

## 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?**

58.117.34.154/0

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 255.255.255.255

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 4.0.0.0/9, 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 52.252.112.0/22, 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 12.0.0.0/6, 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 106.128.0.0/10, 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 46.0.0.0/11, MTU = 2132, PPP remote ad-  
dress 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 25.111.192.0/18, 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 74.0.0.0/7, 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 109.135.110.128/28, 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 126.144.0.0/12, 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 114.192.0.0/10, 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