

# Assignment 2

Dec. 4, 2022

## Q1

(a) The range and number are listed below.

Interface	Range	Number
0	11100100 - 11101111	24
1	11100000 - 11100011	4
2	11111100 - 11111111	4
3	00000000 - 11011111	224

- (b)
- **11001000** matches no prefix in forwarding table, thus its out interface is **3**.
  - **11100001** matches longest prefix **111000** in forwarding table, thus its out interface is **1**.
  - **11110000** matches longest prefix **111** in forwarding table, thus its out interface is **0**.

## Q2

The prefixes of four subnets are listed below.

- $\lceil \log_2 200 \rceil = 8$

10000000 01110111 00101000 00000000

Prefix: **128.119.40.0/24**

- $\lceil \log_2 96 \rceil = 7$

10000000 01110111 00101001 00000000

Prefix: **128.119.41.0/25**

- $\lceil \log_2 62 \rceil = 6$

10000000 01110111 00101001 10000000

Prefix: **128.119.41.128/26**

- $\lceil \log_2 60 \rceil = 6$

10000000 01110111 00101001 11000000

Prefix: **128.119.41.192/26**

## Q3

- (a) Addresses of three hosts in the home network are **192.168.2.128**, **192.168.2.129**, **192.168.2.130** respectively.
- (b) The four entries in NAT translation table are listed below.

WAN side addr	LAN side addr
24.34.114.232, 1145	192.168.2.200, 3000
24.34.114.232, 1146	192.168.2.200, 3001
24.34.114.232, 1147	192.168.2.201, 3000
24.34.114.232, 1148	192.168.2.201, 3001

## Q4

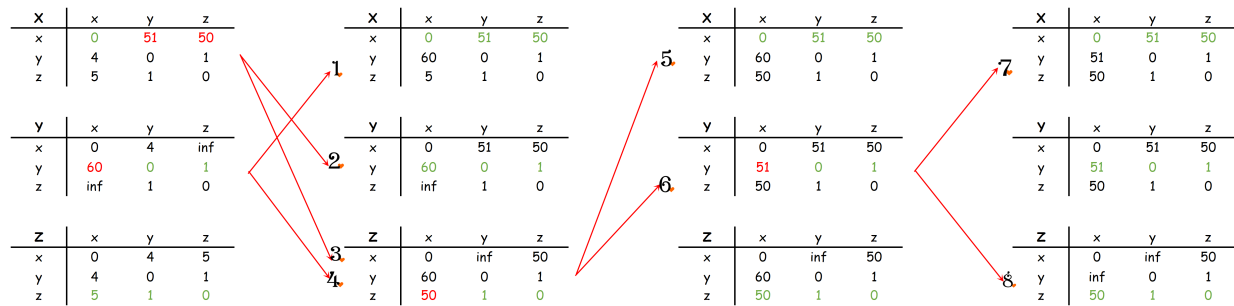
Step	N'	D(t), p(t)	D(u), p(u)	D(v), p(v)	D(w), p(w)	D(y), p(y)	D(z), p(z)
0	x	$\infty$	$\infty$	3, x	6, x	6, x	8, x
1	xv	7, v	6, v	3, x	6, x	6, x	8, x
2	xvu	7, v	6, v	3, x	6, x	6, x	8, x
3	xvuw	7, v	6, v	3, x	6, x	6, x	8, x
4	xvuwy	7, v	6, v	3, x	6, x	6, x	8, x
5	xvuwyt	7, v	6, v	3, x	6, x	6, x	8, x
6	xvuwytz	7, v	6, v	3, x	6, x	6, x	8, x

The shortest path from node x to all other nodes are,

Destination	Path	Path length
t	$x \rightarrow v \rightarrow t$	7
u	$x \rightarrow v \rightarrow u$	6
v	$x \rightarrow v$	3
w	$x \rightarrow w$	6
y	$x \rightarrow y$	6
z	$x \rightarrow z$	8

## Q5

- (a) The process is listed below



(b) The messages are listed below

1. y [60, 0, 1]
2. x [0, 51, 50]
3. x [0,  $\infty$ , 50]
4. y [60, 0, 1]
5. z [50, 1, 0]
6. z [50, 1, 0]
7. y [51, 0, 1]
8. y [ $\infty$ , 0, 1]