Template Week 6 – Networking

Student number:

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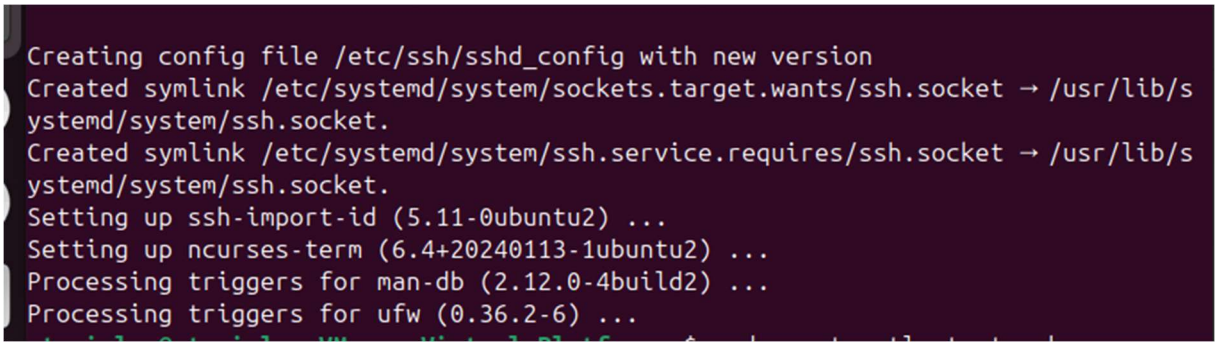
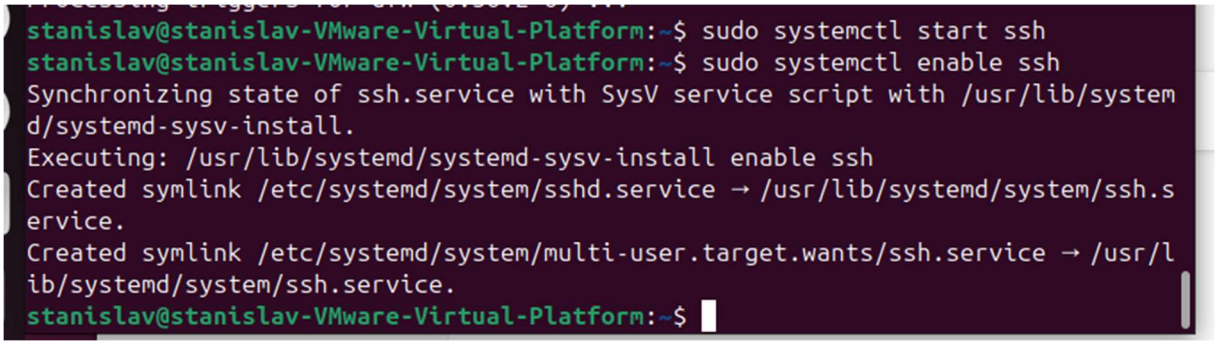
Assignment 6.1: Working from home

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 (2⁵).
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.

```
public class Main {
   public static void main(String[] args) {
      String ipAddress = "192.168.1.100";
      String subnetMask = "255.255.255.124";

      System.out.println("IP Address: " + ipAddress);
      System.out.println("Subnet Mask: " + subnetMask);

      int[] ip = parseAddress(ipAddress);
      int[] subnet = parseAddress(subnetMask);
      int[] networkAddress = new int[4];

      for (int i = 0; i < 4; i++) {
         networkAddress[i] = ip[i] & subnet[i];
      }

      System.out.println("Network Address: " + formatAddress(networkAddress));
      System.out.println("Subnet Range: " + formatAddress(networkAddress) + " - " +
calculateBroadcastAddress(networkAddress, subnet));
   }

   private static int[] parseAddress(String address) {
      String[] parts = address.split("\\.");
      int[] result = new int[4];
```

```
        for (int i = 0; i < 4; i++) {
            result[i] = Integer.parseInt(parts[i]);
        }
        return result;
    }

    private static String formatAddress(int[] address) {
        return address[0] + "." + address[1] + "." + address[2] + "." + address[3];
    }

    private static String calculateBroadcastAddress(int[] networkAddress, int[] subnetMask) {
        int[] broadcastAddress = new int[4];
        for (int i = 0; i < 4; i++) {
            broadcastAddress[i] = networkAddress[i] | ~subnetMask[i] & 0xFF;
        }
        return formatAddress(broadcastAddress);
    }
}
```

```java
public class Main {
    public static void main(String[] args) {
        String ipAddress = "192.168.1.100";
        String subnetMask = "255.255.255.124";

        System.out.println("IP Address: " + ipAddress);
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        int[] ip = parseAddress(ipAddress);
        int[] subnet = parseAddress(subnetMask);
        int[] networkAddress = new int[4];

        for (int i = 0; i < 4; i++) {
            networkAddress[i] = ip[i] & subnet[i];
        }

        System.out.println("Network Address: " + formatAddress(networkAddress));
        System.out.println("Subnet Range: " + formatAddress(networkAddress) + " - " +
calculateBroadcastAddress(networkAddress, subnet));
    }

    private static int[] parseAddress(String address) {
        String[] parts = address.split("\\.");
        int[] result = new int[4];
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            result[i] = Integer.parseInt(parts[i]);
        }
        return result;
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    private static String formatAddress(int[] address) {
        return address[0] + "." + address[1] + "." + address[2] + "." + address[3];
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        return formatAddress(broadcastAddress);
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}
```

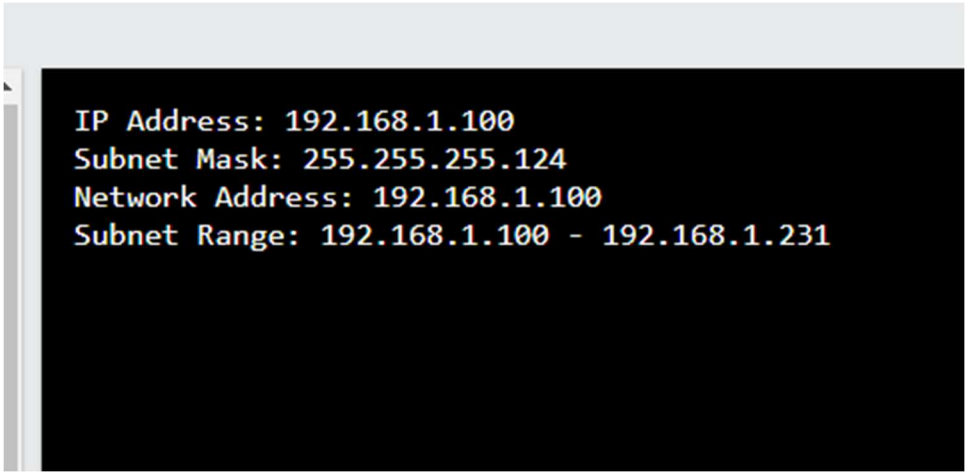

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