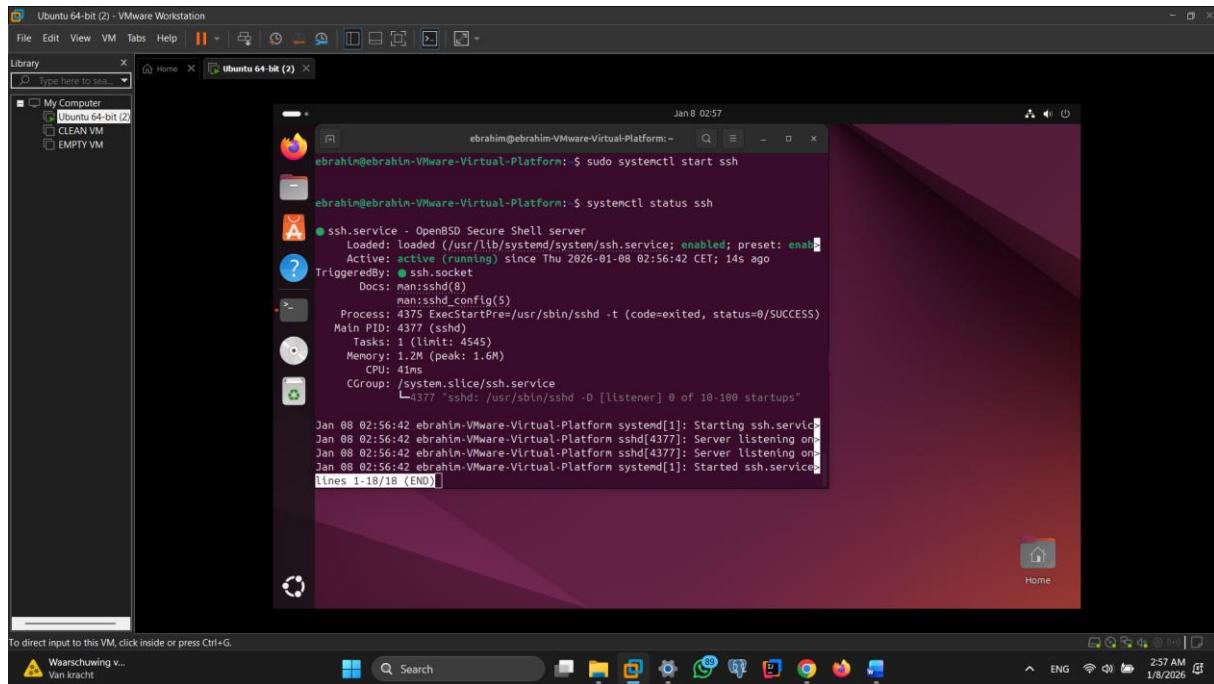


# Template Week 6 – Networking

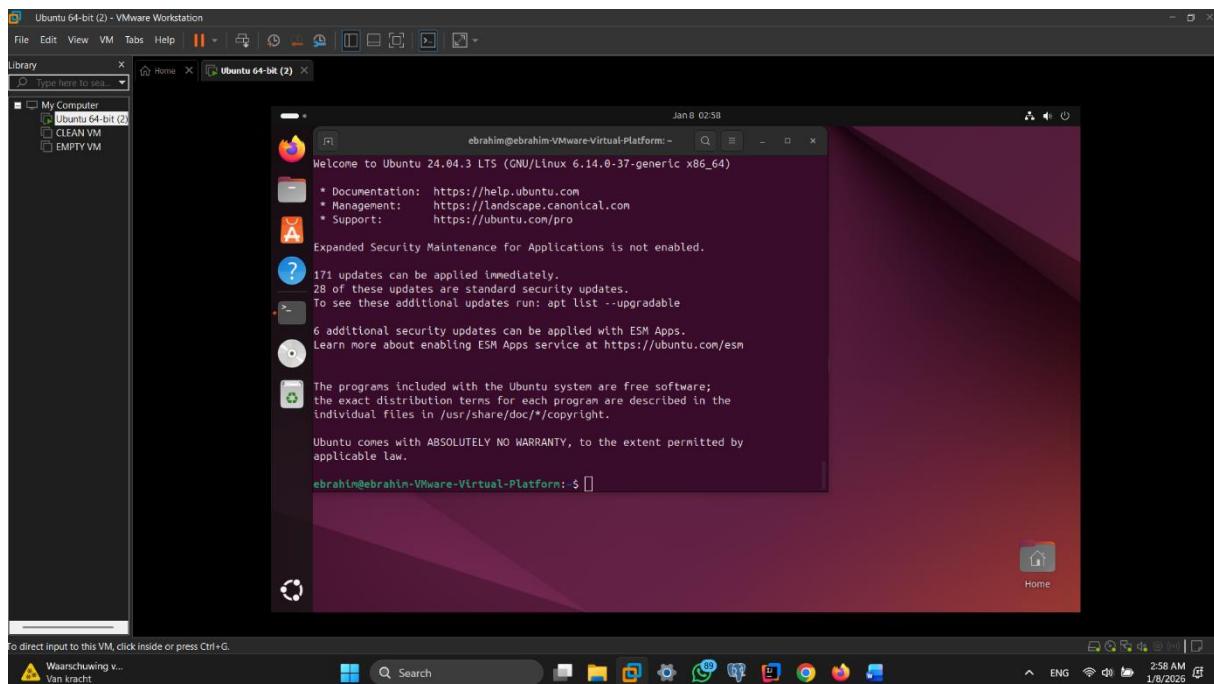
Student number: 546746

## Assignment 6.1: Working from home

Screenshot installation openssh-server:



Screenshot successful SSH command execution:



The screenshot shows a Linux desktop environment with a terminal window open. The terminal window title is 'Practical A' and the command being run is 'ip'. The output shows that 'ip' is not recognized as an internal or external command. Below this, an SSH session is established with a host at 192.168.2.19. The user 'ebrahim' logs in and is prompted for a password. The terminal then displays system updates information, including 171 immediate updates and 28 standard security updates. It also mentions ESM Apps and provides a link for enabling it. Finally, the user logs out with the message 'Last login: Thu Jan 8 02:57:52 2026 from 192.168.2.19'. The desktop bar at the bottom shows various icons and the date/time.

```
(c) Microsoft Corporation. All rights reserved.

C:\Users\xenon>ip
'ip' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\xenon>ssh ebrahim@192.168.2.19
The authenticity of host '192.168.2.19 (192.168.2.19)' can't be established.
ED25519 key fingerprint is SHA256:2QpwYF8AbMHE6FDmU/wNYP4a0TJ2wNjkI+cVOC9WPw.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.2.19' (ED25519) to the list of known hosts.
ebrahim@192.168.2.19's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-37-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/pro

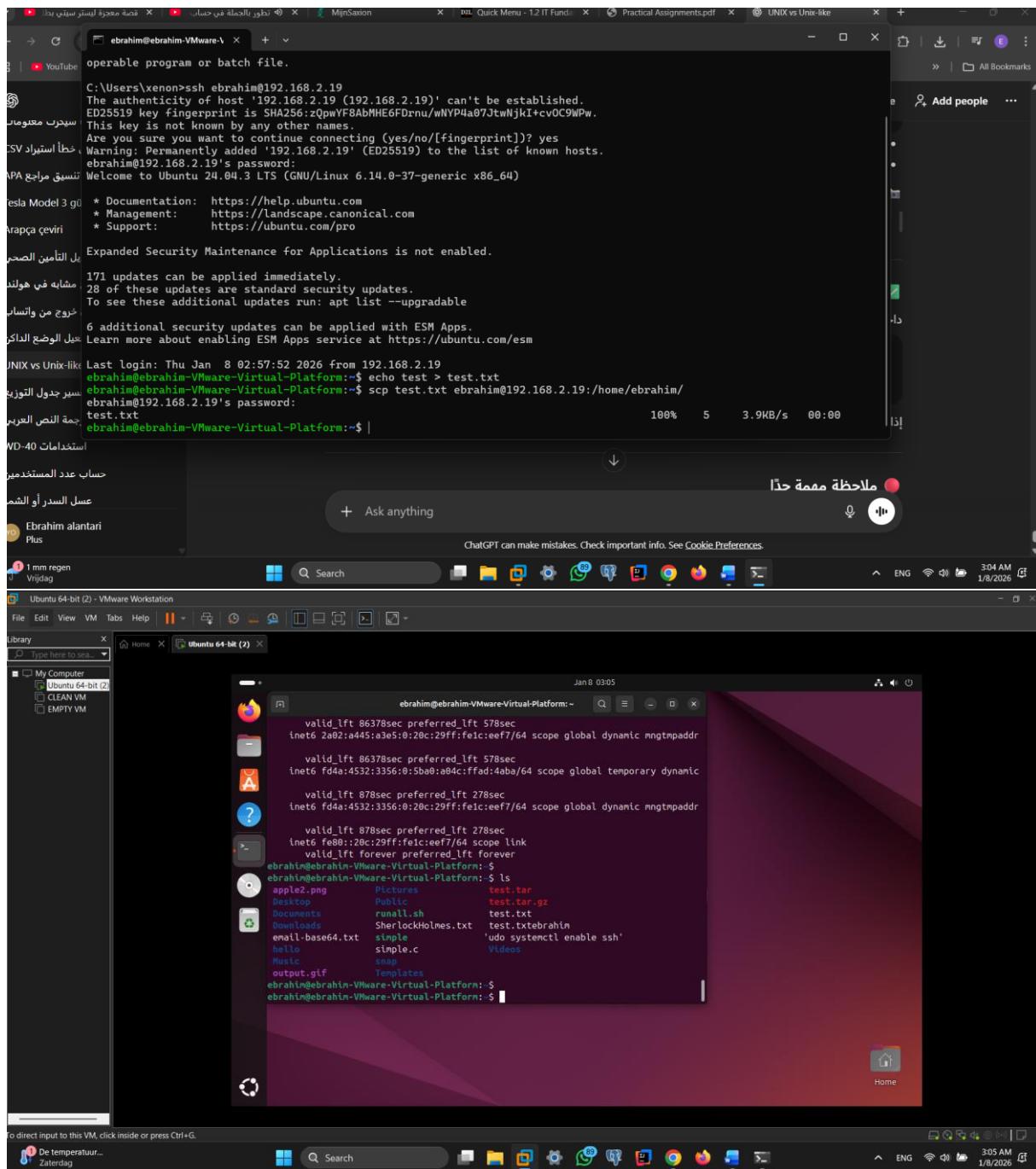
Expanded Security Maintenance for Applications is not enabled.

171 updates can be applied immediately.
28 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

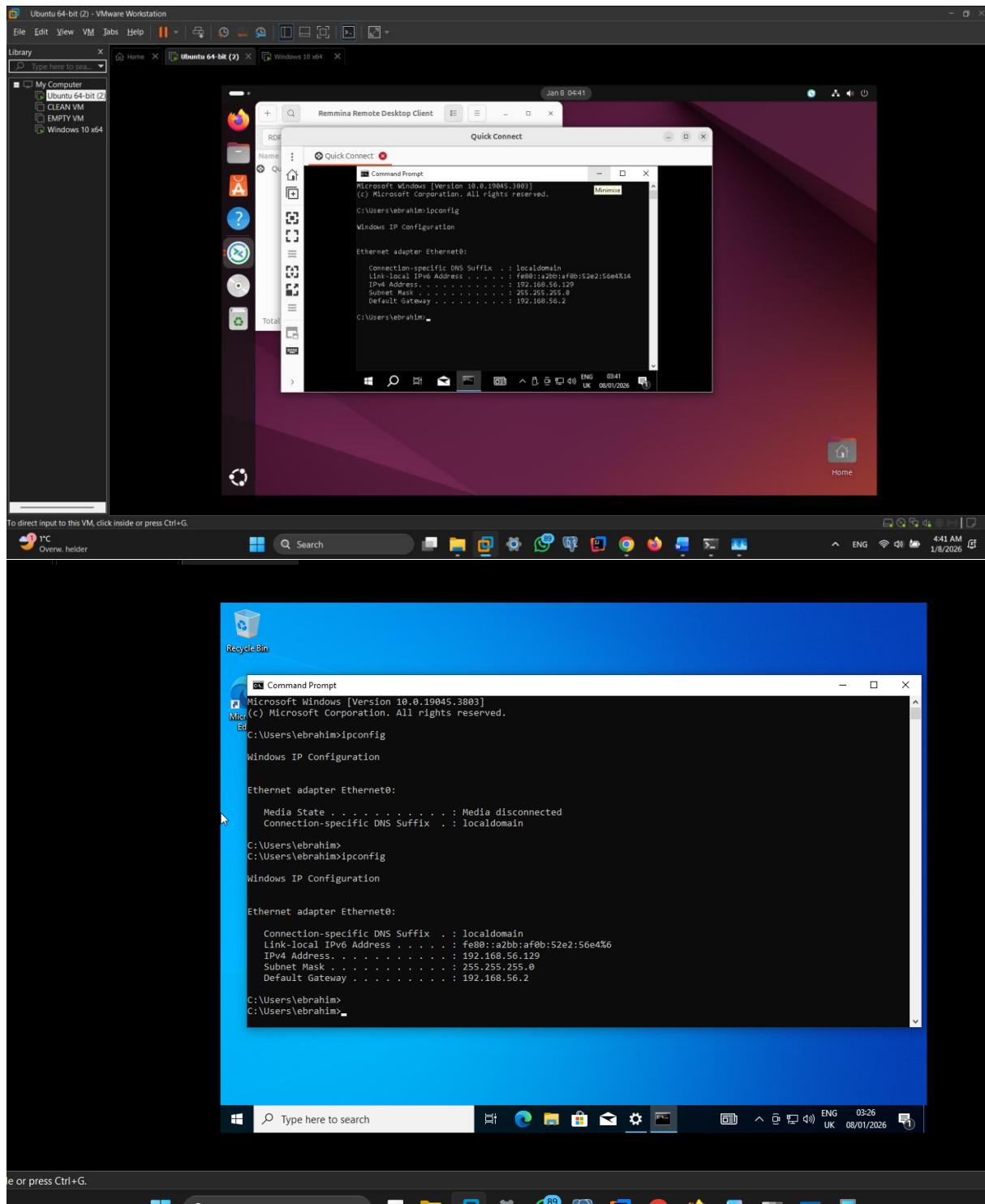
6 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

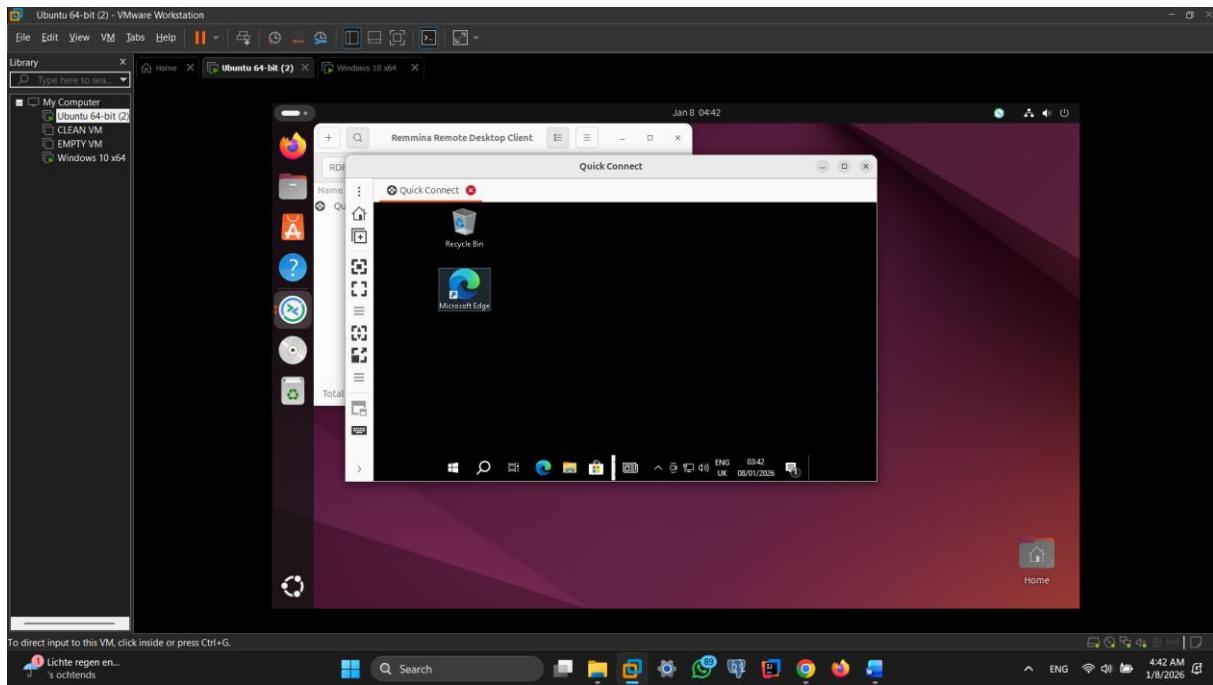
Last login: Thu Jan 8 02:57:52 2026 from 192.168.2.19
ebrahim@ebrahim-Virtual-Platform:~$ |
```

Screenshot successful execution SCP command:



Screenshot remmina:





## Assignment 6.2: IP addresses websites

Relevant screenshots nslookup command:

```
Ubuntu 64-bit (2) - VMware Workstation
File Edit View VM Tabs Help || Library Home Ubuntu 64-bit (2) Windows 10 x64

Jan 8 04:55
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: 98.87.178.71
Name: amazon.com
Address: 98.82.161.185
Name: amazon.com
Address: 98.87.178.74
> google.com
Server: 127.0.0.53
Address: 127.0.0.53#53

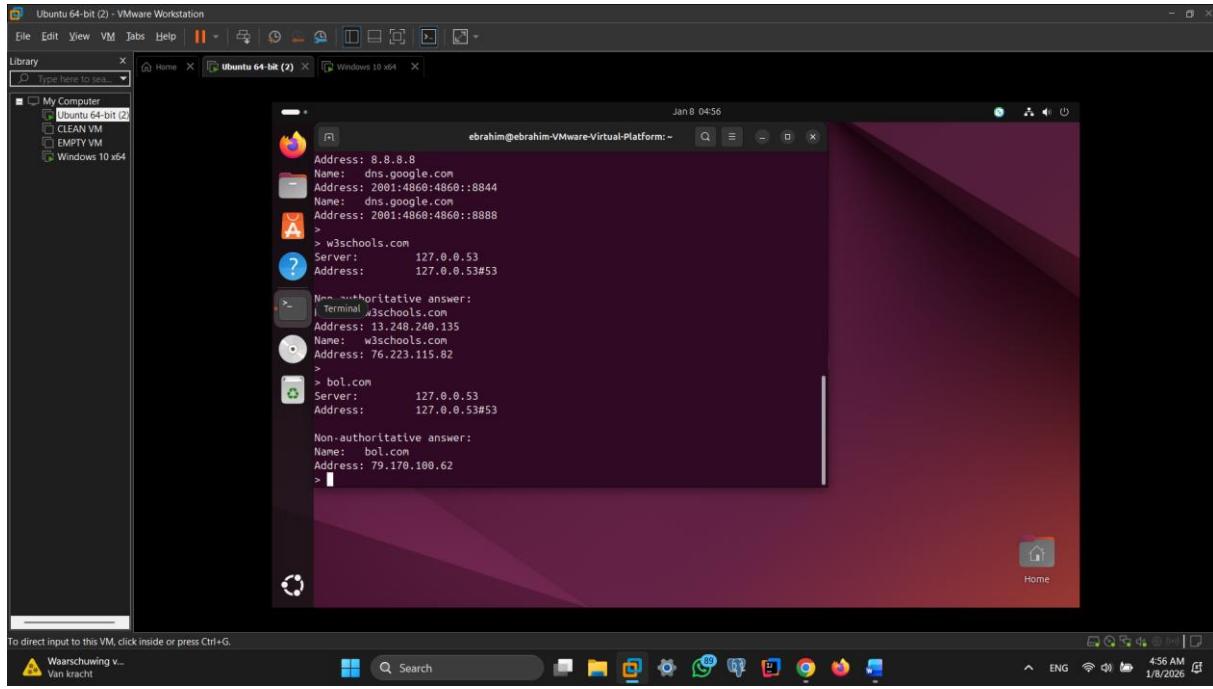
Non-authoritative answer:
Name: google.com
Address: 142.250.179.142
Name: google.com
Address: 2a00:1450:400e:80f::208e
> S

To direct input to this VM, click inside or press Ctrl+G.

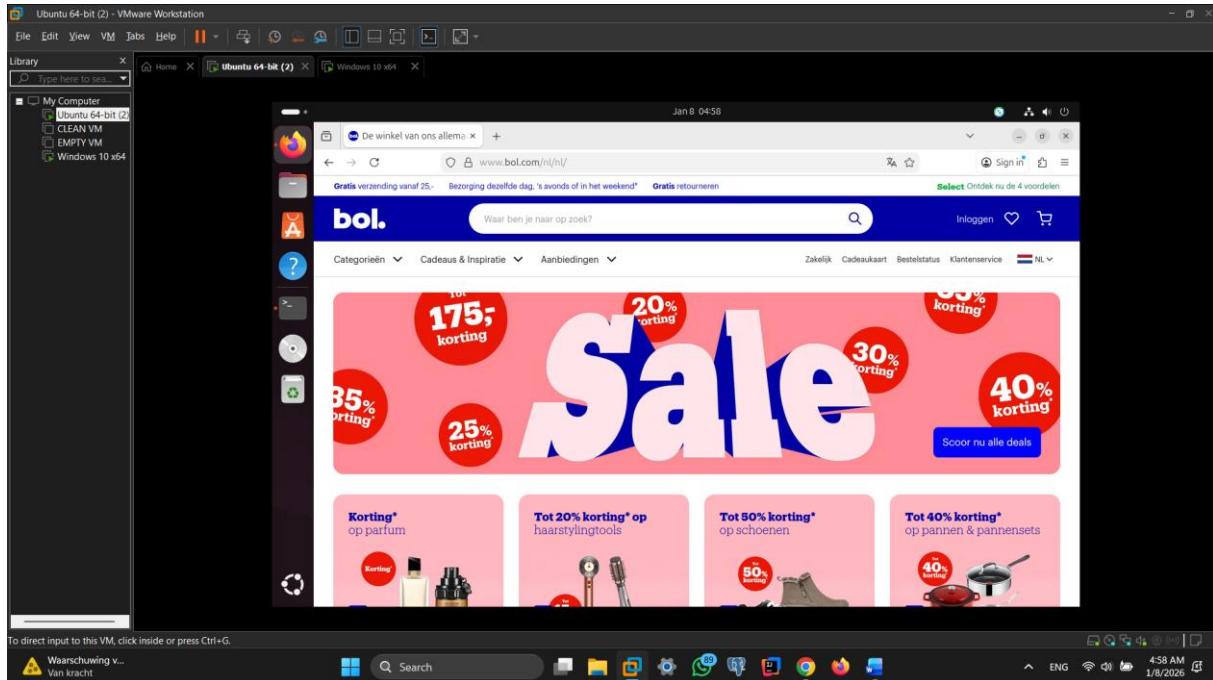
Ubuntu 64-bit (2) - VMware Workstation
File Edit View VM Tabs Help || Library Home Ubuntu 64-bit (2) Windows 10 x64

Jan 8 04:56
ebrahim@ebrahim-VMware-Virtual-Platform: ~ $ nslookup
Address: 1.0.0.1
Name: one.one.one.one
> 1.1.1.1
Address: 1.0.0.1
Name: one.one.one.one
> 2606:4700:4700::1111
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
> |
```



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.

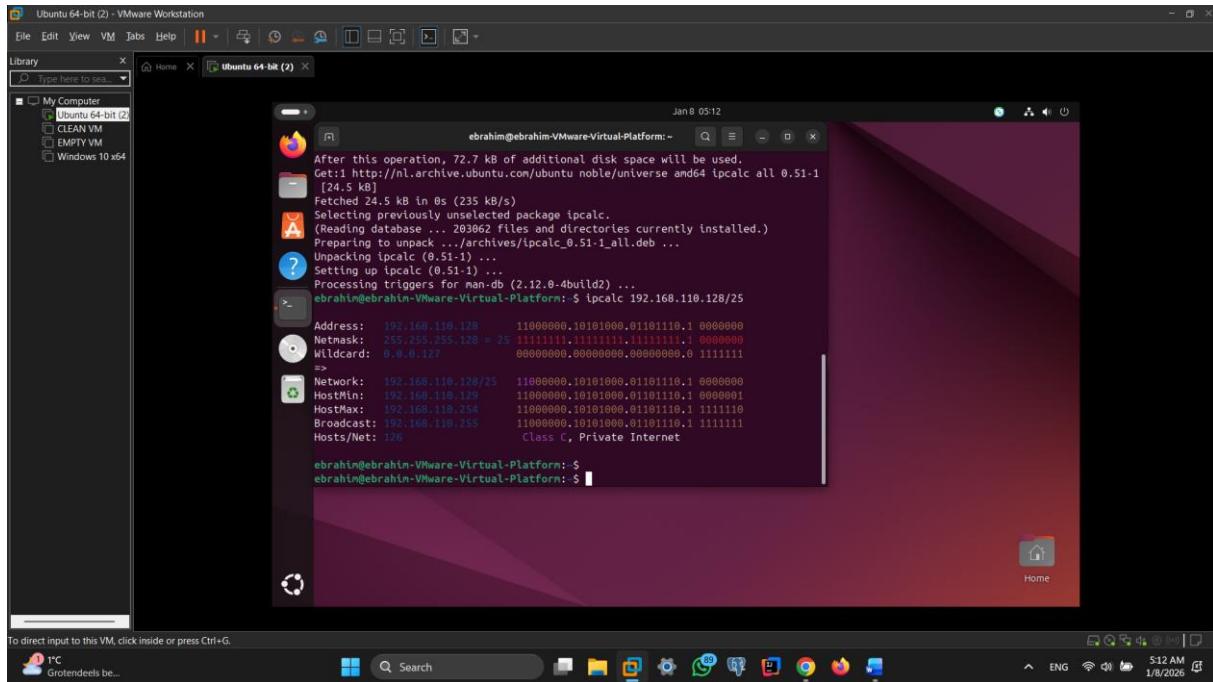
This results in  $2^7 = 128$  total IP addresses.

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.

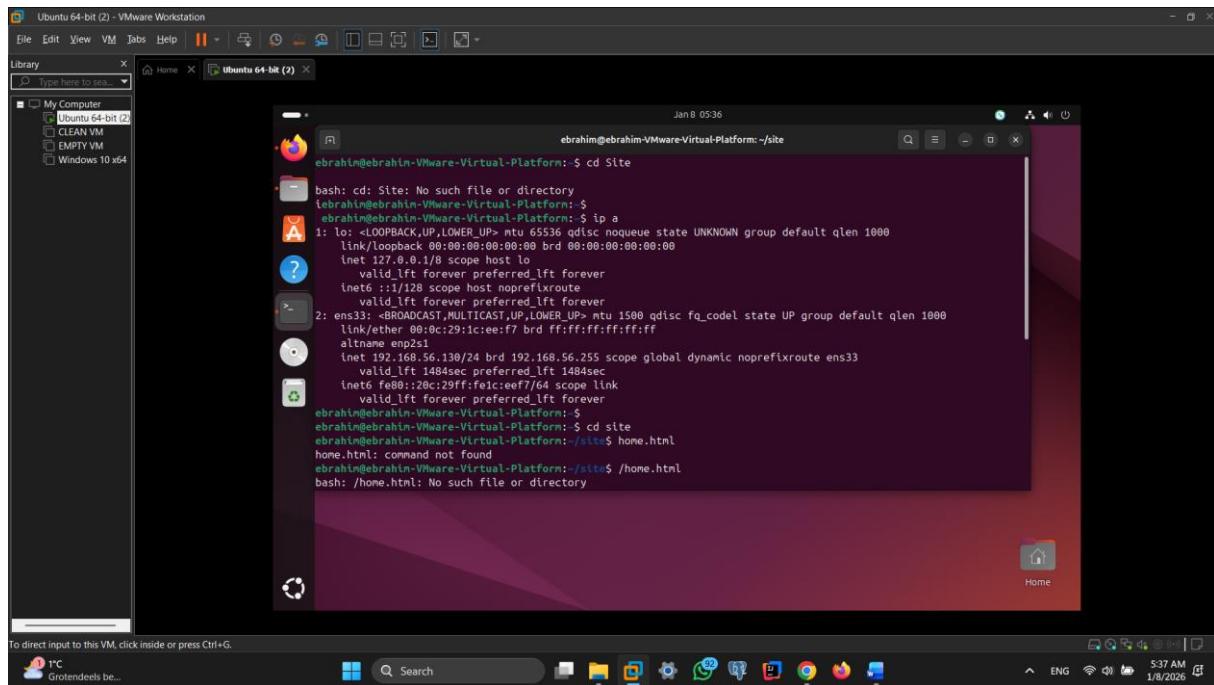
The first address is the **network address** and the last address is the **broadcast address**, so they cannot be used by devices.

This leaves **126 usable IP addresses**, ranging from **192.168.110.129** to **192.168.110.254**.

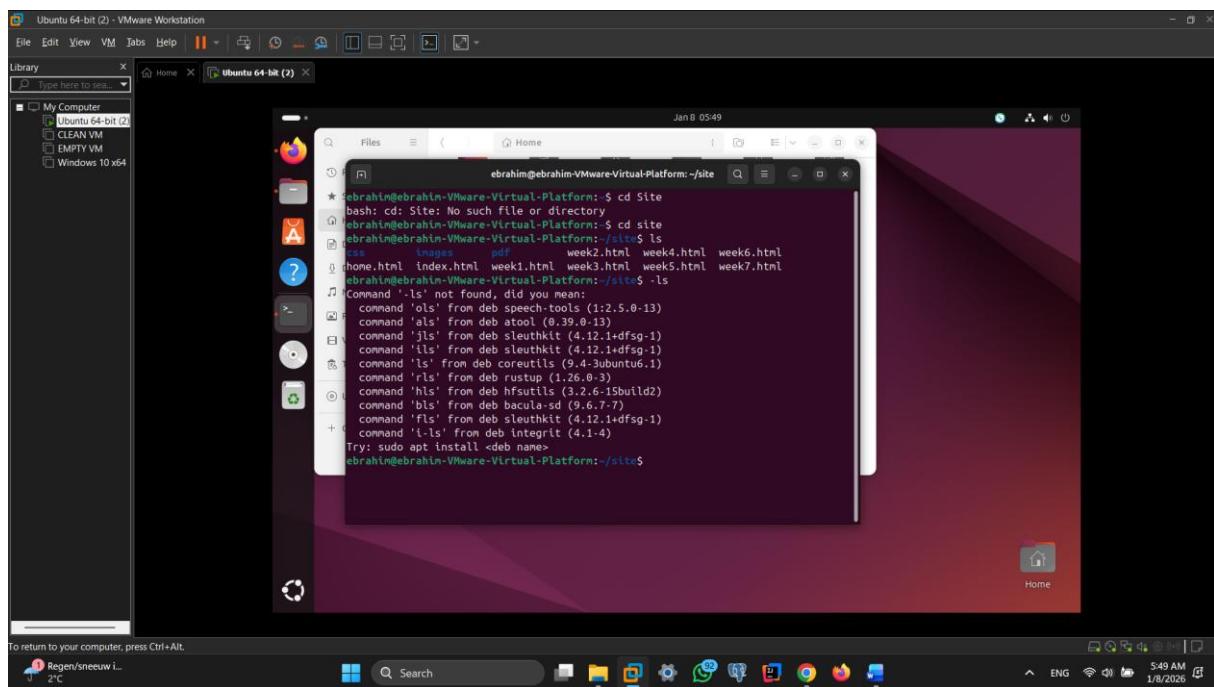
The result was confirmed using the **ipcalc** command.

#### Assignment 6.4: HTML

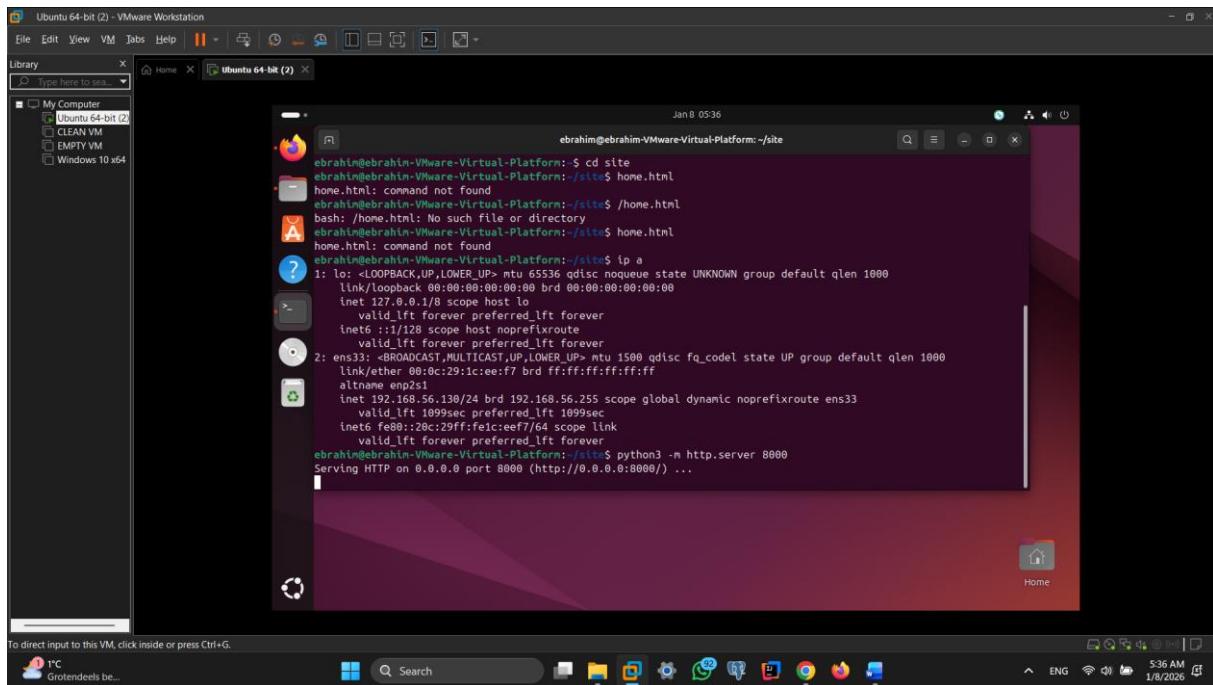
Screenshot IP address Ubuntu VM:



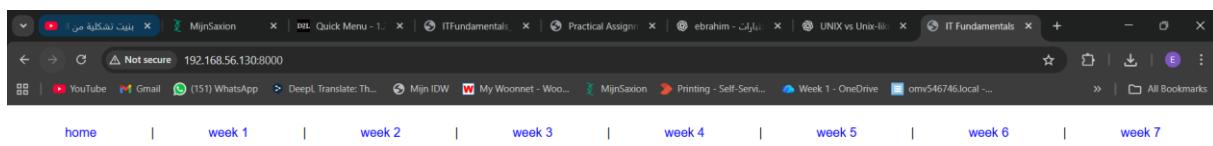
Screenshot of Site directory contents:



Screenshot python3 webserver command:



## Screenshot web browser visits your site



## My Hobby: Gaming

I enjoy playing video games in my free time.



## 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]);  
        }  
    }  
}
```

The screenshot shows the IntelliJ IDEA interface with the following details:

- Project View:** Shows a tree structure of projects and files. The current project is "Lists2" which contains "Exercise1", "src", and "NetworkSegment.java".
- Code Editor:** Displays the content of `NetworkSegment.java`. The code prints the network octet of an IP address.
- Run Tab:** Shows the command used to run the application: `C:\Java\jdk-21.0.2\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2025.2.1\lib\idea_rt.jar=64115" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8`.
- Output Tab:** Shows the output of the run: "Network Address: 192.168.1.96".
- System Bar:** Includes a warning icon for "Waarschuwing van kracht", the Windows Start button, a search bar, and system status icons.

Ready? Save this file and export it as a pdf file with the name: [week6.pdf](#)