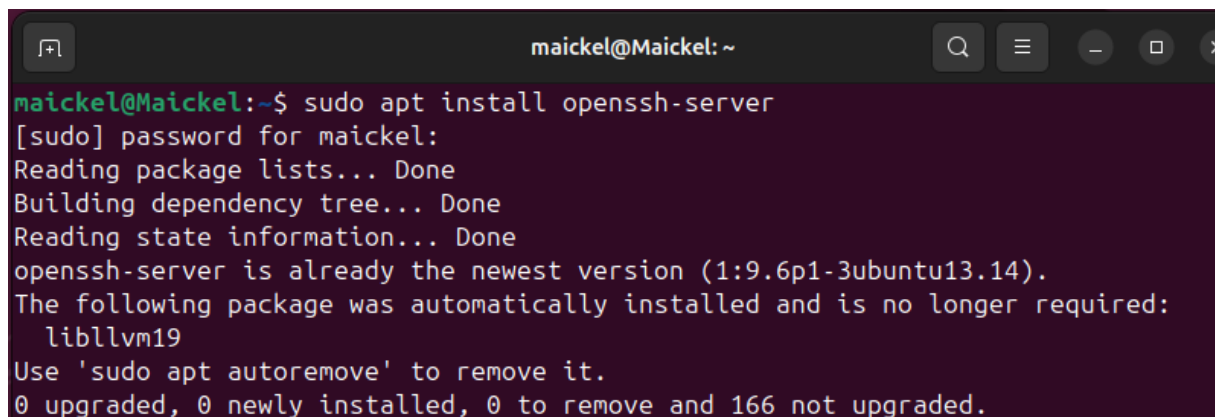


Template Week 6 – Networking

Student number: 589845

Assignment 6.1: Working from home

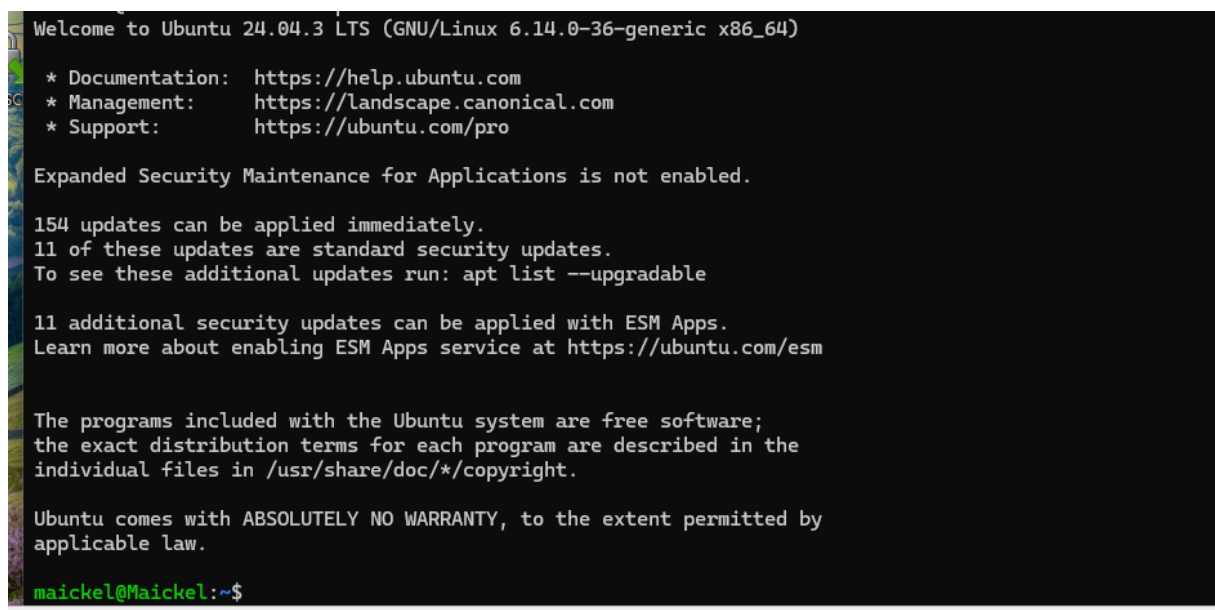
Screenshot installation openssh-server:

A terminal window titled 'maickel@Maickel: ~' showing the command 'sudo apt install openssh-server'. The output indicates that the package is already the newest version (1:9.6p1-3ubuntu13.14) and that libllvm19 was automatically installed and is no longer required. The terminal shows '0 upgraded, 0 newly installed, 0 to remove and 166 not upgraded.'

```
maickel@Maickel:~$ sudo apt install openssh-server
[sudo] password for maickel:
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:
  libllvm19
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 166 not upgraded.
```

(Already installed forgot to make screenshot)

Screenshot successful SSH command execution:

A terminal window showing the output of a successful SSH command execution. The output includes the Ubuntu version (24.04.3 LTS), documentation links, and information about updates and security maintenance. The prompt 'maickel@Maickel:~\$' is visible at the bottom.

```
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.

154 updates can be applied immediately.
11 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

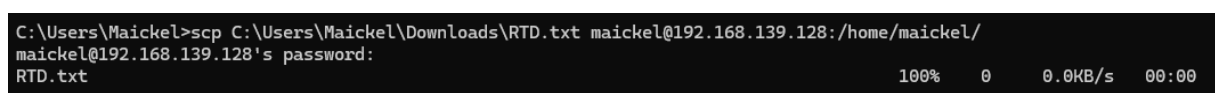
11 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

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.

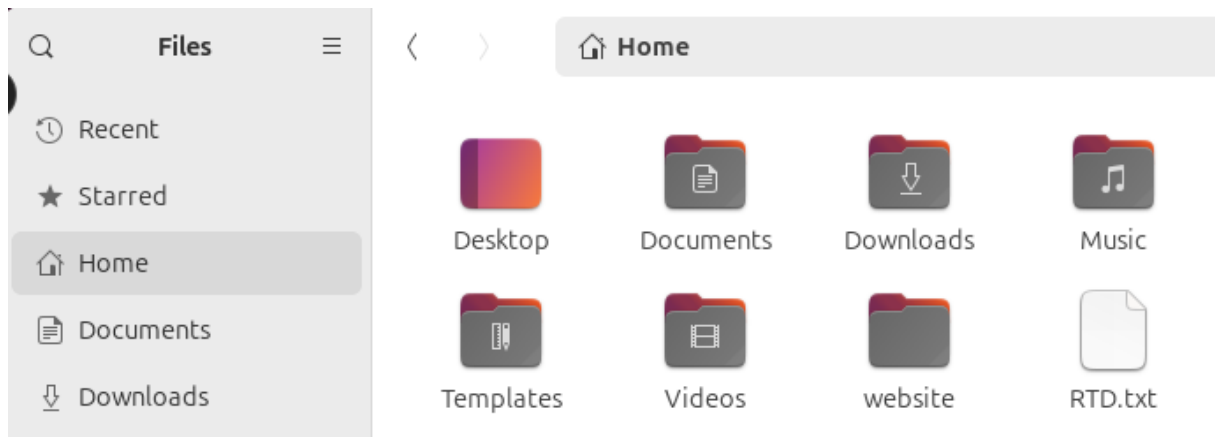
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

maickel@Maickel:~$
```

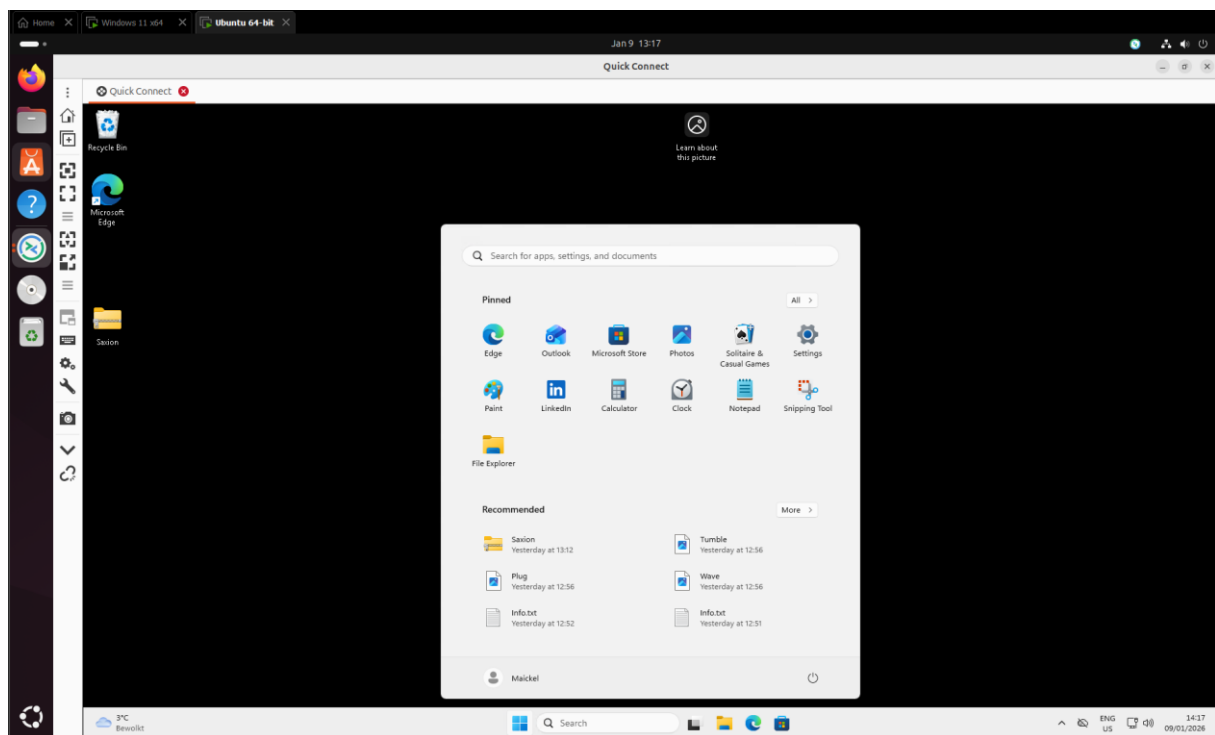
Screenshot successful execution SCP command:

A terminal window showing the successful execution of an SCP command. The command is 'C:\Users\Maickel>scp C:\Users\Maickel\Downloads\RTD.txt maickel@192.168.139.128:/home/maickel/'. The output shows the file 'RTD.txt' being transferred at 100% speed, with 0.0KB/s and 00:00 time.

```
C:\Users\Maickel>scp C:\Users\Maickel\Downloads\RTD.txt maickel@192.168.139.128:/home/maickel/
maickel@192.168.139.128's password:
RTD.txt                                     100%   0   0.0KB/s   00:00
```



Screenshot remmina:



Assignment 6.2: IP addresses websites

Relevant screenshots nslookup command:

```

> amazon.com
Server: d-hk-mer-ib02.infra.saxion.net
Address: 145.2.14.10

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

> google.com
Server: d-hk-mer-ib02.infra.saxion.net
Address: 145.2.14.10

Non-authoritative answer:
Name: google.com
Addresses: 2a00:1450:400e:802::200e
          142.250.179.174

> one.one.one.one
Server: d-hk-mer-ib02.infra.saxion.net
Address: 145.2.14.10

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

> dns.google.com
Server: d-hk-mer-ib02.infra.saxion.net
Address: 145.2.14.10

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: d-hk-mer-ib02.infra.saxion.net
Address: 145.2.14.10

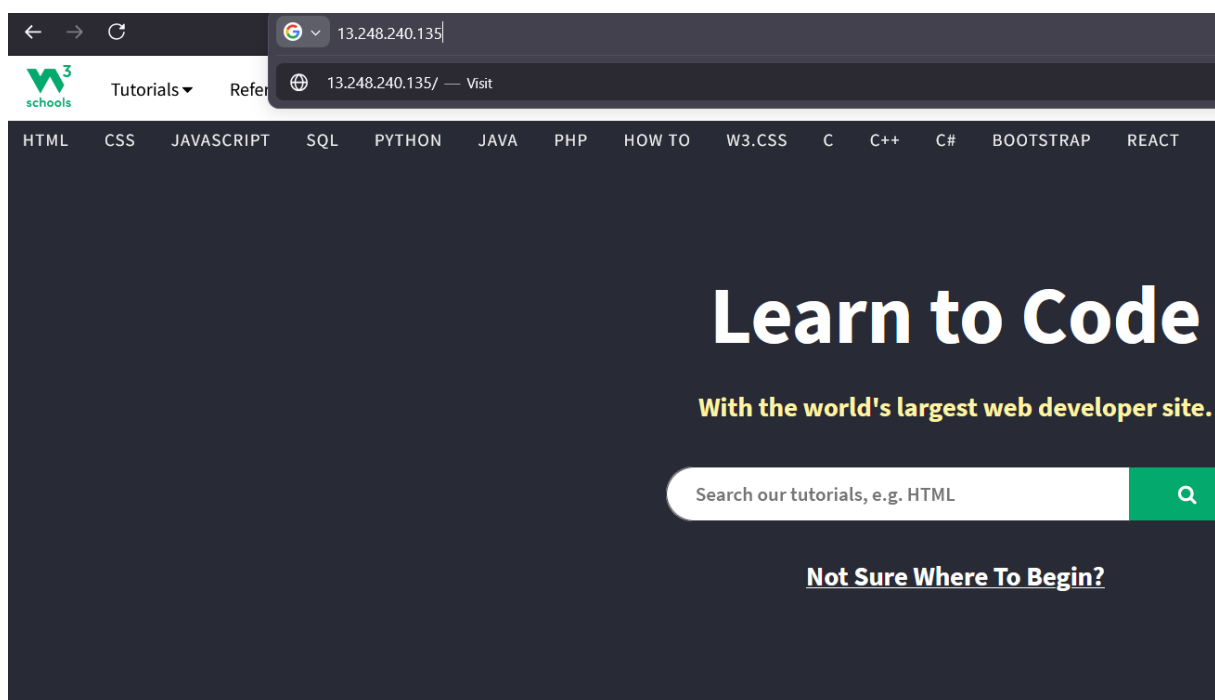
Non-authoritative answer:
Name: bol.com
Address: 79.170.100.62

> w3schools.com
Server: d-hk-mer-ib02.infra.saxion.net
Address: 145.2.14.10

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?

129-254

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

```
maickel@Maickel:~$ 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
```

Explain the above calculation in your own words.

So the first 3 lines are a & calculation to get the amount of IP addresses,

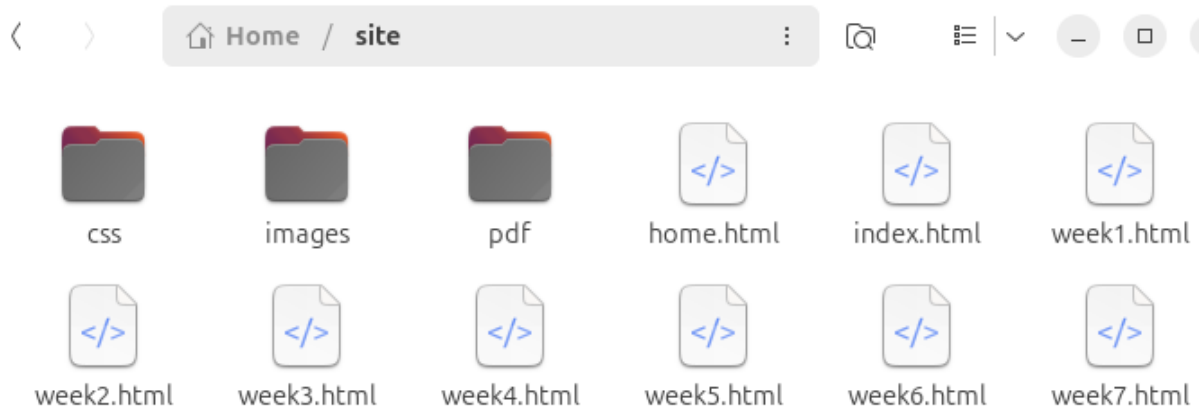
The second part calculates the usable part of the network. It takes the minimal (lowest possible + 1) and highest possible (- 1) to calculate.

Assignment 6.4: HTML

Screenshot IP address Ubuntu VM:

```
maickel@Maickel:~/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:a2:a6:10 brd ff:ff:ff:ff:ff:ff
    altname enp2s1
    inet 192.168.139.128/24 brd 192.168.139.255 scope global dynamic noprefixroute ens33
        valid_lft 989sec preferred_lft 989sec
    inet6 fe80::20c:29ff:fea2:a610/64 scope link
        valid_lft forever preferred_lft forever
```

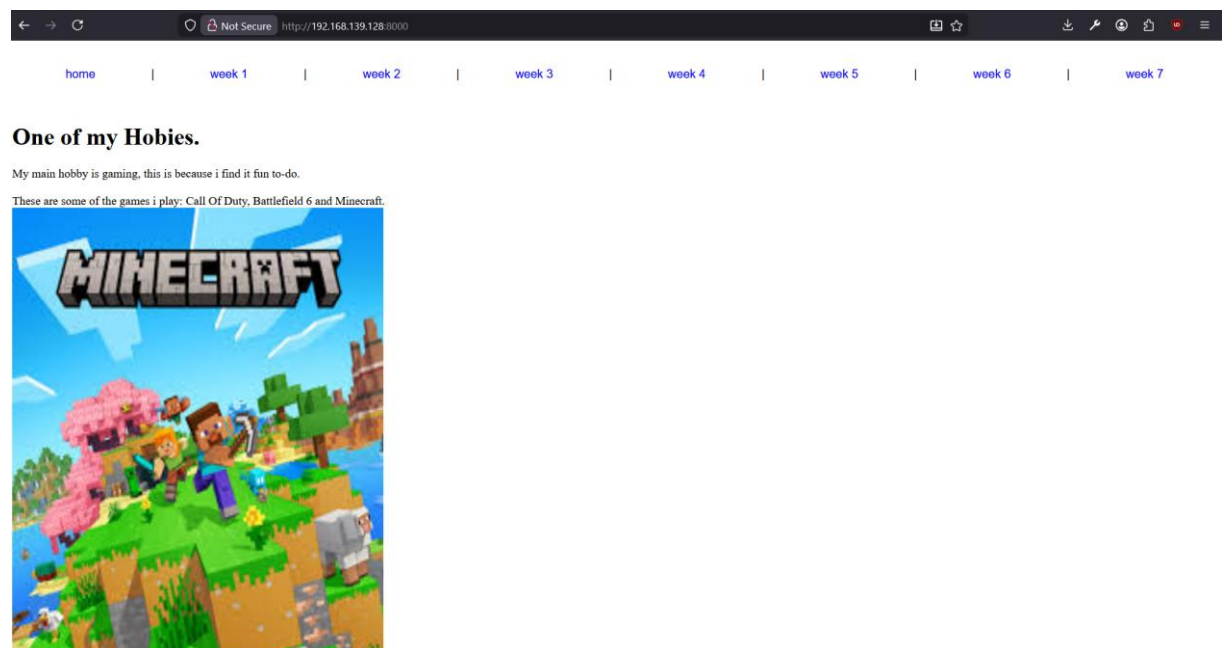
Screenshot of Site directory contents:



Screenshot python3 webserver command:

```
maickel@Maickel:~/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.

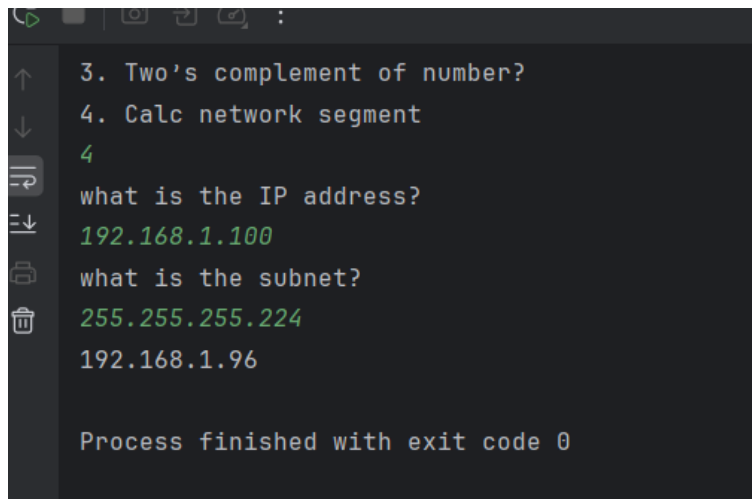
```
static void calcNetworkSegment() {
    Scanner in = new Scanner(System.in);
    System.out.println("what is the IP address?");
    String ipAddress = in.next();
    System.out.println("what is the subnet?");
    String subnet = in.next();

    String[] ipAddressArray = ipAddress.split("\\.");
    String[] subnetArray = subnet.split("\\.");
    String[] networkAddress = new String[4];

    for (int i = 0; i < 4; i++) {
        int i1 = Integer.parseInt(ipAddressArray[i]) &
Integer.parseInt(subnetArray[i]);
        networkAddress[i] = String.valueOf(i1);
    }

    String network = String.join(".", networkAddress);

    System.out.println(network);
}
```



```
3. Two's complement of number?  
4. Calc network segment  
4  
what is the IP address?  
192.168.1.100  
what is the subnet?  
255.255.255.224  
192.168.1.96  
  
Process finished with exit code 0
```

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