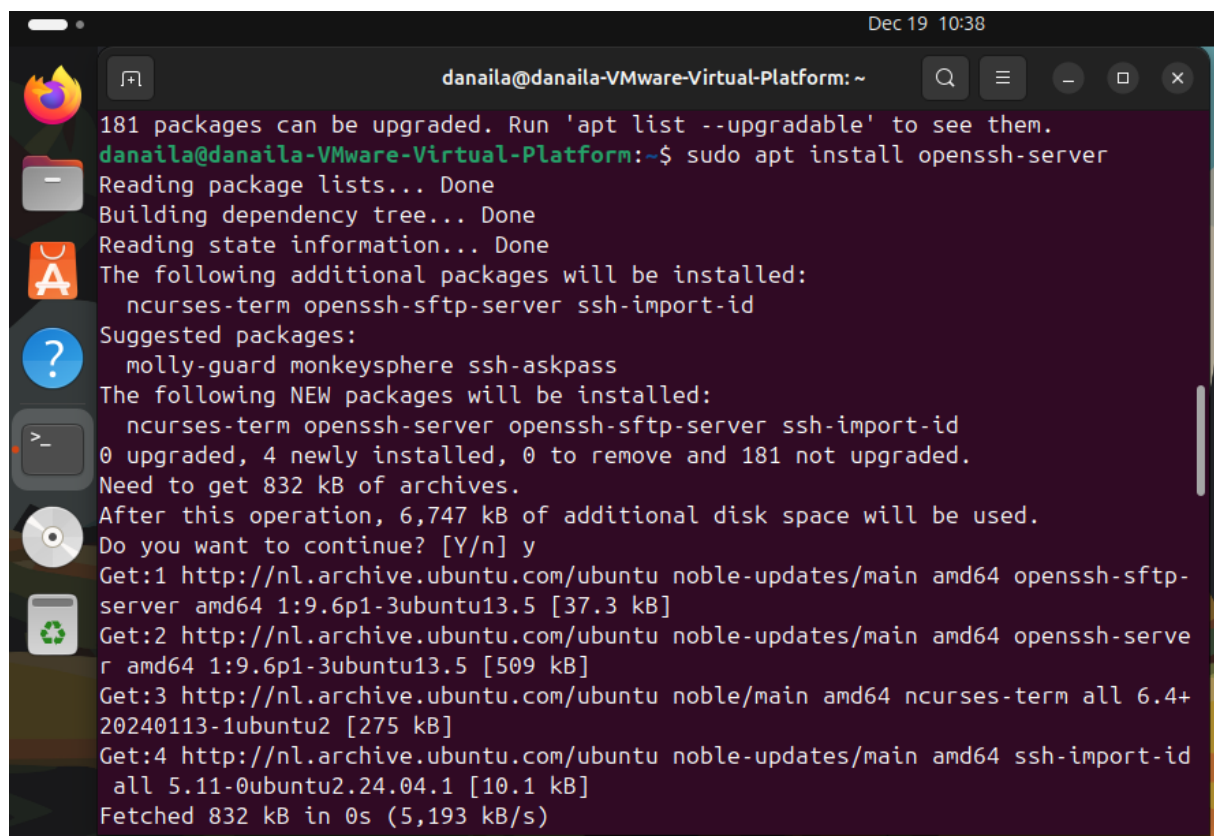


Template Week 6 – Networking

Student number: 562606

Assignment 6.1: Working from home

Screenshot installation openssh-server:

A screenshot of a terminal window titled 'danaila@danaila-VMware-Virtual-Platform: ~'. The terminal shows the command 'sudo apt install openssh-server' being executed. The output indicates that 181 packages can be upgraded and lists additional packages to be installed: ncurses-term, openssh-sftp-server, and ssh-import-id. It also shows the disk space requirements and the progress of downloading the packages from the Ubuntu repository.

```
181 packages can be upgraded. Run 'apt list --upgradable' to see them.
danaila@danaila-VMware-Virtual-Platform:~$ sudo apt install openssh-server
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ncurses-term openssh-sftp-server ssh-import-id
Suggested packages:
  molly-guard monkeysphere ssh-askpass
The following NEW packages will be installed:
  ncurses-term openssh-server openssh-sftp-server ssh-import-id
0 upgraded, 4 newly installed, 0 to remove and 181 not upgraded.
Need to get 832 kB of archives.
After this operation, 6,747 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://nl.archive.ubuntu.com/ubuntu noble-updates/main amd64 openssh-sftp-
server amd64 1:9.6p1-3ubuntu13.5 [37.3 kB]
Get:2 http://nl.archive.ubuntu.com/ubuntu noble-updates/main amd64 openssh-serve
r amd64 1:9.6p1-3ubuntu13.5 [509 kB]
Get:3 http://nl.archive.ubuntu.com/ubuntu noble/main amd64 ncurses-term all 6.4+
20240113-1ubuntu2 [275 kB]
Get:4 http://nl.archive.ubuntu.com/ubuntu noble-updates/main amd64 ssh-import-id
all 5.11-0ubuntu2.24.04.1 [10.1 kB]
Fetched 832 kB in 0s (5,193 kB/s)
```

Screenshot successful SSH command execution:

```
danaïla@danaïla-VMware-Vir × + v
The authenticity of host '192.168.179.135 (192.168.179.135)' can't be established.
ED25519 key fingerprint is SHA256:Cud4zrctSJKoes2TKlatrN612tnPqIbArKbTvUGDYM.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.179.135' (ED25519) to the list of known hosts.
danaïla@192.168.179.135's password:
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-48-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.

173 updates can be applied immediately.
53 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

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.

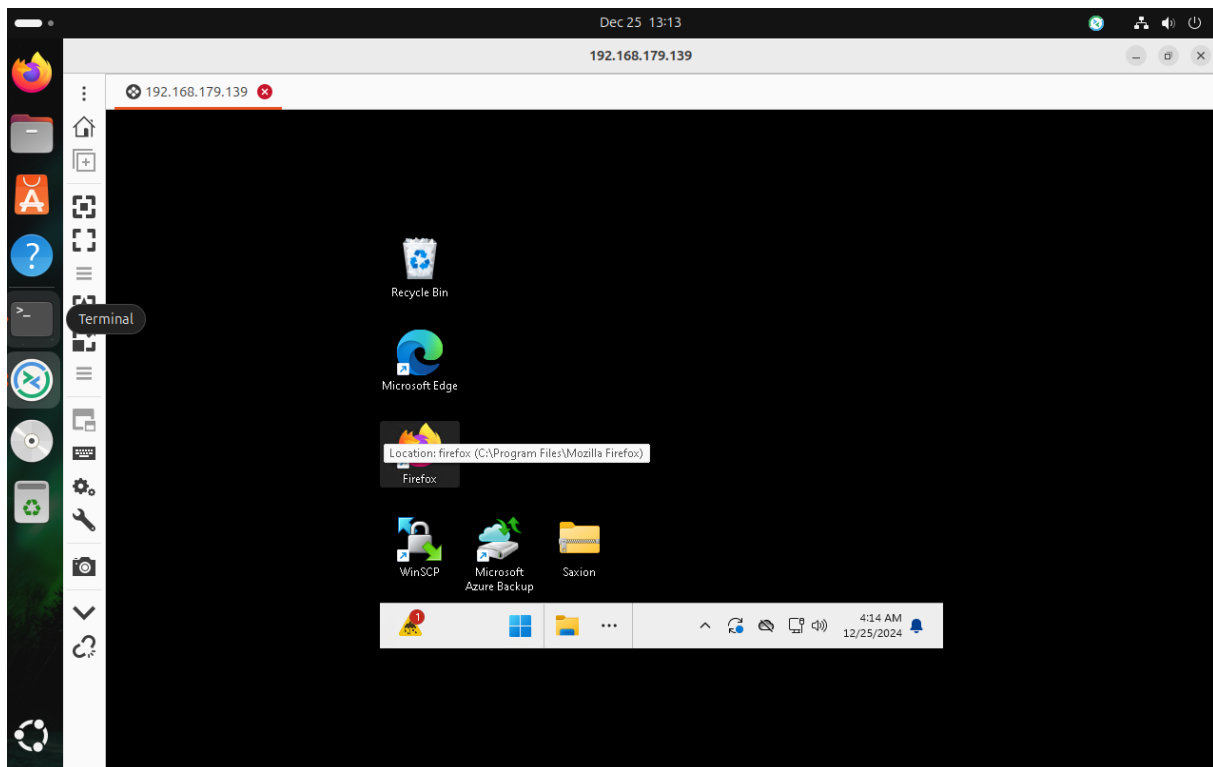
danaïla@danaïla-VMware-Virtual-Platform:~$ |
```

Screenshot successful execution SCP command:

```
PS C:\Users\danaï> scp C:\text.txt danaïla@192.168.179.135:/home/danaïla/
danaïla@192.168.179.135's password:
text.txt                                     100%   0   0.0KB/s   00:00
PS C:\Users\danaï> |

danaïla@danaïla-VMware-Virtual-Platform:~$ ls /home/danaïla/
apple2.jpeg    decoded.gif    Downloads      message.txt    oldcar        sherlock.txt   text.txt
archive.tar    Desktop        email-base64.txt Music          Pictures       snap           Videos
archive.tar.gz Documents       hello          myfile.txt    Public        Templates
danaïla@danaïla-VMware-Virtual-Platform:~$ |
```

Screenshot remmina:



Assignment 6.2: IP addresses websites

Relevant screenshots nslookup command:

```
danaila@danaila-VMware-Virtual-Platform:~$ nslookup
> amazon.com
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
Name:   amazon.com
Address: 52.94.236.248
Name:   amazon.com
Address: 54.239.28.85
Name:   amazon.com
Address: 205.251.242.103
> google.com
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 172.217.17.142
Name:   google.com
Address: 2a00:1450:4017:811::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: 1.1.1.1
Name:   one.one.one.one
Address: 1.0.0.1
Name:   one.one.one.one
Address: 2606:4700:4700::1111
Name:   one.one.one.one
Address: 2606:4700:4700::1001
> dns.google.com
Server:      127.0.0.53
Address:     127.0.0.53#53
```

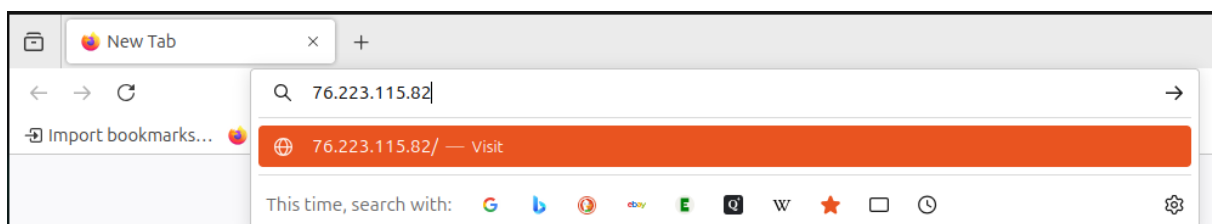
```
Non-authoritative answer:
Name:   dns.google.com
Address: 8.8.8.8
Name:   dns.google.com
Address: 8.8.4.4
Name:   dns.google.com
Address: 2001:4860:4860::8888
Name:   dns.google.com
Address: 2001:4860:4860::8844
```

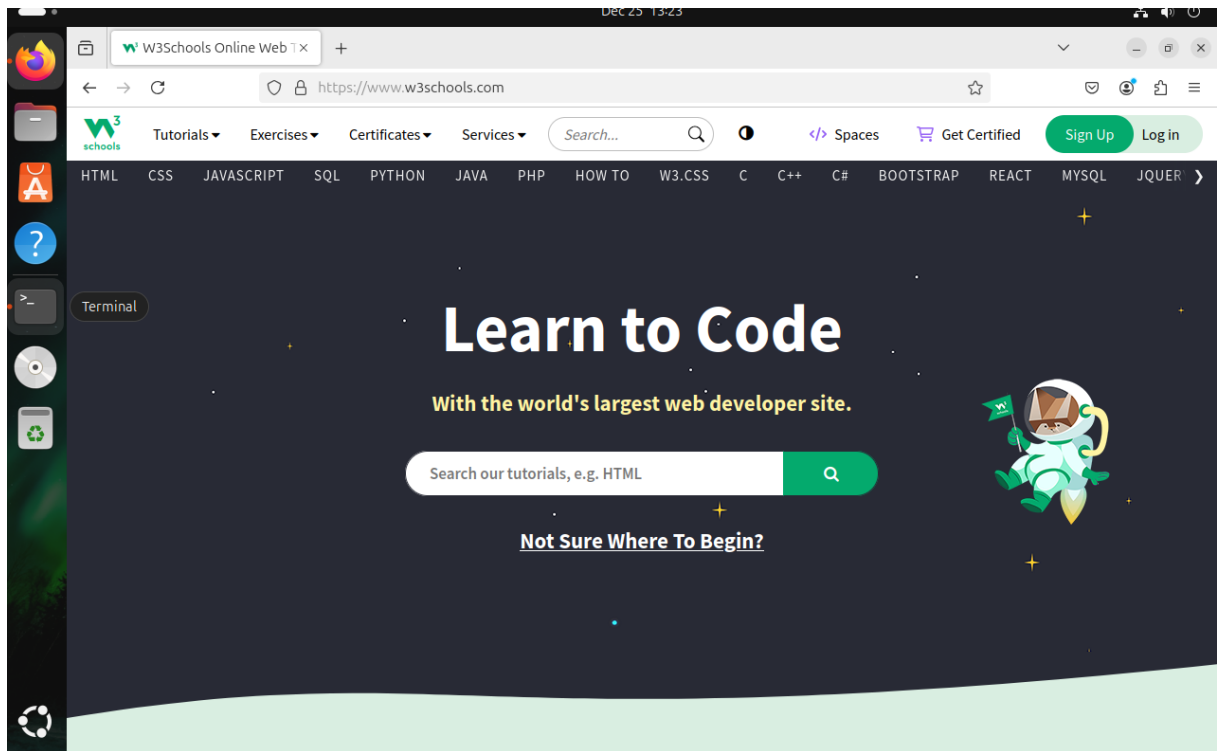
```
> bol.com
Server:      127.0.0.53
Address:     127.0.0.53#53
```

```
Non-authoritative answer:
Name:   bol.com
Address: 34.36.121.47
> 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
Address: 13.248.240.135
>
```

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 addresses

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

192.168.110.129 - 192.168.110.254

Check your two previous answers with this calculator:

<https://www.calculator.net/ip-subnet-calculator.html>

Explain the above calculation in your own words.

The port number of the network configuration is 25 while IP addresses are 32-bit which means that there are 7 left (32-25). The number of IP addresses is calculated by putting 2 to the power of seven which results in 128.

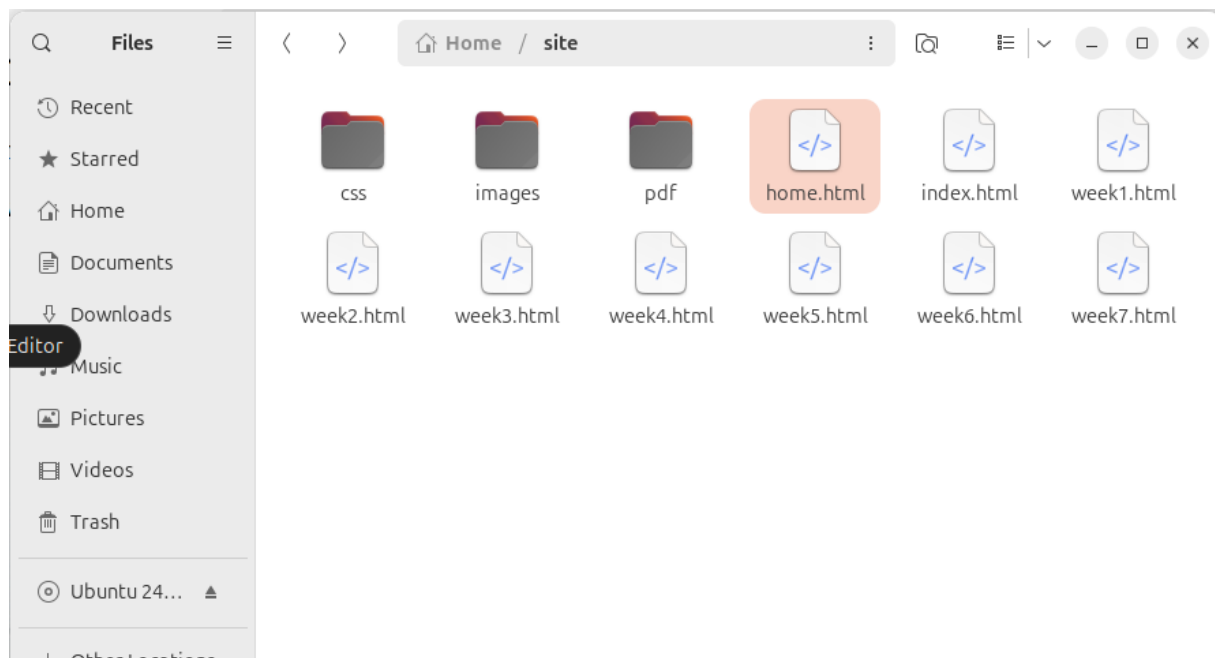
The broadcast address in this range is 192.168.110.255 which is not usable as the network address and the range of the usable ones is between these two numbers: 192.168.110.129 - 192.168.110.254

Assignment 6.4: HTML

Screenshot IP address Ubuntu VM:

```
danaila@danaila-VMware-Virtual-Platform: ~/site
bash: cd: /home/site/: No such file or directory
danaila@danaila-VMware-Virtual-Platform:~$ cd home/site
bash: cd: home/site: No such file or directory
danaila@danaila-VMware-Virtual-Platform:~$ cd /Home/site/
bash: cd: /Home/site/: No such file or directory
danaila@danaila-VMware-Virtual-Platform:~$ cd ~/site
danaila@danaila-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 pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:27:ba:bf brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.179.135/24 brd 192.168.179.255 scope global dynamic noprefixroute ens33
        valid_lft 1128sec preferred_lft 1128sec
    inet6 fe80::20c:29ff:fe27:babf/64 scope link
        valid_lft forever preferred_lft forever
danaila@danaila-VMware-Virtual-Platform:~/site$
```

Screenshot of Site directory contents:



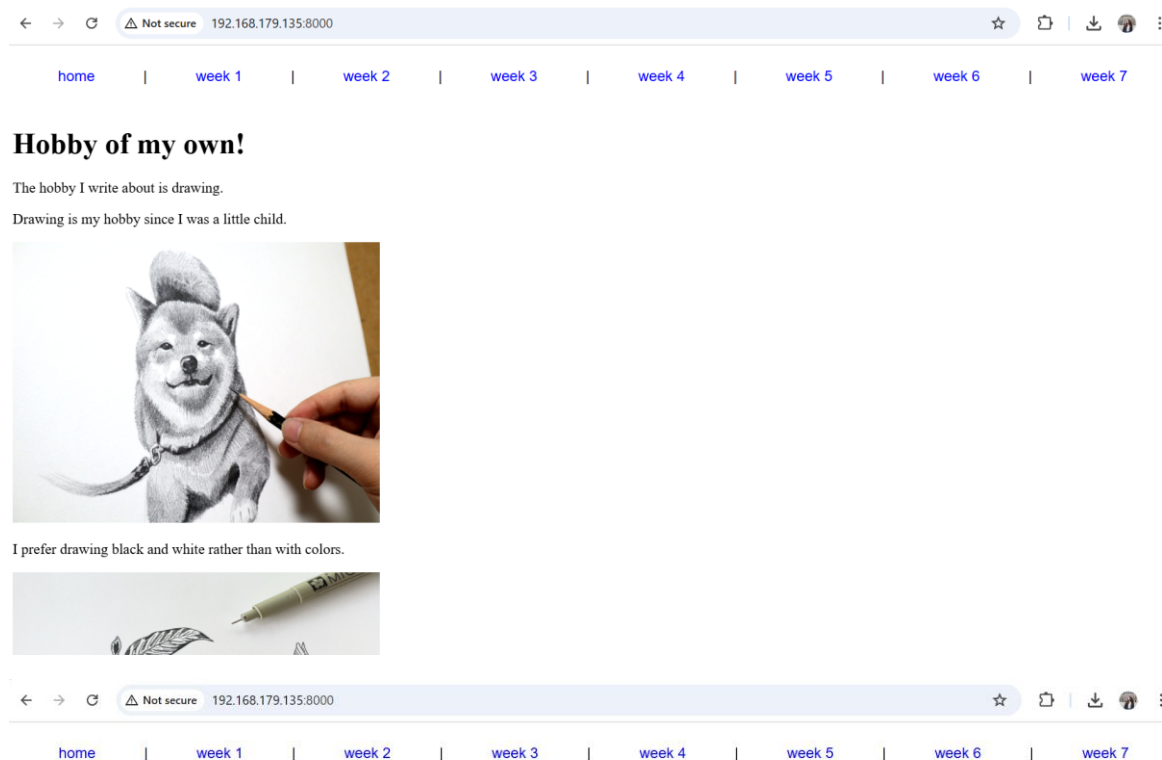
Screenshot python3 webserver command:

```

danaila@danaila-VMware-Virtual-Platform:~/site$ python3 -m http.server 8000
Serving HTTP on 0.0.0.0 port 8000 (http://0.0.0.0:8000/) ...
192.168.179.1 - - [25/Dec/2024 13:57:46] "GET / HTTP/1.1" 200 -
192.168.179.1 - - [25/Dec/2024 13:57:46] "GET /home.html HTTP/1.1" 200 -
192.168.179.1 - - [25/Dec/2024 13:57:46] "GET /css/mypdfstyle.css HTTP/1.1" 200 -
192.168.179.1 - - [25/Dec/2024 13:57:46] "GET /images/original.jpeg HTTP/1.1" 200 -
192.168.179.1 - - [25/Dec/2024 13:57:46] "GET /images/image2.jpg HTTP/1.1" 200 -
192.168.179.1 - - [25/Dec/2024 13:57:46] "GET /images/bro.jpg HTTP/1.1" 200 -
192.168.179.1 - - [25/Dec/2024 13:57:46] code 404, message File not found
192.168.179.1 - - [25/Dec/2024 13:57:46] "GET /favicon.ico HTTP/1.1" 404 -

```

Screenshot web browser visits your site



I prefer drawing black and white rather than with colors.



Realistic drawings are my favourite



Bonus point assignment – week 6

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

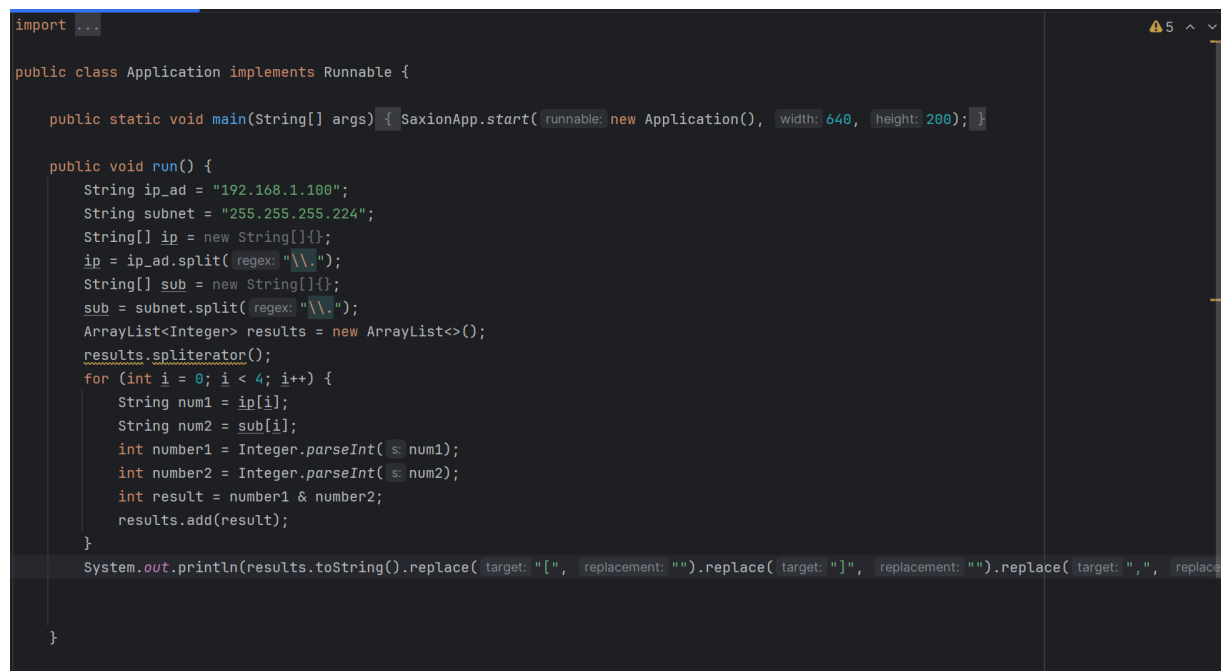
Network Addr: 11000000.10101000.00000001.01100000

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.

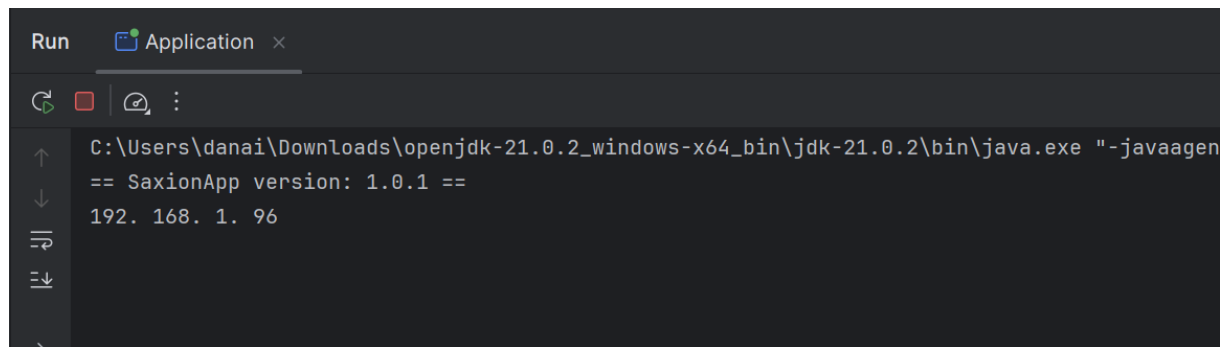


```
import ...

public class Application implements Runnable {

    public static void main(String[] args) { SaxionApp.start( runnable: new Application(), width: 640, height: 200); }

    public void run() {
        String ip_ad = "192.168.1.100";
        String subnet = "255.255.255.224";
        String[] ip = new String[]{};
        ip = ip_ad.split( regex: "\\.");
        String[] sub = new String[]{};
        sub = subnet.split( regex: "\\.");
        ArrayList<Integer> results = new ArrayList<>();
        results.spliterator();
        for (int i = 0; i < 4; i++) {
            String num1 = ip[i];
            String num2 = sub[i];
            int number1 = Integer.parseInt( s: num1);
            int number2 = Integer.parseInt( s: num2);
            int result = number1 & number2;
            results.add(result);
        }
        System.out.println(results.toString().replace( target: "[", replacement: "").replace( target: "]", replacement: "").replace( target: ",", replacement: ""));
    }
}
```

```
Run Application x
C:\Users\danai\Downloads\openjdk-21.0.2_windows-x64_bin\jdk-21.0.2\bin\java.exe "-javaagen
== SaxionApp version: 1.0.1 ==
192.168.1.96
```

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