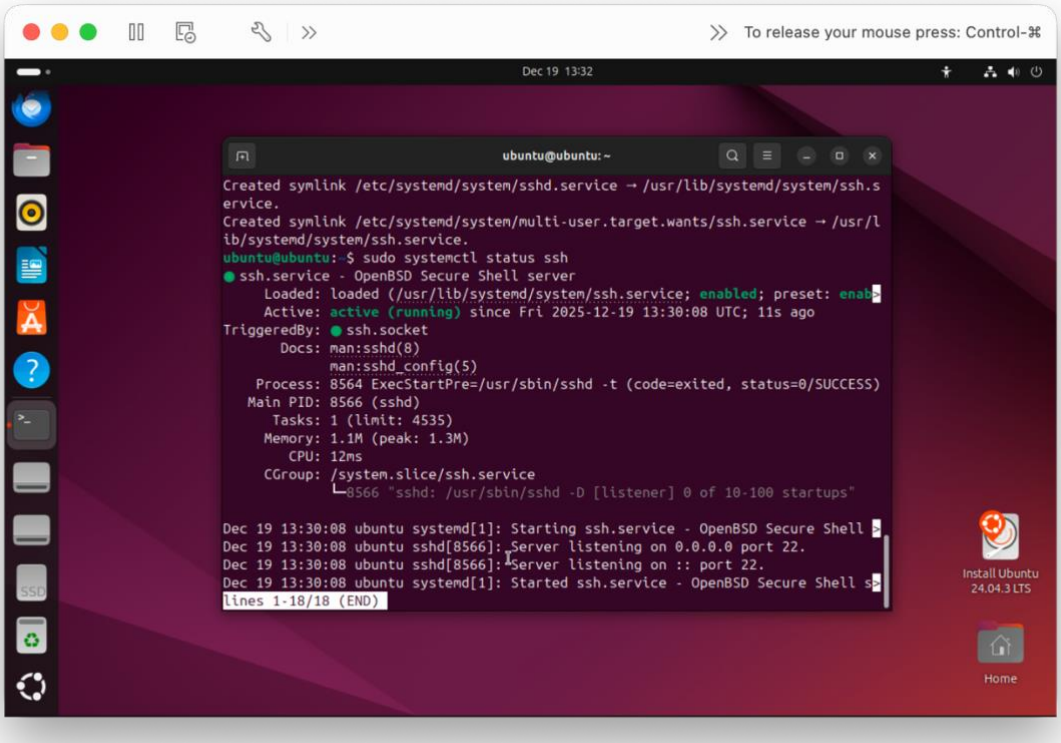
Week 6 – Networking

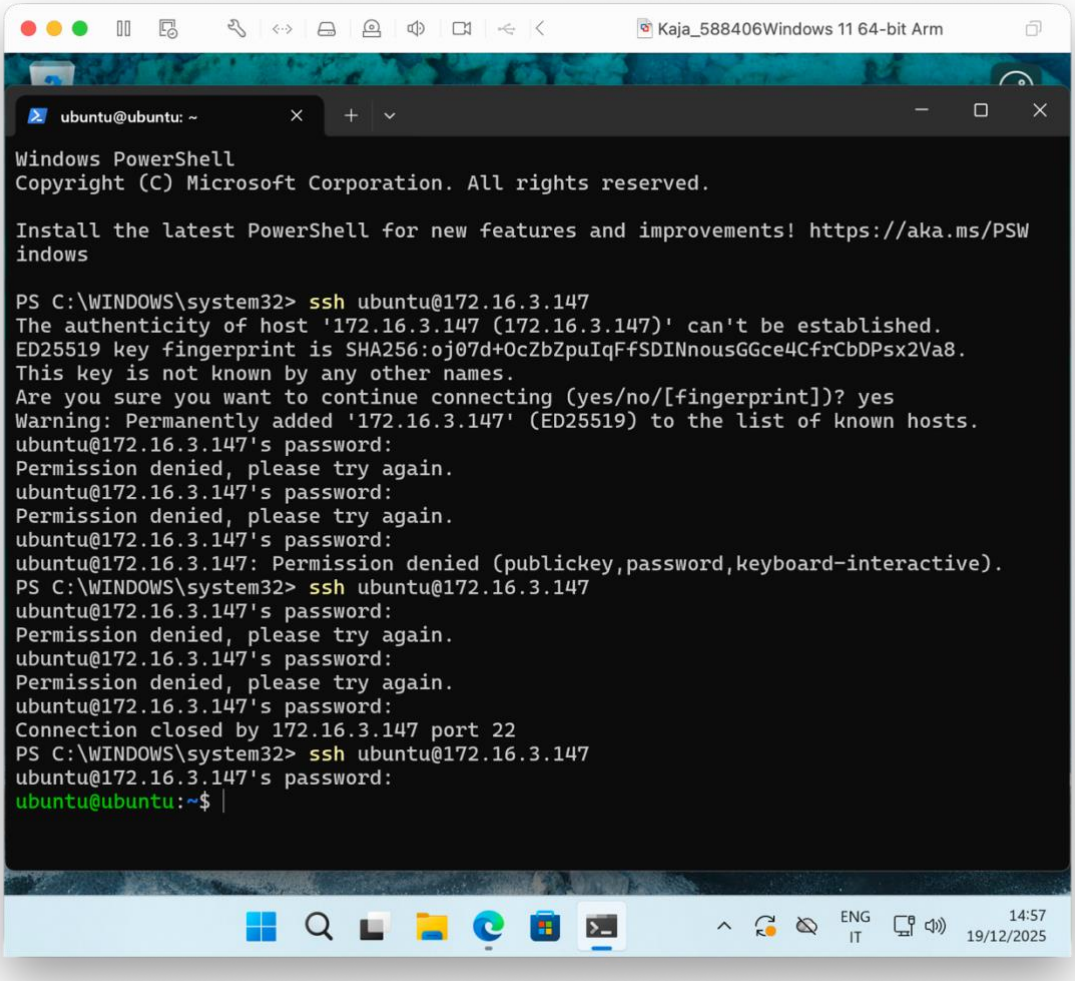
Student number: 588406

Assignment 6.1: Working from home

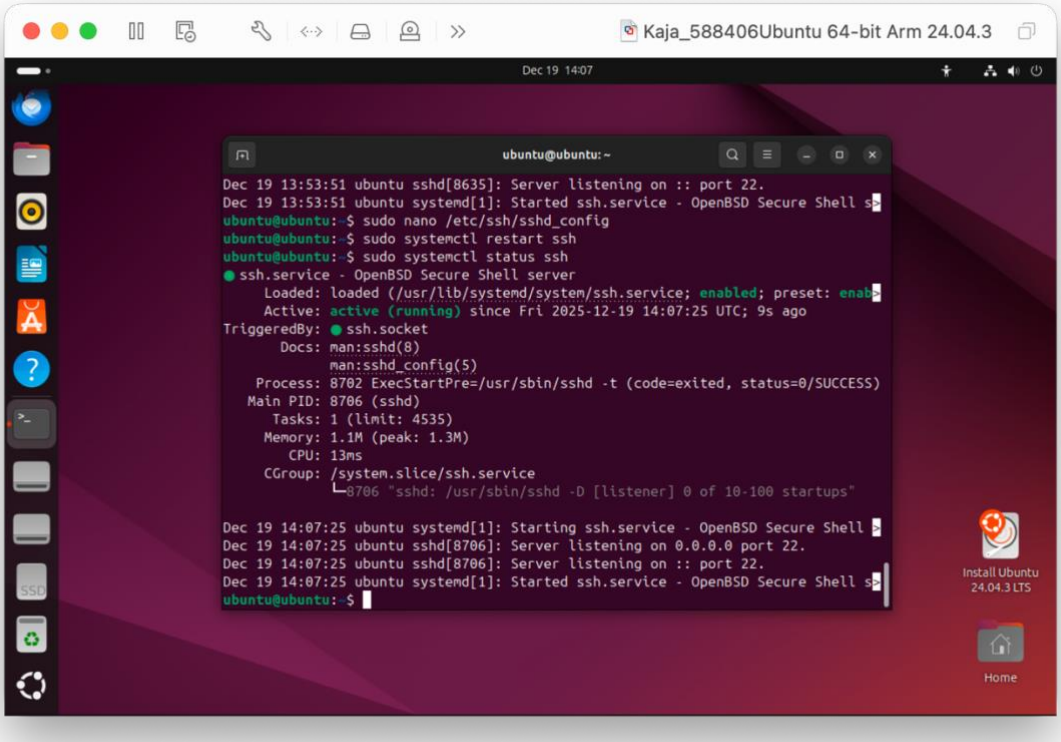
Screenshot installation openssh-server:

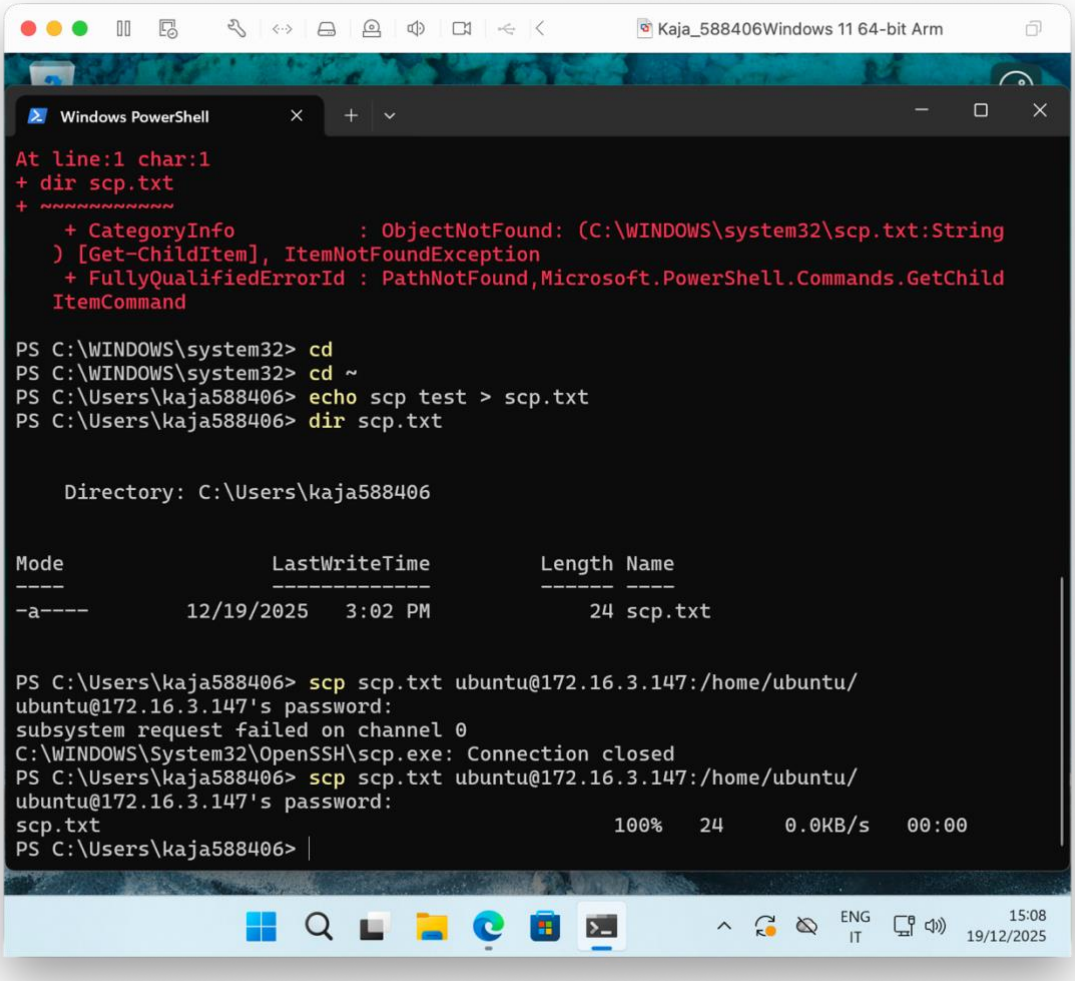


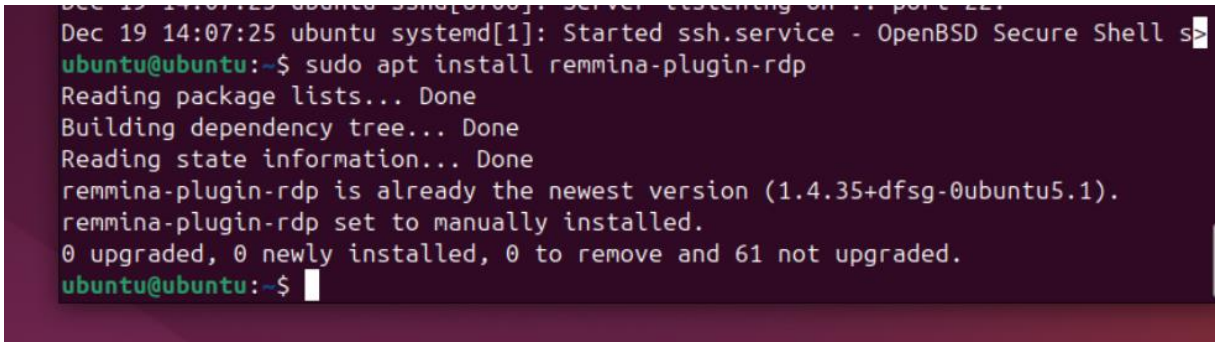
Screenshot successful SSH command execution:




```
PS C:\WINDOWS\system32> cd
PS C:\WINDOWS\system32> cd ~
PS C:\Users\kaja588406> echo scp test > scp.txt
PS C:\Users\kaja588406> dir scp.txt


    Directory: C:\Users\kaja588406


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----        12/19/2025   3:02 PM             24 scp.txt


PS C:\Users\kaja588406>
```


Kaja_588406Ubuntu 64-bit Arm 24.04.3
Dec 19 14:07
ubuntu@ubuntu: ~
Dec 19 13:53:51 ubuntu sshd[8635]: Server listening on :: port 22.
Dec 19 13:53:51 ubuntu systemd[1]: Started ssh.service - OpenBSD Secure Shell s
ubuntu@ubuntu:~$ sudo nano /etc/ssh/sshd_config
ubuntu@ubuntu:~$ sudo systemctl restart ssh
ubuntu@ubuntu:~$ sudo systemctl status ssh
ssh.service - OpenBSD Secure Shell server
Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enab
Active: active (running) since Fri 2025-12-19 14:07:25 UTC; 9s ago
TriggeredBy: ssh.socket
Docs: man:sshd(8)
man:sshd_config(5)
Process: 8702 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
Main PID: 8706 (sshd)
Tasks: 1 (limit: 4535)
Memory: 1.1M (peak: 1.3M)
CPU: 13ms
CGroup: /system.slice/ssh.service
└─8706 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"
Dec 19 14:07:25 ubuntu systemd[1]: Starting ssh.service - OpenBSD Secure Shell
Dec 19 14:07:25 ubuntu sshd[8706]: Server listening on 0.0.0.0 port 22.
Dec 19 14:07:25 ubuntu sshd[8706]: Server listening on :: port 22.
Dec 19 14:07:25 ubuntu systemd[1]: Started ssh.service - OpenBSD Secure Shell s
ubuntu@ubuntu:~$
Install Ubuntu 24.04.3 LTS
Home





Screenshot successful execution SCP command:

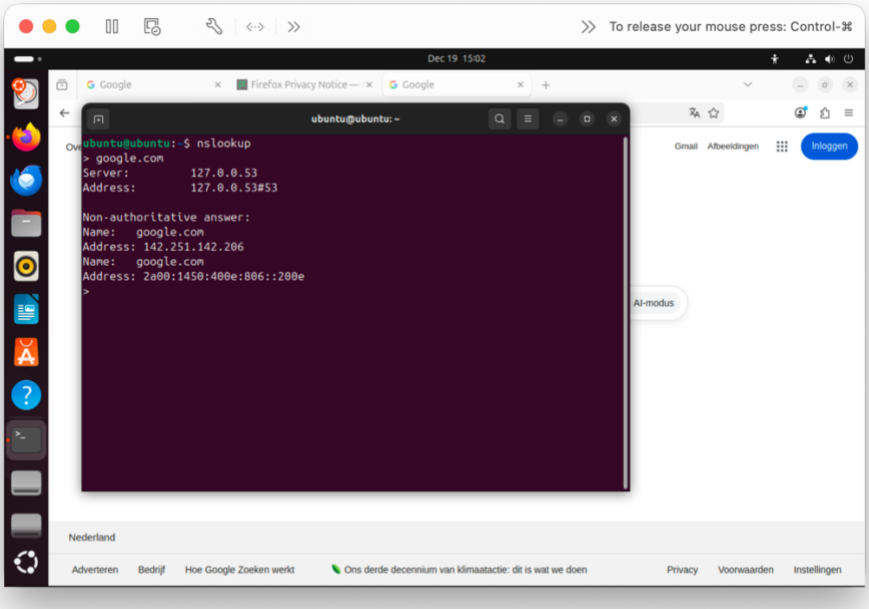
Screenshot remmina:

Assignment 6.2: IP addresses websites

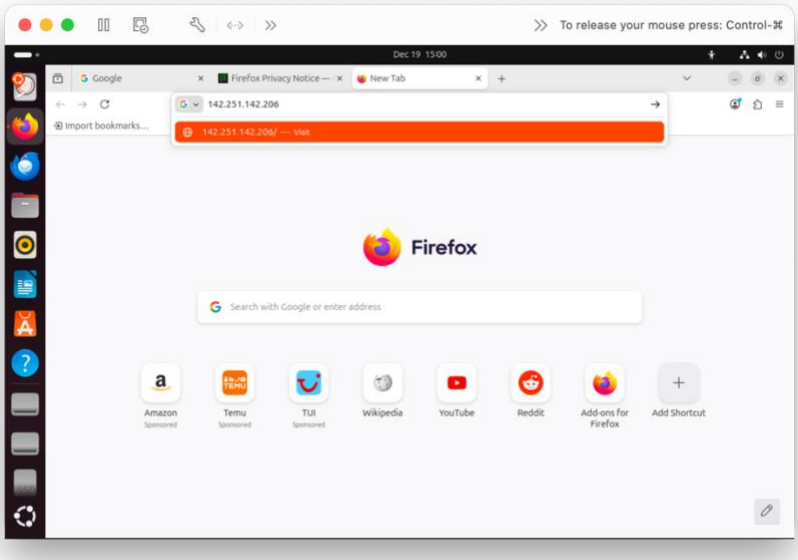
Relevant screenshots nslookup command:

Investigation IP addresses with nslookup command:

- amazon.com - 98.87.170.71, 98.87.170.74, 98.82.161.185
- google.com – 142.251.142.206, 2a00:1450:400e:806::200e
- one.one.one.one – 1.1.1.1, 1.0.0.1, 2606:4700:4700::1001, 2606:4700:4700::1111
- dns.google.com – 8.8.8.8, 8.8.4.4, 2001:4860:4860::8844, 2001:4860:4860:8888
- bol.com – 79.170.100.42
- w3schools.com – 76.223.115.82, 13.248.240.135



Screenshot website visit via IP address:



Assignment 6.3: subnetting

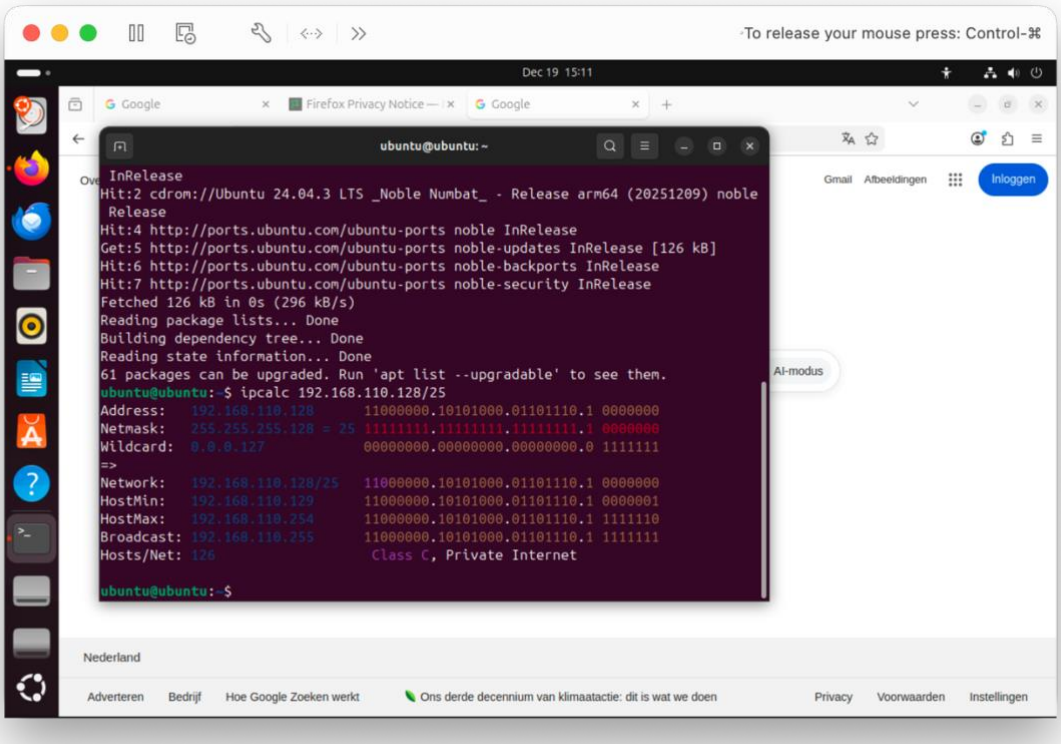
How many IP addresses are in this network configuration 192.168.110.128/25?

- The network 192.168.110.128/25 contains 128 IP addresses in total.

What is the usable IP range to hand out to the connected computers?

- The usable IP range that can be connected to computers runs from 192.168.110.129 to 192.168.110.254.

Check your two previous answers with this Linux command: `ipcalc 192.168.110.128/25`

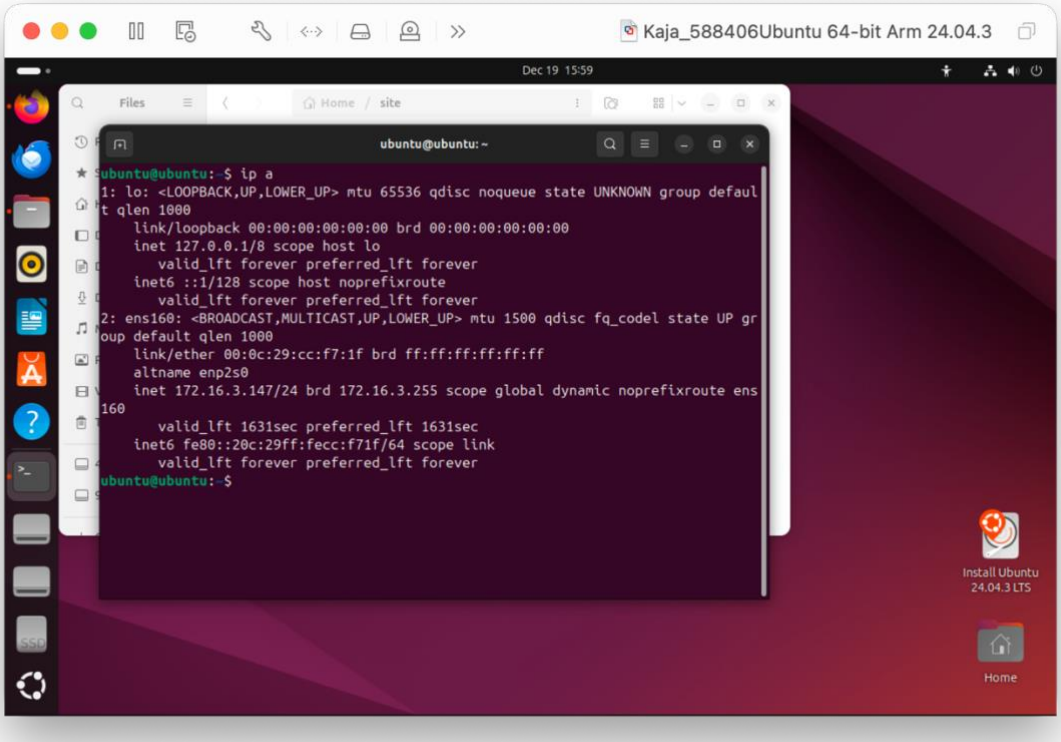


Explain the above calculation in your own words.

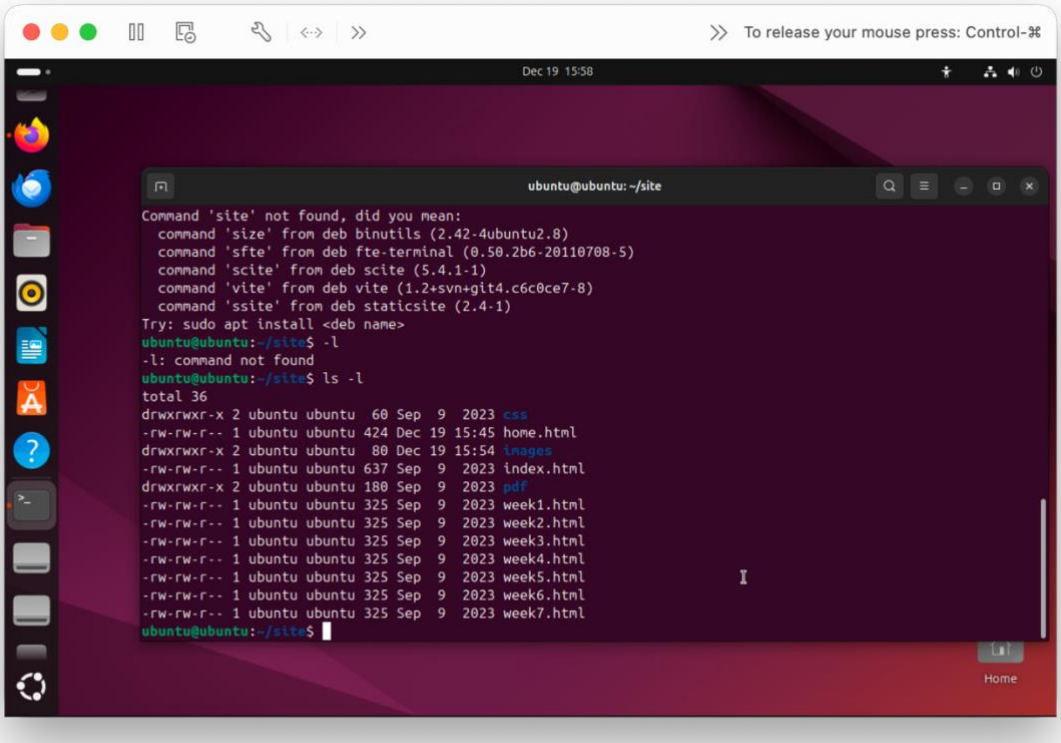
- This output confirms the calculation: with a /25 subnet there are 128 total addresses, where 192.168.110.128 is the network address and 192.168.110.255 is the broadcast address, leaving the usable host range 192.168.110.129 - 192.168.110.254 (126 usable IPs).

Assignment 6.4: HTML

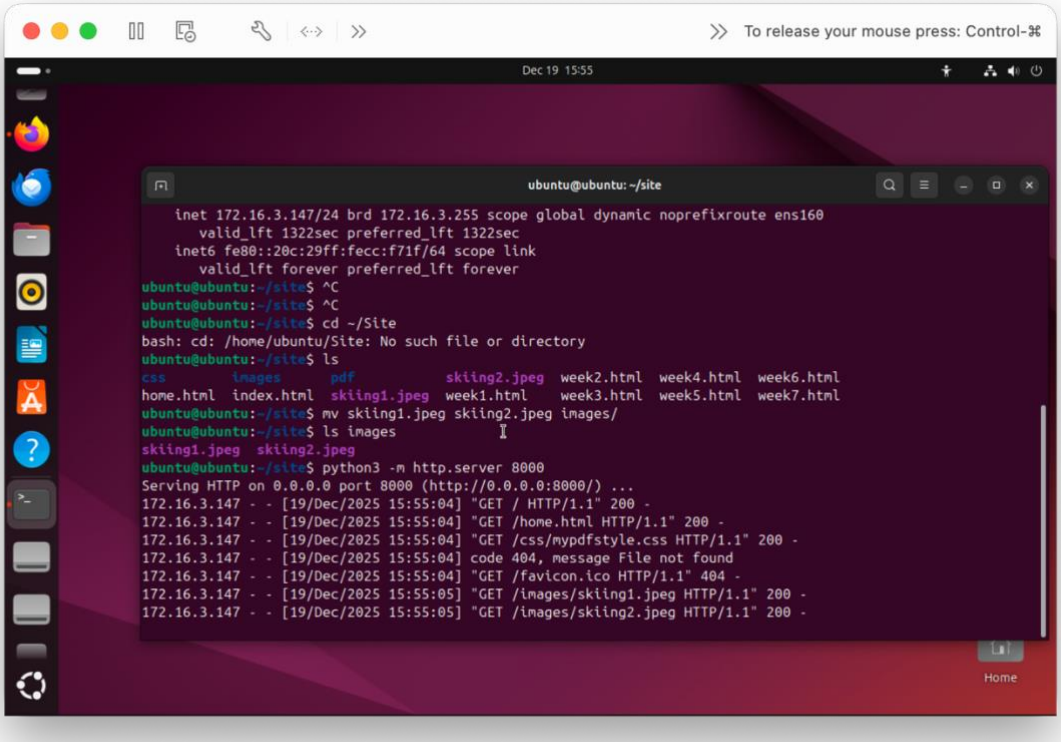
Screenshot IP address Ubuntu VM:



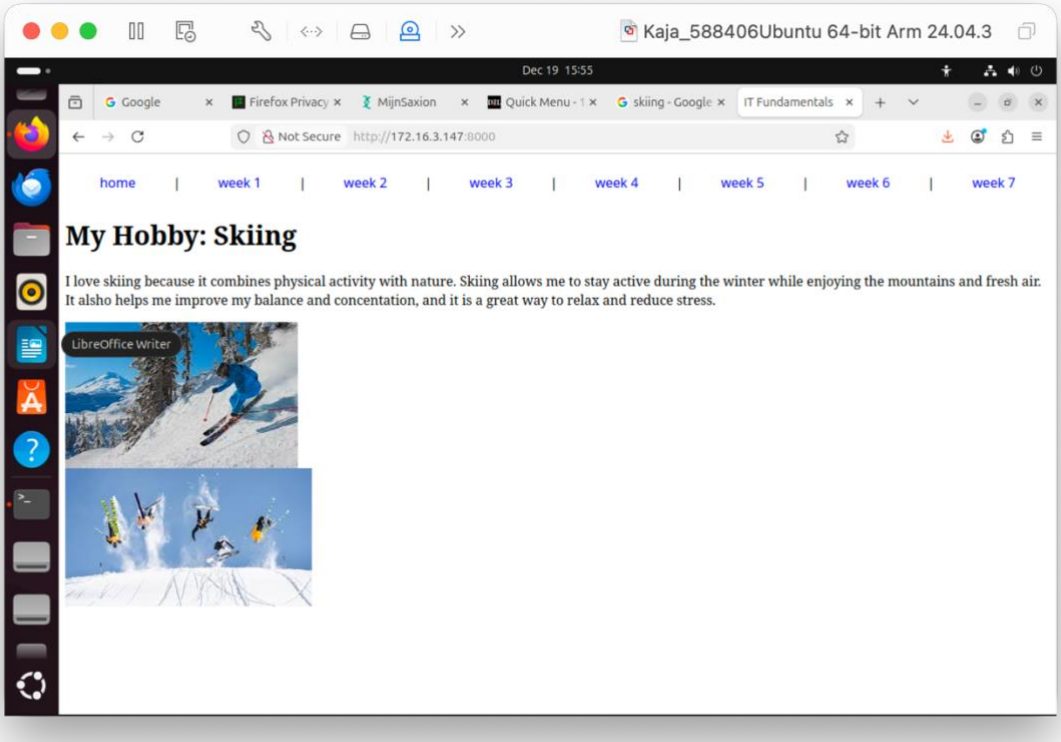
Screenshot of Site directory contents:



Screenshot python3 webserver command:



Screenshot web browser visits your site



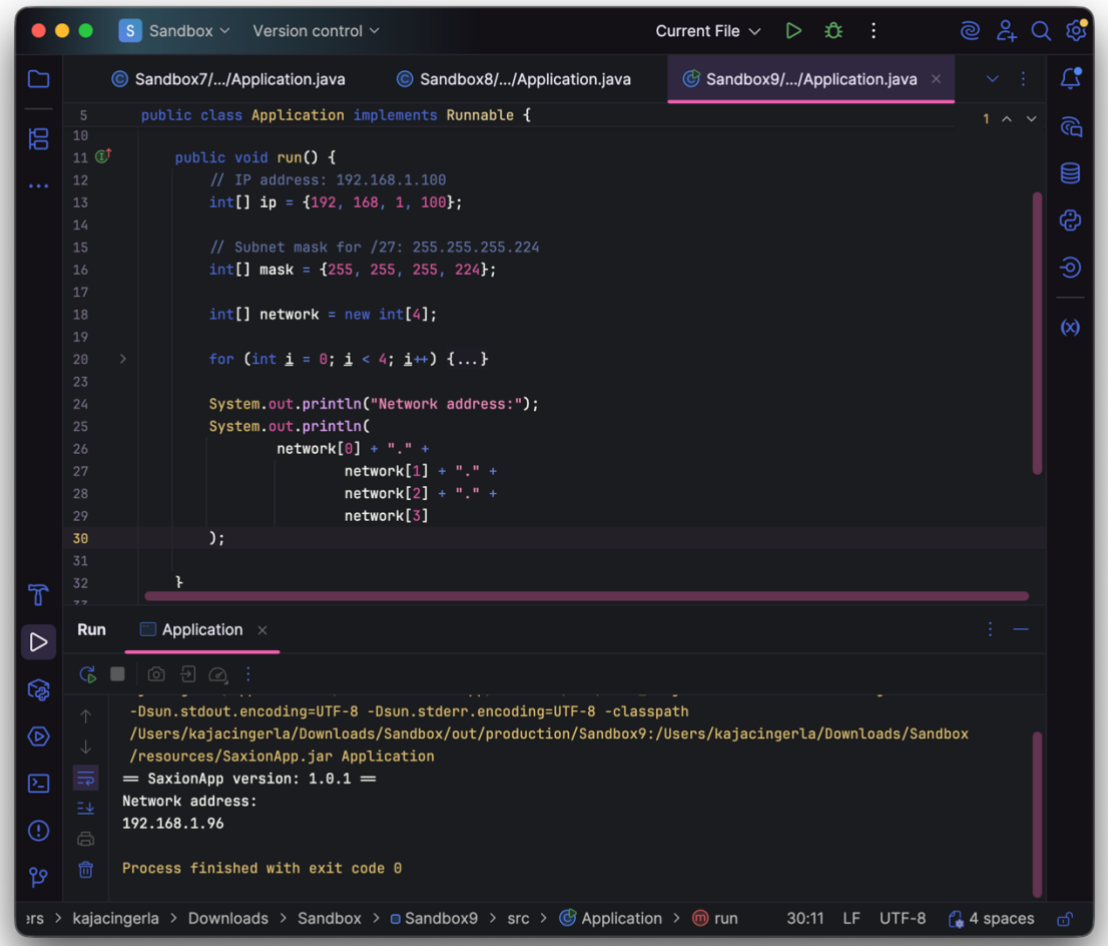
Assignment 6.5: Network segment

Remember that bitwise java application you've made in week 2? Expand that application so that you can also calculate a network segment as explained in the PowerPoint slides of week 6. Use the bitwise & AND operator. You need to be able to input two Strings. An IP address and a subnet.

IP: 192.168.1.100 and subnet: 255.255.255.224 for /27

```
Example: 192.168.1.100/27
Calculate the network segment
IP Address:   11000000.10101000.00000001.01100100
Subnet Mask:  11111111.11111111.11111111.11100000
-----------------------------------------------
Network Addr: 11000000.10101000.00000001.01100000

This gives 192.168.1.96 in decimal as the network address.
For a /27 subnet, each segment (or subnet) has 32 IP addresses (2^5).
The range of this network segment is from 192.168.1.96 to 192.168.1.127.
```

Paste source code here, with a screenshot of a working application.



Ready? Save this file and export it as a pdf file with the name: **week6.pdf**