

# CS3103 Assignment 1

Wang Xinman A0180257E

## Question 1

**a**

There are  $2^4 = 16$  addresses in this network, as only 4 bits are free.

**b**

Network id: 207.15.37.32

Broadcast id: 207.15.37.47

## Question 2

**1**

**First group**

8 bits for 256 blocks, 7 bits for 127 addresses each: 140.77.0.0/17

- business1 is given 140.77.0.0/25
- business2 is given 140.77.0.128/25
- up to business 256 which is given 140.77.127.128/25

**Second group**

9 bits for 512 blocks, 4 bits for 16 addresses each: 140.77.128.0/19

- business1 is given 140.77.128.0/28
- business2 is given 140.77.128.16/28
- up to business 512 which is given 140.77.159.240/28

**Third group**

11 bits for 2048 blocks, 2 bits for 4 addresses each: 140.77.192.0/19

- household1 is given 140.77.192.0/30
- household2 is given 140.77.192.16/30
- up to household 2048 which is given 140.77.223.252/30

**2**

**Remaining**

$$2^{16} - 256 \times 128 - 512 \times 16 - 2048 \times 4 = 2 \times 2^{13} = 16384$$

## Question 3

**a**

**Answer**

Block required: 140.78.0.0/21

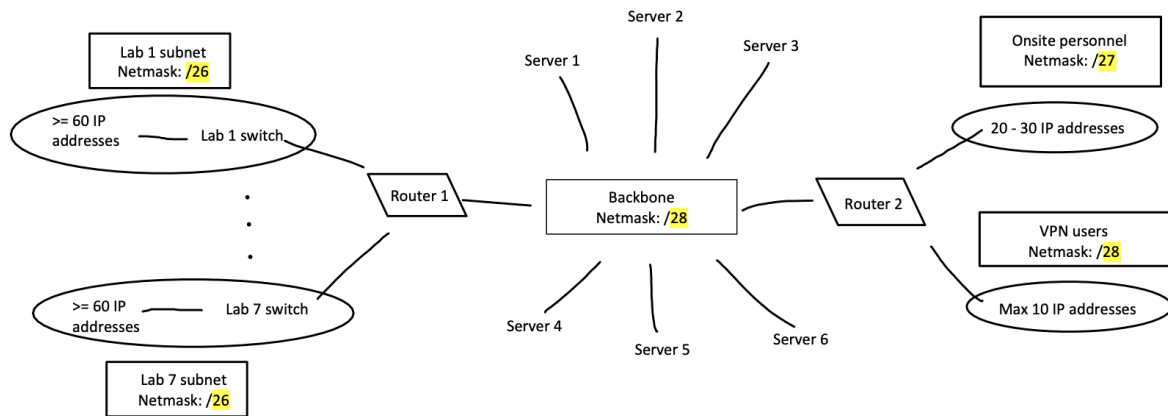
**Explanation**

- Labs
  - Considering future expansions of 12 labs  $\rightarrow$  4 bits, 16 blocks available. Lab-12: 140.78.2.192/26
  - Each lab requires minimally 60 IP addresses  $\rightarrow$  6 bits/ lab subnet, 62 IP addresses available (first and last not usable).

- Total:  $4 + 6 = 10$  bits needed for labs
- On-site Personnel
  - Considering future expansions of 30 desktops  $\rightarrow$  5 bits for 32 addresses.
- VPN Users
  - Max 10 users a time  $\rightarrow$  4 bits for 16 addresses

With minimally 10 bits needed, the overall mask is thus /22.

**b**



**c**

Network Name	Net-id (a.b.c.d/n)	Broadcast id
Backbone	140.78.3.48/28	140.78.3.63
Lab-1	140.78.0.0/26	140.78.0.63
Lab-2	140.78.0.64/26	140.78.0.127
Lab-3	140.78.0.128/26	140.78.0.191
Lab-4	140.78.0.192/26	140.78.0.255
Lab-5	140.78.1.0/26	140.78.1.63
Lab-6	140.78.1.64/26	140.78.1.127
Lab-7	140.78.1.128/26	140.78.1.191
Lab-8	140.78.1.192/26	140.78.1.255
Lab-9	140.78.2.0/26	140.78.2.63
Lab-10	140.78.2.64/26	140.78.2.127
Lab-11	140.78.2.128/26	140.78.2.191
Lab-12	140.78.2.192/26	140.78.2.255
On-site sales persons network	140.78.3.0/27	140.78.3.31
Remote sales persons network	140.78.3.32/28	140.78.3.47
Unused blocks	140.78.3.64/26	140.78.3.127
	140.78.3.128/25	140.78.3.255