

Template Week 6 – Networking

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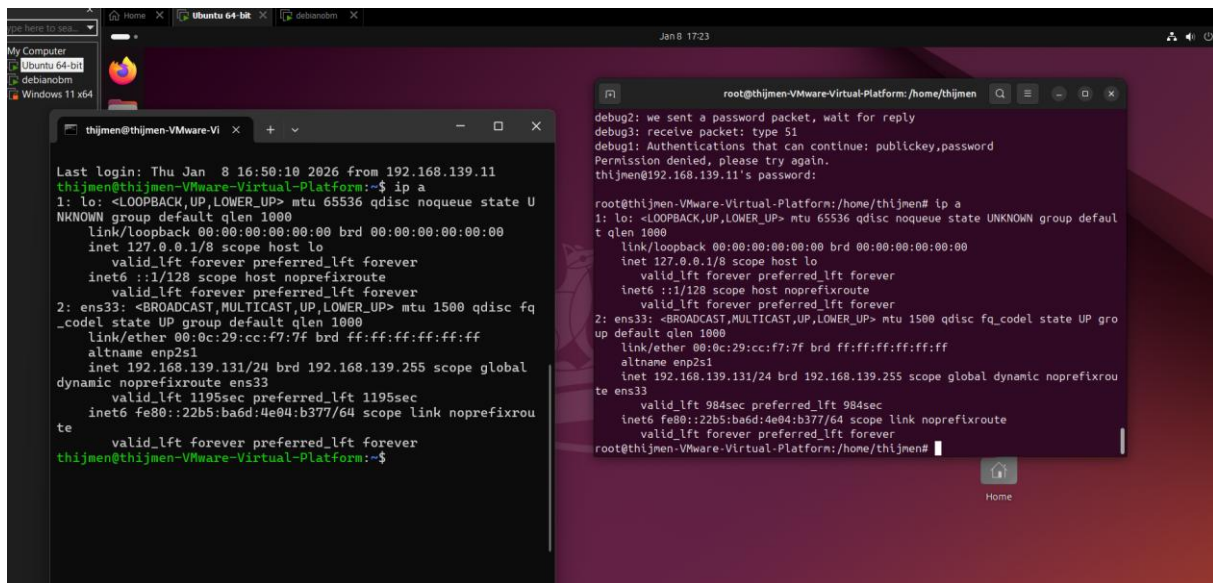
Assignment 6.1: Working from home

Screenshot installation openssh-server:

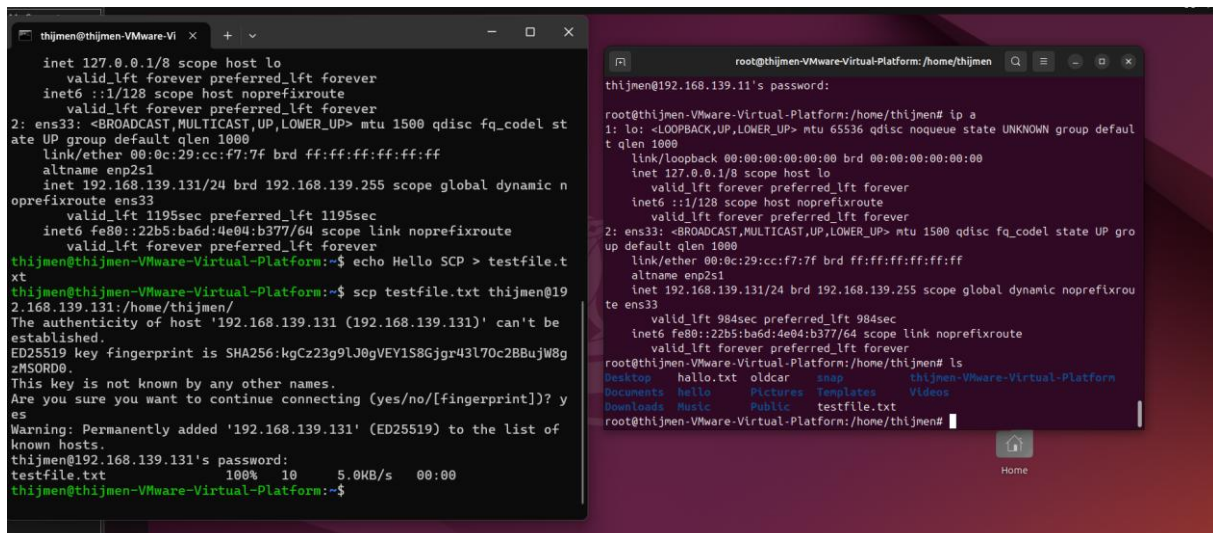
```
root@thijmen-VMware-Virtual-Platform:/home/thijmen# systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enab>
   Active: active (running) since Thu 2026-01-08 16:49:37 CET; 27min ago
   TriggeredBy: ● ssh.socket
     Docs: man:sshd(8)
           man:sshd_config(5)
   Process: 4763 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
  Main PID: 4766 (sshd)
    Tasks: 1 (limit: 4537)
   Memory: 3.2M (peak: 4.1M)
      CPU: 147ms
   CGroup: /system.slice/ssh.service
           └─4766 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Jan 08 16:49:37 thijmen-VMware-Virtual-Platform systemd[1]: Starting ssh.servic>
Jan 08 16:49:37 thijmen-VMware-Virtual-Platform sshd[4766]: Server listening on>
Jan 08 16:49:37 thijmen-VMware-Virtual-Platform systemd[1]: Started ssh.servic>
Jan 08 16:49:37 thijmen-VMware-Virtual-Platform sshd[4766]: Server listening on>
Jan 08 16:50:09 thijmen-VMware-Virtual-Platform sshd[4785]: Accepted password f>
Jan 08 16:50:09 thijmen-VMware-Virtual-Platform sshd[4785]: pam_unix(sshd:sessi>
lines 1-20/20 (END)
```

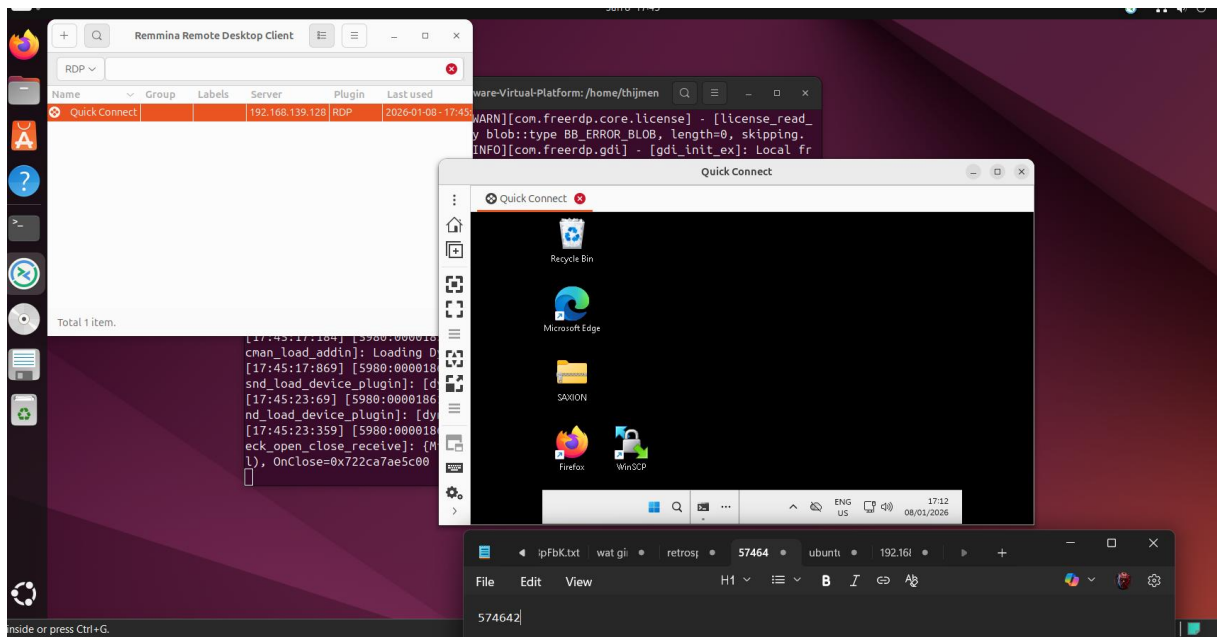
Screenshot successful SSH command execution:



Screenshot successful execution SCP command:



Screenshot remmina:



Je ziet hier da tik via remmina geconnect ben met mijn windows vm

Assignment 6.2: IP addresses websites

Relevant screenshots nslookup command:

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

```
C:\Users\thijm>nslookup amazon.com  
Server: e-kw-mer-ib01.infra.saxion.net  
Address: 145.76.14.10
```

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

```
C:\Users\thijm>nslookup google.com  
Server: e-kw-mer-ib01.infra.saxion.net  
Address: 145.76.14.10
```

```
Non-authoritative answer:  
Name: google.com  
Addresses: 2a00:1450:400e:801::200e  
           142.250.179.142
```

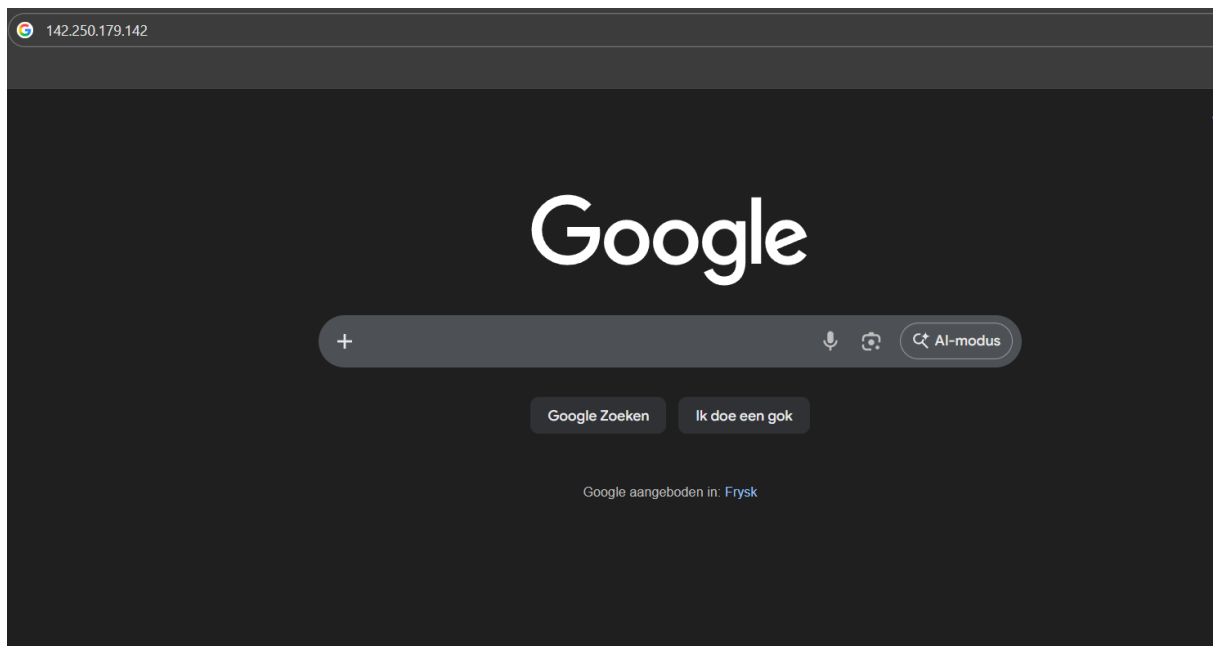
```
C:\Users\thijm>nslookup one.one.one.one  
Server: e-kw-mer-ib01.infra.saxion.net  
Address: 145.76.14.10
```

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

```
C:\Users\thijm>nslookup dns.google.com  
Server: e-kw-mer-ib01.infra.saxion.net  
Address: 145.76.14.10
```

```
Non-authoritative answer:
```

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 ip adressen

$32 - 25 = 7$ 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 een 25/ dan is het 126

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

```
thijmen@thijmen-VMware-Virtual-Platform:~$ 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

thijmen@thijmen-VMware-Virtual-Platform:~$
```

Explain the above calculation in your own words.

Het adres 192.168.110.128 gebruikt een subnet 255.255.255.128. Dit betekent dat er nog 7 bits over zijn als je die in de macht van 2 doet krijgt je 128. Je moet er vervolgens nog 2 bits vanaf halen voor het broadcast en het netwerk adres en dan krijg je 126

Assignment 6.4: HTML

Screenshot IP address Ubuntu VM:

```
thijmen@thijmen-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:cc:f7:7f brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.139.131/24 brd 192.168.139.255 scope global dynamic noprefixroute
    te ens33
        valid_lft 1180sec preferred_lft 1180sec
    inet6 fe80::22b5:ba6d:4e04:b377/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
thijmen@thijmen-VMware-Virtual-Platform:~$
```

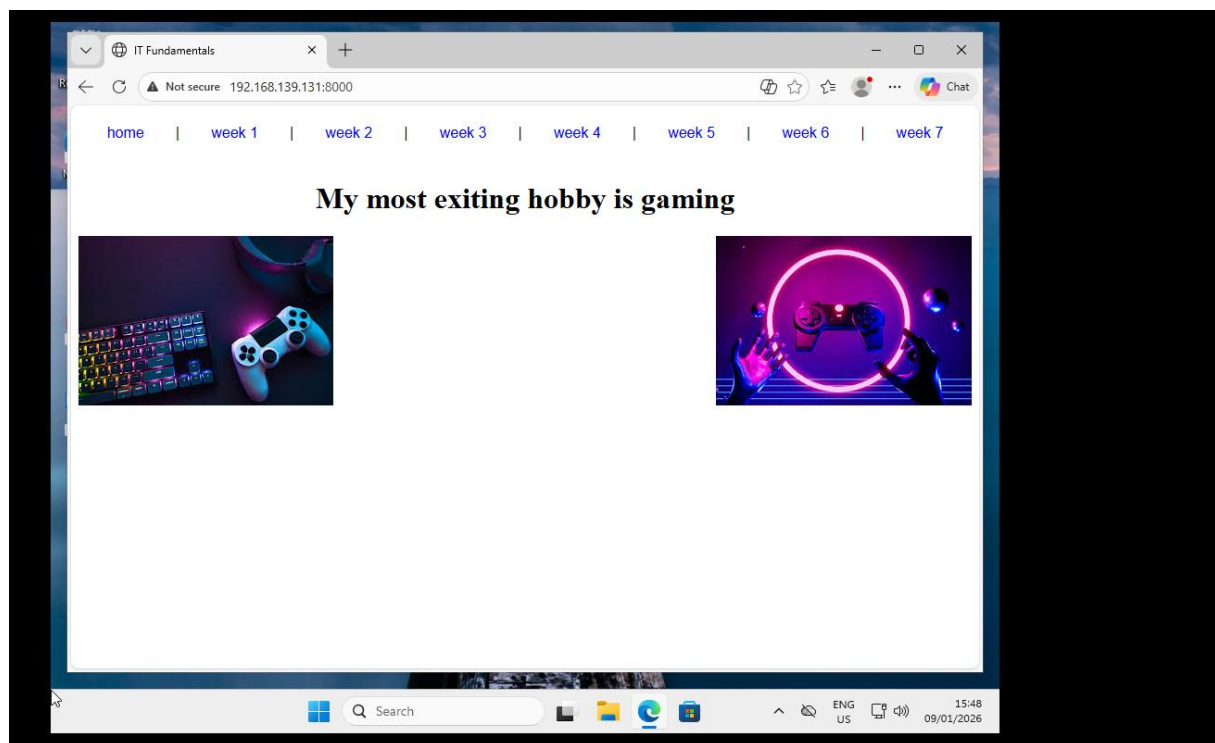
Screenshot of Site directory contents:

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

Screenshot python3 webserver command:

```
thijmen@thijmen-VMware-Virtual-Platform:~$ cd Downloads
thijmen@thijmen-VMware-Virtual-Platform:~/Downloads$ cd site
thijmen@thijmen-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/) ...
192.168.139.128 - - [09/Jan/2026 16:21:17] "GET / HTTP/1.1" 200 -
192.168.139.128 - - [09/Jan/2026 16:21:17] "GET /home.html HTTP/1.1" 200 -
192.168.139.128 - - [09/Jan/2026 16:21:17] "GET /css/mypdfstyle.css HTTP/1.1" 200 -
192.168.139.128 - - [09/Jan/2026 16:21:17] "GET /images/Untitled.jpeg HTTP/1.1" 200 -
192.168.139.128 - - [09/Jan/2026 16:21:17] "GET /images/gaming.jpeg HTTP/1.1" 200 -
192.168.139.128 - - [09/Jan/2026 16:21:18] code 404, message File not found
192.168.139.128 - - [09/Jan/2026 16:21:18] "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

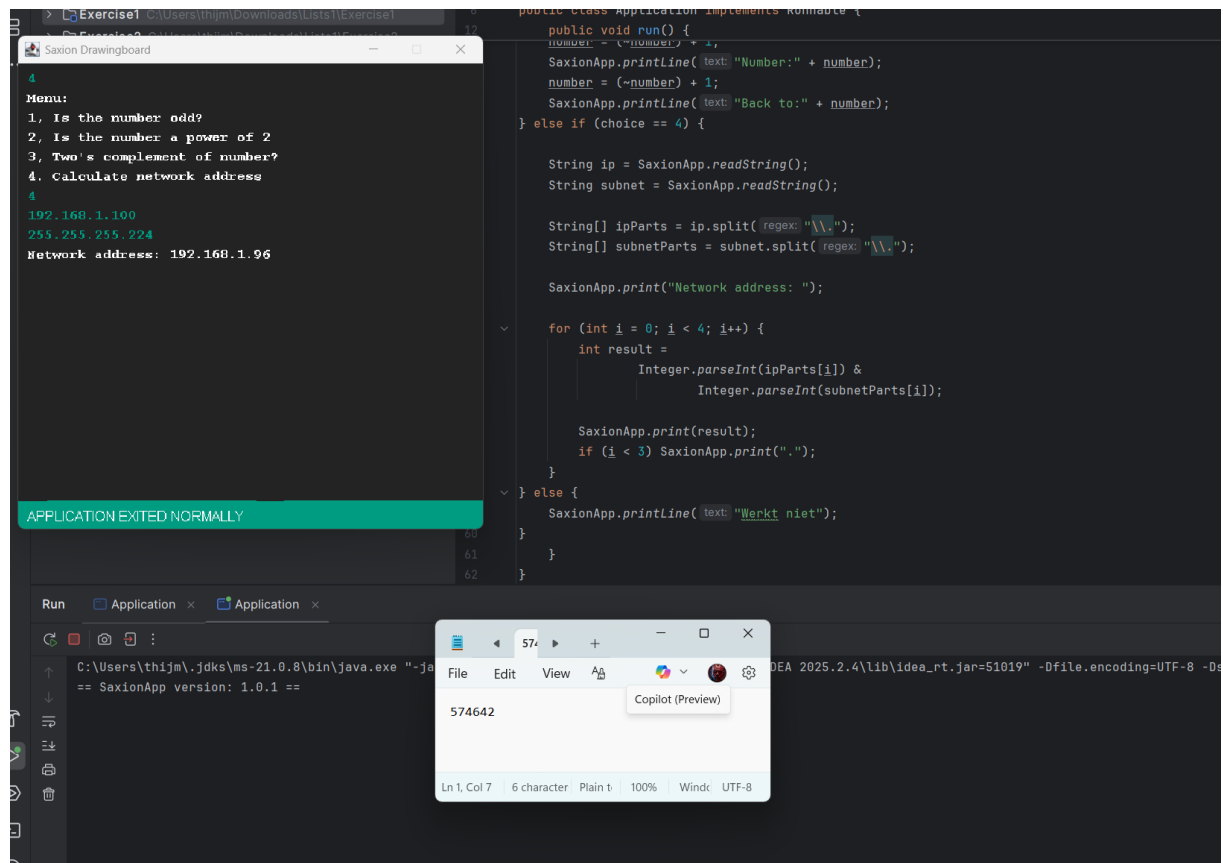
Network Addr: 11000000.10101000.00000001.01100000

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.



```
import nl.saxion.app.SaxionApp;

import java.awt.color.ICC_ColorSpace;
import java.util.ArrayList;

public class Application implements Runnable {

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



```

    }

    public void run() {
int number = SaxionApp.readInt("Please enter a number:");

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

if (choice == 1) {
    if ((number & 1) == 1){
        SaxionApp.println("The number is odd");
    } else {
        SaxionApp.println("The number is even");
    }
} else if (choice == 2) {
    if (number > 0 && (number & (number - 1)) == 0) {
        SaxionApp.println(number + "is a power of 2");
    } else {
        SaxionApp.println(number + "Isnt a power of 2");
    }
} else if (choice == 3){
    number = (~number) + 1;
    SaxionApp.println("Number:" + number);
    number = (~number) + 1;
    SaxionApp.println("Back to:" + number);
} else if (choice == 4) {

    String ip = SaxionApp.readString();
    String subnet = SaxionApp.readString();

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

    SaxionApp.print("Network address: ");

    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(".");
    }
} else {
    SaxionApp.println("Werkt niet");
}

```

```
}  
  }  
}
```

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