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

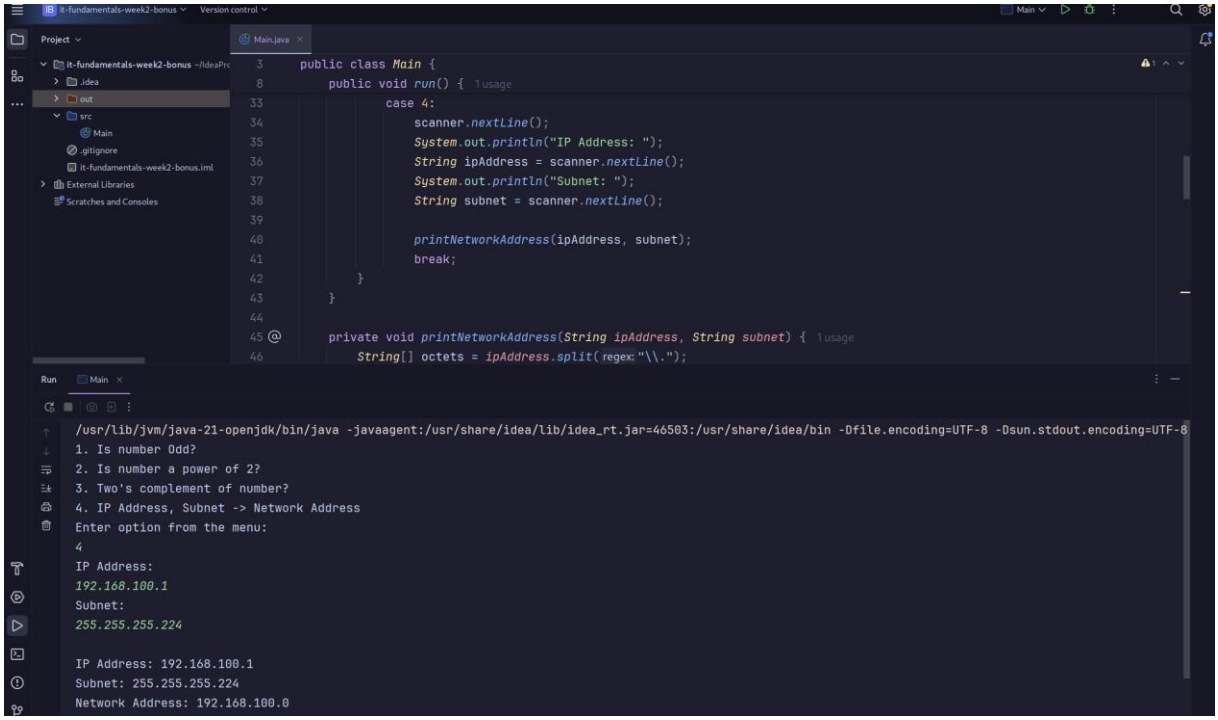
Remember that bitwise java application you've made in week 2? Expand that application so that you can also calculate a network segment as explained in the PowerPoint slides of week 6. Use the bitwise & AND operator. You need to be able to input two Strings. An IP address and a subnet.

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
-----------------------------------------------
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.



https://pastebin.com/hrpxnXF4

```
import java.util.Scanner;


public class Main {
    public static void main(String[] args) {
        new Main().run();
    }


    public void run() {
        System.out.println("1. Is number Odd?");
        System.out.println("2. Is number a power of 2?");
        System.out.println("3. Two's complement of number?");
        System.out.println("4. IP Address, Subnet -> Network Address");


        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter option from the menu: ");
        int option = scanner.nextInt();
```

```
    int number = 0;
    if (option == 1 || option == 2 || option == 3){
        number = scanner.nextInt();
    }

    switch (option) {
        case 1:
            printIfNumberIsOdd(number);
            break;
        case 2:
            printIfNumberIsPower(number);
            break;
        case 3:
            printTwosComplementOfNumber(number);
            break;
        case 4:
            scanner.nextLine();
            System.out.println("IP Address: ");
            String ipAddress = scanner.nextLine();
            System.out.println("Subnet: ");
            String subnet = scanner.nextLine();

            printNetworkAddress(ipAddress, subnet);
            break;
    }
}

  private void printNetworkAddress(String ipAddress, String subnet) {
    String[] octets = ipAddress.split("\\.");
    String[] eightBits = subnet.split("\\.");
    StringBuilder networkAddress = new StringBuilder();
```

```
        for (int i = 0; i < octets.length; i++) {
            networkAddress.append(Integer.parseInt(octets[i]) & Integer.parseInt(eightBits[i]));
            if (i < 3){
                networkAddress.append(".");
            }
        }

        System.out.println();
        System.out.println("IP Address: " + ipAddress);
        System.out.println("Subnet: " + subnet);
        System.out.println("Network Address: " + networkAddress);
    }

    private static void printTwosComplementOfNumber(int number) {
        System.out.println(~number + 1);
    }

    private static void printIfNumberIsPower(int number) {
        if (((number & number - 1) == 0)) System.out.println("number is a power of 2");
        else System.out.println("number isn't a power of 2");
    }

    private static void printIfNumberIsOdd(int number) {
        if ((number & 1) == 1) System.out.println("number is odd");
        else System.out.println("number is even");
    }


}
```

Ready? Save this file and export it as a pdf file with the name: **week6.pdf**