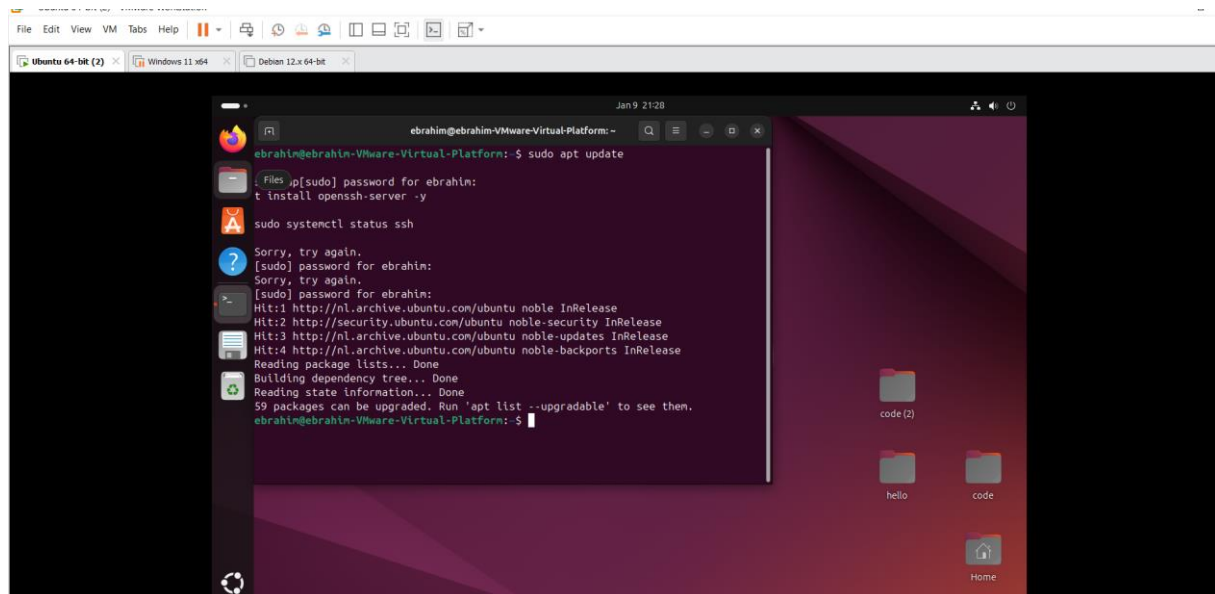


Template Week 6 – Networking

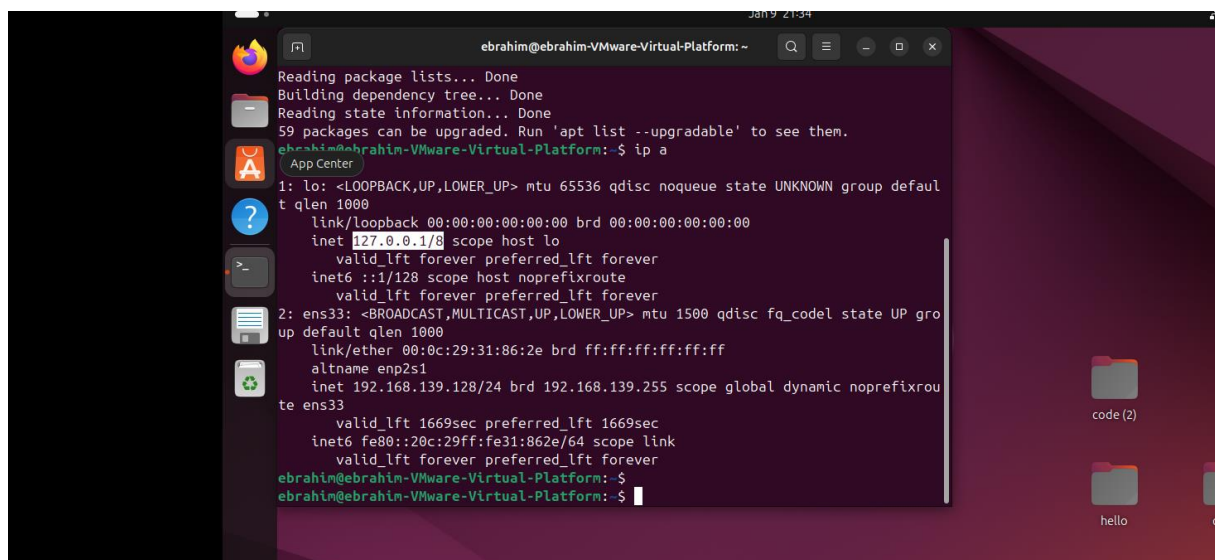
Student number: 577534 Ebrahim Amin

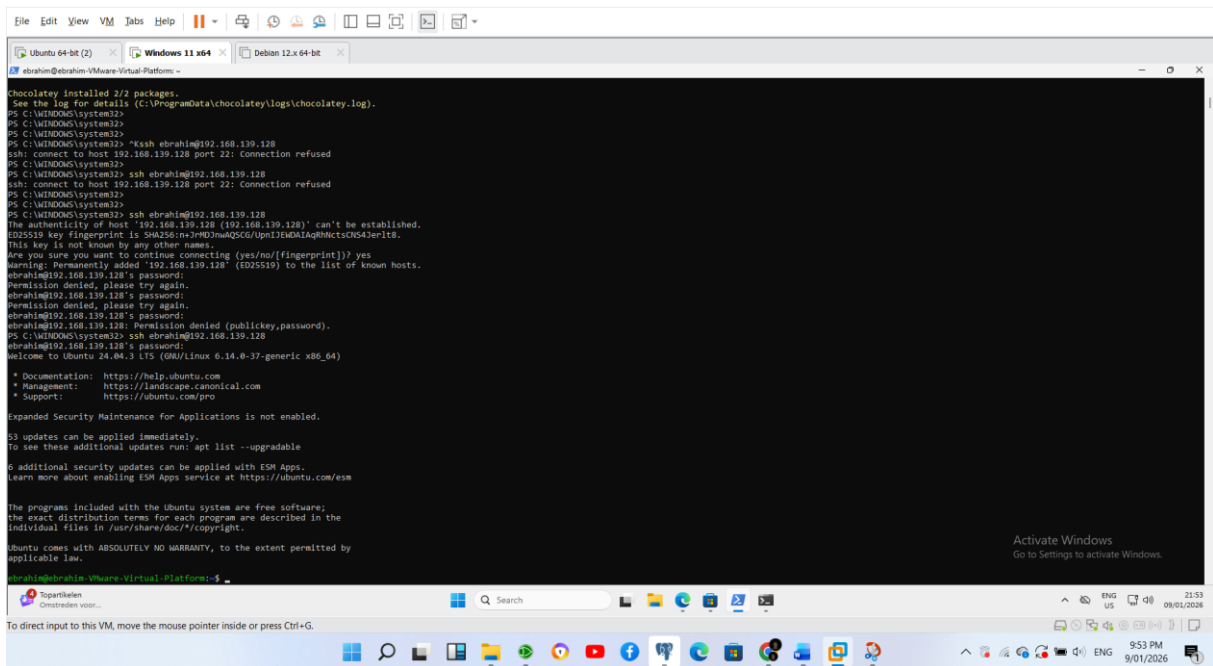
Assignment 6.1: Working from home

Screenshot installation openssh-server:

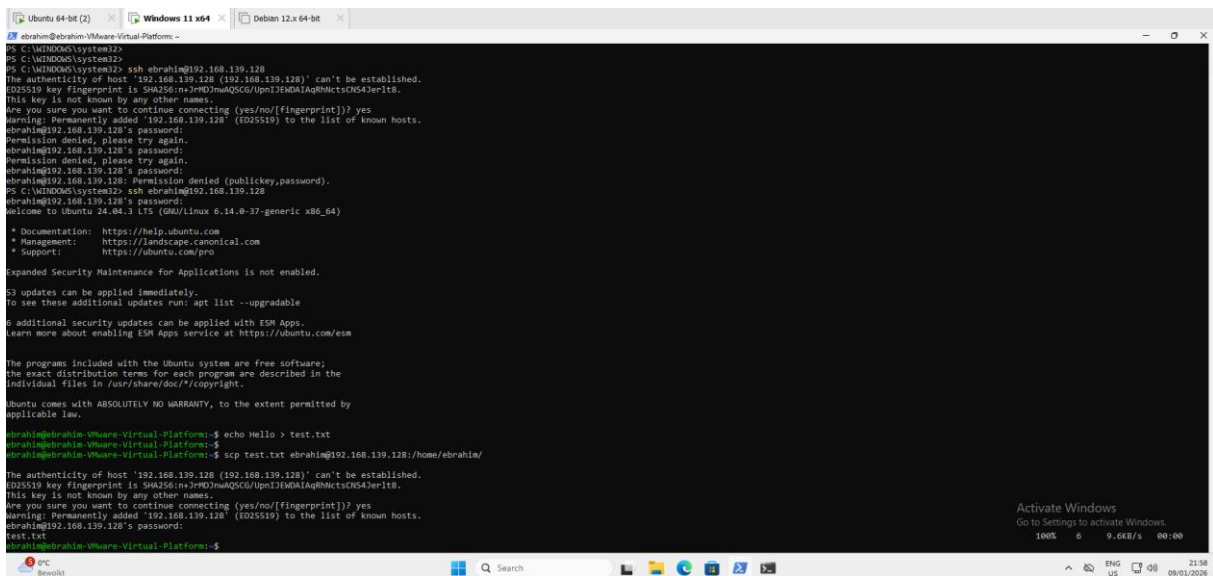


Screenshot successful SSH command execution:

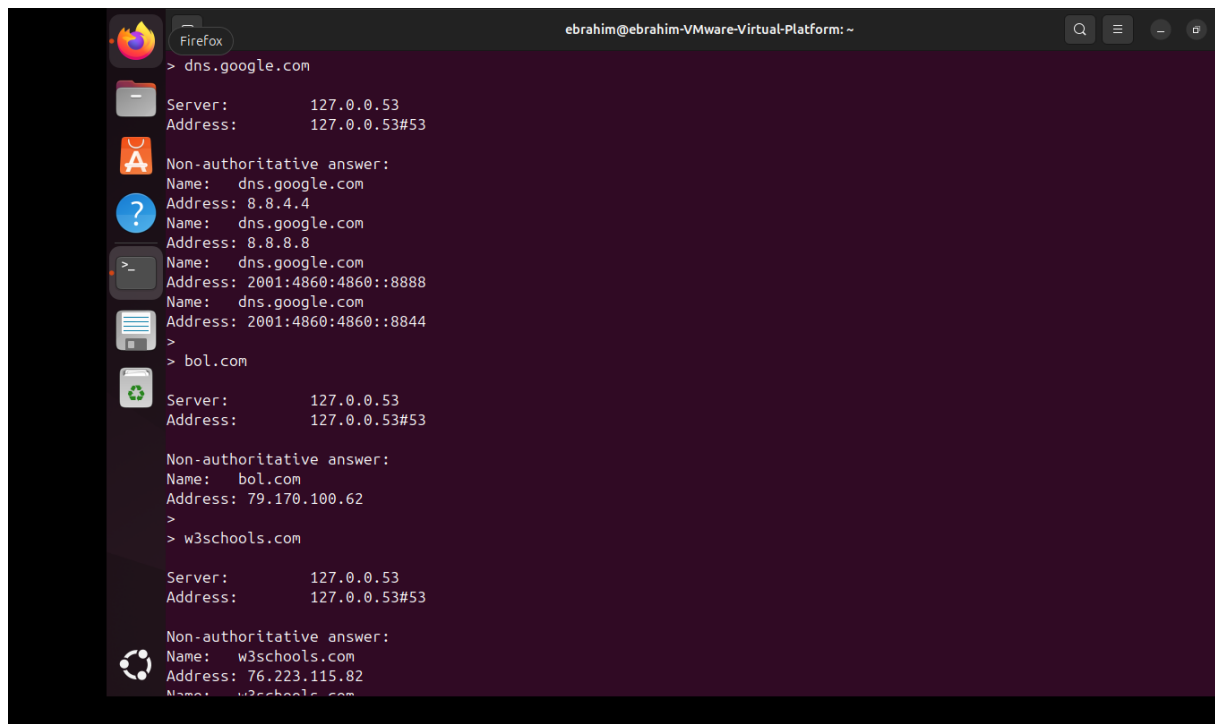




Screenshot successful execution SCP command:

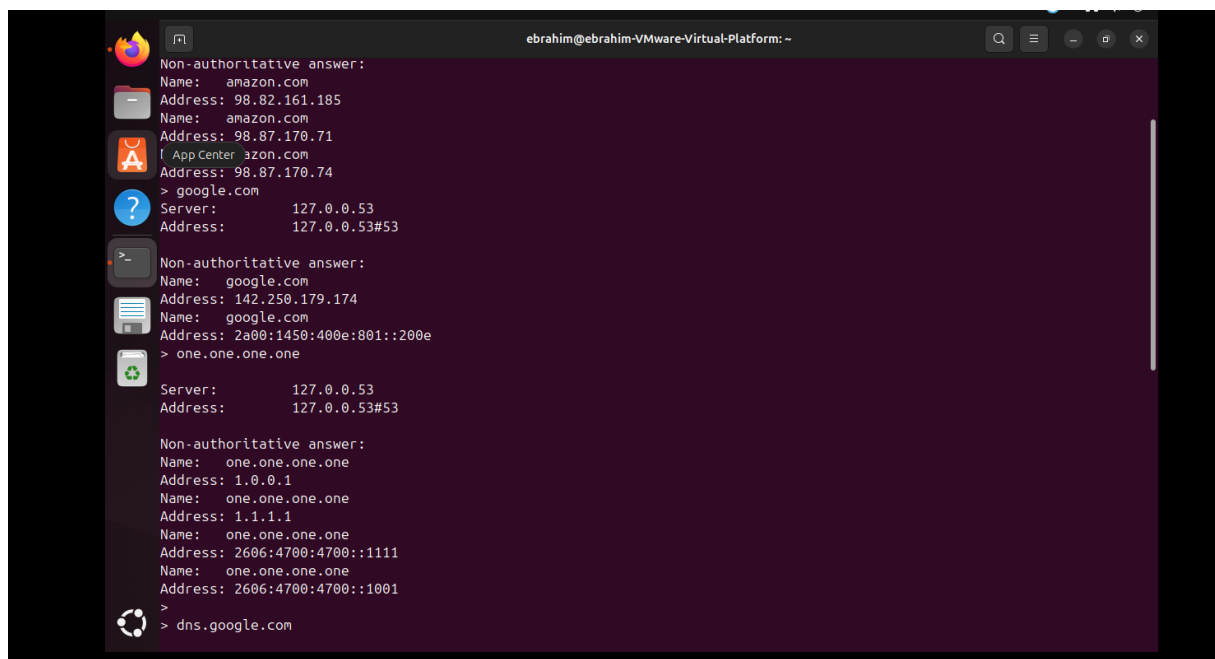


Screenshot remmina:



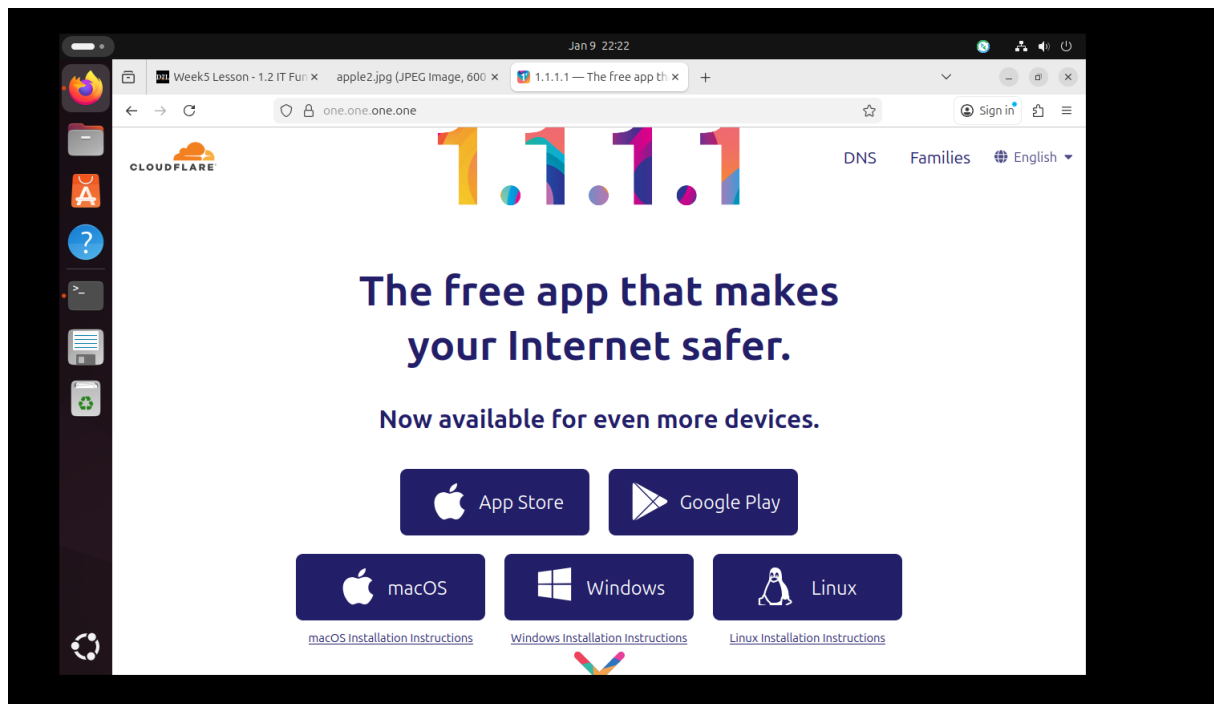
```
ebrahim@ebrahim-VMware-Virtual-Platform: ~  
> dns.google.com  
Server:          127.0.0.53  
Address:         127.0.0.53#53  
  
Non-authoritative answer:  
Name:   dns.google.com  
Address: 8.8.4.4  
Name:   dns.google.com  
Address: 8.8.8.8  
Name:   dns.google.com  
Address: 2001:4860:4860::8888  
Name:   dns.google.com  
Address: 2001:4860:4860::8844  
>  
> bol.com  
Server:          127.0.0.53  
Address:         127.0.0.53#53  
  
Non-authoritative answer:  
Name:   bol.com  
Address: 79.170.100.62  
>  
> w3schools.com  
Server:          127.0.0.53  
Address:         127.0.0.53#53  
  
Non-authoritative answer:  
Name:   w3schools.com  
Address: 76.223.115.82  
Name:   w3schools.com
```

inside or press Ctrl+G.



```
ebrahim@ebrahim-VMware-Virtual-Platform: ~  
Non-authoritative answer:  
Name:   amazon.com  
Address: 98.82.161.185  
Name:   amazon.com  
Address: 98.87.170.71  
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: 142.250.179.174  
Name:   google.com  
Address: 2a00:1450:400e:801::200e  
> one.one.one.one  
Server:          127.0.0.53  
Address:         127.0.0.53#53  
  
Non-authoritative answer:  
Name:   one.one.one.one  
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
```

Screenshot website visit via IP address:



Assignment 6.3: subnetting

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

A /25 subnet leaves 7 bits for host addresses. This gives $2^7 = 128$ total IP addresses.

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

The network address is **192.168.110.128** and the broadcast address is **192.168.110.255**.

These two cannot be used by devices.

The usable IP range is:

192.168.110.129 – 192.168.110.254

This gives **126 usable host addresses**.

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

```
Reading state information... Done
The following package was automatically installed and is no longer required:
  liblvm19
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  ipcalc
0 upgraded, 1 newly installed, 0 to remove and 59 not upgraded.
Need to get 24.5 kB of archives.
After this operation, 72.7 kB of additional disk space will be used.
Get:1 http://nl.archive.ubuntu.com/ubuntu noble/universe amd64 ipcalc all 0.51-1 [24.5 kB]
Terminal 24.5 kB in 0s (171 kB/s)
Selecting previously unselected package ipcalc.
(Reading database ... 203874 files and directories currently installed.)
Preparing to unpack .../archives/ipcalc_0.51-1_all.deb ...
Unpacking ipcalc (0.51-1) ...
Setting up ipcalc (0.51-1) ...
Processing triggers for man-db (2.12.0-4build2) ...
ebrahim@ebrahim-VMware-Virtual-Platform: $ ipcalc 192.168.110.128/25

Address: 192.168.110.128      11000000.10101000.01101110.1 0000000
Netmask: 255.255.255.128 = 25 11111111.11111111.11111111.1 00000000
Wildcard: 0.0.0.127         00000000.00000000.00000000.0 11111111
=>
Network: 192.168.110.128/25  11000000.10101000.01101110.1 0000000
HostMin: 192.168.110.129    11000000.10101000.01101110.1 0000001
HostMax: 192.168.110.254    11000000.10101000.01101110.1 1111110
Broadcast: 192.168.110.255  11000000.10101000.01101110.1 1111111
Hosts/Net: 126              Class C, Private Internet

ebrahim@ebrahim-VMware-Virtual-Platform: $
ebrahim@ebrahim-VMware-Virtual-Platform: $
```

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 network address is **192.168.110.128** and the broadcast address is **192.168.110.255**.

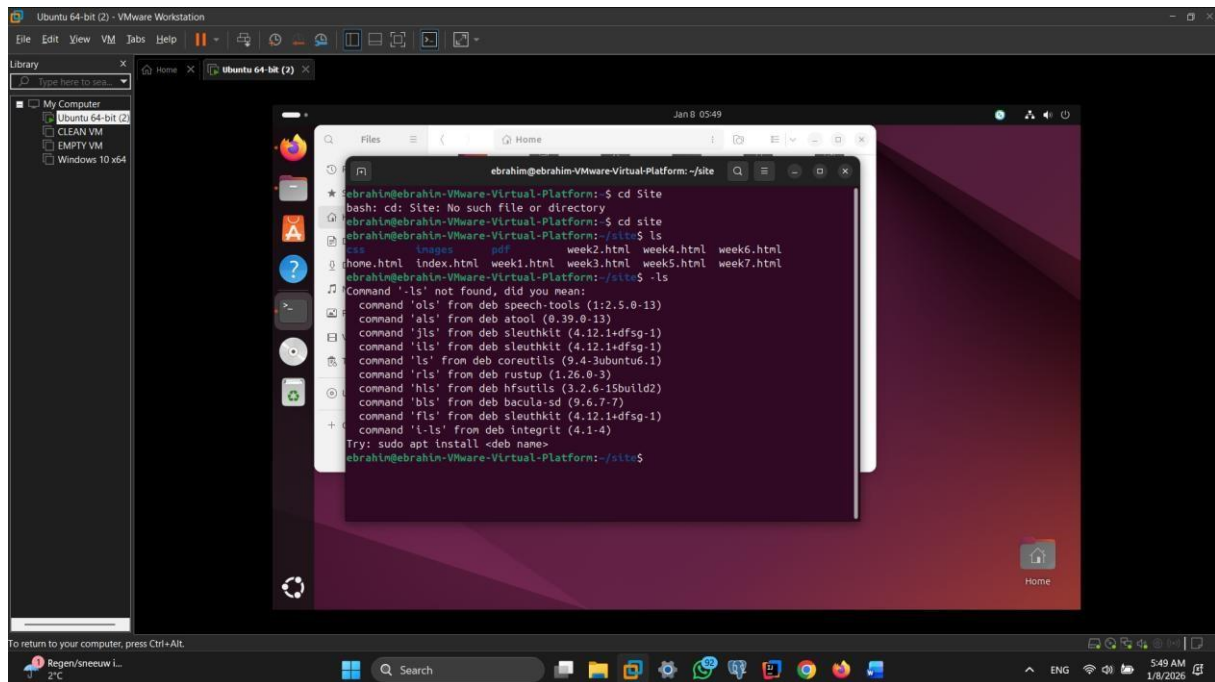
The result was confirmed using the **ipcalc 192.168.110.128/25** command.

Assignment 6.4: HTML

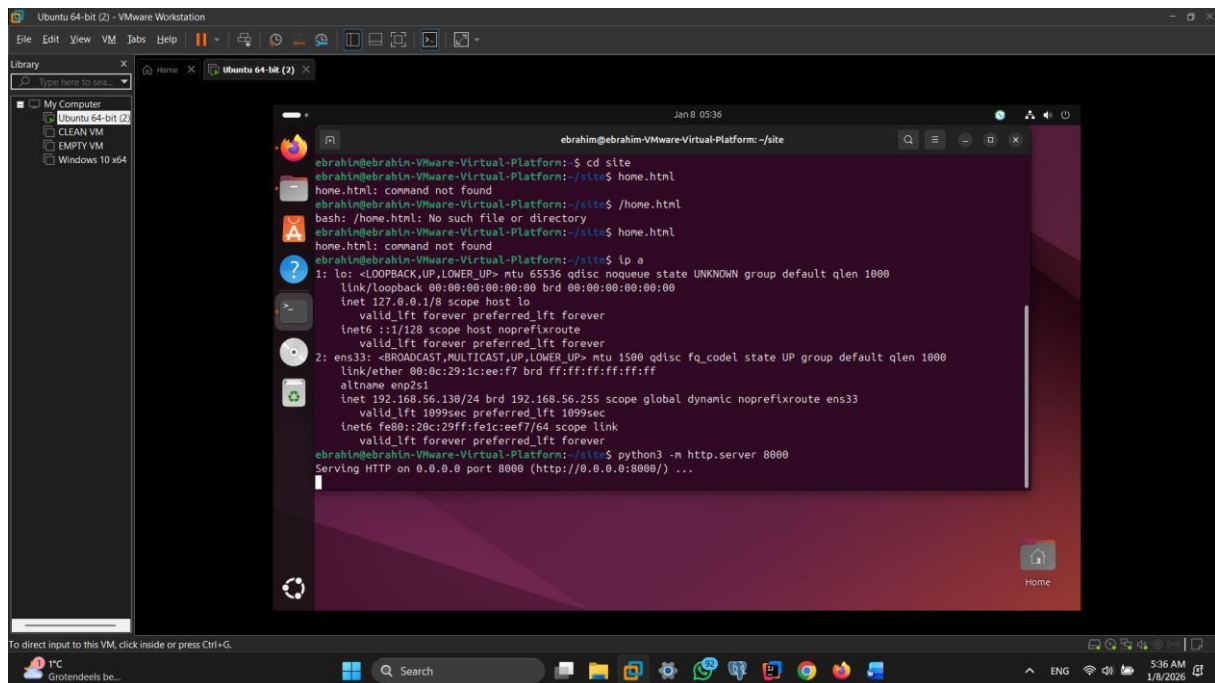
Screenshot IP address Ubuntu VM:

```
ebrahim@ebrahim-VMware-Virtual-Platform: ~
ebrahim@ebrahim-VMware-Virtual-Platform:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:31:86:2e brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.139.128/24 brd 192.168.139.255 scope global dynamic noprefixroute ens33
        valid_lft 1444sec preferred_lft 1444sec
    inet6 fe80::20c:29ff:fe31:862e/64 scope link
        valid_lft forever preferred_lft forever
ebrahim@ebrahim-VMware-Virtual-Platform:~$
ebrahim@ebrahim-VMware-Virtual-Platform:~$
```

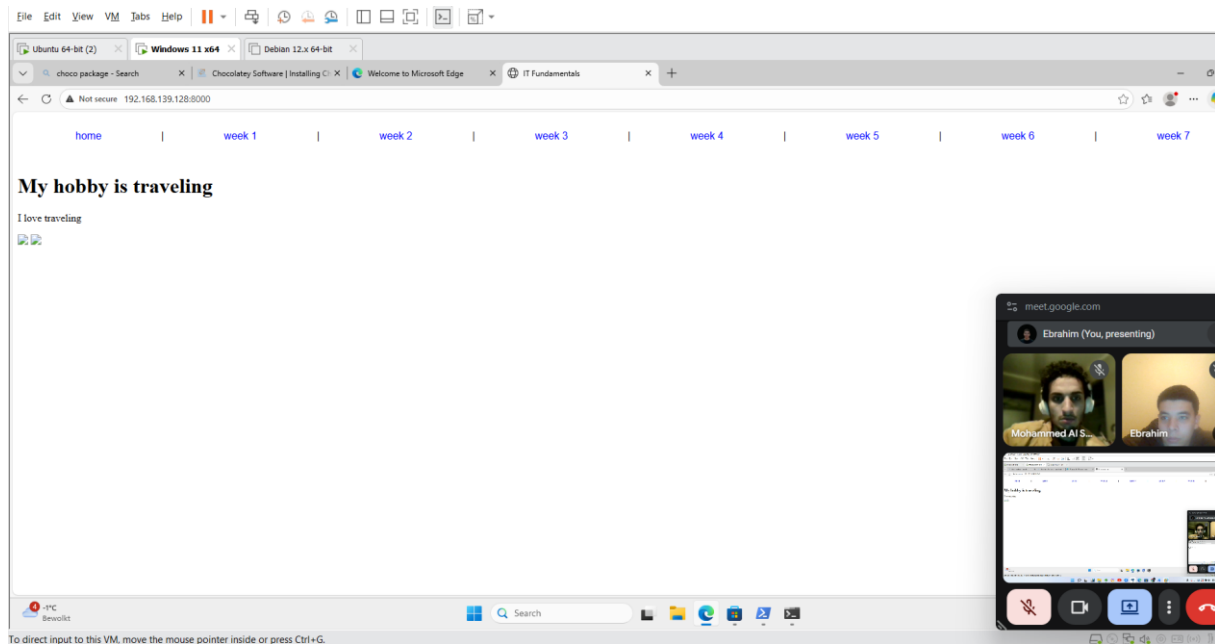
Screenshot of Site directory contents:



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("\\.");
```

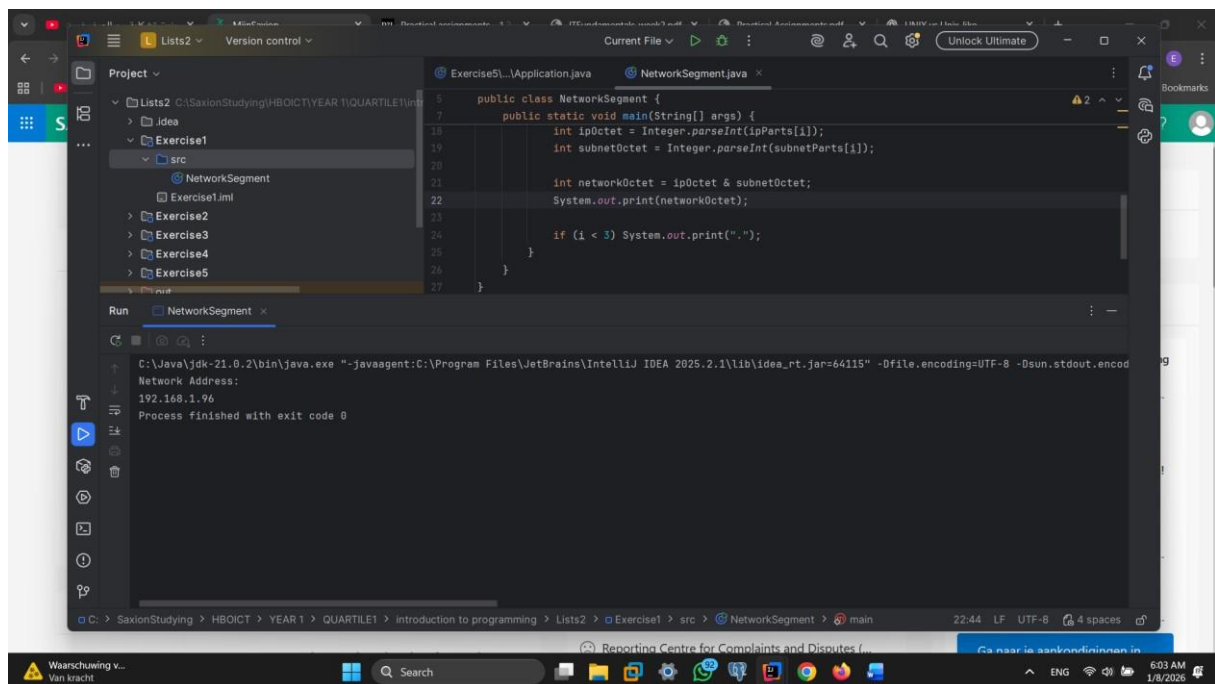
```
String[] subnetParts =  
subnet.split("\\.");
```

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

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

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

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



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