Template Week 6 – Networking

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```
public void run() {
        SaxionApp.printLine("Het eerste octet van het ip-adres: ");
        int octetip1 = SaxionApp.readInt();
        SaxionApp.printLine("Het tweede octet van het ip-adres: ");
        int octetip2 = SaxionApp.readInt();
        SaxionApp.printLine("Het derde octet van het ip-adres: ");
        int octetip3 = SaxionApp.readInt();
        SaxionApp.printLine("Het vierde octet van het ip-adres: ");
        int octetip4 = SaxionApp.readInt();

        SaxionApp.printLine("Het eerste octet van het subnet: ");
        int octetsubnet1 = SaxionApp.readInt();
        SaxionApp.printLine("Het tweede octet van het subnet: ");
        int octetsubnet2 = SaxionApp.readInt();
        SaxionApp.printLine("Het derde octet van het subnet: ");
        int octetsubnet3 = SaxionApp.readInt();
        SaxionApp.printLine("Het vierde octet van het subnet: ");
        int octetsubnet4 = SaxionApp.readInt();

        int sm1 = octetip1 & octetsubnet1;
        int sm2 = octetip2 & octetsubnet2;
        int sm3 = octetip3 & octetsubnet3;
        int sm4 = octetip4 & octetsubnet4;

        SaxionApp.printLine("ipadres: " + octetip1 + "." + octetip2 + "." + octetip3 + "." + octetip4);
        SaxionApp.printLine("Subnet: " + octetsubnet1 + "." + octetsubnet2 + "." + octetsubnet3 + "." +
octetsubnet4);
        SaxionApp.printLine("Network id: " + sm1 + "." + sm2 + "." + sm3 + "." + sm4);

    }
}
```

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.

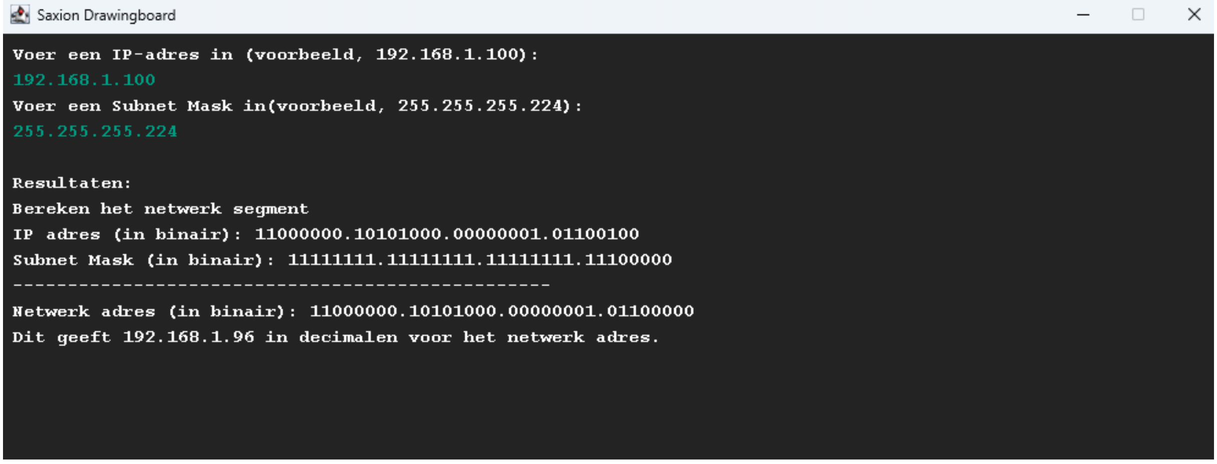
IP: 192.168.1.100 and subnet: 255.255.255.224 for /27

```
Example: 192.168.1.100/27
Calculate the network segment
IP Address:   11000000.10101000.00000001.01100100
Subnet Mask:  11111111.11111111.11111111.11100000
---------------------------------------------------
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.

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

import java.awt.*;

public class Application implements Runnable {

    public static void main(String[] args) {
        SaxionApp.start(new Application(), 1000, 1000); // Adjust window size as needed
    }

    @Override
    public void run() {
        SaxionApp.printLine("Voer een IP-adres in (voorbeeld, 192.168.1.100):" );
        String ipAddress = SaxionApp.readString();
        SaxionApp.printLine("Voer een Subnet Mask in(voorbeeld, 255.255.255.224):");
        String subnetMask = SaxionApp.readString();

        int ipoct1 = 0, ipoct2 = 0, ipoct3 = 0, ipoct4 = 0;
    int submaskoct1 = 0, submaskoct2 = 0, submaskoct3 = 0, submaskoct4 = 0;

    if (ipAddress.matches("\\d+\\.\\d+\\.\\d+\\.\\d+")) {
      String temp = "";
      int dotCount = 0;
      for (int i = 0; i < ipAddress.length(); i++) {
        char ch = ipAddress.charAt(i);
        if (ch == '.') {
          dotCount++;
          int value = Integer.parseInt(temp);
          temp = "";
          if (dotCount == 1) ipoct1 = value;
          else if (dotCount == 2) ipoct2 = value;
          else if (dotCount == 3) ipoct3 = value;
        } else {
          temp += ch;
        }
      }
      ipoct4 = Integer.parseInt(temp);
    }

    if (subnetMask.matches("\\d+\\.\\d+\\.\\d+\\.\\d+")) {
      String temp = "";
      int dotCount = 0;
      for (int i = 0; i < subnetMask.length(); i++) {
        char ch = subnetMask.charAt(i);
        if (ch == '.') {
          dotCount++;
          int value = Integer.parseInt(temp);
          temp = "";
          if (dotCount == 1) submaskoct1 = value;
          else if (dotCount == 2) submaskoct2 = value;
          else if (dotCount == 3) submaskoct3 = value;
        } else {
          temp += ch;
        }
      }
      submaskoct4 = Integer.parseInt(temp);
    }

    int net1 = ipoct1 & submaskoct1;
    int net2 = ipoct2 & submaskoct2;
    int net3 = ipoct3 & submaskoct3;
    int net4 = ipoct4 & submaskoct4;

    String binaryIP = toBinary(ipoct1) + "." + toBinary(ipoct2) + "." + toBinary(ipoct3) + "." +
toBinary(ipoct4);
    String binarySubnet = toBinary(submaskoct1) + "." + toBinary(submaskoct2) + "." +
toBinary(submaskoct3) + "." + toBinary(submaskoct4);
    String binaryNetwork = toBinary(net1) + "." + toBinary(net2) + "." + toBinary(net3) + "." +
toBinary(net4);


    SaxionApp.printLine();
    SaxionApp.printLine("Resultaten:");
    SaxionApp.printLine("Bereken het netwerk segment");
    SaxionApp.printLine("IP adres (in binair): " + binaryIP);
    SaxionApp.printLine("Subnet Mask (in binair): " + binarySubnet);

    SaxionApp.printLine("-------------------------------------------------");
    SaxionApp.printLine("Netwerk adres (in binair): " + binaryNetwork);
    SaxionApp.printLine("Dit geeft "  + net1 + "." + net2 + "." + net3 + "." + net4 + " in decimalen voor
het netwerk adres.");


    }

    private String toBinary(int number) {
    String binary = Integer.toBinaryString(number);
    while (binary.length() < 8) {
      binary = "0" + binary;
    }
    return binary;
    }
}
```



```
Voer een IP-adres in (voorbeeld, 192.168.1.100):
192.168.1.100
Voer een Subnet Mask in(voorbeeld, 255.255.255.224):
255.255.255.224

Resultaten:
Bereken het netwerk segment
IP adres (in binair): 11000000.10101000.00000001.01100100
Subnet Mask (in binair): 11111111.11111111.11111111.11100000
-------------------------------------------------
Netwerk adres (in binair): 11000000.10101000.00000001.01100000
Dit geeft 192.168.1.96 in decimalen voor het netwerk adres.
```

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