

## Network Engineering 2019 Exercises - Unit 3

### 0.1 Netmask Calculation

**What is the netmask for this network?**

91.4.0.0/14

Put your answer on a single line in `unit3/answers.txt`, with 0: at the beginning of the line, e.g., 0:255.255.255.0

**What is the netmask for this network?**

17.90.204.0/22

Put your answer on a single line in `unit3/answers.txt`, with 1: at the beginning of the line, e.g., 1:255.255.255.0

**What is the netmask for this network?**

72.0.0.0/8

Put your answer on a single line in `unit3/answers.txt`, with 2: at the beginning of the line, e.g., 2:255.255.255.0

**What is the netmask for this network?**

59.32.0.0/11

Put your answer on a single line in `unit3/answers.txt`, with 3: at the beginning of the line, e.g., 3:255.255.255.0

**What is the netmask for this network?**

6.182.0.0/15

Put your answer on a single line in `unit3/answers.txt`, with 4: at the beginning of the line, e.g., 4:255.255.255.0

**What is the netmask for this network?**

100.75.132.0/22

Put your answer on a single line in `unit3/answers.txt`, with 5: at the beginning of the line, e.g., 5:255.255.255.0

**What is the netmask for this network?**

109.57.55.128/26

Put your answer on a single line in `unit3/answers.txt`, with 6: at the beginning of the line, e.g., 6:255.255.255.0

**What is the netmask for this network?**

87.227.128.0/17

Put your answer on a single line in `unit3/answers.txt`, with 7: at the beginning of the line, e.g., 7:255.255.255.0

**What is the netmask for this network?**

26.47.8.0/21

Put your answer on a single line in `unit3/answers.txt`, with 8: at the beginning of the line, e.g., 8:255.255.255.0

**What is the netmask for this network?**

64.249.104.64/26

Put your answer on a single line in `unit3/answers.txt`, with 9: at the beginning of the line, e.g., 9:255.255.255.0

**What is the netmask for this network?**

46.28.80.0/23

Put your answer on a single line in `unit3/answers.txt`, with 10: at the beginning of the line, e.g., 10:255.255.255.0

**What is the netmask for this network?**

14.200.27.212/31

Put your answer on a single line in `unit3/answers.txt`, with 11: at the beginning of the line, e.g., 11:255.255.255.0

**What is the netmask for this network?**

3.224.0.0/11

Put your answer on a single line in `unit3/answers.txt`, with 12: at the beginning of the line, e.g., 12:255.255.255.0

**What is the netmask for this network?**

22.27.0.0/16

Put your answer on a single line in `unit3/answers.txt`, with 13: at the beginning of the line, e.g., 13:255.255.255.0

**What is the netmask for this network?**

80.119.128.0/22

Put your answer on a single line in `unit3/answers.txt`, with 14: at the beginning of the line, e.g., `14:255.255.255.0`

**What is the netmask for this network?**

48.136.0.0/15

Put your answer on a single line in `unit3/answers.txt`, with 15: at the beginning of the line, e.g., `15:255.255.255.0`

**What is the netmask for this network?**

96.40.0.0/13

Put your answer on a single line in `unit3/answers.txt`, with 16: at the beginning of the line, e.g., `16:255.255.255.0`

**What is the netmask for this network?**

0.0.0.0/3

Put your answer on a single line in `unit3/answers.txt`, with 17: at the beginning of the line, e.g., `17:255.255.255.0`

**What is the netmask for this network?**

4.220.0.0/14

Put your answer on a single line in `unit3/answers.txt`, with 18: at the beginning of the line, e.g., `18:255.255.255.0`

**What is the netmask for this network?**

41.0.0.0/11

Put your answer on a single line in `unit3/answers.txt`, with 19: at the beginning of the line, e.g., `19:255.255.255.0`

**What is the netmask for this network?**

90.58.128.0/22

Put your answer on a single line in `unit3/answers.txt`, with 20: at the beginning of the line, e.g., `20:255.255.255.0`

**What is the netmask for this network?**

85.0.0.0/9

Put your answer on a single line in `unit3/answers.txt`, with 21: at the beginning of the line, e.g., `21:255.255.255.0`

**What is the netmask for this network?**

36.144.173.48/28

Put your answer on a single line in `unit3/answers.txt`, with 22: at the beginning of the line, e.g., `22:255.255.255.0`

**What is the netmask for this network?**

2.0.0.0/7

Put your answer on a single line in `unit3/answers.txt`, with 23: at the beginning of the line, e.g., `23:255.255.255.0`

**What is the netmask for this network?**

125.26.64.0/20

Put your answer on a single line in `unit3/answers.txt`, with 24: at the beginning of the line, e.g., `24:255.255.255.0`

**What is the netmask for this network?**

25.140.0.0/14

Put your answer on a single line in `unit3/answers.txt`, with 25: at the beginning of the line, e.g., `25:255.255.255.0`

**What is the netmask for this network?**

18.49.240.0/22

Put your answer on a single line in `unit3/answers.txt`, with 26: at the beginning of the line, e.g., `26:255.255.255.0`

**What is the netmask for this network?**

5.87.207.0/24

Put your answer on a single line in `unit3/answers.txt`, with 27: at the beginning of the line, e.g., `27:255.255.255.0`

**What is the netmask for this network?**

20.229.64.0/18

Put your answer on a single line in `unit3/answers.txt`, with 28: at the beginning of the line, e.g., 28:255.255.255.0

**What is the netmask for this network?**

72.0.0.0/10

Put your answer on a single line in `unit3/answers.txt`, with 29: at the beginning of the line, e.g., 29:255.255.255.0

**What is the netmask for this network?**

88.56.0.0/13

Put your answer on a single line in `unit3/answers.txt`, with 30: at the beginning of the line, e.g., 30:255.255.255.0

**What is the netmask for this network?**

16.216.0.0/13

Put your answer on a single line in `unit3/answers.txt`, with 31: at the beginning of the line, e.g., 31:255.255.255.0

**What is the netmask for this network?**

0.0.0.0/0

Put your answer on a single line in `unit3/answers.txt`, with 32: at the beginning of the line, e.g., 32:255.255.255.0

**What is the netmask for this network?**

97.100.0.0/15

Put your answer on a single line in `unit3/answers.txt`, with 33: at the beginning of the line, e.g., 33:255.255.255.0

**What is the netmask for this network?**

85.253.238.236/30

Put your answer on a single line in `unit3/answers.txt`, with 34: at the beginning of the line, e.g., 34:255.255.255.0

**What is the netmask for this network?**

74.224.0.0/12

Put your answer on a single line in `unit3/answers.txt`, with 35: at the beginning of the line, e.g., 35:255.255.255.0

**What is the netmask for this network?**

23.184.241.32/27

Put your answer on a single line in `unit3/answers.txt`, with 36: at the beginning of the line, e.g., 36:255.255.255.0

**What is the netmask for this network?**

112.0.0.0/5

Put your answer on a single line in `unit3/answers.txt`, with 37: at the beginning of the line, e.g., 37:255.255.255.0

**What is the netmask for this network?**

77.109.0.0/16

Put your answer on a single line in `unit3/answers.txt`, with 38: at the beginning of the line, e.g., 38:255.255.255.0

**What is the netmask for this network?**

123.0.0.0/9

Put your answer on a single line in `unit3/answers.txt`, with 39: at the beginning of the line, e.g., 39:255.255.255.0

## **0.2 Variable Length Sub-net Masking**

**What is the VLSM name of the network corresponding to the following?**

64.133.123.69 netmask 255.248.0.0

Put your answer on a single line in `unit3/answers.txt`, with 40: at the beginning of the line, e.g., 40:10.0.0.0/8

**What is the VLSM name of the network corresponding to the following?**

117.190.95.152 netmask 255.255.0.0

Put your answer on a single line in `unit3/answers.txt`, with 41: at the beginning of the line, e.g., 41:10.0.0.0/8

**What is the VLSM name of the network corresponding to the following?**

60.235.83.164 netmask 252.0.0.0

Put your answer on a single line in `unit3/answers.txt`, with 42: at the beginning of the line, e.g., `42:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

104.218.25.201 netmask 248.0.0.0

Put your answer on a single line in `unit3/answers.txt`, with 43: at the beginning of the line, e.g., `43:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

22.137.148.24 netmask 255.255.192.0

Put your answer on a single line in `unit3/answers.txt`, with 44: at the beginning of the line, e.g., `44:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

55.45.126.240 netmask 0.0.0.0

Put your answer on a single line in `unit3/answers.txt`, with 45: at the beginning of the line, e.g., `45:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

41.118.111.31 netmask 255.192.0.0

Put your answer on a single line in `unit3/answers.txt`, with 46: at the beginning of the line, e.g., `46:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

39.44.246.78 netmask 255.255.255.192

Put your answer on a single line in `unit3/answers.txt`, with 47: at the beginning of the line, e.g., `47:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

93.224.166.10 netmask 255.255.255.252

Put your answer on a single line in `unit3/answers.txt`, with 48: at the beginning of the line, e.g., `48:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

35.63.226.41 netmask 255.255.255.0

Put your answer on a single line in `unit3/answers.txt`, with 49: at the beginning of the line, e.g., `49:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

18.252.34.221 netmask 240.0.0.0

Put your answer on a single line in `unit3/answers.txt`, with 50: at the beginning of the line, e.g., `50:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

100.23.6.228 netmask 255.255.128.0

Put your answer on a single line in `unit3/answers.txt`, with 51: at the beginning of the line, e.g., `51:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

14.99.231.31 netmask 255.255.255.192

Put your answer on a single line in `unit3/answers.txt`, with 52: at the beginning of the line, e.g., `52:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

102.254.178.118 netmask 255.255.254.0

Put your answer on a single line in `unit3/answers.txt`, with 53: at the beginning of the line, e.g., `53:10.0.0.0/8`



**What is the VLSM name of the network corresponding to the following?**

87.95.83.42 netmask 192.0.0.0

Put your answer on a single line in `unit3/answers.txt`, with 54: at the beginning of the line, e.g., `54:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

38.89.59.193 netmask 255.254.0.0

Put your answer on a single line in `unit3/answers.txt`, with 55: at the beginning of the line, e.g., `55:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

118.158.79.112 netmask 255.255.255.128

Put your answer on a single line in `unit3/answers.txt`, with 56: at the beginning of the line, e.g., `56:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

106.156.60.64 netmask 255.255.240.0

Put your answer on a single line in `unit3/answers.txt`, with 57: at the beginning of the line, e.g., `57:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

23.45.202.31 netmask 255.128.0.0

Put your answer on a single line in `unit3/answers.txt`, with 58: at the beginning of the line, e.g., `58:10.0.0.0/8`

**What is the VLSM name of the network corresponding to the following?**

5.90.74.249 netmask 255.255.254.0

Put your answer on a single line in `unit3/answers.txt`, with 59: at the beginning of the line, e.g., `59:10.0.0.0/8`

### 0.3 Configure Network Interfaces using the ifconfig and ip commands

What is the ifconfig command to setup interface eth0 with the following network settings (apply any options in the order listed)?

4.90.141.27 netmask 255.128.0.0, in promiscuous mode

Put your answer on a single line in unit3/answers.txt, with 60: at the beginning of the line, e.g., 60:ifconfig moo0 1.2.3.4 netmask 255.0.0.0 -broadcast

What is ip command sequence to setup interface eth0 with the following network settings (apply any options in the order listed)?

52.252.112.30 netmask 255.255.252.0, TX queue length = 3389

Put your answer on a single line in unit3/answers.txt, with 61: at the beginning of the line, e.g., 61:ip blah blah; ip again with other options; ip again with yet other options

What is ip command sequence equivalent to the following ifconfig command (apply any options in the order listed)?

ifconfig eth0 45.136.240.95 netmask 255.224.0.0

Put your answer on a single line in unit3/answers.txt, with 62: at the beginning of the line, e.g., 62:ip blah blah; ip again with other options; ip again with yet other options

What is ip command sequence equivalent to the following ifconfig command (apply any options in the order listed)?

ifconfig eth0 3.128.81.23 netmask 255.128.0.0 -arp

Put your answer on a single line in unit3/answers.txt, with 63: at the beginning of the line, e.g., 63:ip blah blah; ip again with other options; ip again with yet other options

What is ifconfig command equivalent to the following ip command sequence (apply any options in the order listed)?

ip address add 71.104.104.97/3 dev eth0; ip link set dev eth0 txqueuelen 2961

Put your answer on a single line in unit3/answers.txt, with 64: at the beginning of the line, e.g., 64:ip blah blah; ip again with other options; ip again with yet other options

**What is the `ifconfig` command to setup interface `eth0` with the following network settings (apply any options in the order listed)?**

12.224.84.136 netmask 252.0.0.0, MTU = 1947

Put your answer on a single line in `unit3/answers.txt`, with 65: at the beginning of the line, e.g., 65:`ifconfig moo0 1.2.3.4 netmask 255.0.0.0 -broadcast`

**What is `ip` command sequence equivalent to the following `ifconfig` command (apply any options in the order listed)?**

`ifconfig eth0 52.216.179.125 netmask 255.255.255.224 mtu 3258 -arp  
promisc`

Put your answer on a single line in `unit3/answers.txt`, with 66: at the beginning of the line, e.g., 66:`ip blah blah; ip again with other options; ip again with yet other options`

**What is `ifconfig` command equivalent to the following `ip` command sequence (apply any options in the order listed)?**

`ip address add 3.170.9.42/29 dev eth0; ip link set eth0 down`

Put your answer on a single line in `unit3/answers.txt`, with 67: at the beginning of the line, e.g., 67:`ip blah blah; ip again with other options; ip again with yet other options`

**What is `ifconfig` command equivalent to the following `ip` command sequence (apply any options in the order listed)?**

`ip address add 15.89.207.61/1 dev eth0; ip link set dev eth0 mtu  
2199`

Put your answer on a single line in `unit3/answers.txt`, with 68: at the beginning of the line, e.g., 68:`ip blah blah; ip again with other options; ip again with yet other options`

**What is `ifconfig` command equivalent to the following `ip` command sequence (apply any options in the order listed)?**

`ip address add 119.223.122.252/26 dev eth0; ip link set dev eth0 mtu  
3083; ip link set dev eth0 promisc on`

Put your answer on a single line in `unit3/answers.txt`, with 69: at the beginning of the line, e.g., 69:`ip blah blah; ip again with other options; ip again with yet other options`

**What is ip command sequence equivalent to the following ifconfig command (apply any options in the order listed)?**

`ifconfig eth0 41.112.2.160 netmask 255.255.255.248`

Put your answer on a single line in `unit3/answers.txt`, with 70: at the beginning of the line, e.g., `70:ip blah blah; ip again with other options; ip again with yet other options`

**What is the ifconfig command to setup interface eth0 with the following network settings (apply any options in the order listed)?**

`106.182.52.23 netmask 255.192.0.0, PPP remote address 27.141.81.66, in promiscuous mode, TX queue length = 3851`

Put your answer on a single line in `unit3/answers.txt`, with 71: at the beginning of the line, e.g., `71:ifconfig moo0 1.2.3.4 netmask 255.0.0.0 -broadcast`

**What is ifconfig command equivalent to the following ip command sequence (apply any options in the order listed)?**

`ip address add 33.159.129.68/17 dev eth0`

Put your answer on a single line in `unit3/answers.txt`, with 72: at the beginning of the line, e.g., `72:ip blah blah; ip again with other options; ip again with yet other options`

**What is the ifconfig command to setup interface eth0 with the following network settings (apply any options in the order listed)?**

`46.15.241.118 netmask 255.224.0.0, MTU = 2132, PPP remote address 43.239.188.55, in promiscuous mode`

Put your answer on a single line in `unit3/answers.txt`, with 73: at the beginning of the line, e.g., `73:ifconfig moo0 1.2.3.4 netmask 255.0.0.0 -broadcast`

**What is ip command sequence to setup interface eth0 with the following network settings (apply any options in the order listed)?**

`25.111.221.55 netmask 255.255.192.0, TX queue length = 2442`

Put your answer on a single line in `unit3/answers.txt`, with 74: at the beginning of the line, e.g., `74:ip blah blah; ip again with other options; ip again with yet other options`

**What is ip command sequence to setup interface eth0 with the following network settings (apply any options in the order listed)?**

75.34.157.148 netmask 254.0.0.0, MTU = 644, TX queue length = 4496

Put your answer on a single line in `unit3/answers.txt`, with 75: at the beginning of the line, e.g., `75:ip blah blah; ip again with other options; ip again with yet other options`

**What is the ifconfig command to setup interface eth0 with the following network settings (apply any options in the order listed)?**

109.135.110.137 netmask 255.255.255.240, PPP remote address 16.2.126.123

Put your answer on a single line in `unit3/answers.txt`, with 76: at the beginning of the line, e.g., `76:ifconfig moo0 1.2.3.4 netmask 255.0.0.0 -broadcast`

**What is the ifconfig command to setup interface eth0 with the following network settings (apply any options in the order listed)?**

126.145.159.251 netmask 255.240.0.0, but not running

Put your answer on a single line in `unit3/answers.txt`, with 77: at the beginning of the line, e.g., `77:ifconfig moo0 1.2.3.4 netmask 255.0.0.0 -broadcast`

**What is the ifconfig command to setup interface eth0 with the following network settings (apply any options in the order listed)?**

114.250.111.231 netmask 255.192.0.0, MTU = 4267, PPP remote address 51.79.207.189, TX queue length = 3466

Put your answer on a single line in `unit3/answers.txt`, with 78: at the beginning of the line, e.g., `78:ifconfig moo0 1.2.3.4 netmask 255.0.0.0 -broadcast`

**What is ifconfig command equivalent to the following ip command sequence (apply any options in the order listed)?**

ip address add 78.105.127.6/23 dev eth0; ip link set dev eth0 txqueuelen 2860

Put your answer on a single line in `unit3/answers.txt`, with 79: at the beginning of the line, e.g., `79:ip blah blah; ip again with other options; ip again with yet other options`

## 0.4 Configure Network Interfaces using `/etc/network/interfaces` file

### 0.4.1 Prepare `unit3/iface0-solution.txt`

Produce an `interfaces` file in `unit3/iface0-solution.txt`, that contains the following:

- A template called `ruins0`, that specifies an MTU of 7242 and MAC address `F0:EC:F1:33:BC:D8`.
- A template called `ruins1`, that specifies an MTU of 5896 and MAC address `70:F5:21:8E:28:4F`.
- An interface named `jam0`, with IPv4 settings configured by DHCP.
- An interface named `ftdi1`, with IPv4 address `39.243.129.209` and netmask `255.255.255.240`, and inherits the template `ruins0`.
- An interface named `ftdi2`, with IPv4 address `109.14.104.115` and netmask `255.255.252.0`.

### 0.4.2 Prepare `unit3/iface1-solution.txt`

Produce an `interfaces` file in `unit3/iface1-solution.txt`, that contains the following:

- A template called `ruins0`, that specifies an MTU of 4725 and MAC address `A6:3A:BE:43:9E:2E`.
- A template called `wealth1`, that specifies an MTU of 1988 and MAC address `BC:60:0F:64:20:14`.
- A template called `wealth2`, that specifies an MTU of 1126 and MAC address `91:35:02:97:70:BE`.
- A template called `ruins3`, that specifies an MTU of 6564 and MAC address `14:77:75:09:EA:F2`.
- A template called `castle4`, that specifies an MTU of 988 and MAC address `2C:AC:D3:CB:DA:0C`.
- An interface named `ftdi0`, with IPv4 address `72.223.137.150` and netmask `255.240.0.0`, and inherits the template `ruins3`.
- An interface named `jam1`, with IPv4 settings configured by DHCP.
- An interface named `eth2`, with IPv4 address `15.16.98.214` and netmask `248.0.0.0`, and inherits the template `castle4`.

### 0.4.3 Prepare unit3/iface2-solution.txt

Produce an `interfaces` file in `unit3/iface2-solution.txt`, that contains the following:

- A template called `castle0`, that specifies an MTU of 1905 and MAC address `2D:50:40:BE:7D:EC`.
- A template called `ruins1`, that specifies an MTU of 5880 and MAC address `C7:9D:D3:5D:0A:6D`.
- A template called `wealth2`, that specifies an MTU of 5595 and MAC address `1B:B7:0A:5B:4C:80`.
- A template called `ruins3`, that specifies an MTU of 5313 and MAC address `B4:FD:3A:FD:40:98`.
- A template called `castle4`, that specifies an MTU of 8717 and MAC address `E8:8E:2B:65:7B:BD`.
- An interface named `eth0`, with IPv4 address `26.189.120.66` and netmask `255.255.255.192`.
- An interface named `jam1`, with IPv4 address `14.34.193.237` and netmask `255.255.255.0`, and inherits the template `castle0`.
- An interface named `ftdi2`, with IPv4 address `82.198.157.100` and netmask `255.255.255.224`.
- An interface named `ftdi3`, with IPv4 settings configured by DHCP.
- An interface named `eth4`, with IPv4 address `44.147.144.30` and netmask `252.0.0.0`, and inherits the template `castle4`.
- An interface named `eth5`, with IPv4 settings configured by DHCP.
- An interface named `wlan6`, with IPv4 address `3.97.125.131` and netmask `255.255.255.192`.

### 0.4.4 Prepare unit3/iface3-solution.txt

Produce an `interfaces` file in `unit3/iface3-solution.txt`, that contains the following:

- A template called `moths0`, that specifies an MTU of 7581 and MAC address `19:E9:F5:14:6F:8A`.
- A template called `ruins1`, that specifies an MTU of 3598 and MAC address `1D:E7:E2:EF:06:69`.
- A template called `moths2`, that specifies an MTU of 1605 and MAC address `7E:9B:79:0E:C3:93`.

- An interface named wlan0, with IPv4 settings configured by DHCP.
- An interface named jam1, with IPv4 settings configured by DHCP.
- An interface named wlan2, with IPv4 settings configured by DHCP and inherits the template ruins1.

#### 0.4.5 Prepare unit3/iface4-solution.txt

Produce an `interfaces` file in `unit3/iface4-solution.txt`, that contains the following:

- A template called ruins0, that specifies an MTU of 4966 and MAC address D3:37:5F:02:44:DD.
- A template called ruins1, that specifies an MTU of 1189 and MAC address EB:61:51:CB:A7:7F.
- A template called ruins2, that specifies an MTU of 741 and MAC address 35:D8:E6:7C:AC:E0.
- A template called wealth3, that specifies an MTU of 8416 and MAC address 4A:7E:DE:5E:62:0F.
- A template called wealth4, that specifies an MTU of 461 and MAC address 46:B4:37:8A:91:D5.
- An interface named eth0, with IPv4 settings configured by DHCP and inherits the template ruins0.
- An interface named eth1, with IPv4 address 80.145.139.101 and netmask 255.255.224.0, and inherits the template wealth3.
- An interface named eth2, with IPv4 settings configured by DHCP.
- An interface named ftdi3, with IPv4 address 102.168.82.255 and netmask 255.255.255.240, and inherits the template ruins2.
- An interface named ftdi4, with IPv4 address 127.82.243.150 and netmask 255.255.128.0, and inherits the template wealth3.
- An interface named wlan5, with IPv4 settings configured by DHCP and inherits the template wealth3.
- An interface named jam6, with IPv4 address 114.101.248.182 and netmask 255.255.192.0, and inherits the template ruins0.



## 0.5 Create and delete routes

**0.5.1 Create files `unit3/routes0add.sh` and `unit3/routes0del.sh` that contains commands that will respectively establish and delete the following routes**

- 30.251.173.0/28 via the interface to your 2nd VM
- 121.175.168.0/25 via the interface to your 2nd VM
- 16.202.211.138/31 via the IP address of your 2nd VM
- 63.125.219.192/26 via the interface to your 2nd VM
- 11.178.64.0/19 via the interface to your 2nd VM
- 58.180.158.156/31 via the IP address of your 2nd VM

**0.5.2 Create files `unit3/routes1add.sh` and `unit3/routes1del.sh` that contains commands that will respectively establish and delete the following routes**

- 72.174.237.72/30 via the interface to your 2nd VM
- 89.121.192.208/29 via the IP address of your 2nd VM
- 124.21.243.4/31 via the interface to your 2nd VM
- 32.8.136.0/27 via the interface to your 2nd VM
- 22.6.75.208/28 via the interface to your 2nd VM
- 33.184.0.0/16 via the IP address of your 2nd VM

**0.5.3 Create files `unit3/routes2add.sh` and `unit3/routes2del.sh` that contains commands that will respectively establish and delete the following routes**

- 30.54.0.0/16 via the IP address of your 2nd VM
- 90.27.3.224/28 via the IP address of your 2nd VM
- 104.118.64.0/18 via the interface to your 2nd VM
- 14.130.250.246/31 via the IP address of your 2nd VM
- 64.103.160.0/19 via the IP address of your 2nd VM
- 88.137.0.0/18 via the interface to your 2nd VM

**0.5.4 Create files `unit3/routes3add.sh` and `unit3/routes3del.sh` that contains commands that will respective establish and delete the following routes**

- 121.47.0.0/17 via the IP address of your 2nd VM
- 48.238.75.0/24 via the IP address of your 2nd VM
- 36.151.56.0/21 via the interface to your 2nd VM
- 81.62.112.0/22 via the IP address of your 2nd VM
- 101.162.80.0/22 via the interface to your 2nd VM
- 118.175.130.240/29 via the interface to your 2nd VM

**0.5.5 Create files `unit3/routes4add.sh` and `unit3/routes4del.sh` that contains commands that will respective establish and delete the following routes**

- 93.93.15.64/26 via the IP address of your 2nd VM
- 73.113.7.0/26 via the IP address of your 2nd VM
- 26.175.0.0/16 via the interface to your 2nd VM
- 110.225.178.236/30 via the interface to your 2nd VM
- 48.77.255.0/25 via the IP address of your 2nd VM
- 11.24.219.120/29 via the interface to your 2nd VM