1.

(a)

Interface	Prefix
0	11100000 00**...
1	11100000 01 **....
2	11100000 ** ----
2	11100001 0* ----
3	Otherwise

(b)

The forwarding table searches the prefix of datagram whether it is included or not. If there is a matching longest prefix in the table, the forwarding table allocates corresponding interface to datagram. However, if there is no matching longest-prefix in the table, then the table allocates interface 3 to datagram.

2.

Interface	Prefix	Range	Number of Address
0	00-- ----	0~63	64
1	010- ----	64~95	32
2	011- ----	96~127	32
2	10-- ----	128~191	64
3	11-- ----	192~255	64

3.

Interface	Prefix	Range	Number of Address
0	1-------	192~223	32
1	10-- ----	128~191	64
2	111- ----	224~255	32
3	Otherwise	0~127	128

4.

Prefix : 223.1.17/24

3 subnets ⇒ Need to allocate 2-bit

Subnet #1 ⇒ at least 60 interfaces (at least 6-bit)

Subnet #2 ⇒ at least 90 interfaces (at least 7-bit)

Subnet #3 ⇒ at least 12 interfaces (at least 4-bit)

i) Subnet #2

223.1.17.1_____ ⇒ 223.1.17.128/25

or

223.1.17.0_____ ⇒ 223.1.17.0/25

ii)

Subnet #1

223.1.17.10_____ ⇒ 223.1.17.128/26

or

223.1.17.00_____ ⇒ 223.1.17.0/26

Subnet #2

223.1.17.11_____

or

223.1.17.01_____

⇓

223.1.17.192/26 or 223.1.17.64/26

$$\therefore \begin{bmatrix} \text{Subnet \#1} \\ \text{Subnet \#2} \\ \text{Subnet \#3} \end{bmatrix} = \begin{bmatrix} 223.1.17.128/26 \\ 223.1.17.128/25 \\ 223.1.17.192/26 \end{bmatrix} \quad \text{or} \quad \begin{bmatrix} 223.1.17.0/26 \\ 223.1.17.0/25 \\ 223.1.17.64/26 \end{bmatrix}$$

5.

128. 119. 40. 64/26 , 4 subnet ⇒ 2-bit allocation

128. 119. 40. 01 0 0 0000 /28
01
10
11

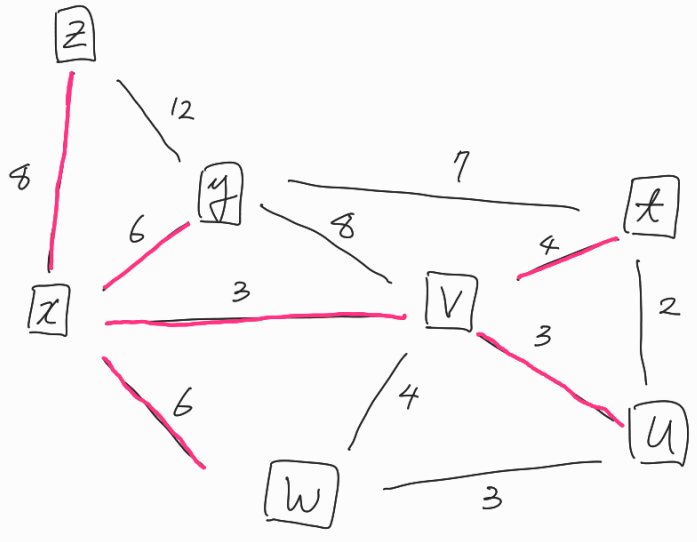
∴ 128. 119. 40. 64/28

128. 119. 40. 80/28

128. 119. 40. 96/28

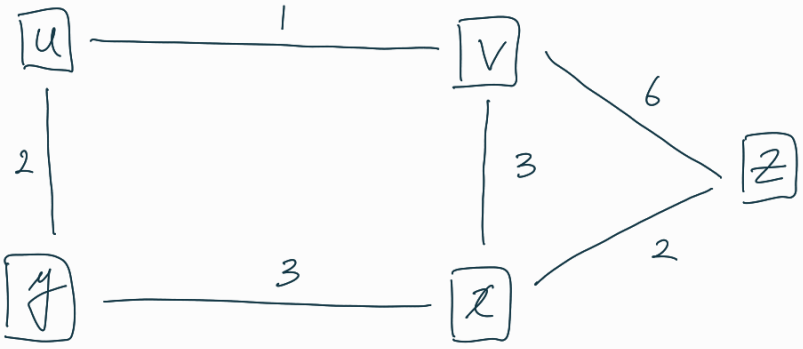
128. 119. 40. 112/28

6.



N'	\ N'	z	y	w	v	u	t
x	ϕ	∞	∞	∞	∞	∞	∞
x	zyvw	8,x	6,x	6,x	3,x	∞	∞
xv	ywut	8,x	6,x	6,x		6,v	7,v
xvw	u	8,x	6,x			6,v	7,v
xvwu	t	8,x	6,x				7,v
xvwuy	zt	8,x					7,v
xvwuyt	-	8,x					
xvwuytz	-						

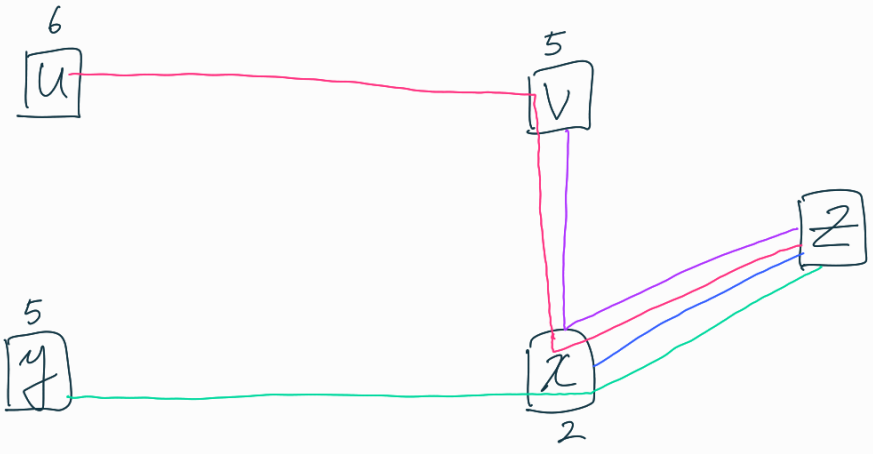
7.



$$\min_{a \in N(x)} \{ c(x,a) + D_a^n(y) \} = D_x^{n+1}(y)$$

	u	y	v	x	z
0	∞	∞	∞	∞	
1	∞	∞	6	2	
2	7	5	5	2	
3	6	5	5	2	
4	6	5	5	2	

- $D_x^1(z) = \min\{ {}^{y}3+\infty, {}^{v}3+\infty, {}^{z}2+0 \} = 2$
- $D_v^1(z) = \min\{ {}^{x}3+\infty, {}^{u}1+\infty, {}^{z}6+0 \} = 6$
- $D_y^2(z) = \min\{ {}^{u}2+\infty, {}^{x}3+2 \} = 5$
- $D_u^2(z) = \min\{ {}^{v}1+6, {}^{y}2+\infty \} = 7$
- $D_v^2(z) = \min\{ {}^{z}6+0, {}^{u}1+\infty, {}^{x}3+2 \} = 5$
- $D_u^3(z) = \min\{ {}^{v}1+5, {}^{y}2+5 \} = 6$



<Distance Table>

	u	y	v	x
Distance from z	6	5	5	2