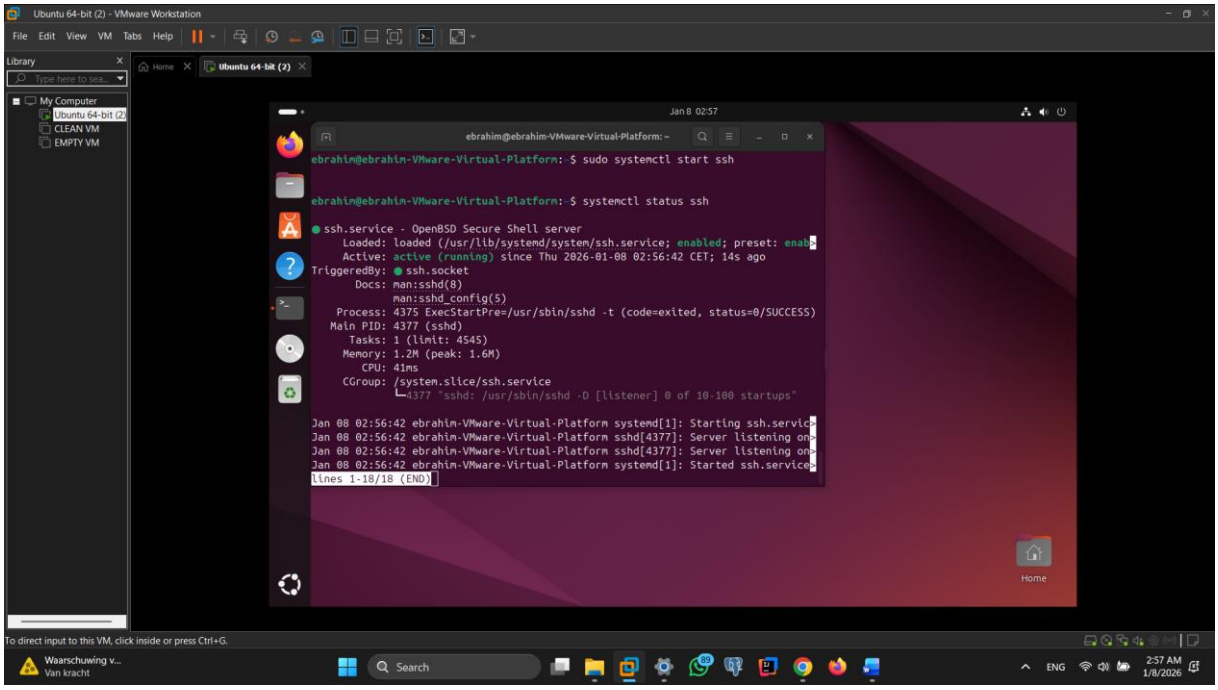
Template Week 6 – Networking

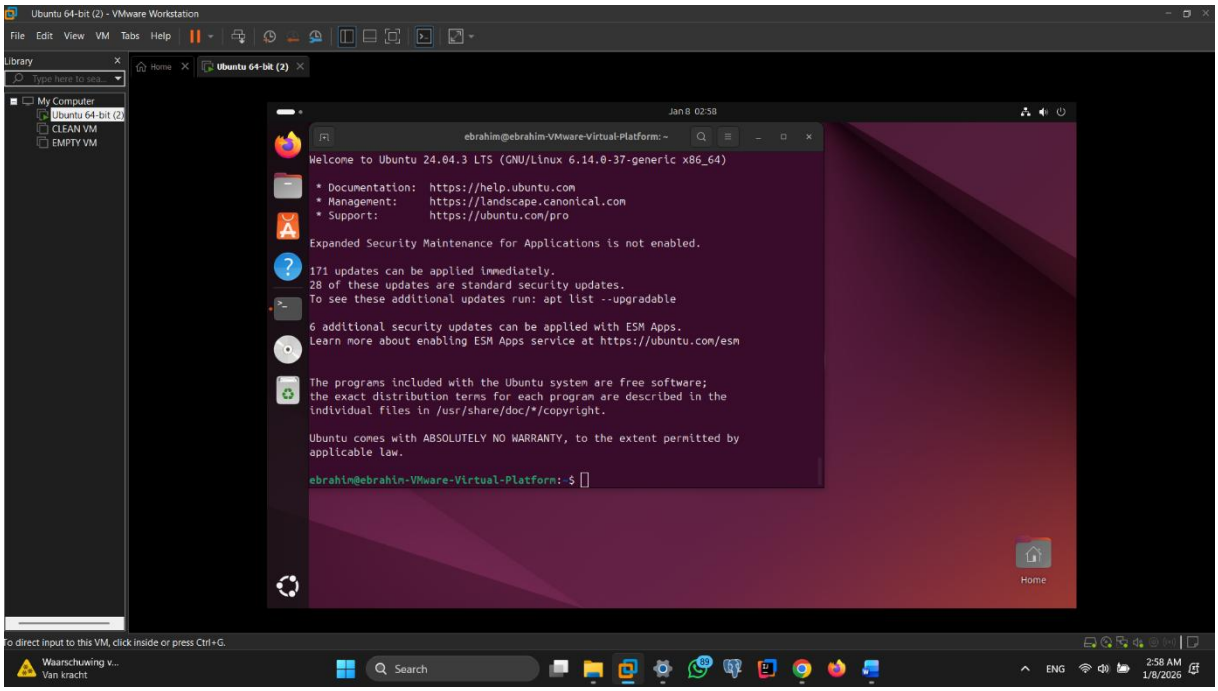
Student number: 546746

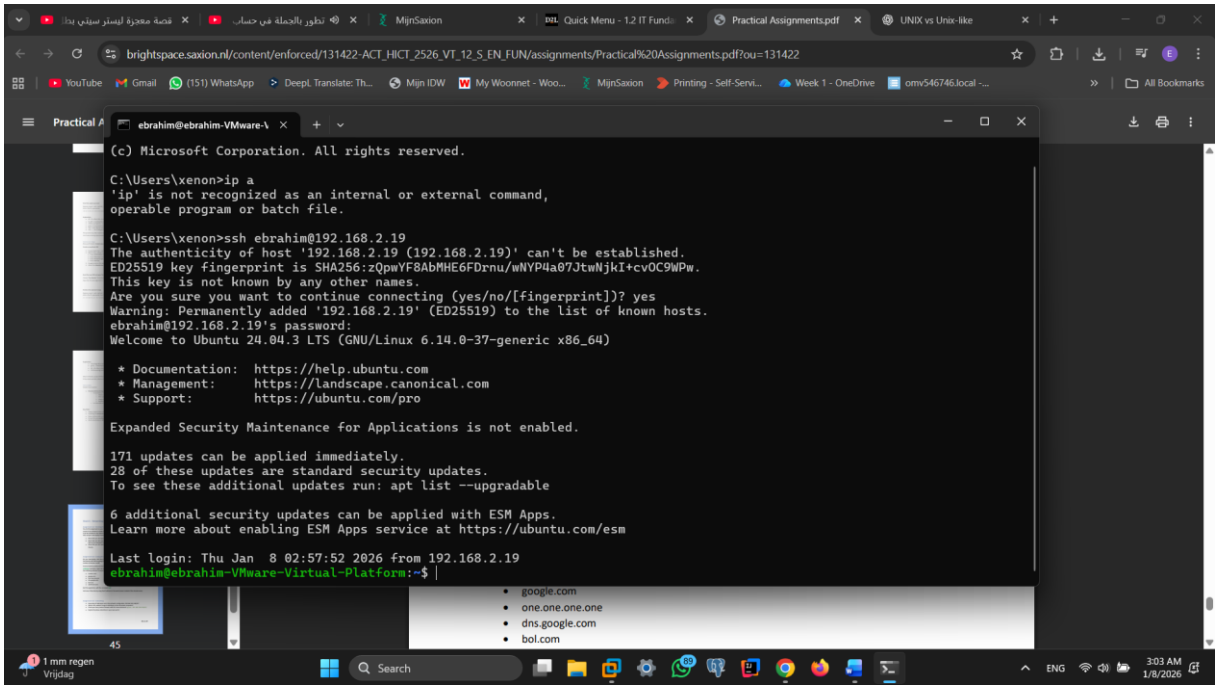
Assignment 6.1: Working from home

Screenshot installation openssh-server:

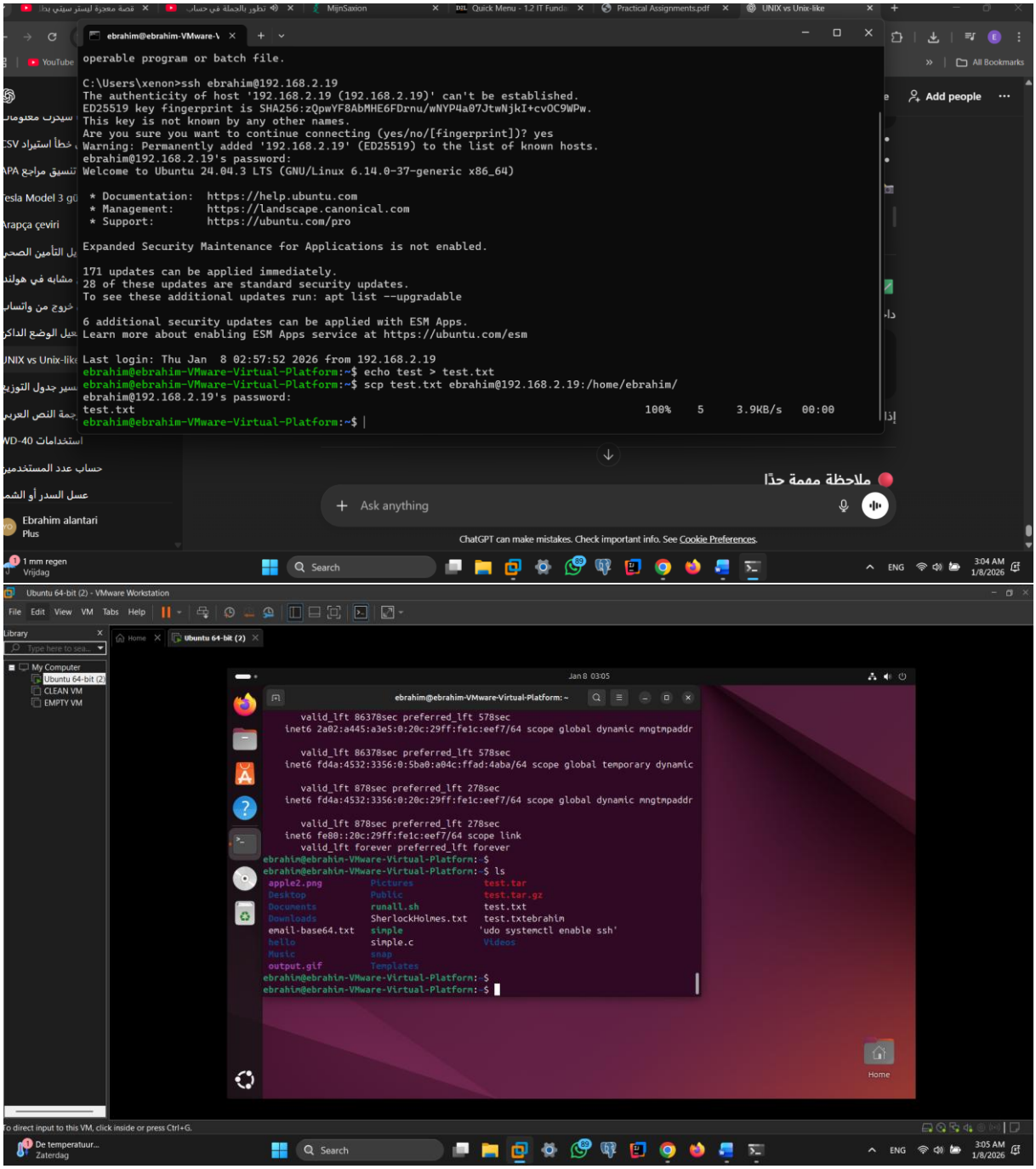


Screenshot successful SSH command execution:

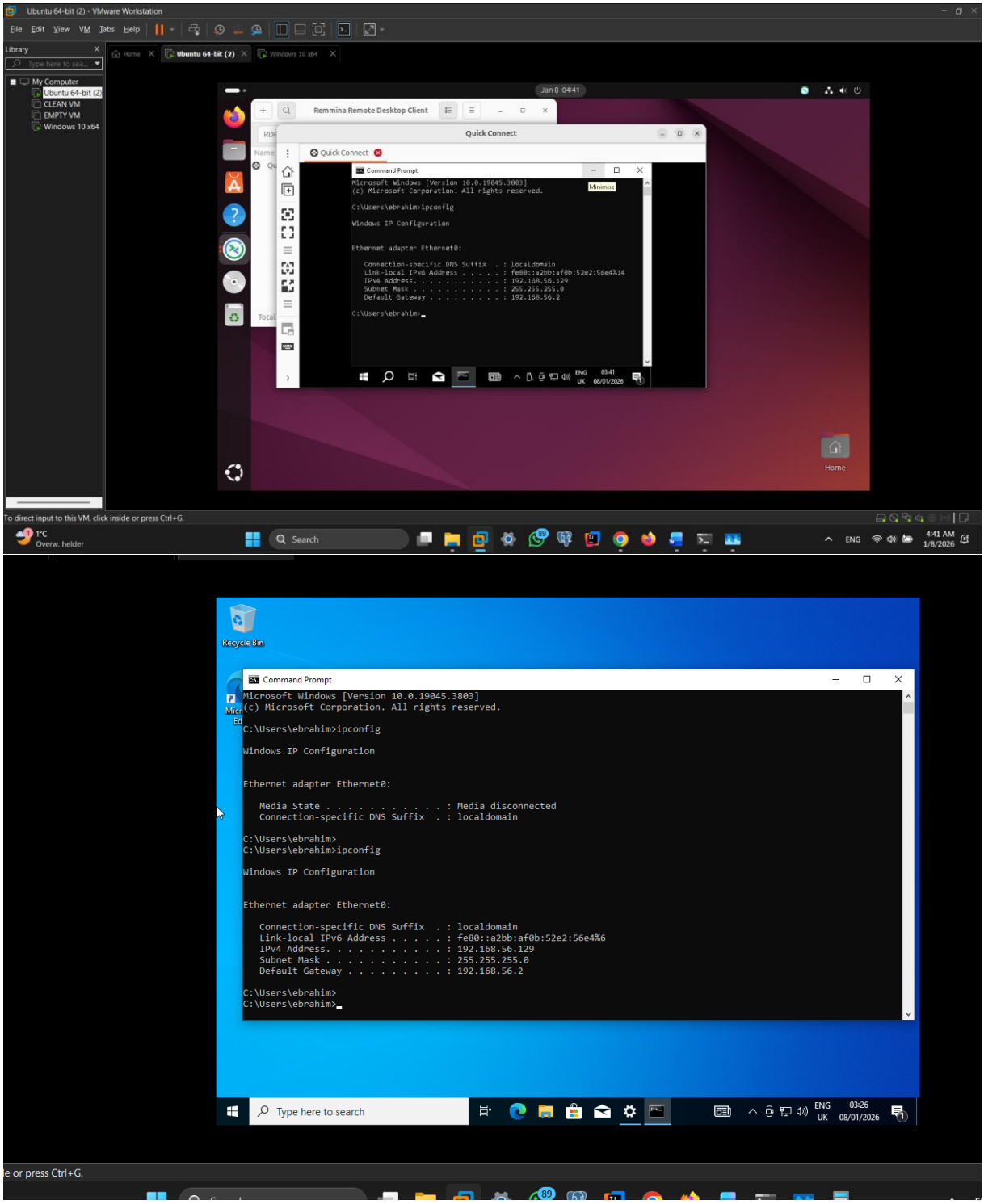


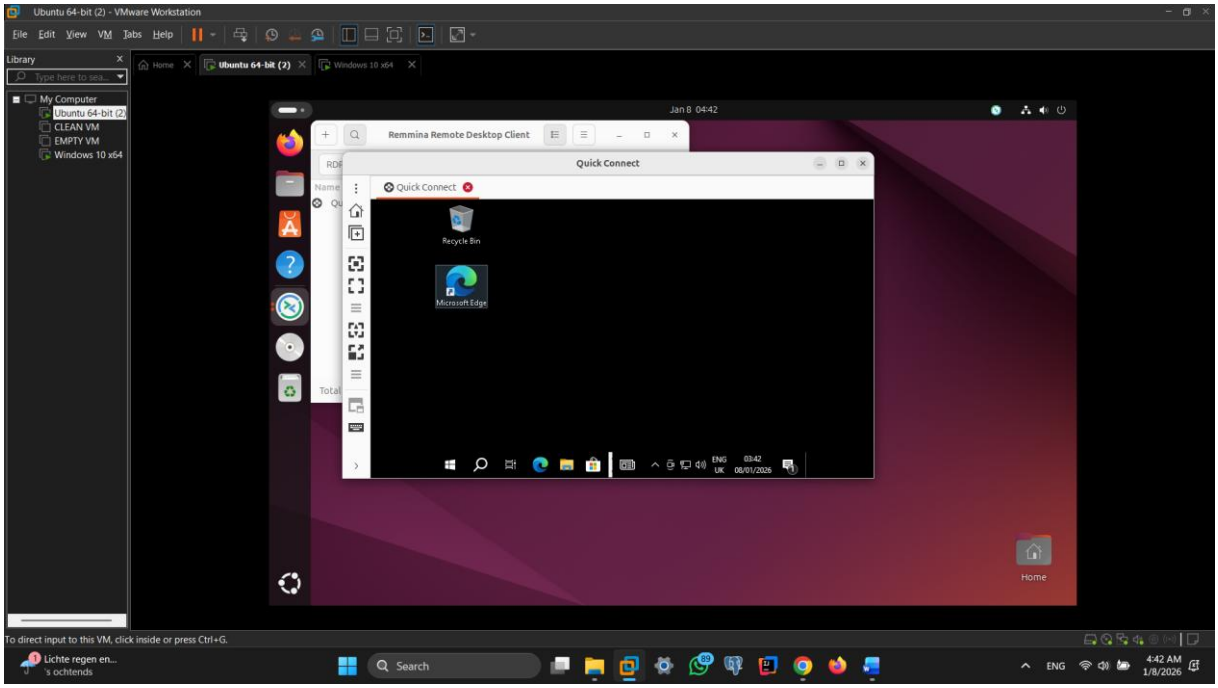


Screenshot successful execution SCP command:



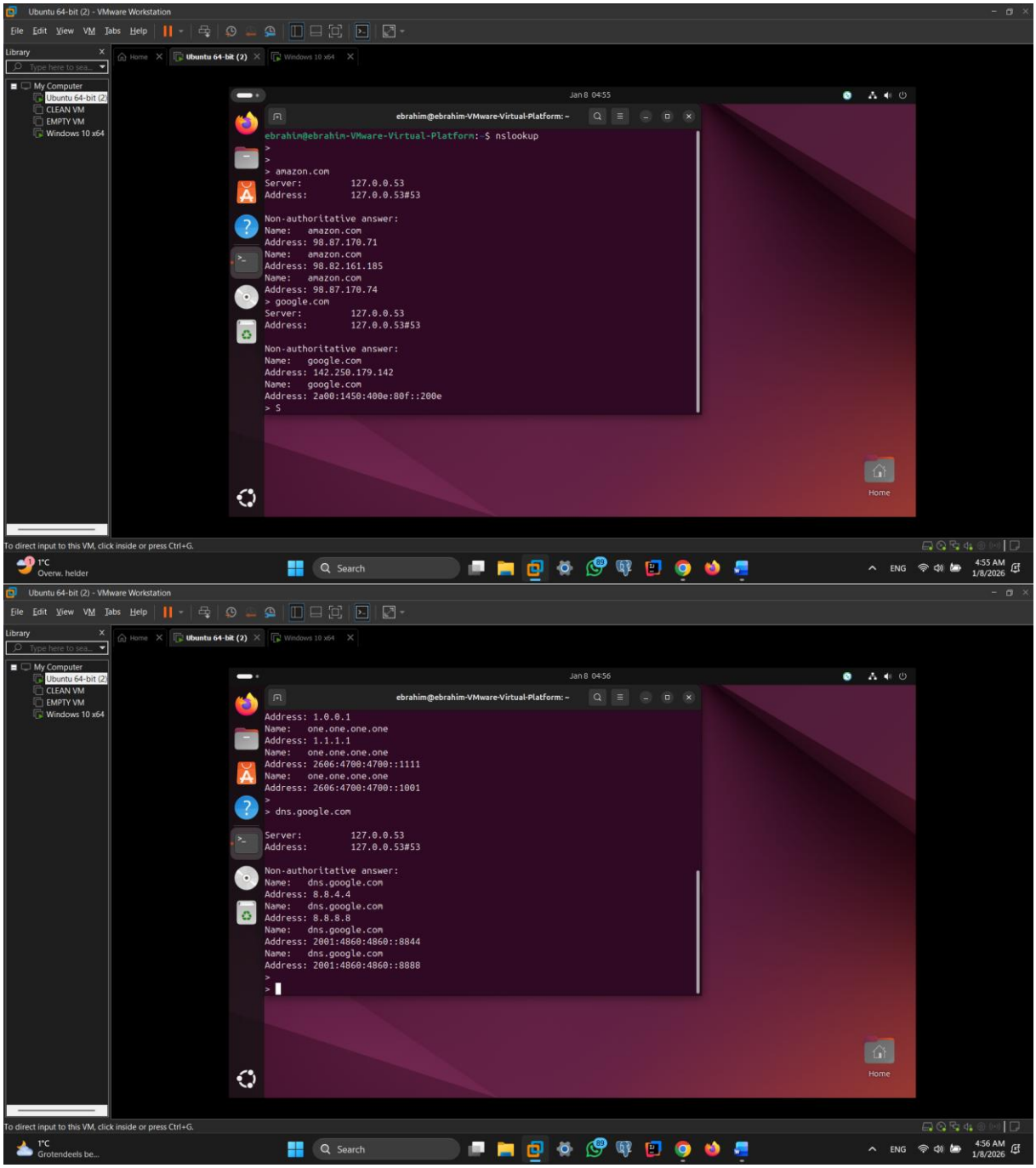
Screenshot remmina:


Ubuntu 64-bit (2) - VMware Workstation
Remmina Remote Desktop Client
Quick Connect
Command Prompt
Microsoft Windows [Version 10.0.19045.3803]
(c) Microsoft Corporation. All rights reserved.
C:\Users\ebrahim>ipconfig
Windows IP Configuration
Ethernet adapter Ethernet0:
Connection-specific DNS Suffix . : localdomain
Link-local IPv6 Address . . . . . : fe80::a2bb:af0b:52e2:56e4%14
IPv4 Address. . . . . : 192.168.56.129
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.56.2
C:\Users\ebrahim>
Recycle Bin
Command Prompt
Microsoft Windows [Version 10.0.19045.3803]
(c) Microsoft Corporation. All rights reserved.
C:\Users\ebrahim>ipconfig
Windows IP Configuration
Ethernet adapter Ethernet0:
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . : localdomain
C:\Users\ebrahim>
C:\Users\ebrahim>ipconfig
Windows IP Configuration
Ethernet adapter Ethernet0:
Connection-specific DNS Suffix . : localdomain
Link-local IPv6 Address . . . . . : fe80::a2bb:af0b:52e2:56e4%6
IPv4 Address. . . . . : 192.168.56.129
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.56.2
C:\Users\ebrahim>
C:\Users\ebrahim>
Type here to search
ENG
UK
03:26
08/01/2026

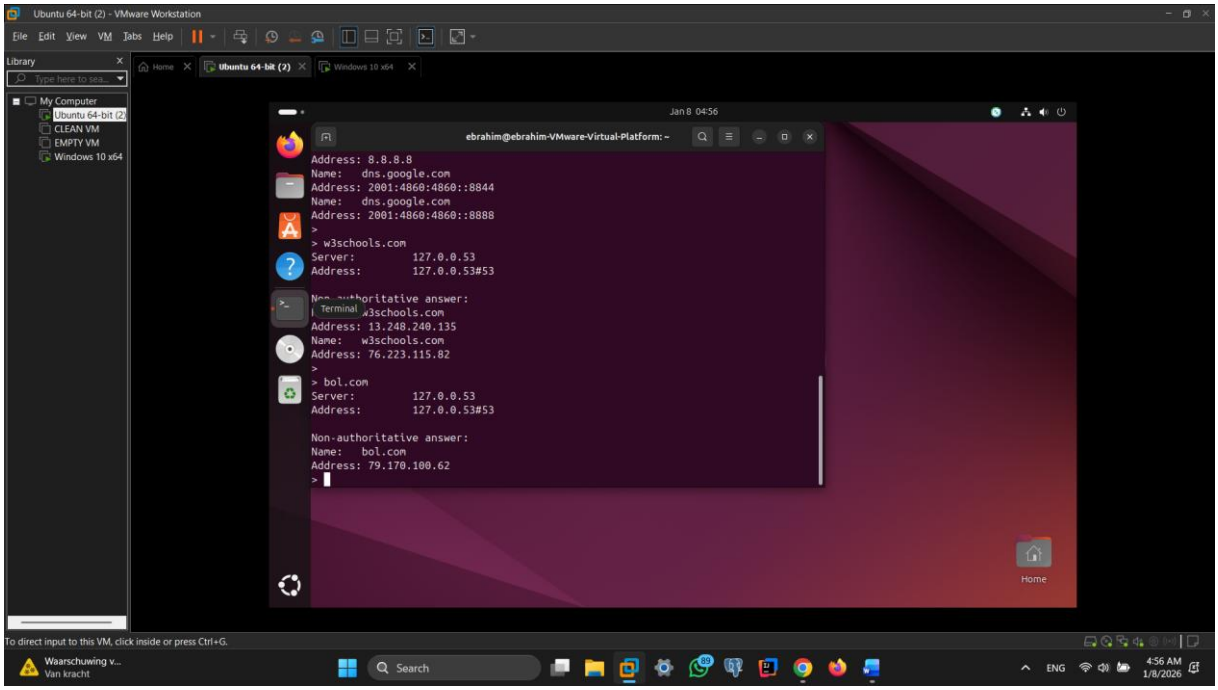


Assignment 6.2: IP addresses websites

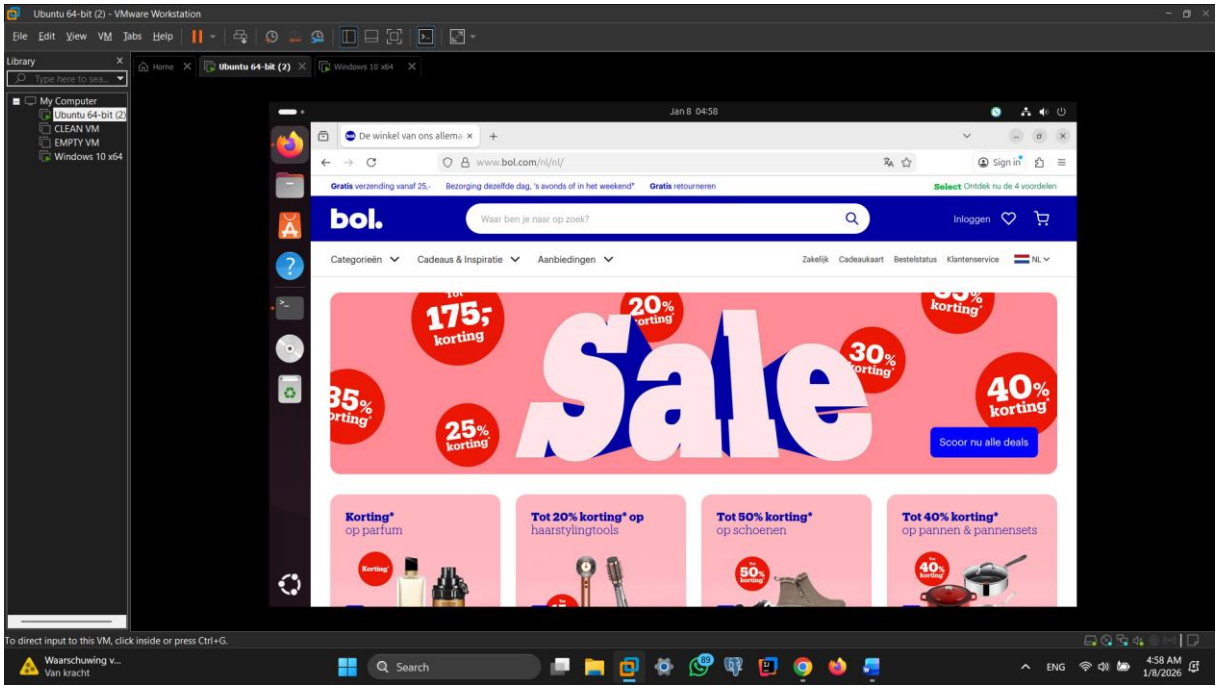
Relevant screenshots nslookup command:


Ubuntu 64-bit (2) - VMware Workstation
File Edit View VM Tabs Help
Library
My Computer
Ubuntu 64-bit (2)
CLEAN VM
EMPTY VM
Windows 10 x64
Home
Ubuntu 64-bit (2)
Windows 10 x64
Jan 8 04:55
ebrahim@ebrahim-VMware-Virtual-Platform: ~
ebrahim@ebrahim-VMware-Virtual-Platform:~$ nslookup
> amazon.com
Server: 127.0.0.53
Address: 127.0.0.53#53
Non-authoritative answer:
Name: amazon.com
Address: 98.87.170.71
Name: amazon.com
Address: 98.82.161.185
Name: amazon.com
Address: 98.87.170.74
> google.com
Server: 127.0.0.53
Address: 127.0.0.53#53
Non-authoritative answer:
Name: google.com
Address: 142.250.179.142
Name: google.com
Address: 2a00:1450:400e:80f::200e
> S
Home
To direct input to this VM, click inside or press Ctrl+G.
1°C
Overw. helder
Search
ENG
4:55 AM
1/8/2026

Ubuntu 64-bit (2) - VMware Workstation
File Edit View VM Tabs Help
Library
My Computer
Ubuntu 64-bit (2)
CLEAN VM
EMPTY VM
Windows 10 x64
Home
Ubuntu 64-bit (2)
Windows 10 x64
Jan 8 04:56
ebrahim@ebrahim-VMware-Virtual-Platform: ~
Address: 1.0.0.1
Name: one.one.one.one
Address: 1.1.1.1
Name: one.one.one.one
Address: 2606:4700:4700::1111
Name: one.one.one.one
Address: 2606:4700:4700::1001
> dns.google.com
Server: 127.0.0.53
Address: 127.0.0.53#53
Non-authoritative answer:
Name: dns.google.com
Address: 8.8.4.4
Name: dns.google.com
Address: 8.8.8.8
Name: dns.google.com
Address: 2001:4860:4860::8844
Name: dns.google.com
Address: 2001:4860:4860::8888
Home
To direct input to this VM, click inside or press Ctrl+G.
1°C
Grotendeels be...
Search
ENG
4:56 AM
1/8/2026



Screenshot website visit via IP address:



Assignment 6.3: subnetting

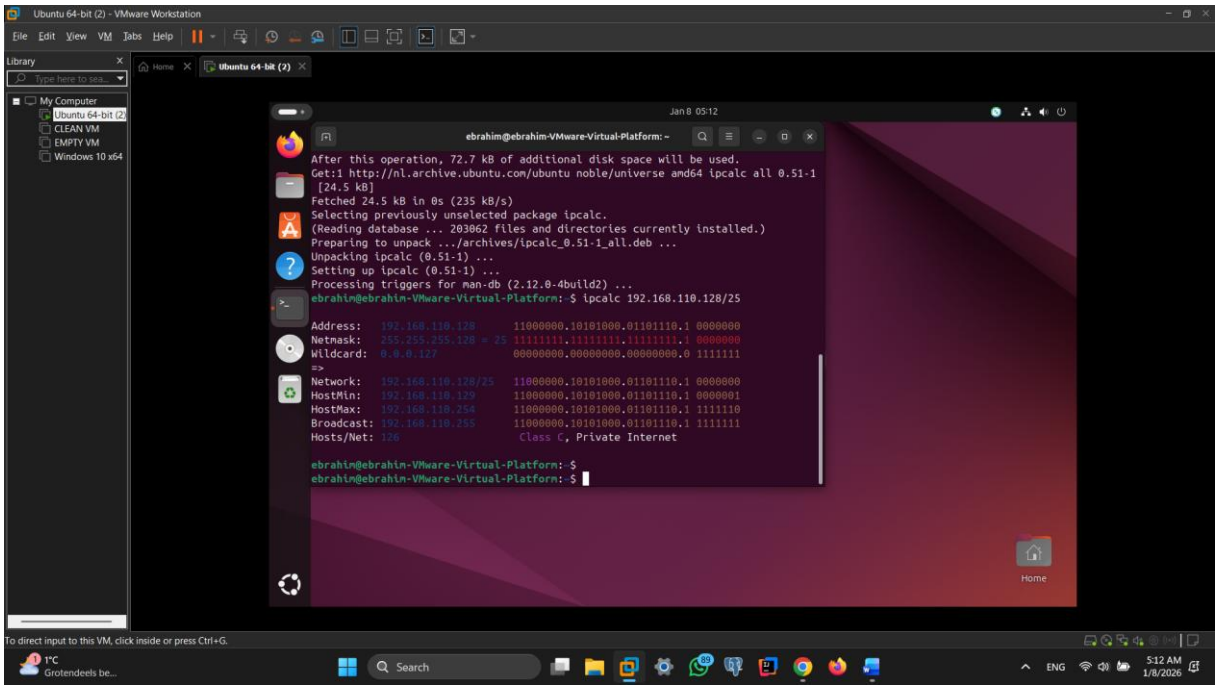
How many IP addresses are in this network configuration 192.168.110.128/25?

The network 192.168.110.128/25 uses 25 bits for the network and 7 bits for hosts.
This results in $2^7 = 128$ total IP addresses.
The first address is the network address and the last address is the broadcast address, so they cannot be assigned to hosts

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

the usable IP range is from 192.168.110.129 to 192.168.110.254, providing 126 usable host addresses.

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

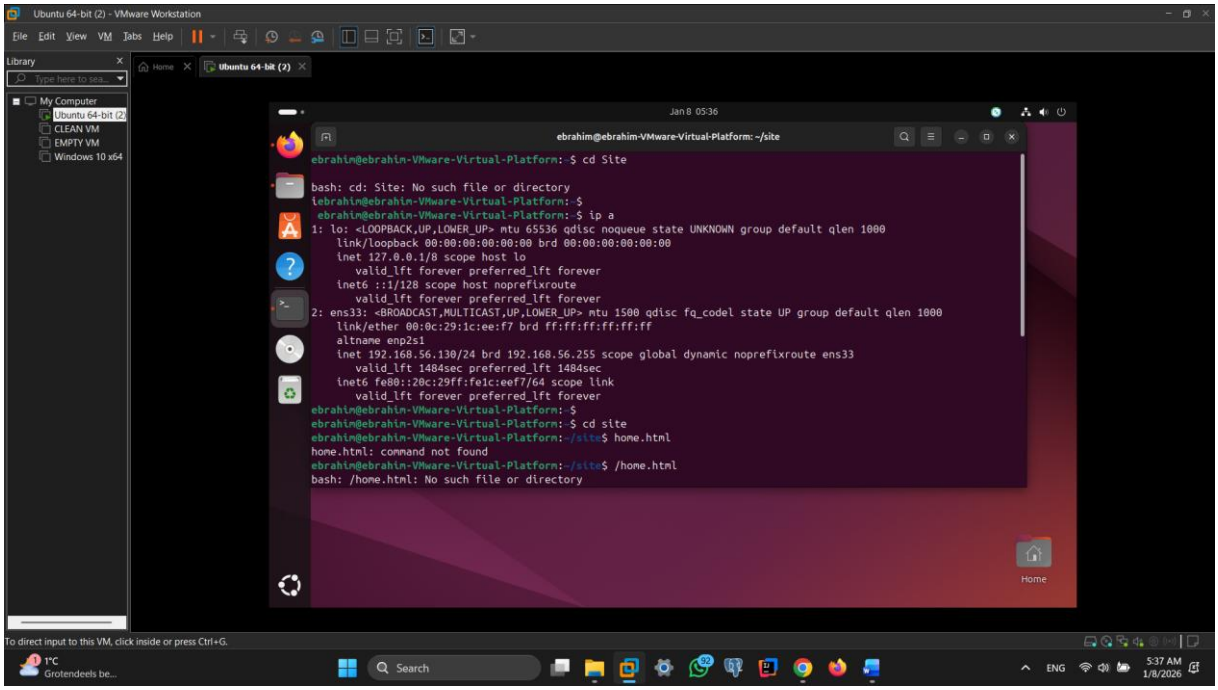


Explain the above calculation in your own words.

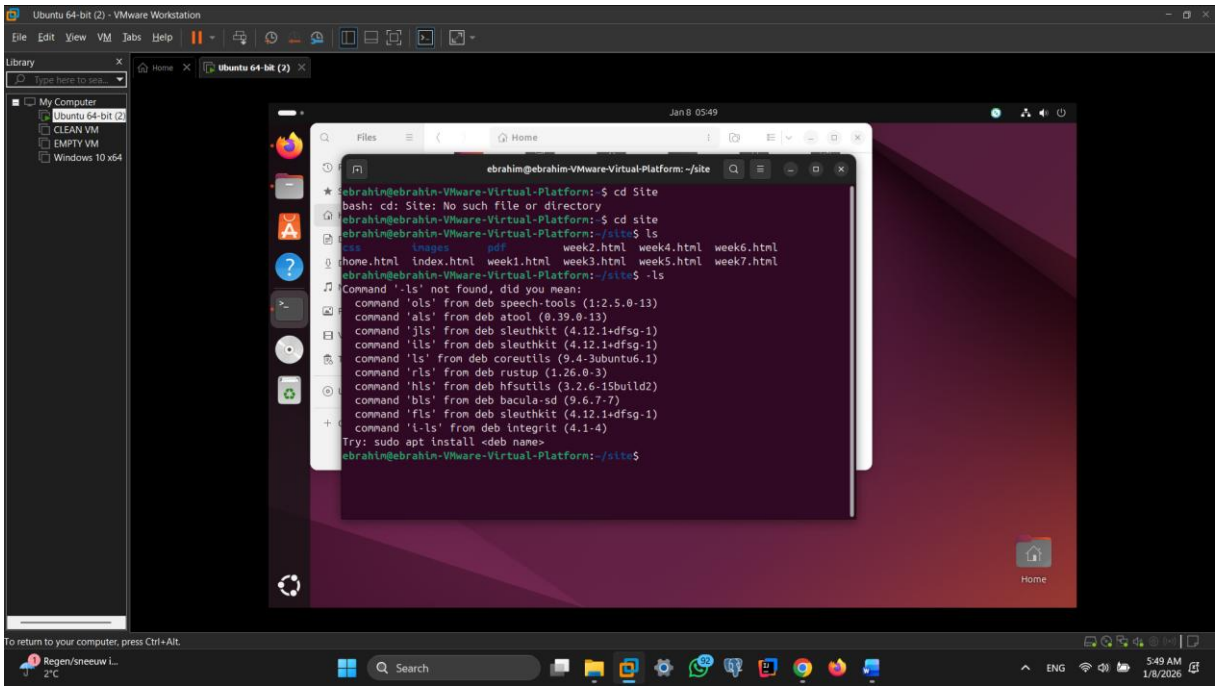
The first address is the **network address** and the last address is the **broadcast address**, so they cannot be used by devices.
This leaves **126 usable IP addresses**, ranging from **192.168.110.129 to 192.168.110.254**.
The result was confirmed using the **ipcalc** command.

Assignment 6.4: HTML

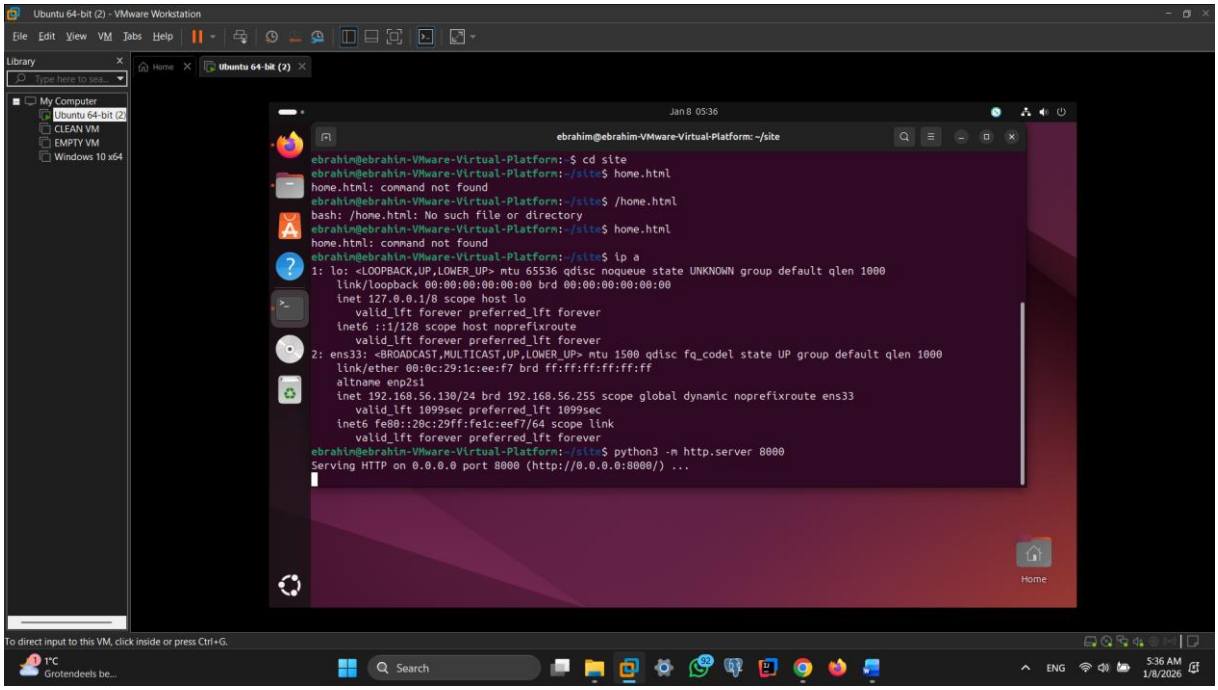
Screenshot IP address Ubuntu VM:



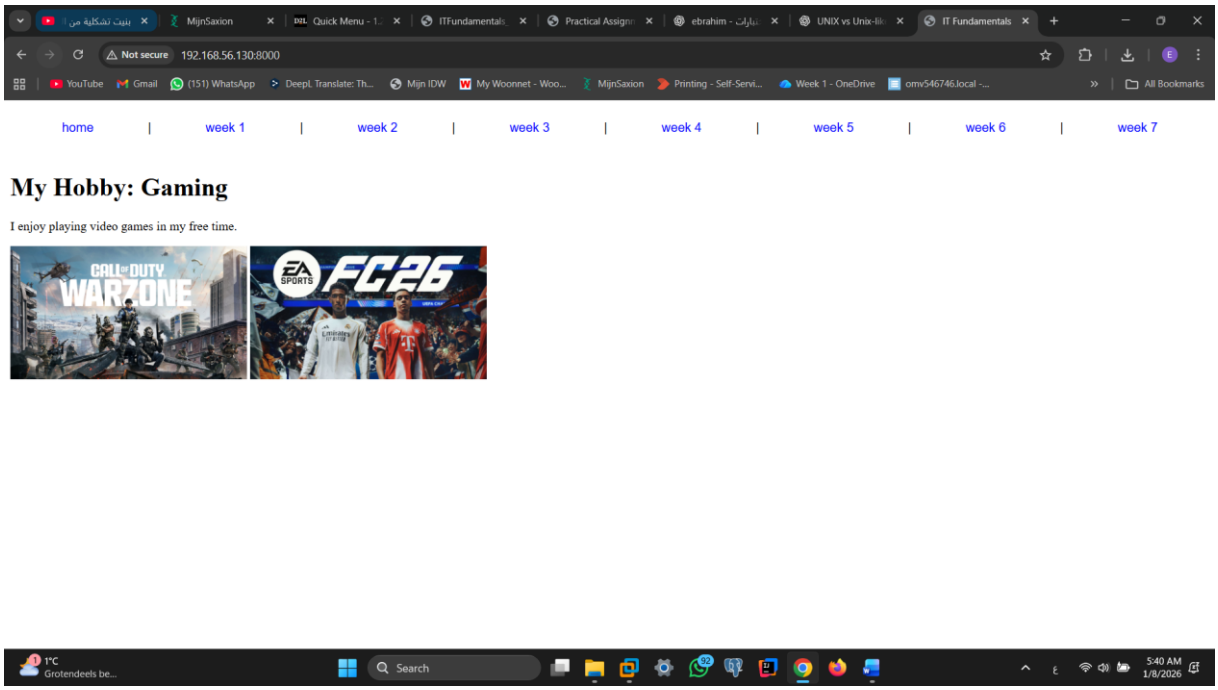
Screenshot of Site directory contents:



Screenshot python3 webserver command:



Screenshot web browser visits your site



Assignment 6.5: Network segment

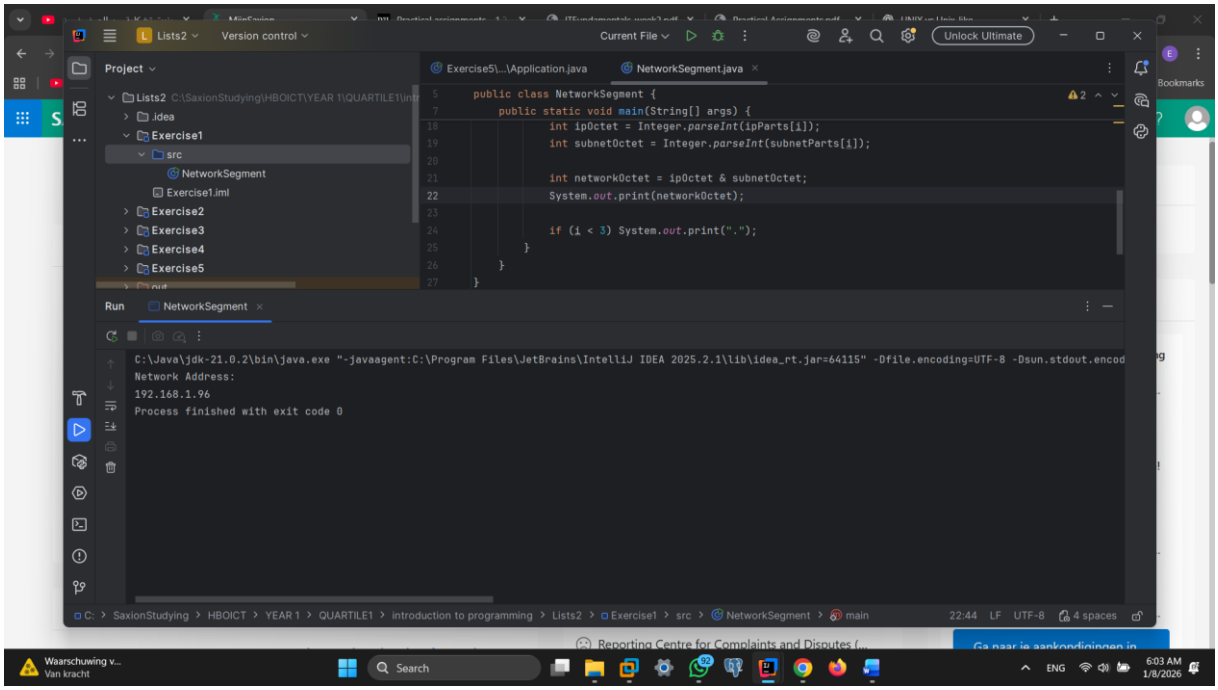
Remember that bitwise java application you've made in week 2? Expand that application so that you can also calculate a network segment as explained in the PowerPoint slides of week 6. Use the bitwise & AND operator. You need to be able to input two Strings. An IP address and a subnet.

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.

```
public class NetworkSegment {


   public static void main(String[] args) {


      String ip = "192.168.1.100";

      String subnet = "255.255.255.224";


      String[] ipParts = ip.split("\\.");

      String[] subnetParts =
subnet.split("\\.");


      System.out.println("Network
Address:");


      for (int i = 0; i < 4; i++) {

         int ipOctet =
Integer.parseInt(ipParts[i]);

         int subnetOctet =
Integer.parseInt(subnetParts[i]);
```



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