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?

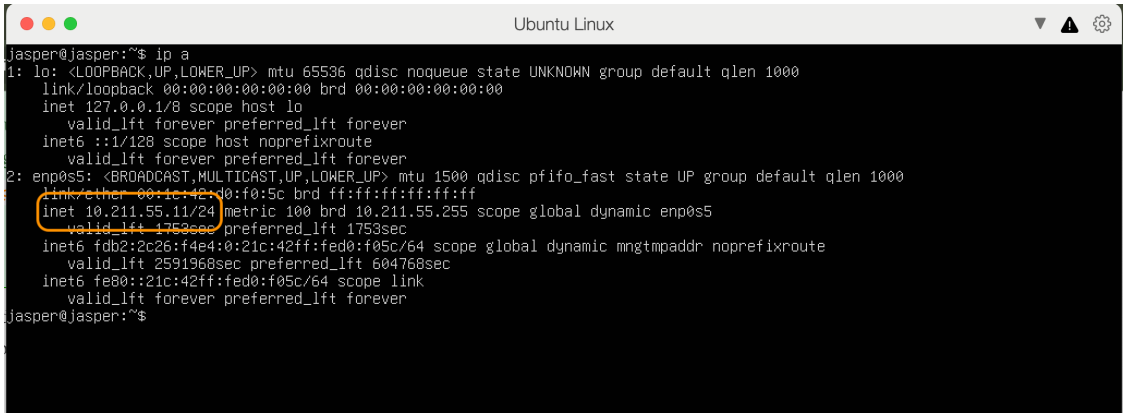
What is the usable IP range to hand out to the connected computers?

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.

```java
private static int[] convertToBinaryArray(String dottedDecimal) {  2 usages
    String[] parts = dottedDecimal.split( regex: "\\.");
    if (parts.length != 4) return null;

    int[] binaryArray = new int[32];
    for (int i = 0; i < 4; i++) {
        int octet;
        try {
            octet = Integer.parseInt(parts[i]);
        } catch (NumberFormatException e) {
            return null;
        }

        if (octet < 0 || octet > 255) return null;

        for (int j = 7; j >= 0; j--) {
            binaryArray[i * 8 + j] = (octet & 1);
            octet >>= 1;
        }
    }
    return binaryArray;
}
```

Convert to binary

```java
private static String convertToDecimal(int[] binaryArray) {  3 usages
    StringBuilder decimal = new StringBuilder();
    for (int i = 0; i < 4; i++) {
        int value = 0;
        for (int j = 0; j < 8; j++) {
            value = (value << 1) | binaryArray[i * 8 + j];
        }
        decimal.append(value);
        if (i != 3) {
            decimal.append(".");
        }
    }
    return decimal.toString();
}
```

convert to decimal

```
Enter IP address (e.g., 192.168.1.100
Enter subnet mask (e.g., 255.255.255.224
192.168.1.100
255.255.255.224

Results:
IP Address:   11000000.10101000.00000001.01100100
Subnet Mask:  11111111.11111111.11111111.11100000
Network Addr: 11000000.10101000.00000001.01100000
Network Address in Decimal: 192.168.1.96
IP Range: 192.168.1.96 - 192.168.1.127
```

output

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