

# Template Week 6 – Networking

Student number:

## **Assignment 6.1: Working from home**

Screenshot installation openssh-server:

Screenshot successful SSH command execution:

Screenshot successful execution SCP command:

Screenshot remmina:

## **Assignment 6.2: IP addresses websites**

Relevant screenshots nslookup command:

Screenshot website visit via IP address:

## **Assignment 6.3: subnetting**

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

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

Check your two previous answers with this calculator:

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

Explain the above calculation in your own words.

## Assignment 6.4: HTML

Screenshot IP address Ubuntu VM:

Screenshot of Site directory contents:

Screenshot python3 webserver command:

Screenshot web browser visits your site

## 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

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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 java.util.Scanner;

public class ChiemITFunda {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Voer een heel getal in:");
        int nummer = scanner.nextInt();

        boolean doorgaan = true;
        while (doorgaan) {
            System.out.println("\nKies een optie:");
            System.out.println("1. Is het getal oneven?");
            System.out.println("2. Is het getal een macht van 2?");
            System.out.println("3. Wat is het twee's complement van dit getal?");
            System.out.println("4. Bereken netwerksegment");
            System.out.println("5. Stop het programma");
            int keuze = scanner.nextInt();

            if (keuze == 1) {
                if ((nummer & 1) == 1) {
                    System.out.println("Het getal is oneven.");
                } else {
                    System.out.println("Het getal is even.");
                }
            } else if (keuze == 2) {
                if (nummer > 0 && (nummer & (nummer - 1)) == 0) {
                    System.out.println("Het getal is een macht van 2.");
                } else {
                    System.out.println("Het getal is geen macht van 2.");
                }
            } else if (keuze == 3) {
                int complement = ~nummer + 1;
                System.out.println("Het twee's complement van het getal is: " + complement);
            } else if (keuze == 4) {
                scanner.nextLine();
                System.out.print("Voer een IP-adres in (bijv. 192.168.1.100): ");
                String ip = scanner.nextLine();

                System.out.print("Voer een subnetmasker in (bijv. 255.255.255.224): ");
                String subnet = scanner.nextLine();

                String netwerkAdres = berekenNetwerkAdres(ip, subnet);
                System.out.println("Netwerkadres: " + netwerkAdres);

                String[] delen = netwerkAdres.split("\\.");
                int laatsteOctet = Integer.parseInt(delen[3]);
                int hostBits = 32 - telEenBits(subnet);
            }
        }
    }
}

```

```

        int aantalHosts = (int) Math.pow(2, hostBits);

        String beginIP = netwerkAdres;
        String eindIP = delen[0] + "." + delen[1] + "." + delen[2] + "." + (laatsteOctet + aantalHosts -
1);

        System.out.println("IP-bereik: " + beginIP + " tot " + eindIP);
    } else if (keuze == 5) {
        System.out.println("Programma wordt afgesloten.");
        doorgaan = false;
    } else {
        System.out.println("Ongeldige keuze. Probeer het opnieuw.");
    }
}

scanner.close();
}

private static String berekenNetwerkAdres(String ip, String subnet) {
    int[] ipDelen = converteerNaarIntArray(ip);
    int[] subnetDelen = converteerNaarIntArray(subnet);
    int[] netwerkDelen = new int[4];
    for (int i = 0; i < 4; i++) {
        netwerkDelen[i] = ipDelen[i] & subnetDelen[i];
    }
    return netwerkDelen[0] + "." + netwerkDelen[1] + "." + netwerkDelen[2] + "." + netwerkDelen[3];
}

private static int telEenBits(String subnet) {
    int[] subnetDelen = converteerNaarIntArray(subnet);
    int count = 0;
    for (int deel : subnetDelen) {
        count += Integer.bitCount(deel);
    }
    return count;
}

private static int[] converteerNaarIntArray(String adres) {
    String[] delen = adres.split("\\.");
    int[] resultaat = new int[4];
    for (int i = 0; i < 4; i++) {
        resultaat[i] = Integer.parseInt(delen[i]);
    }
    return resultaat;
}
}

```

```
4. Bereken netwerksegment
5. Stop het programma
4
Voer een IP-adres in (bijv. 192.168.1.100): 192.168.10.1
Voer een subnetmasker in (bijv. 255.255.255.224): 255.0.0.0
Netwerkadres: 192.0.0.0
IP-bereik: 192.0.0.0 tot 192.0.0.16777215
```

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