

Template Week 6 – Networking

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Assignment 6.1: Working from home

Screenshot installation openssh-server:

```
roan@roan-VMware-Virtual-Platform:~$ systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
  Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enabled)
  Active: inactive (dead)
TriggeredBy: ● ssh.socket
    Docs: man:sshd(8)
          man:sshd_config(5)
roan@roan-VMware-Virtual-Platform:~$
```

Screenshot successful SSH command execution:

```
roan@roan-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
            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:29:09:0f:cf brd ff:ff:ff:ff:ff:ff
        altname enp2s1
        inet 192.168.139.132/24 brd 192.168.139.255 scope global dynamic noprefixroute ens33
            valid_lft 1359sec preferred_lft 1359sec
            inet6 fe80::20c:29ff:fe09:fccf/64 scope link
                valid_lft forever preferred_lft forever
roan@roan-VMware-Virtual-Platform:~$
```

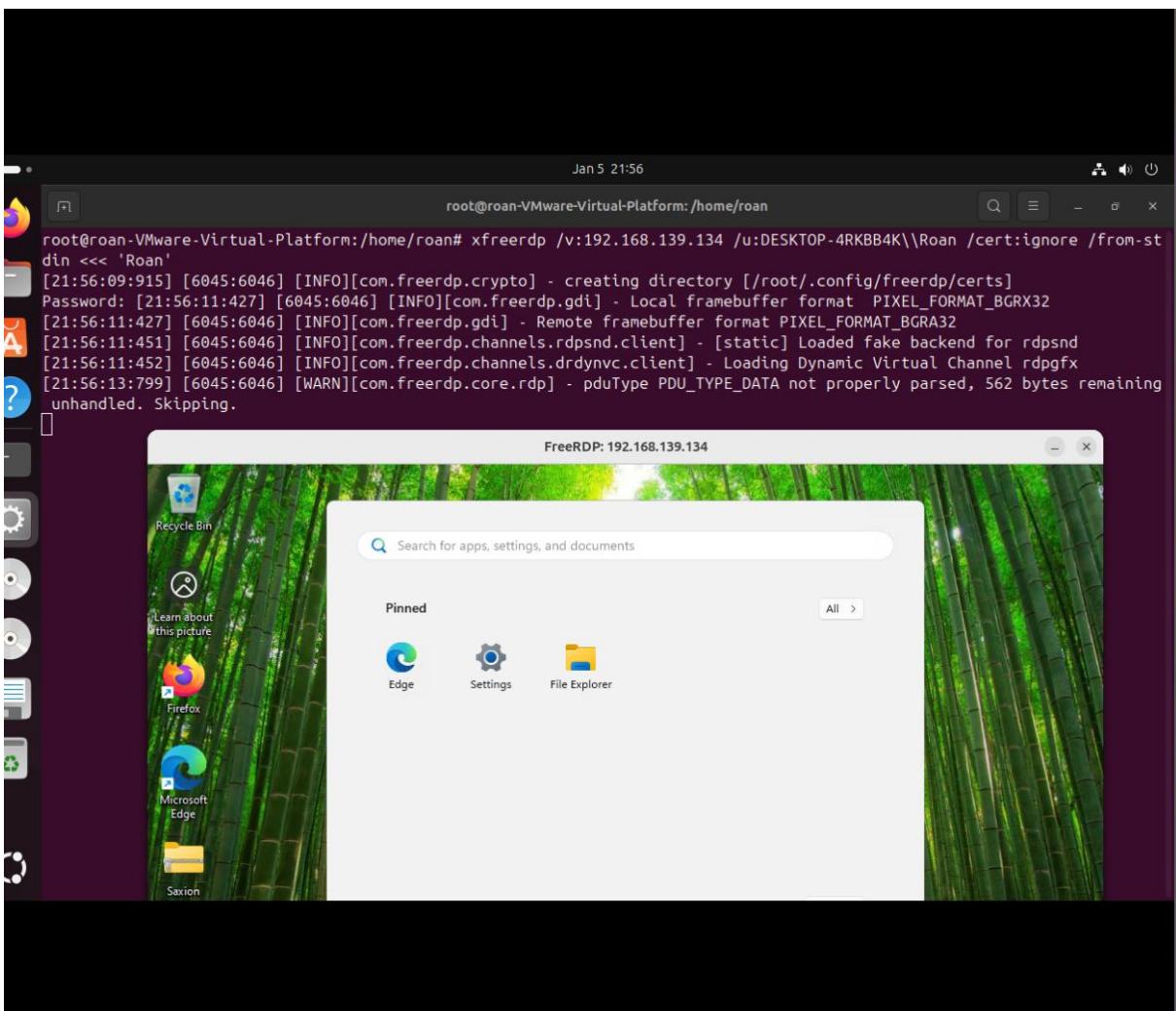
Screenshot successful execution SCP command:

```
C:\Users\Zbook>scp "C:\Users\Zbook\OneDrive - Saxion\Bureaublad\linuxtest.txt" roan@192.168.139.132:/home/roan/
roan@192.168.139.132's password:
linuxtest.txt

100%   11      5.4KB/s  00:00
C:\Users\Zbook>

roan@roan-VMware-Virtual-Platform:~$ ls -l
total 2456
-rw-rw-r-- 1 roan roan  90161 Jan  5 17:29 apple2.jpg
-rw-r--r-- 1 root root  1856 Jan  5 17:21 decoded.gif
-rw-r--r-- 1 root root  1856 Jan  5 17:23 decoded.txt
drwxr-xr-x 2 roan roan  4096 Sep  7 16:46 Desktop
drwxr-xr-x 3 roan roan  4096 Jan  5 16:45 Documents
drwxr-xr-x 6 roan roan  4096 Jan  2 16:40 Downloads
-rw-r--r-- 1 root root  2509 Jan  5 17:20 email-base64.txt
-rw-rw-r-- 1 roan roan    11 Jan  5 21:07 linuxtest.txt
-rw-r--r-- 1 root root    48 Jan  5 17:30 message.txt
drwxr-xr-x 2 roan roan  4096 Sep  7 16:46 Music
-rw-rw-r-- 1 roan roan 2361308 Jan  5 17:07 oldcar
drwxr-xr-x 2 roan roan  4096 Sep  7 16:46 Pictures
drwxr-xr-x 2 roan roan  4096 Sep  7 16:46 Public
drwx----- 7 roan roan  4096 Jan  5 16:34 snap
drwxr-xr-x 2 roan roan  4096 Sep  7 16:46 Templates
-rw-r--r-- 1 root root     0 Jan  5 15:59 testbestandviafileexplorer.txt
drwxr-xr-x 2 roan roan  4096 Sep  7 16:46 Videos
roan@roan-VMware-Virtual-Platform:~$
```

Screenshot remmina:



Remmina is niet gelukt want ik moet een domain name aangeven met freerdp werkt het wel.

Assignment 6.2: IP addresses websites

Relevant screenshots nslookup command:

```
C:\Windows\System32>nslookup
Default Server: 089-101-251229.customer.vmie.ie
Address: 89.101.251.229

> amazon.com
Server: 089-101-251229.customer.vmie.ie
Address: 89.101.251.229

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

> google.com
Server: 089-101-251229.customer.vmie.ie
Address: 89.101.251.229

Non-authoritative answer:
Name: google.com
Addresses: 2a00:1450:400e:801::200e
          142.250.179.206

> one.one.one.one
Server: 089-101-251229.customer.vmie.ie
Address: 89.101.251.229

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

> dns.google.com
Server: 089-101-251229.customer.vmie.ie
Address: 89.101.251.229

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

> bol.com
Server: 089-101-251229.customer.vmie.ie
Address: 89.101.251.229

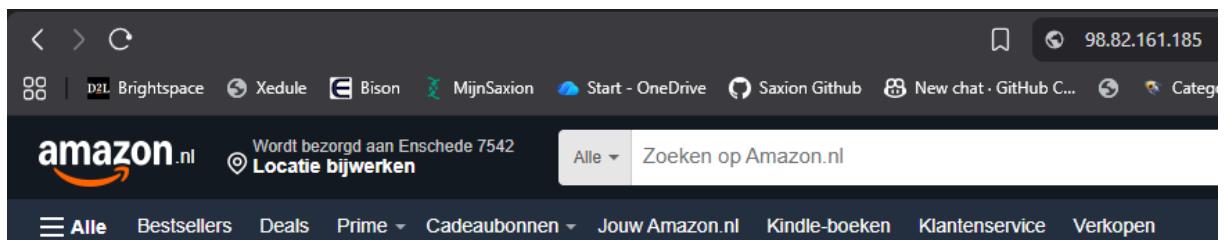
Non-authoritative answer:
Name: bol.com
Address: 79.170.100.62

> w3schools.com
Server: 089-101-251229.customer.vmie.ie
Address: 89.101.251.229

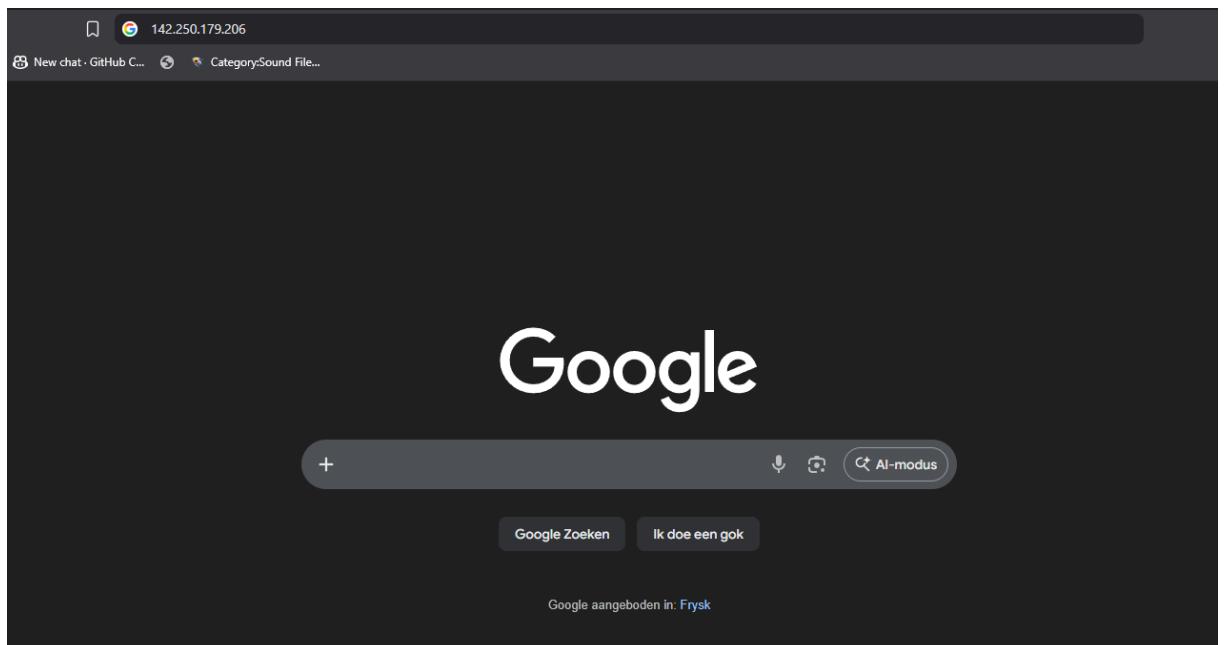
Non-authoritative answer:
Name: w3schools.com
Addresses: 76.223.115.82
          13.248.240.135

>
C:\Windows\System32>
```

Screenshot website visit via IP address:



Hier zie je dat ik op amazon kom



hier zie je dat ik op google kom via het IP address



1.1.1.1

The free app that makes your Internet safer.

Now available for even more devices.



App Store



Google Play



macOS



Windows



Linux

[macOS Installation Instructions](#)

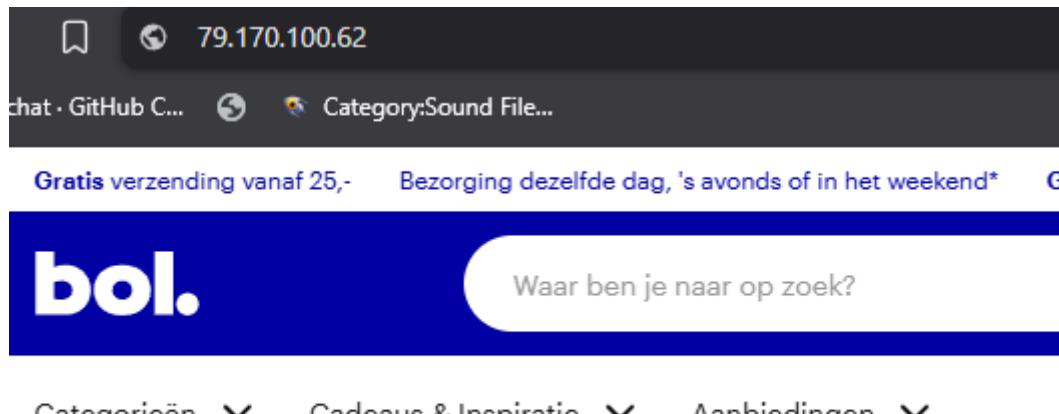
[Windows Installation Instructions](#)

[Linux Installation Instructions](#)

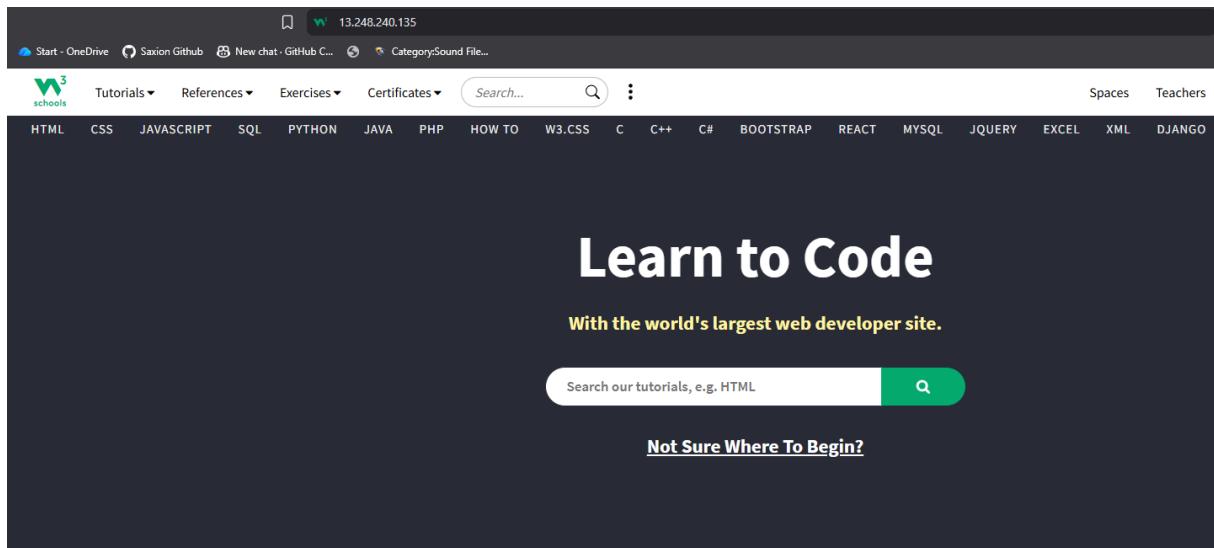
hier zie je dat ik op one one one kom via het IP address



Hier zie je dat ik op DNS google kom via het IP address



Hier zie je dat ik op Bol kom via het IP address



hier zie je dat ik op w3school kom via het IP address

Assignment 6.3: subnetting

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

128 ip adressen namelijk

$32 - 25 = 7$ bits, twee tot de macht 7 is 128

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

254 bij een /24 1 bit voor broadcast en 1 bit voor het network

Bij /25 is het dan 126

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 11111111
=>
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

root@roan-VMware-Virtual-Platform:/home/roan#
```

Explain the above calculation in your own words.

Het ip adres 192.168.110.128 gebruikt een subnet van 255.255.255.128, dat betekent dat er nog 7 bitjes over zijn. Deze 7 bitjes moet je in de macht van 2 doen vanwege het tweetallig stelsel (binair) dan wordt 128, daar moet je er nog twee van af halen vanwege het broadcast address en het network address. Dan heb je dus 126 over.

Assignment 6.4: HTML

Screenshot IP address Ubuntu VM:

```
roan@roan-VMware-Virtual-Platform:~/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:29:09:0f:cf brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.139.132/24 brd 192.168.139.255 scope global dynamic noprefixroute ens33
        valid_lft 1414sec preferred_lft 1414sec
    inet6 fe80::20c:29ff:fe09:fcf/64 scope link
        valid_lft forever preferred_lft forever
```

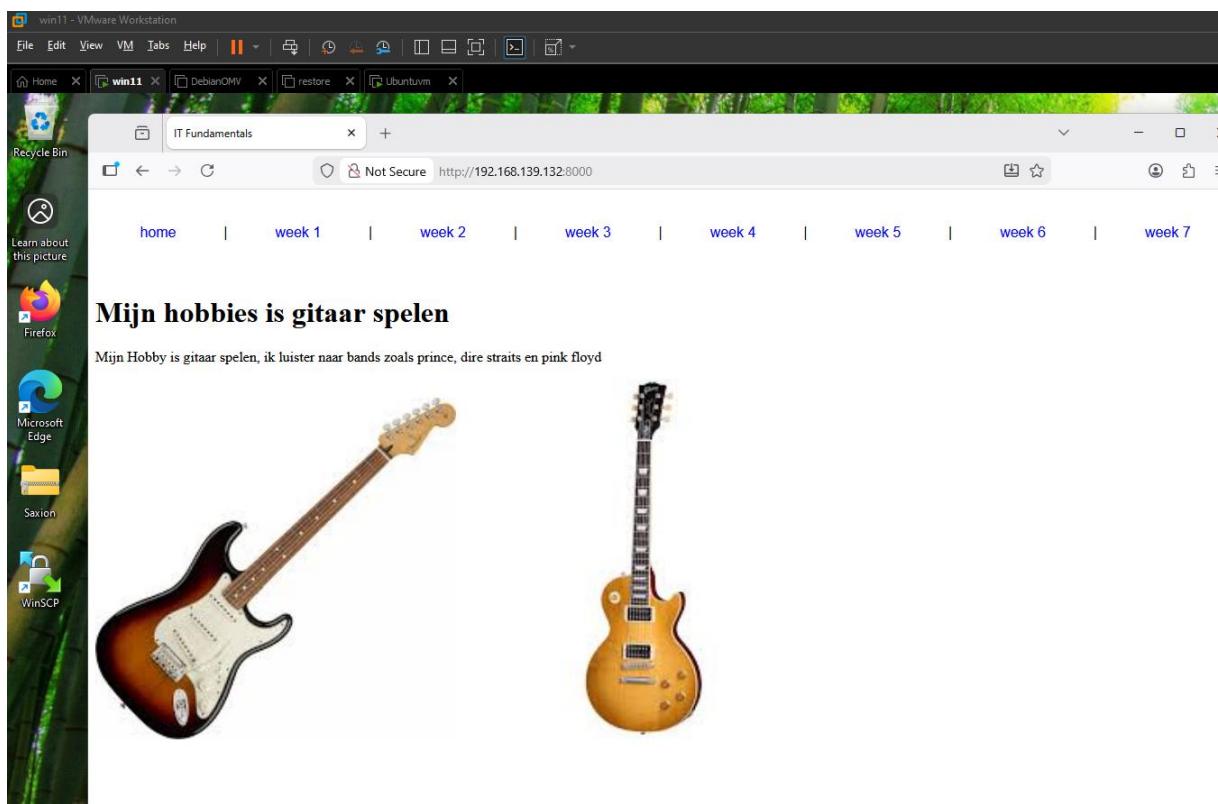
Screenshot of Site directory contents:

```
roan@roan-VMware-Virtual-Platform:~$ cd site
roan@roan-VMware-Virtual-Platform:~/site$ ls
css  home.html  images  index.html  pdf  week1.html  week2.html  week3.html  week4.html  week5.html  week6.html  week7.html
```

Screenshot python3 webserver command:

```
roan@roan-VMware-Virtual-Platform:~/site$ python3 -m http.server 8000
Serving HTTP on 0.0.0.0 port 8000 (http://0.0.0.0:8000/) ...
192.168.139.1 -- [06/Jan/2026 13:58:39] "GET / HTTP/1.1" 200 -
192.168.139.1 -- [06/Jan/2026 13:58:39] "GET /css/mypdfstyle.css HTTP/1.1" 200 -
192.168.139.1 -- [06/Jan/2026 13:58:39] "GET /home.html HTTP/1.1" 200 -
192.168.139.1 -- [06/Jan/2026 13:58:39] "GET /images/gitaar1.jpeg HTTP/1.1" 200 -
192.168.139.1 -- [06/Jan/2026 13:58:39] "GET /images/gitaar2.jpeg HTTP/1.1" 200 -
192.168.139.1 -- [06/Jan/2026 13:58:39] code 404, message File not found
192.168.139.1 -- [06/Jan/2026 13:58:39] "GET /favicon.ico HTTP/1.1" 404 -
```

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.

The screenshot shows a Java development environment with a code editor and a terminal window.

Code Editor:

```
2 C:\Users\Zbook\OneDrive - Saxon\bureaublad\HBO\Jaar_1\Kwartiel_1\Introductie Programmeren\Lists2
de
exercis1
exercis2
src
  Application
  Exercise2.iml
exercis3
exercis4
exercis5
Menu:
1. Is number odd?
2. Is number a power of 2?
3. Two's complement of number?
4. Calculate network address
4
192.168.1.100
255.255.255.224
Network address: 192.168.1.96

APPLICATION EXITED NORMALLY
```

Terminal Window:

```
Bestand   lim   +   -   x
Bestand   Bewerken   Weergeven
roan 582762
```

```

import nl.saxion.app.SaxionApp;

public class Application implements Runnable {
    public static void main(String[] args) {
        SaxionApp.start(new Application(), 500, 500);
    }

    public void run() {

        SaxionApp.printLine("Menu:");
        SaxionApp.printLine("1. Is number odd?");
        SaxionApp.printLine("2. Is number a power of 2?");
        SaxionApp.printLine("3. Two's complement of number?");
        SaxionApp.printLine("4. Calculate network address");
        int choice = SaxionApp.readInt("Choose an option: ");

        if (choice == 1) {
            int number = SaxionApp.readInt("Enter a number: ");
            if ((number & 1) == 1) {
                SaxionApp.printLine("Number is odd");
            } else {
                SaxionApp.printLine("Number is even");
            }
        } else if (choice == 2) {
            int number = SaxionApp.readInt("Enter a number: ");
            if (number > 0 && (number & (number - 1)) == 0) {
                SaxionApp.printLine(number + " is a power of 2");
            } else {
                SaxionApp.printLine(number + " isn't a power of 2");
            }
        } else if (choice == 3) {
            int number = SaxionApp.readInt("Enter a number: ");
            number = (~number) + 1;
            SaxionApp.printLine("Two's complement: " + number);
        } else if (choice == 4) {

            // Geen tekst bij de readstring, als ik er tekst bij deed kreeg ik de SaxionApp.readString(color:) en dan kijkt hij naar kleur
            String ip = SaxionApp.readString();
            String subnet = SaxionApp.readString();

            // split het ip en subnet op basis van een . en stop het in String[]
            String[] ipParts = ip.split("\\.");
            String[] subnetParts = subnet.split("\\.");

            SaxionApp.print("Network address: ");

            // loopje voor het berekenen van netwerk address, door de & operator te gebruiken.
            for (int i = 0; i < 4; i++) {
                int result =
                    Integer.parseInt(ipParts[i])
                    & Integer.parseInt(subnetParts[i]);

                SaxionApp.print(result);
                if (i < 3) SaxionApp.print(".");
            }
            //kleine failsafe als het niet werkt.
        } else {
            SaxionApp.printLine("werkt niet");
        }
    }
}

```

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