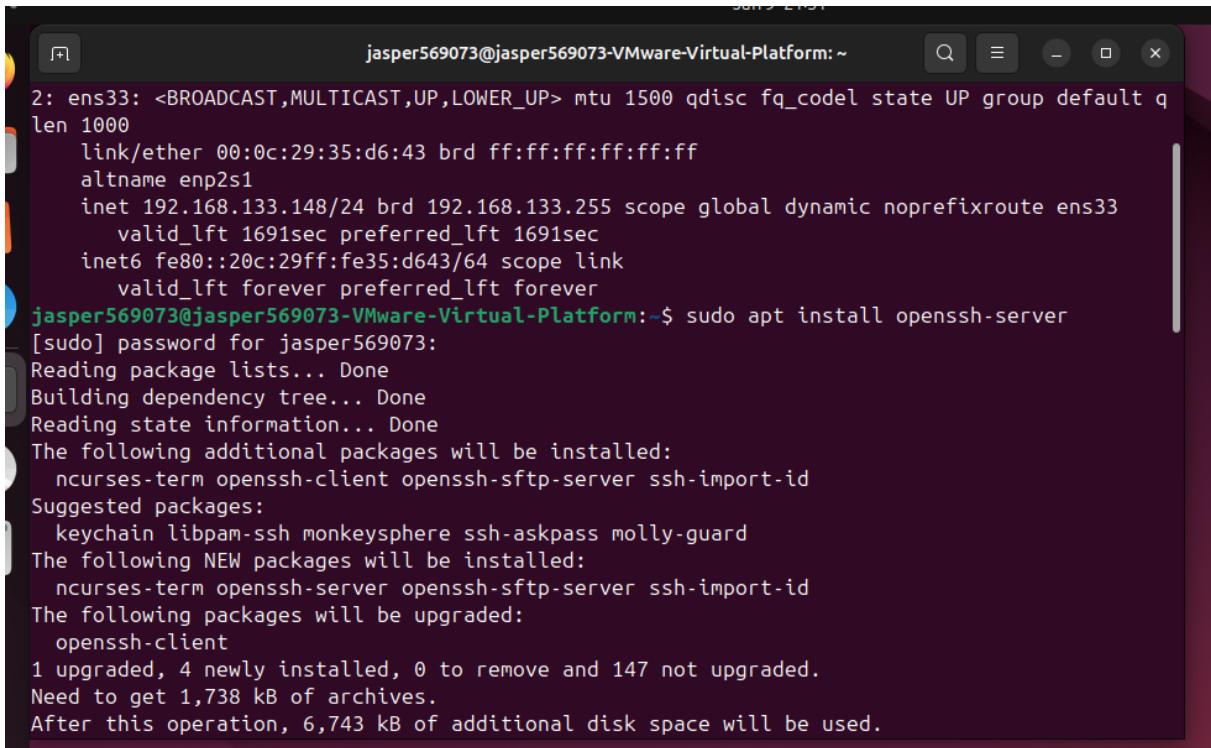


Template Week 6 – Networking

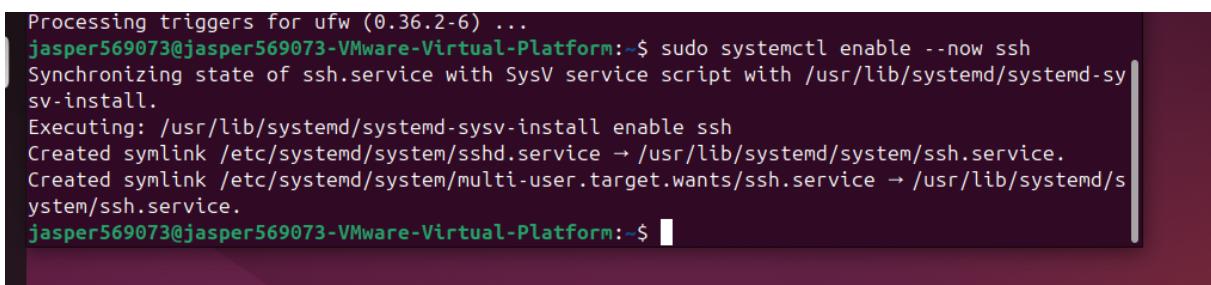
Student number: 569073

Assignment 6.1: Working from home

Screenshot installation openssh-server:



```
jasper569073@jasper569073-VMware-Virtual-Platform:~$ sudo apt install openssh-server
[sudo] password for jasper569073:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ncurses-term openssh-client openssh-sftp-server ssh-import-id
Suggested packages:
  keychain libpam-ssh monkeysphere ssh-askpass molly-guard
The following NEW packages will be installed:
  ncurses-term openssh-server openssh-sftp-server ssh-import-id
The following packages will be upgraded:
  openssh-client
1 upgraded, 4 newly installed, 0 to remove and 147 not upgraded.
Need to get 1,738 kB of archives.
After this operation, 6,743 kB of additional disk space will be used.
```



```
Processing triggers for ufw (0.36.2-6) ...
jasper569073@jasper569073-VMware-Virtual-Platform:~$ sudo systemctl enable --now ssh
Synchronizing state of ssh.service with SysV service script with /usr/lib/systemd/systemd-sv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable ssh
Created symlink /etc/systemd/system/sshd.service → /usr/lib/systemd/system/sshd.service.
Created symlink /etc/systemd/system/multi-user.target.wants/sshd.service → /usr/lib/systemd/system/sshd.service.
jasper569073@jasper569073-VMware-Virtual-Platform:~$
```

Screenshot successful SSH command execution:

```
jasper569073@jasper569073- ~ + - 
C:\Users\jasper>ssh jasper569073@192.168.133.148
The authenticity of host '192.168.133.148 (192.168.133.148)' can't be established.
ED25519 key fingerprint is SHA256:luKkc9IBn0OkxJFBspR5h6kr+pDtSix9Vtio2/Ir/b4.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.133.148' (ED25519) to the list of known hosts.
jasper569073@192.168.133.148'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.

142 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

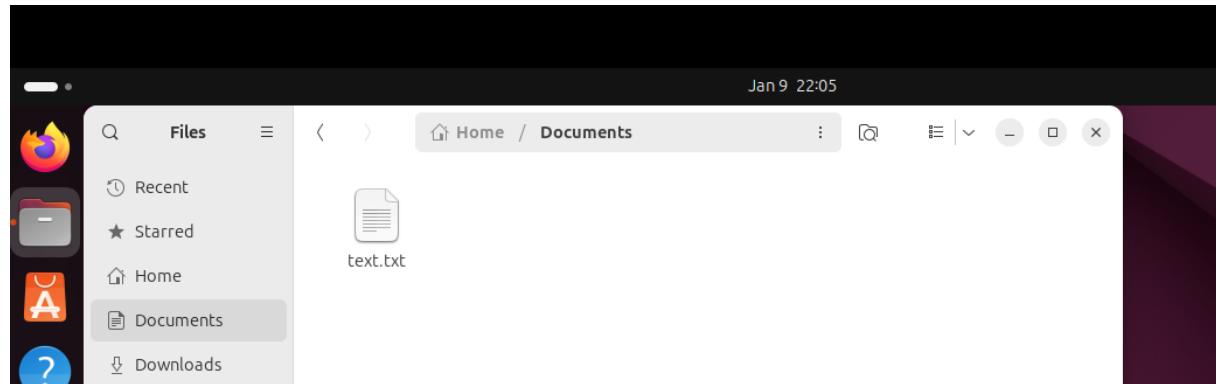
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
```

Microsoft Edge

Screenshot successful execution SCP command:

```
PS C:\Users\jasper\Documents> scp text.txt jasper569073@192.168.133.148:/home/jasper569073/Documents
jasper569073@192.168.133.148's password:
text.txt                                              100%   7   3.4KB/s  00:00
PS C:\Users\jasper\Documents>
```



Screenshot remmina:

The screenshot shows a Windows desktop environment. At the top, there is a window titled "192.168.133.141" which displays an error message: "Lost connection to the RDP server '192.168.133.141'." A "Close" button is visible in the top right corner of this window. Below this window, a "Recycle Bin" icon is visible on the desktop. In the center, there is a "Windows PowerShell" window with the following command history:

```
PS C:\Users\jasper\Desktop> Get-NetAdapter | Select-Object -Property Name, ConnectionState, Description, PhysicalAddress, DhcpEnabled, AutoconfigurationEnabled, LinkLocalIPv6Address, IPv4Address, SubnetMask, LeaseObtained, LeaseExpires, DefaultGateway, DhcpServer, Dhcpv6Iaid, Dhcpv6ClientDuid, DnsServers, PrimaryWinsServer, NetBIOSoverTcpip
```

The output shows the configuration for two network adapters:

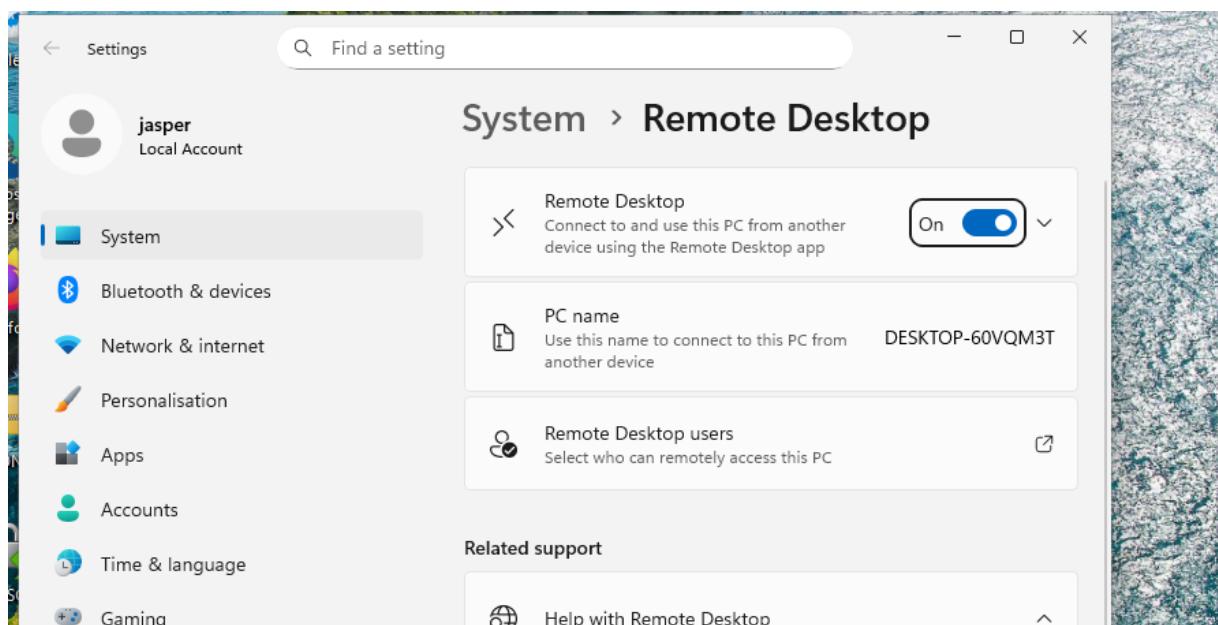
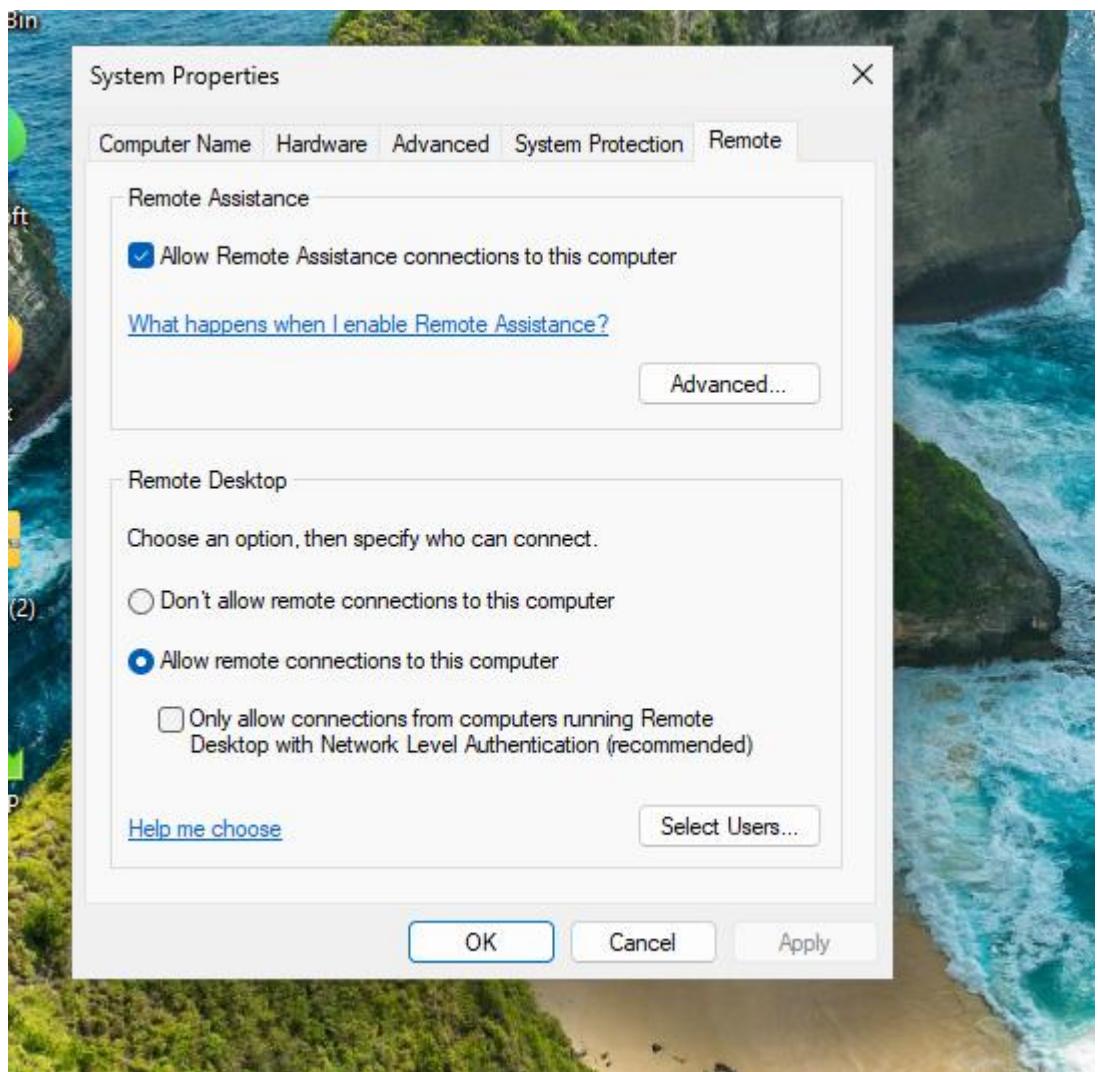
Ethernet adapter Ethernet0:

```
Connection-specific DNS Suffix . . . . . : localdomain
Description . . . . . : Intel(R) 82574L Gigabit Network Connection
Physical Address . . . . . : 00-0C-29-C2-A8-25
DHCP Enabled . . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::27ff:1662:962a:46e%15(Preferred)
IPv4 Address . . . . . : 192.168.133.141(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained . . . . . : Friday, 9 January 2026 21:56:49
Lease Expires . . . . . : Friday, 9 January 2026 22:26:49
Default Gateway . . . . . : 192.168.133.2
DHCP Server . . . . . : 192.168.133.254
DHCPv6 IAID . . . . . : 100666409
DHCPv6 Client DUID . . . . . : 00-01-00-01-30-F1-E6-76-00-0C-29-C2-A8-25
DNS Servers . . . . . : 192.168.133.2
Primary WINS Server . . . . . : 192.168.133.2
NetBIOS over Tcpip. . . . . : Enabled
```

Ethernet adapter Bluetooth Network Connection:

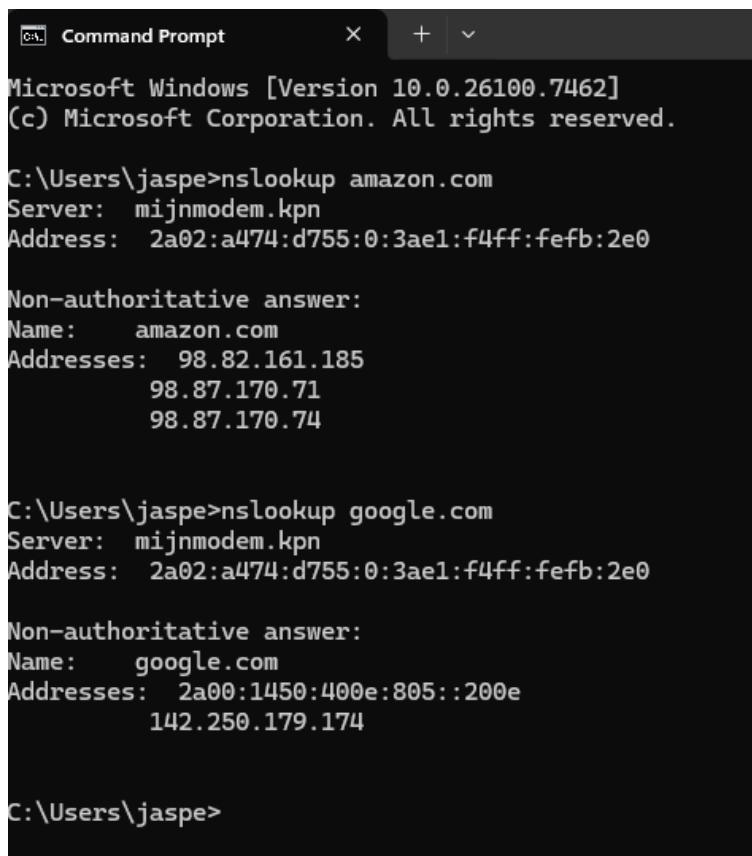
```
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . . . . :
Description . . . . . : Bluetooth Device (Personal Area Network)
Physical Address . . . . . : E8-65-38-7F-8A-44
DHCP Enabled . . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
```

PS C:\Users\jasper\Desktop>



Assignment 6.2: IP addresses websites

Relevant screenshots nslookup command:



```
C:\ Command Prompt      X + ▾

Microsoft Windows [Version 10.0.26100.7462]
(c) Microsoft Corporation. All rights reserved.

C:\Users\jaspe>nslookup amazon.com
Server: mijnmodem.kpn
Address: 2a02:a474:d755:0:3ae1:f4ff:fefb:2e0

Non-authoritative answer:
Name:    amazon.com
Addresses: 98.82.161.185
          98.87.170.71
          98.87.170.74

C:\Users\jaspe>nslookup google.com
Server: mijnmodem.kpn
Address: 2a02:a474:d755:0:3ae1:f4ff:fefb:2e0

Non-authoritative answer:
Name:    google.com
Addresses: 2a00:1450:400e:805::200e
           142.250.179.174

C:\Users\jaspe>
```

```
C:\Users\jaspe>nslookup one.one.one.one
Server: mijnmodem.kpn
Address: 2a02:a474:d755:0:3ae1:f4ff:fefb:2e0
```

```
Non-authoritative answer:
Name: one.one.one.one
Addresses: 2606:4700:4700::1001
           2606:4700:4700::1111
           1.0.0.1
           1.1.1.1
```

```
C:\Users\jaspe>nslookup dns.google.com
Server: mijnmodem.kpn
Address: 2a02:a474:d755:0:3ae1:f4ff:fefb:2e0
```

```
Non-authoritative answer:
Name: dns.google.com
Addresses: 2001:4860:4860::8844
           2001:4860:4860::8888
           8.8.8.8
           8.8.4.4
```

```
C:\Users\jaspe>nslookup bol.com
Server: mijnmodem.kpn
Address: 2a02:a474:d755:0:3ae1:f4ff:fefb:2e0
```

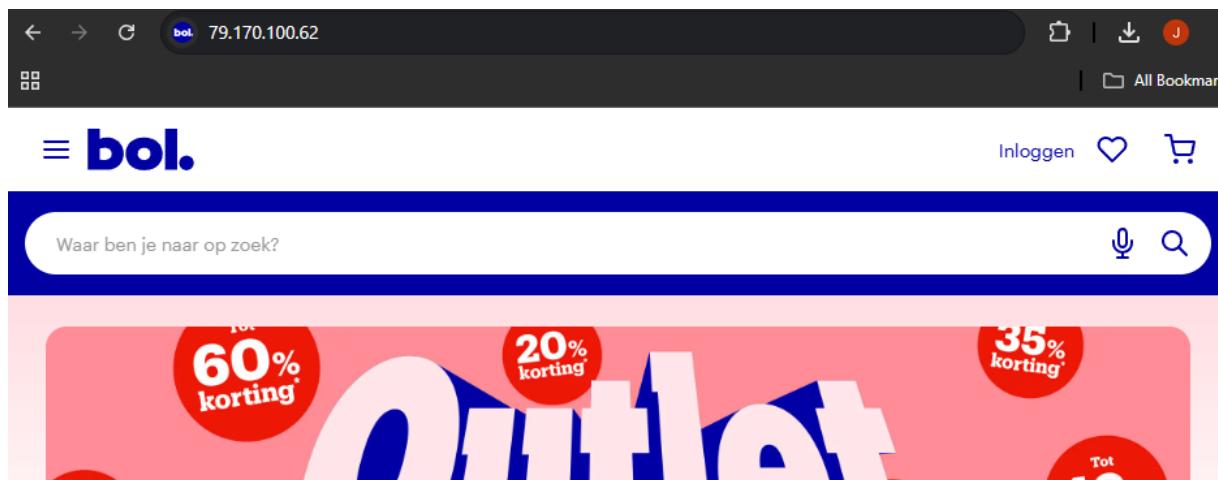
```
Non-authoritative answer:
Name: bol.com
Address: 79.170.100.62
```

```
C:\Users\jaspe>nslookup w3schools.com
Server: mijnmodem.kpn
Address: 2a02:a474:d755:0:3ae1:f4ff:fefb:2e0
```

```
Non-authoritative answer:
Name: w3schools.com
Addresses: 13.248.240.135
           76.223.115.82
```

```
C:\Users\jaspe>
```

Screenshot website visit via IP address:



I got a certificate warning before entering the page.

Assignment 6.3: subnetting

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

128

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

192.168.110.129 - 192.168.110.254 is the usable network range 2 addresses are reserved for network address and broadcast address

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

Address: 192.168.110.128 11000000.10101000.01101110.1 00000000

Netmask: 255.255.255.128 = 25 11111111.11111111.11111111.1 00000000

Wildcard: 0.0.0.127 00000000.00000000.00000000.0 1111111

=>

Network: 192.168.110.128/25 11000000.10101000.01101110.1 00000000

HostMin: 192.168.110.129 11000000.10101000.01101110.1 00000001

HostMax: 192.168.110.254 11000000.10101000.01101110.1 11111110

Broadcast: 192.168.110.255 11000000.10101000.01101110.1 11111111

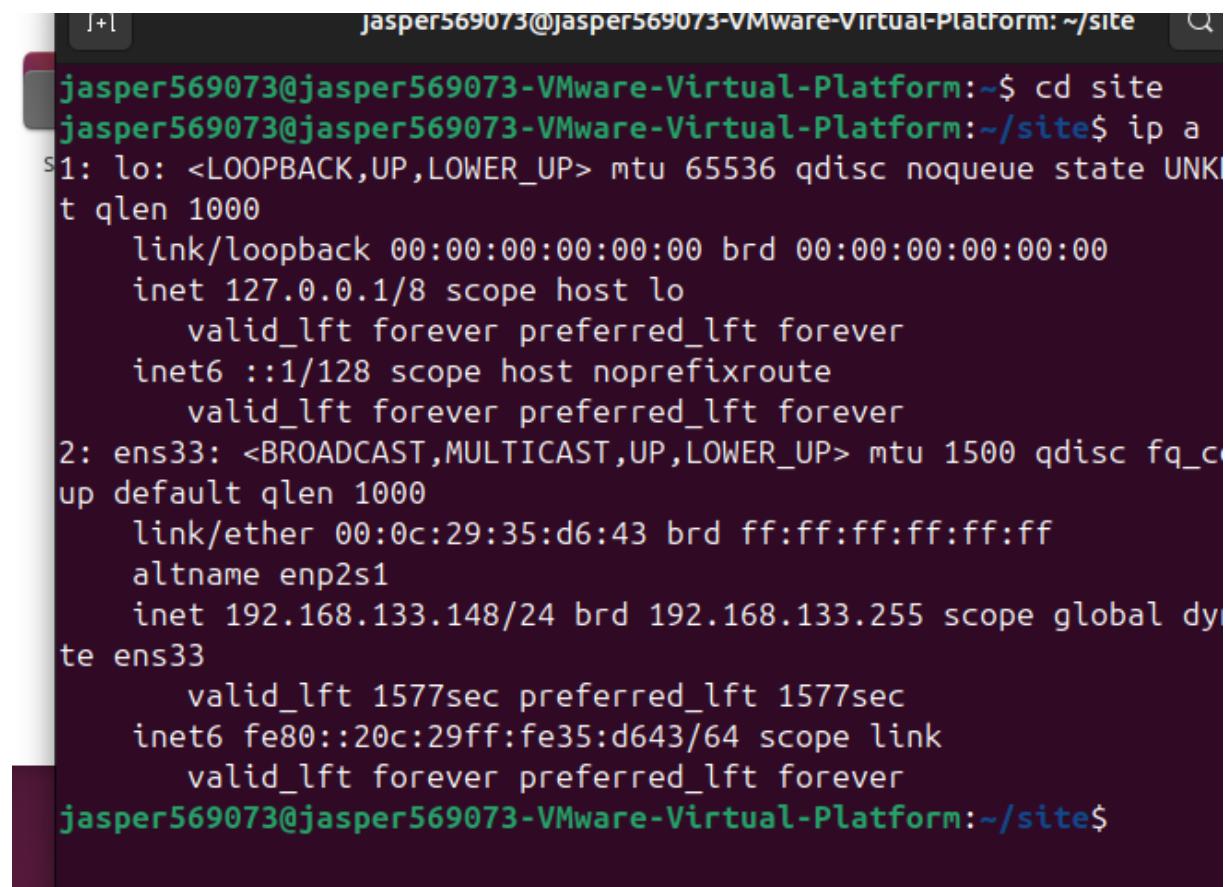
Hosts/Net: 126 Class C, Private Internet

Explain the above calculation in your own words.

25 ip mask gets a subnet of 255.255.255.128 which means there are 128 usable addresses since the network uses 192.168.110.128 as network address the ip range starts from there.

Assignment 6.4: HTML

Screenshot IP address Ubuntu VM:



```
jasper569073@jasper569073-VMware-Virtual-Platform:~/site$ cd site
jasper569073@jasper569073-VMware-Virtual-Platform:~/site$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    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
        inet6 ::1/128 scope host noprefixroute
            valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel
    qlen 1000
    link/ether 00:0c:29:35:d6:43 brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.133.148/24 brd 192.168.133.255 scope global dynamic ens33
        valid_lft 1577sec preferred_lft 1577sec
        inet6 fe80::20c:29ff:fe35:d643/64 scope link
            valid_lft forever preferred_lft forever
jasper569073@jasper569073-VMware-Virtual-Platform:~/site$
```

Ip= 192.168.133.148

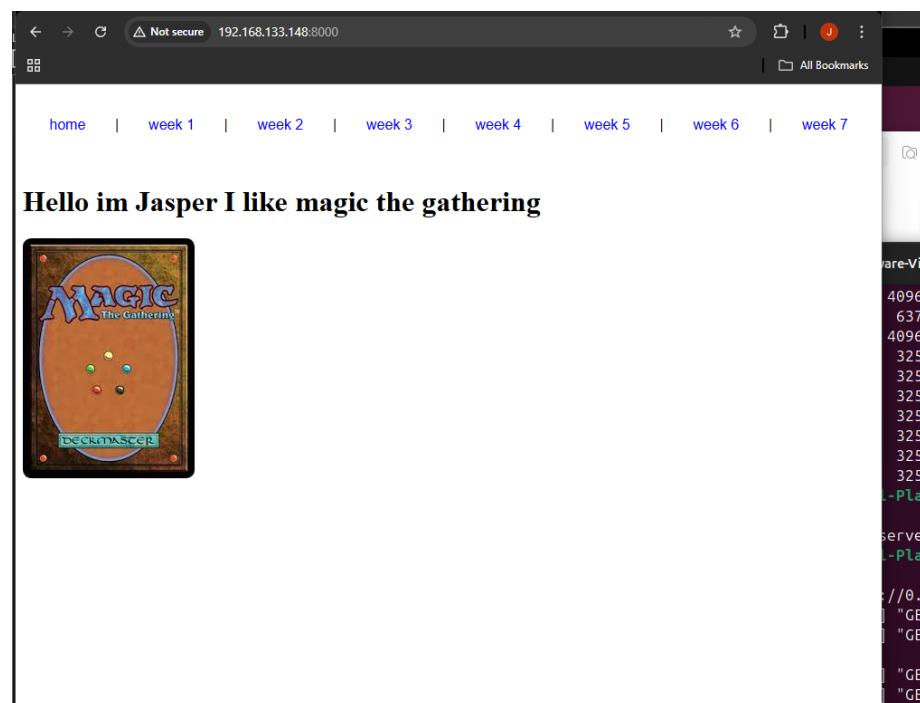
Screenshot of Site directory contents:

```
valid_lft forever preferred_lft forever
jasper569073@jasper569073-VMware-Virtual-Platform:~/site$ ls -la
total 56
drwxrwxr-x  5 jasper569073 jasper569073 4096 Jan  9 22:42 .
drwxr-x--- 17 jasper569073 jasper569073 4096 Jan  9 22:36 ..
drwxrwxr-x  2 jasper569073 jasper569073 4096 Sep  9 2023 css
-rw-rw-r--  1 jasper569073 jasper569073 206 Jan  9 22:42 home.html
drwxrwxr-x  2 jasper569073 jasper569073 4096 Jan  9 22:41 images
-rw-rw-r--  1 jasper569073 jasper569073 637 Sep  9 2023 index.html
drwxrwxr-x  2 jasper569073 jasper569073 4096 Sep  9 2023 pdf
-rw-rw-r--  1 jasper569073 jasper569073 325 Sep  9 2023 week1.html
-rw-rw-r--  1 jasper569073 jasper569073 325 Sep  9 2023 week2.html
-rw-rw-r--  1 jasper569073 jasper569073 325 Sep  9 2023 week3.html
-rw-rw-r--  1 jasper569073 jasper569073 325 Sep  9 2023 week4.html
-rw-rw-r--  1 jasper569073 jasper569073 325 Sep  9 2023 week5.html
-rw-rw-r--  1 jasper569073 jasper569073 325 Sep  9 2023 week6.html
-rw-rw-r--  1 jasper569073 jasper569073 325 Sep  9 2023 week7.html
jasper569073@jasper569073-VMware-Virtual-Platform:~/site$
```

Screenshot python3 webserver command:

```
jasper569073@jasper569073-VMware-Virtual-Platform:~/site$ python3 -m http.server  
8000  
Serving HTTP on 0.0.0.0 port 8000 (http://0.0.0.0:8000/) ...
```

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](#)