

Template Week 6 – Networking

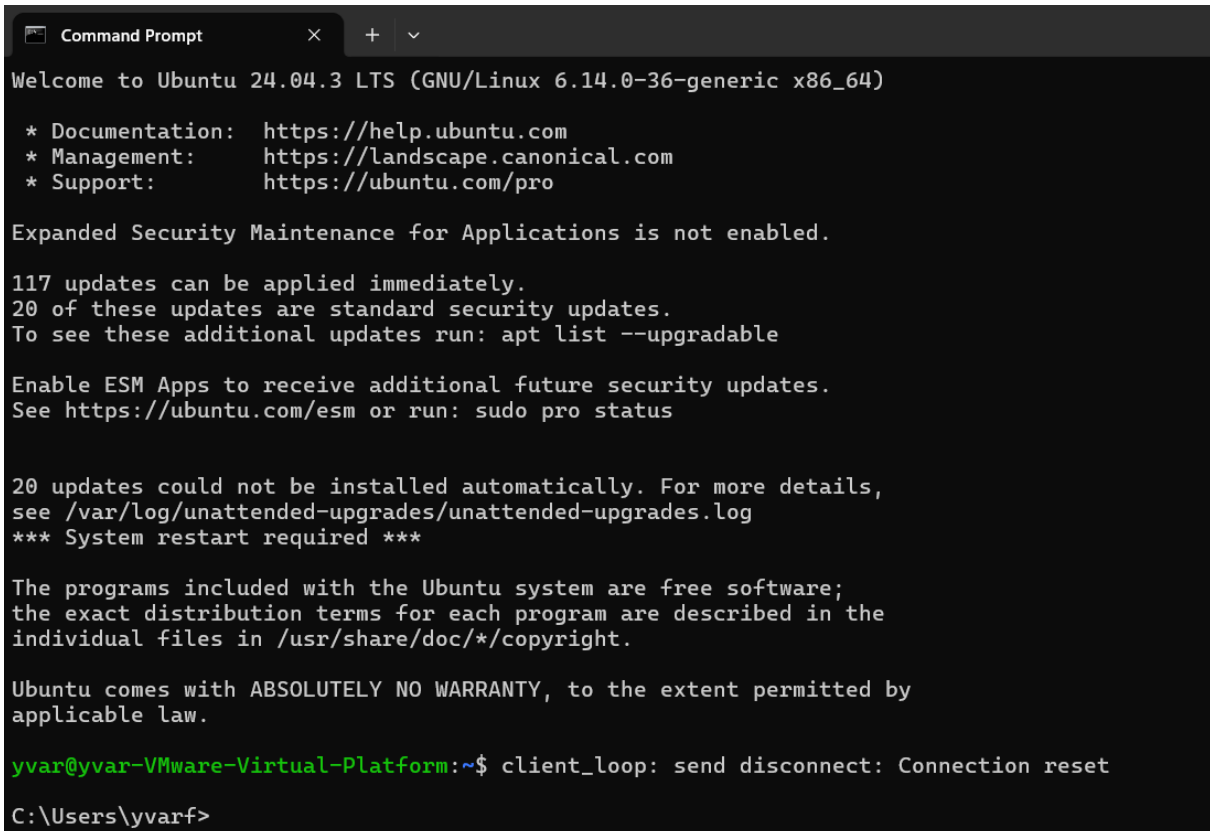
Student number:588991

Assignment 6.1: Working from home

Screenshot installation openssh-server:

```
yvar@yvar-VMware-Virtual-Platform:~/Desktop$ sudo apt install openssh-server -y
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 3702 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 3702 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 3702 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 3702 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 3702 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 3702 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 3702 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 3702 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 3702 (unattended-upgr)
Waiting for cache lock: Could not get lock /var/lib/dpkg/lock-frontend. It is held by process 3702 (unattended-upgr)
Reading package lists... 0%
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
openssh-server is already the newest version (1:9.6p1-3ubuntu13.14).
The following package was automatically installed and is no longer required:
```

Screenshot successful SSH command execution:



```
Command Prompt
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-36-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.

117 updates can be applied immediately.
20 of these updates are standard security updates.
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

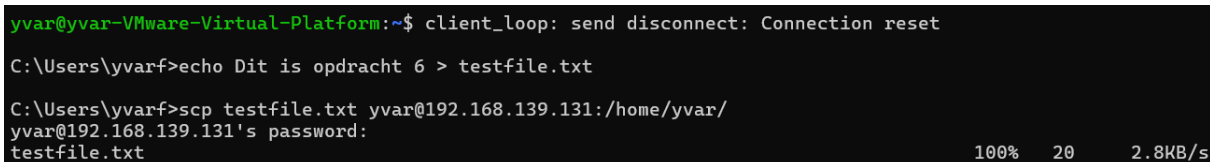
20 updates could not be installed automatically. For more details,
see /var/log/unattended-upgrades/unattended-upgrades.log
*** System restart required ***

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.

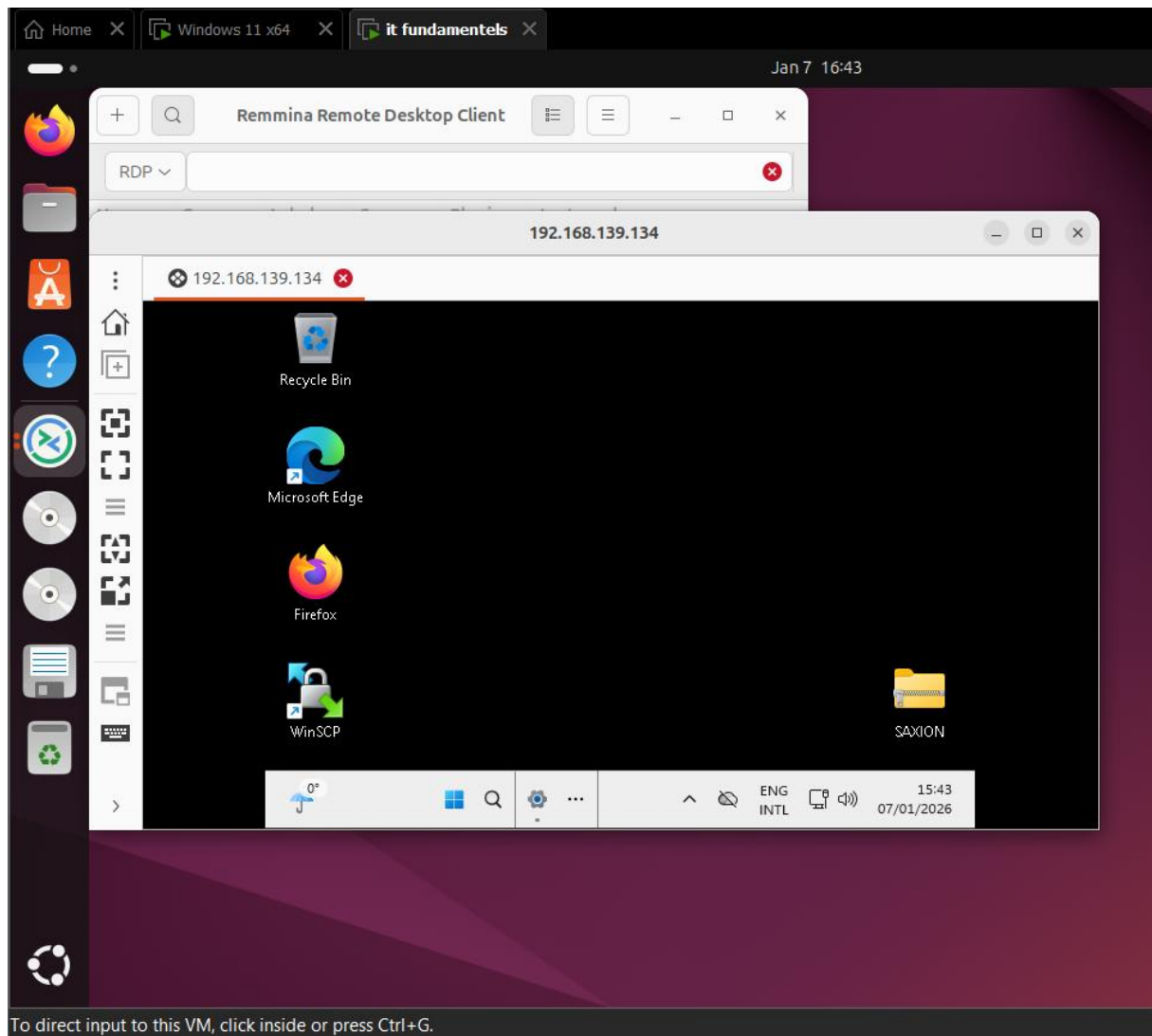
yvar@yvar-VMware-Virtual-Platform:~$ client_loop: send disconnect: Connection reset
C:\Users\yvarf>
```

Screenshot successful execution SCP command:



```
yvar@yvar-VMware-Virtual-Platform:~$ client_loop: send disconnect: Connection reset
C:\Users\yvarf>echo Dit is opdracht 6 > testfile.txt
C:\Users\yvarf>scp testfile.txt yvar@192.168.139.131:/home/yvar/
yvar@192.168.139.131's password:
testfile.txt                                     100%  20    2.8KB/s
```

Screenshot remmina:



Assignment 6.2: IP addresses websites

Relevant screenshots nslookup command:

```
C:\Users\yvarf>nslookup
Default Server:  setup.ui.com
Address:  192.168.4.1

> amazon.com
Server:  setup.ui.com
Address:  192.168.4.1

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

> google
Server:  setup.ui.com
Address:  192.168.4.1

*** setup.ui.com can't find google: Non-existent domain
> google.com
Server:  setup.ui.com
Address:  192.168.4.1

Non-authoritative answer:
Name:    google.com
Addresses:  2a00:1450:400e:802::200e
            172.217.23.206

> one.one.one.one
Server:  setup.ui.com
Address:  192.168.4.1

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
```

```
> dns.google.com
Server:  setup.ui.com
Address: 192.168.4.1

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

> bol.com
Server:  setup.ui.com
Address: 192.168.4.1

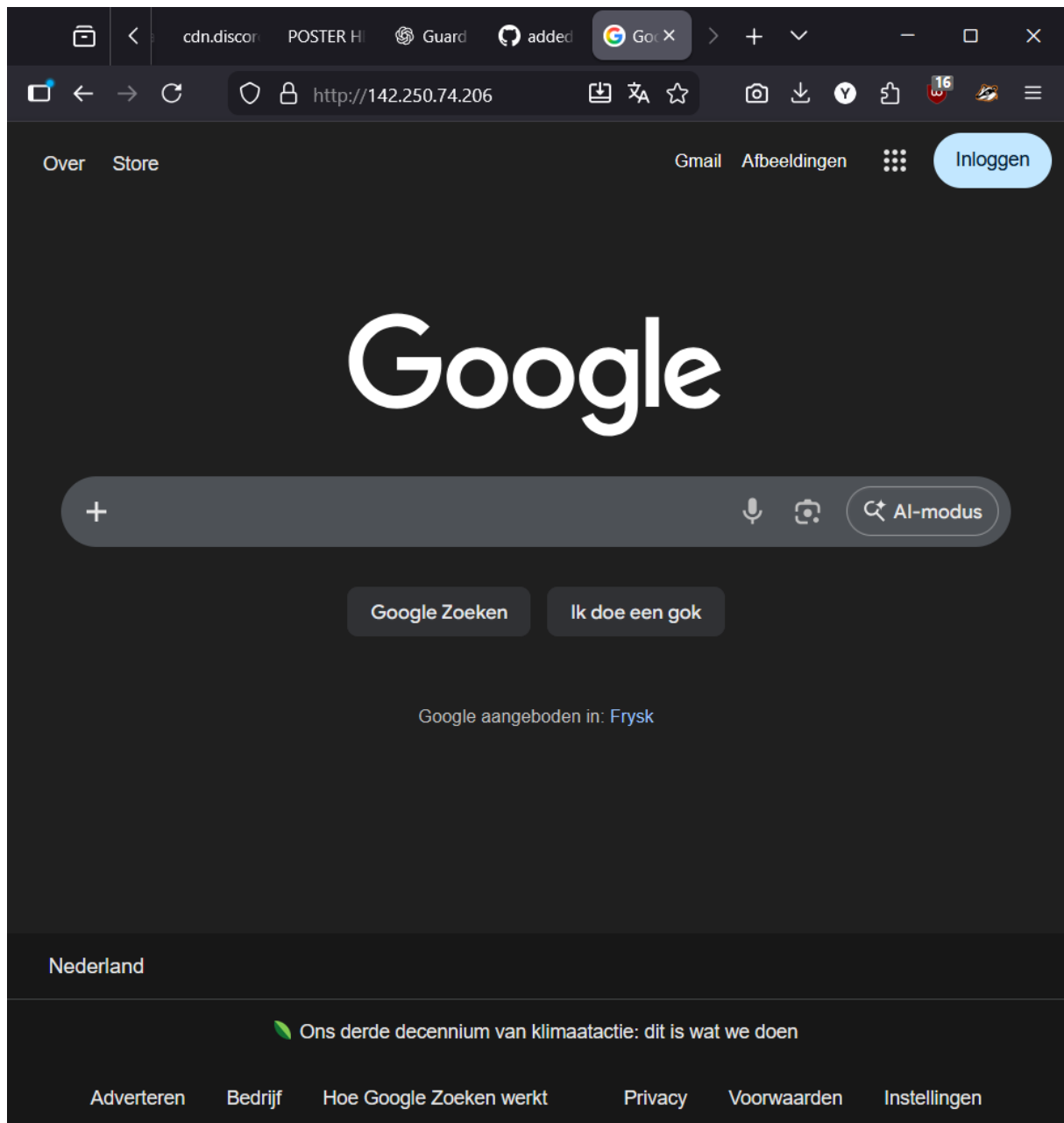
Non-authoritative answer:
Name:     bol.com
Address:  79.170.100.62

> w3schools.com
Server:  setup.ui.com
Address: 192.168.4.1

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

>
```

Screenshot website visit via IP address:



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?

128 maar 1 daarvan is het netwerk adres en 1 daarvan is het broadcast adres dus in totaal 126.

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

```
0 upgraded, 1 newly installed, 0 to remove and 117 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]
Fetched 24.5 kB in 0s (352 kB/s)
Selecting previously unselected package ipcalc.
(Reading database ... 201549 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) ...
yvar@yvar-VMware-Virtual-Platform:~/Desktop$ 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 0000000
Wildcard:   0.0.0.127           00000000.00000000.00000000.0 1111111
=>
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

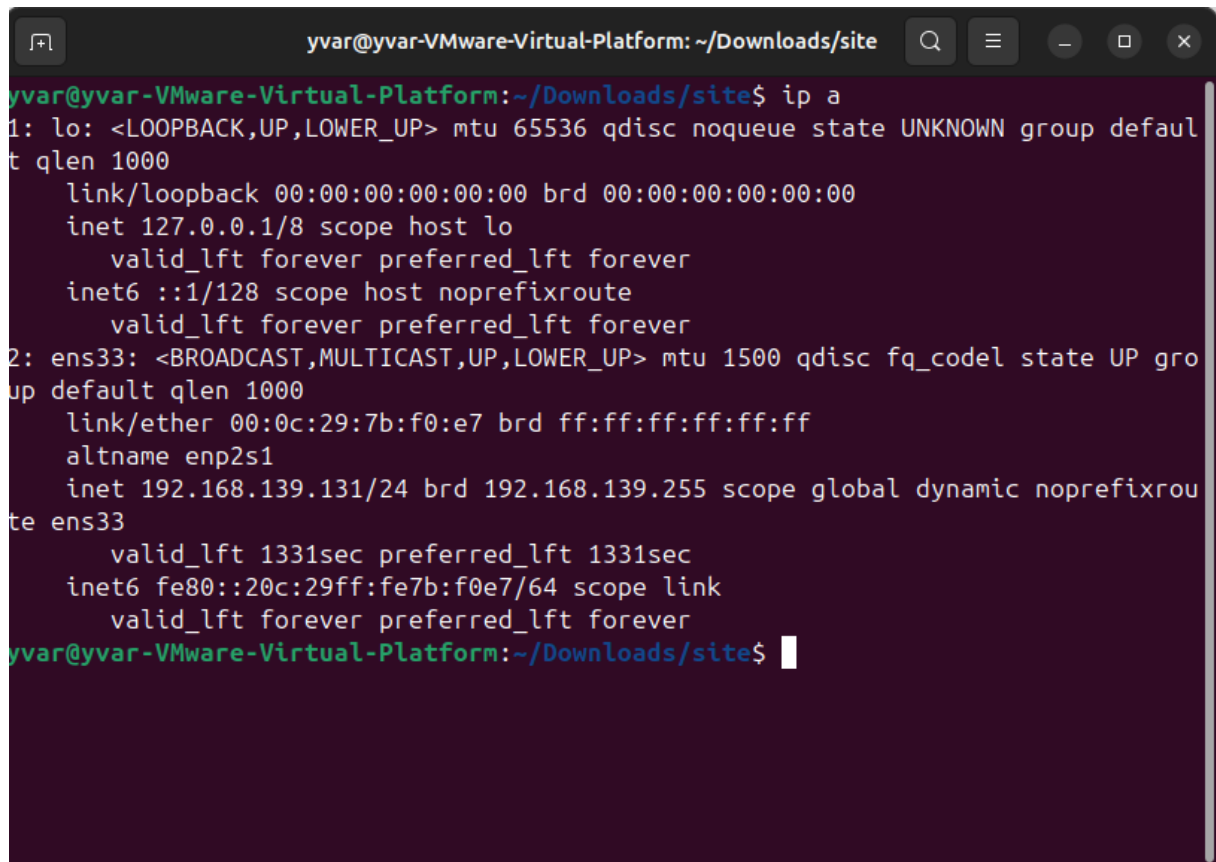
yvar@yvar-VMware-Virtual-Platform:~/Desktop$
```

Explain the above calculation in your own words.

De /25 betekend dat 25 bits worden gebruikt voor het netwerk, daarnaast worden 7 bits gebruikt voor de host adres. Met de 7 host bits zijn er $2^7 = 128$ mogelijke IP adressen. De eerste en de laatste IP adres zijn al ingebruik daardoor kom je uit op 126 IP.

Assignment 6.4: HTML

Screenshot IP address Ubuntu VM:

A terminal window titled 'yvar@yvar-VMware-Virtual-Platform: ~/Downloads/site'. The user has entered the command 'ip a'. The output shows details for the loopback interface 'lo' (127.0.0.1) and the ethernet interface 'ens33' (192.168.139.131).

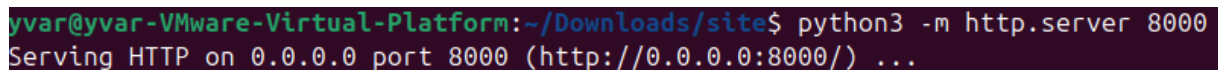
```
yvar@yvar-VMware-Virtual-Platform: ~/Downloads/site$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::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:29:7b:f0:e7 brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.139.131/24 brd 192.168.139.255 scope global dynamic noprefixroute ens33
        valid_lft 1331sec preferred_lft 1331sec
    inet6 fe80::20c:29ff:fe7b:f0e7/64 scope link
        valid_lft forever preferred_lft forever
yvar@yvar-VMware-Virtual-Platform: ~/Downloads/site$
```

Screenshot of Site directory contents:

A terminal window showing the command 'pwd' and its output, which is the full path to the current directory.

```
yvar@yvar-VMware-Virtual-Platform: ~/Downloads/site$ pwd
/home/yvar/Downloads/site
```

Screenshot python3 webserver command:

A terminal window showing the command 'python3 -m http.server 8000' and its output, which indicates that the HTTP server is running on port 8000.

```
yvar@yvar-VMware-Virtual-Platform: ~/Downloads/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

Mijn hobby's

1. Gamen
2. Padel



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.

```
C:\Users\yvarf\.jdk\ms-21.0.8\bin\java.exe

Maak een keuze:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number
4. Calculate network segment
0. Exit
4
IP address: 192.168.1.100
Subnet mask: 255.255.255.224

Binary calculation:
11000000 & 11111111 = 11000000
10101000 & 11111111 = 10101000
00000001 & 11111111 = 00000001
01100100 & 11100000 = 01100000

Network address (decimal): 192.168.1.96
Network range:
From 192.168.1.96
To 192.168.1.127
```

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