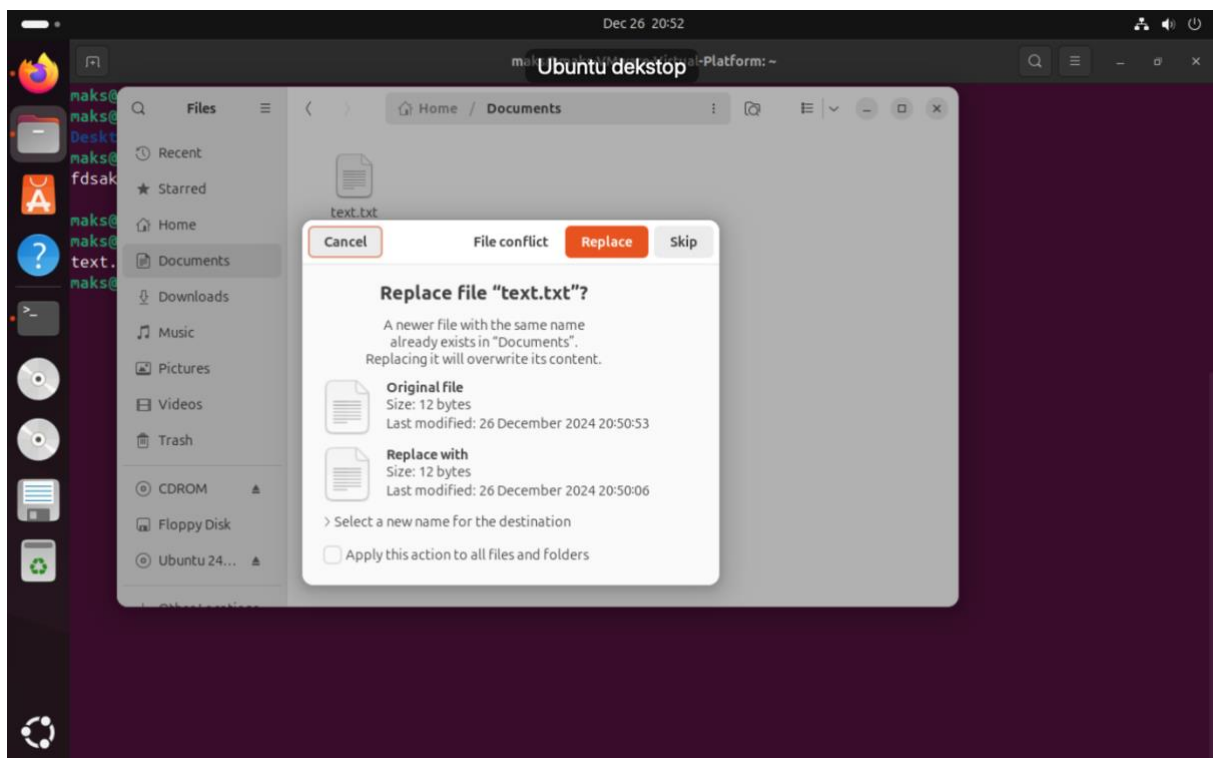
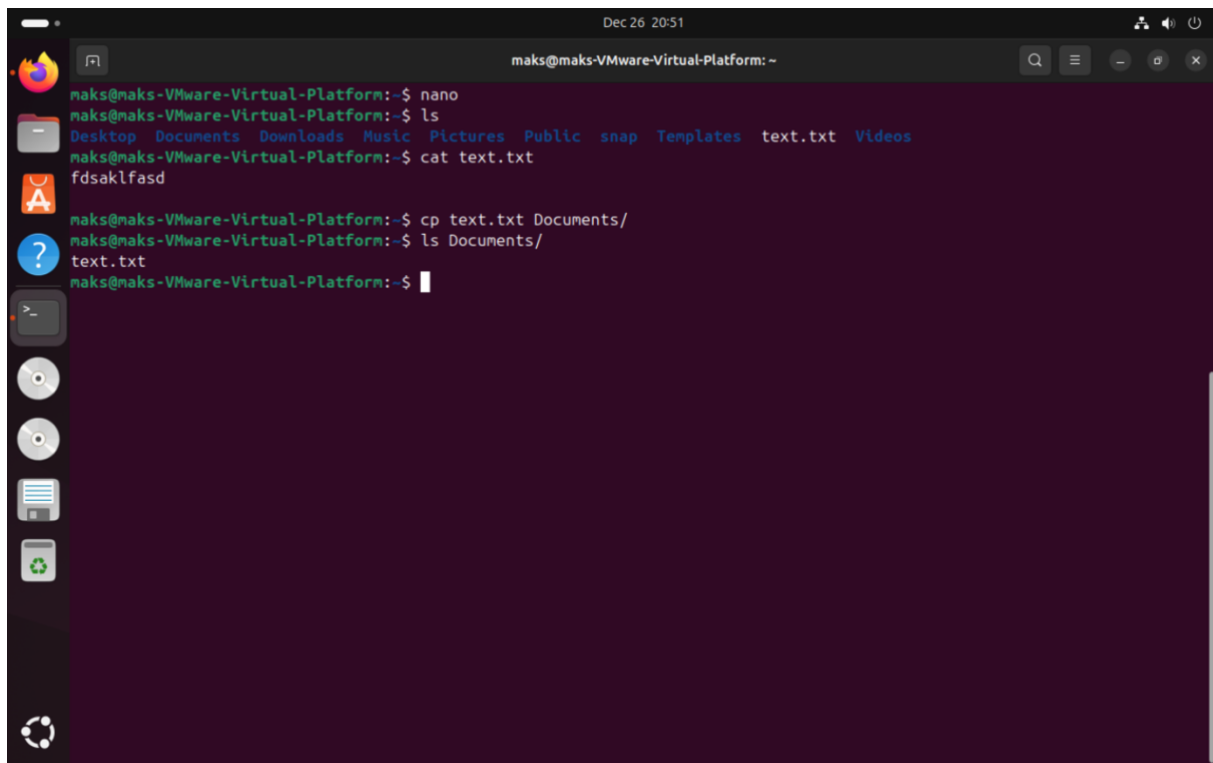
Relevant screenshots that the following software is installed:

- WinSCP
- Notepad++
- 7zip



Assignment 5.4: Working with Linux

Relevant screenshots + motivation



```

Dec 26 21:03
maks@maks-VMware-Virtual-Platform: ~

0[ ||| 3.2%] 4[ 0.0%]
1[ 0.0%] 5[ 0.6%]
2[ 0.0%] 6[ 0.0%]
3[ 0.6%] 7[ 0.0%]
Mem[|||||] 2.25G/7.61G Tasks: 125, 797 thr, 265 kthr; 1 running
Swp[ ] 0K/4.00G Load average: 0.14 0.08 0.09
Uptime: 00:42:25

Main 1/0
PID USER PRI NI VIRT RES SHR S CPU% MEM% TIME+ Command
8978 maks 20 0 21080 6016 3584 R 3.2 0.1 0:00.73 htop
2149 maks 20 0 4261M 285M 133M S 0.6 3.7 1:16.57 /usr/bin/gnome-shell
7017 maks 20 0 2609M 219M 99028 S 0.6 2.8 0:14.16 /snap/firefox/5437/usr/lib/firefox/firefox -contentpr
1 root 20 0 23340 13852 9244 S 0.0 0.2 0:04.01 /sbin/init splash
458 root 19 -1 67252 17724 16572 S 0.0 0.2 0:01.17 /usr/lib/systemd/systemd-journald
497 root 20 0 32028 10056 4936 S 0.0 0.1 0:01.35 /usr/lib/systemd/systemd-udevd
690 systemd-oo 20 0 17556 7424 6656 S 0.0 0.1 0:00.44 /usr/lib/systemd/systemd-oomd
695 systemd-re 20 0 21976 12928 10624 S 0.0 0.2 0:01.12 /usr/lib/systemd/systemd-resolved
696 systemd-ti 20 0 91044 7808 6912 S 0.0 0.1 0:00.11 /usr/lib/systemd/systemd-timesyncd
940 systemd-ti 20 0 91044 7808 6912 S 0.0 0.1 0:00.01 /usr/lib/systemd/systemd-timesyncd
998 avahi 20 0 8668 4480 4096 S 0.0 0.1 0:00.23 avahi-daemon: running [maks-VMware-Virtual-Platform.1
1000 messagebus 20 0 12156 6656 4608 S 0.0 0.1 0:01.35 @dbus-daemon --system --address=systemd: --nofork --n
1004 gnome-remo 20 0 356M 15928 13752 S 0.0 0.2 0:00.09 /usr/libexec/gnome-remote-desktop-daemon --system
1011 polkitd 20 0 375M 10324 7504 S 0.0 0.1 0:00.44 /usr/lib/polkit-1/polkitd --no-debug
1016 root 20 0 314M 6912 6528 S 0.0 0.1 0:00.04 /usr/libexec/power-profiles-daemon
1031 root 20 0 314M 7116 6476 S 0.0 0.1 0:00.08 /usr/libexec/accounts-daemon
1037 root 20 0 18092 2688 2560 S 0.0 0.0 0:00.03 /usr/sbin/cron -f -P
1038 root 20 0 311M 6528 6016 S 0.0 0.1 0:00.20 /usr/libexec/switcheroo-control
1046 root 20 0 18160 8704 7680 S 0.0 0.1 0:00.40 /usr/lib/systemd/systemd-logind
1047 root 20 0 530M 13804 11372 S 0.0 0.2 0:00.31 /usr/libexec/udisks2/udisksd
F1Help F2Setup F3Search F4Filter F5Tree F6SortBy F7Nice F8Nice F9Kill F10Quit

```

```

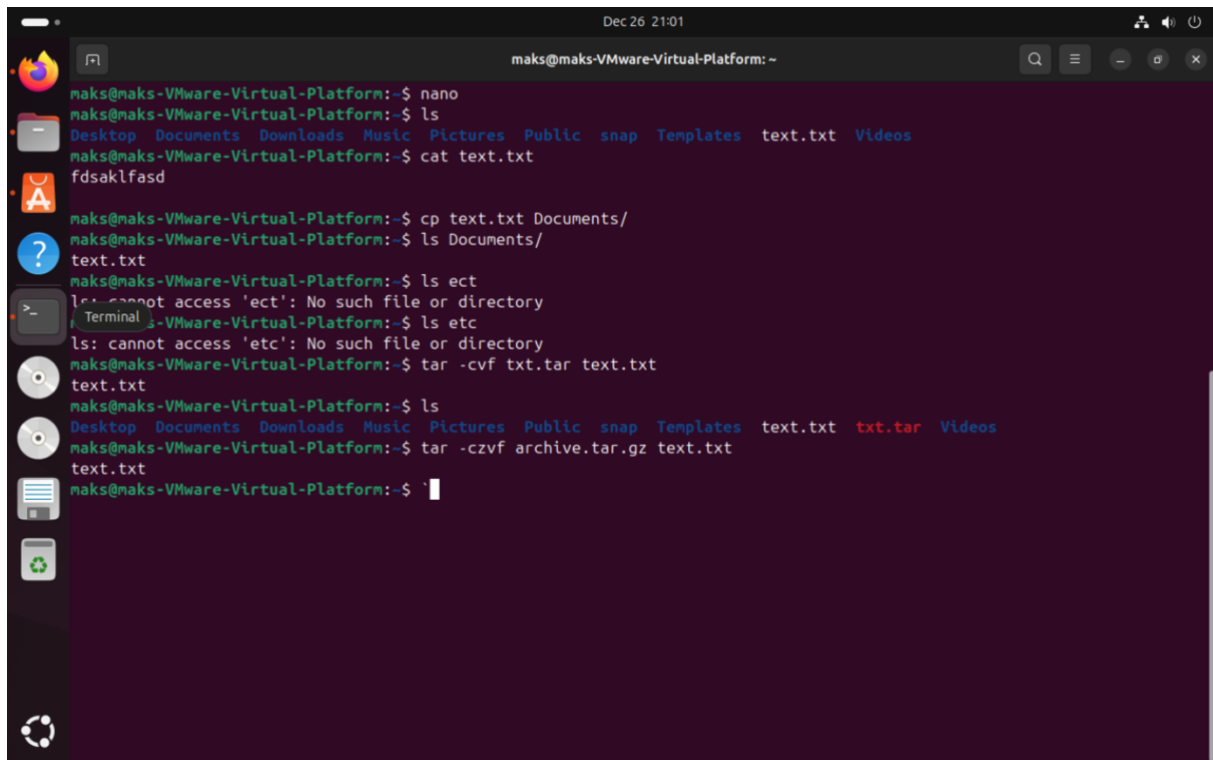
Processing triggers for libe-0.0 (2.12.0-4build2) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for desktop-file-utils (0.27-2build1) ...
maks@maks-VMware-Virtual-Platform:~$ neofetch

  .-/+oosssso+/-.
  `:+ssssssssssssssss+:`
    -+ssssssssssssssssyyssss+-
    .osssssssssssssssssdMMMMNyssssso.
    /ssssssssssshdmmNNmmyNMMMMhssssss/
    +ssssssssshmydMMMMMMMMNdddyssssssss+
    /ssssssssshNMMMyhhyyyhNMMMMhssssssss/
    sssssssssdMMMNhssssssssshNMMMdssssssss.
    -ssssshhhyNMMNysssssssssssyNMMMyssssss+
    ssyNMMMNyMMhssssssssssshmmhssssssso
    ssyNMMMNyMMhssssssssssshmmhssssssso
    -ssssshhhyNMMNysssssssssssyNMMMyssssss+
    sssssssssdMMMNhssssssssshNMMMdssssssss.
    /ssssssssshNMMMyhhyyyhNMMMMhssssssss/
    +sssssssssdmydMMMMMMMMNdddyssssssss+
    /ssssssssssshdmmNNmmyNMMMMhssssss/
    .osssssssssssssssssdMMMMNyssssso.
    -+ssssssssssssssssyyssss+-
    `:+ssssssssssssssss+:`
    .-/+oosssso+/-.

maks@maks-VMware-Virtual-Platform:~$

OS: Ubuntu 24.04.1 LTS x86_64
Host: VMware Virtual Platform None
Kernel: 6.8.0-50-generic
Uptime: 50 mins
Packages: 1526 (dpkg), 12 (snap)
Shell: bash 5.2.21
Resolution: 1280x800
DE: GNOME 46.0
WM: Mutter
WM Theme: Adwaita
Theme: Yaru [GTK2/3]
Icons: Yaru [GTK2/3]
Terminal: gnome-terminal
CPU: Intel i9-9880H (8) @ 2.304GHz
GPU: 00:0f.0 VMware SVGA II Adapter
Memory: 2389MiB / 7797MiB

```

A screenshot of a Linux terminal window titled 'maks@maks-VMware-Virtual-Platform: ~'. The terminal shows a series of commands and their outputs. The user starts by running 'nano', then 'ls', which lists the contents of the home directory: Desktop, Documents, Downloads, Music, Pictures, Public, snap, Templates, text.txt, and Videos. Next, they run 'cat text.txt', which outputs 'fdsaklfasd'. Then, they run 'cp text.txt Documents/' and 'ls Documents/', which lists 'text.txt'. They attempt to run 'ls ect' and 'ls etc', both of which result in errors: 'ls: cannot access 'ect': No such file or directory' and 'ls: cannot access 'etc': No such file or directory'. They then run 'tar -cvf txt.tar text.txt', which outputs 'text.txt'. Finally, they run 'ls' again, showing the updated directory listing with 'txt.tar' added, and then 'tar -czvf archive.tar.gz text.txt', which outputs 'text.txt'.

```
maks@maks-VMware-Virtual-Platform:~$ nano
maks@maks-VMware-Virtual-Platform:~$ ls
Desktop Documents Downloads Music Pictures Public snap Templates text.txt Videos
maks@maks-VMware-Virtual-Platform:~$ cat text.txt
fdsaklfasd
maks@maks-VMware-Virtual-Platform:~$ cp text.txt Documents/
maks@maks-VMware-Virtual-Platform:~$ ls Documents/
text.txt
maks@maks-VMware-Virtual-Platform:~$ ls ect
ls: cannot access 'ect': No such file or directory
maks@maks-VMware-Virtual-Platform:~$ ls etc
ls: cannot access 'etc': No such file or directory
maks@maks-VMware-Virtual-Platform:~$ tar -cvf txt.tar text.txt
text.txt
maks@maks-VMware-Virtual-Platform:~$ ls
Desktop Documents Downloads Music Pictures Public snap Templates text.txt txt.tar Videos
maks@maks-VMware-Virtual-Platform:~$ tar -czvf archive.tar.gz text.txt
text.txt
maks@maks-VMware-Virtual-Platform:~$
```

Neofetch tells you the general characteristics of the system, while htop is an activity monitor.

Assignment 5.5: Users and permissions on Linux

Relevant screenshots + motivation

chmod 744 filename

When it comes to the linux permission system, it is represented in numbers. For example, 2 means is able to write, 4 means the user can view the contents of the file, and finally 1 implies that the user is capable of executing. Together added they represent the permissions number of any group of user, like owner, guest...

A screenshot of a Linux terminal window showing a user running a shell script. The prompt is 'maks@maks-VMware-Virtual-Platform:~/hello\$'. The user enters 'bash hello.sh', and the output is 'Hello Maksym, 5645'. The prompt then changes to 'maks@maks-VMware-Virtual-Platform:~/hello\$'.

```
maks@maks-VMware-Virtual-Platform:~/hello$ bash hello.sh
Hello Maksym, 5645
maks@maks-VMware-Virtual-Platform:~/hello$
```

Assignment 5.6: View the contents of files

Relevant screenshots + motivation

A screenshot of a Linux terminal window showing a user running the 'wc' command on a file. The prompt is 'maks@maks-VMware-Virtual-Platform:~/Downloads\$'. The user enters 'wc sherlock.txt', and the output is '12304 107560 607430 sherlock.txt'.

```
maks@maks-VMware-Virtual-Platform:~/Downloads$ wc sherlock.txt
12304 107560 607430 sherlock.txt
```



```
Dec 26 22:00
maks@maks-VMware-Virtual-Platform: ~/Downloads

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distributed Project Gutenberg-tm eBooks with only a loose network of
volunteer support.

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facility: www.gutenberg.org

This website includes information about Project Gutenberg-tm,
including how to make donations to the Project Gutenberg Literary
Archive Foundation, how to help produce our new eBooks, and how to
subscribe to our email newsletter to hear about new eBooks.

maks@maks-VMware-Virtual-Platform:~/Downloads$ wc sherlock.txt
12304 107560 607430 sherlock.txt
maks@maks-VMware-Virtual-Platform:~/Downloads$ man wc
maks@maks-VMware-Virtual-Platform:~/Downloads$ grep -n kingdom sherlock.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
maks@maks-VMware-Virtual-Platform:~/Downloads$

Contents
I. A Scandal in Bohemia
II. The Red-Headed League
III. A Case of Identity
IV. The Boscombe Valley Mystery
V. The Five Orange Pips
VI. The Man with the Twisted Lip
VII. The Adventure of the Blue Carbuncle
VIII. The Adventure of the Speckled Band
```

```
Dec 26 22:02
maks@maks-VMware-Virtual-Platform: ~/Downloads

maks@maks-VMware-Virtual-Platform:~/Downloads$ wc sherlock.txt
12304 107560 607430 sherlock.txt
maks@maks-VMware-Virtual-Platform:~/Downloads$ man wc
maks@maks-VMware-Virtual-Platform:~/Downloads$ grep -n kingdom sherlock.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
maks@maks-VMware-Virtual-Platform:~/Downloads$ less sherlock.txt
maks@maks-VMware-Virtual-Platform:~/Downloads$ tail sherlock.txt

Most people start at our website which has the main PG search
facility: www.gutenberg.org

This website includes information about Project Gutenberg-tm,
including how to make donations to the Project Gutenberg Literary
Archive Foundation, how to help produce our new eBooks, and how to
subscribe to our email newsletter to hear about new eBooks.

maks@maks-VMware-Virtual-Platform:~/Downloads$ head sherlock.txt
The Project Gutenberg eBook of The Adventures of Sherlock Holmes, by Arthur Conan Doyle

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most other parts of the world at no cost and with almost no restrictions
whatsoever. You may copy it, give it away or re-use it under the terms
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www.gutenberg.org. If you are not located in the United States, you
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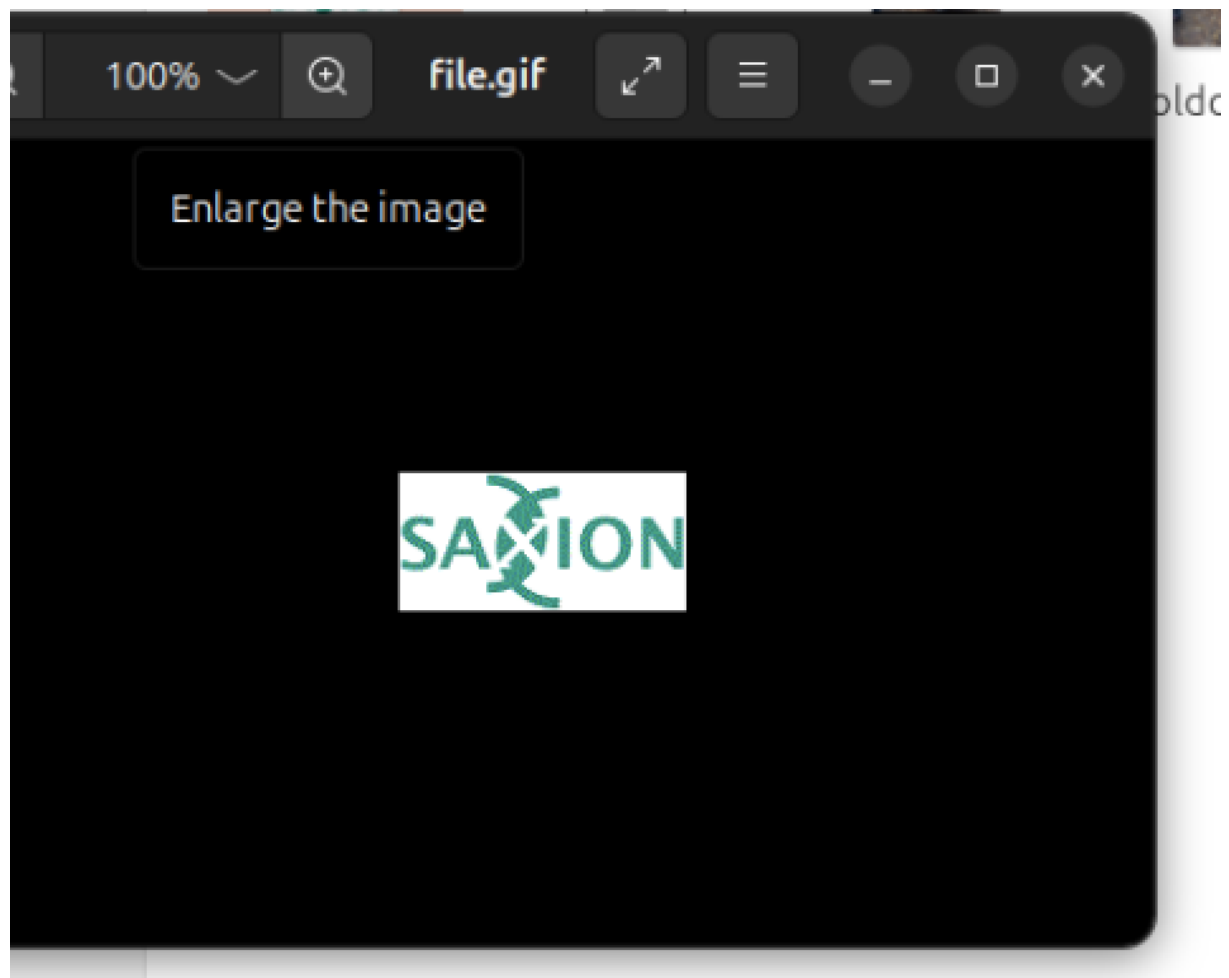
maks@maks-VMware-Virtual-Platform:~/Downloads$ less
VIII. The Adventure of the Speckled Band
```

Relevant screenshots + motivation

[illegible]

- Indicates that instead of showing the contents of the file redirect it to the new file

-d – means decoded



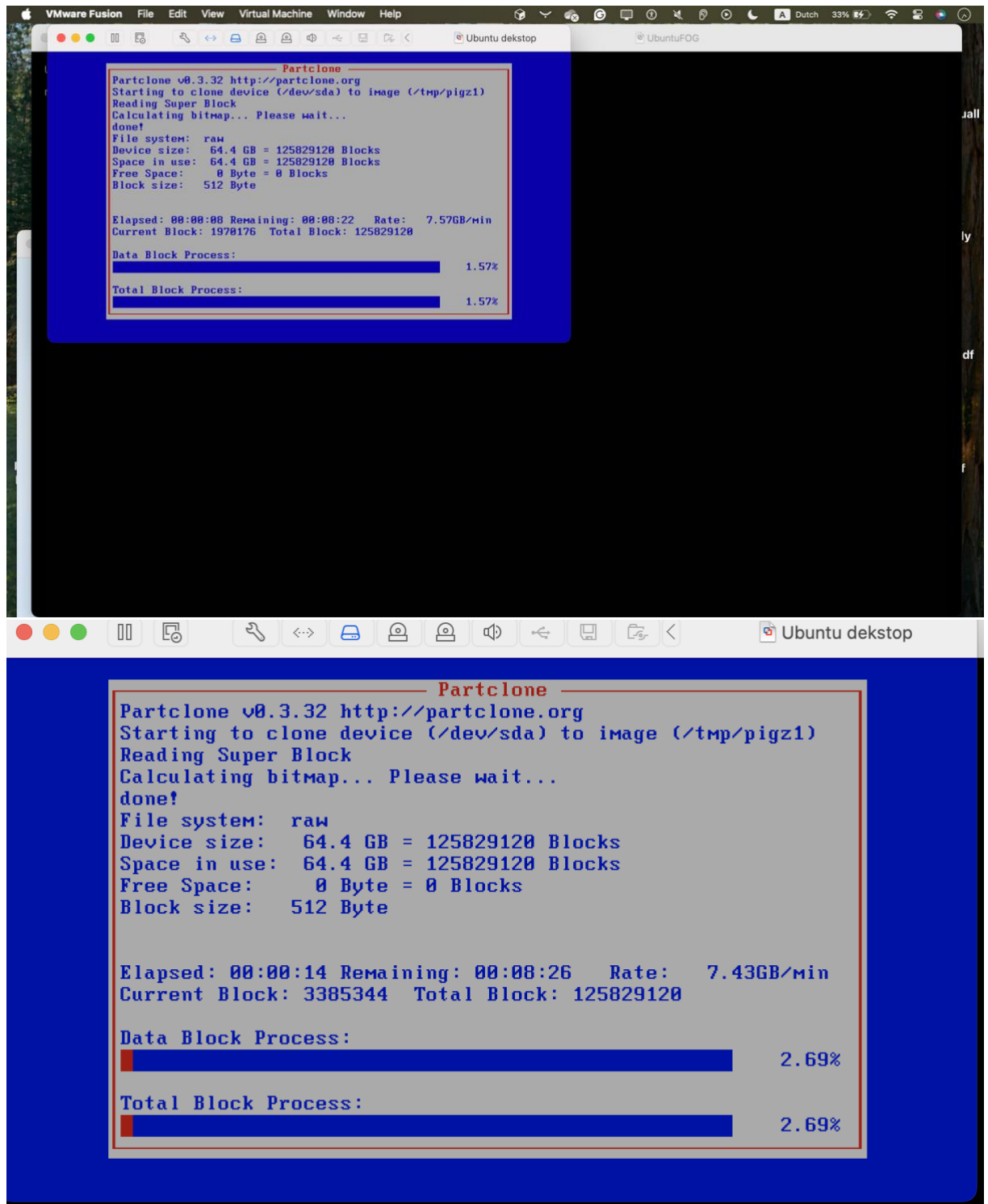
Assignment 5.8: Steganography

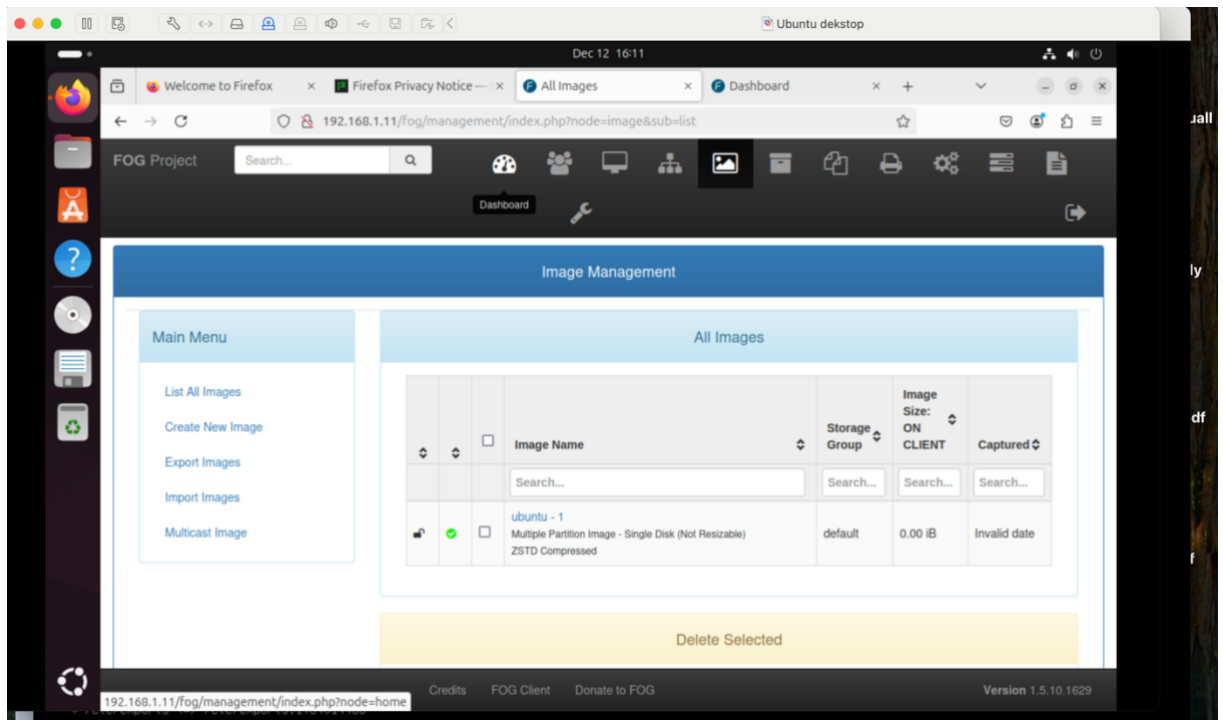
Relevant screenshots + motivation

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.

