Computer network hw2

Name: 黎诗龙

SID: 11811407

Q1

Interface 0

0000 0000

through

0011 1111

total: 2^6=64

Interface 1

0100 0000

through

1011 1111

total: 2^6*2=128

Interface 2

1100 0000

through

1101 1111

total: 2^5 = 32

Interface 3

1110 0000

through

1111 1111

total: 2^5 = 32

Q2

11011110 00000001 00010000 00000000 subnet ID

We know that we must remain the two reserved IP address for broadcasting (all 1's) and network address (all 0's).

We must assign the 256 addresses to those subnets

First allocate subnet 2, since it has the most addresses.

Subnet 2

90+2 = 92, and we have 2^7=128 > 92

So we need 7 bits to identify the hosts.

Therefore, subnet 2 network address is `222.1.16.0/25`.

Then allocate subnet 1

Subnet 1

60+2 = 62, and we have 2^6 = 64 > 62.

So we need 6 bits to identify the hosts.

Therefore, subnet 1 network address is `222.1.16.128/26`.

Then allocate subnet 3

Subnet 3

12+2 = 14, and we have 2^4=16 >12

So we need 4 bits to identify the hosts.

Therefore, subnet 3 network address is `222.1.16.192/28`.

Q3

a

Interface	Address
router	192.168.2.1
host 1 (top)	192.168.2.2
host 2 (middle)	192.168.2.3
host 3 (down)	192.168.2.4

b

NAT translation table:

WAN side addr	LAN side addr
24.34.112.232, 12222	192.168.2.2, 10000
24.34.112.232, 12223	192.168.2.2, 10001
24.34.112.232, 12224	192.168.2.3, 10000
24.34.112.232, 12225	192.168.2.3, 10001
24.34.112.232, 12226	192.168.2.4, 10000
24.34.112.232, 12227	192.168.2.4, 10001

Q4

Each entry in the forwarding table of a destination-based forwarding contains only an IP header field value and the outgoing link interface to which a packet (that matches the IP header field value) is to be forwarded.

Each entry of the flow table in OpenFlow includes a set of header field values to which an incoming packet will be matched, a set of counters that are updated as packets are matched to flow table entries, and a set of actions to be taken when a packet matches a flow table entry. It is more powerful because it can act as router, switch, firewall and NAT.

Q5

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	∞	∞	2,x	6,x	6,x	8,x
1	x,v	6,v	5,v		6,x	6,x	8,x
2	x,v,u	6,v			6,x	6,x	8,x
3	x,v,u,t				6,x	6,x	8,x
4	x,v,u,t,w					6,x	8,x
5	x,v,u,t,w,y						8,x
6	x,v,u,t,w,y,z						

Forwarding table:

Destination	Link
t	(x,v)
u	(x,v)
v	(x,v)
w	(x,w)
y	(x,y)
z	(x,z)

Q6

a

$D_x(y) = 2+2=4$

$D_x(u) = 2+5=7$

The vertical axis is the `"from"` node, and the horizontal axis is the `"to"` node.

	u	w	x	y
x	7	2	0	4

b

$D_x(u) = \min \{c(x,y)+D_y(u), c(x,w)+D_w(u)\}$

I change c(x,w):

`c(x,w) = 11`

Then $D_x(u) = 5+6 = 11$, and inform its neighbor.

c

I change c(x,y):

```
c(x,y) = 4
```

Then $D_x(u)$ remains the same, not informing others.