Homework 4 **Zhanghao Wu (516030910593)**
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Chapter4 P6

Solution: According to the forwarding table, we can have the following Table 1.

From	End	Interface	#
00000000	00111111	0	64
01000000	01111111	1	64
10000000	10011111	2	32
10100000	11111111	3	96

Table 1: Forwarding table with range

Chapter4 P11

Solution:

- The binary form of 192.168.56.128 is: 11000000 10101000 00111000 10000000. 192.168.56.129 is an example of one IP address that can be assigned to 192.168.56.128/26.
- The binary form of 192.168.56.32 is: 11000000 10101000 00111000 00100000. The prefixes of the four subnets of 192.168.56.32/26 are 192.168.56.0/28, 192.168.56.16/28, 192.168.56.32/28, 192.168.56.48/28.

Chapter4 P14

Solution: There will be $\lceil \frac{1600-20}{500-20} \rceil = 4$ fragments generated.

- Identification: The identification for the 4 datagrams are all 291.
- Datagram length: The datagram length for the first three datagrams are all 500, but it is $1600 - 20 - 3 * (500 - 20) + 20 = 160$ for the last one.
- Fragmentation offset: The fragmentation offset for the for datagrams are 0, 60, 120, 180, 240.
- Flag: And the flag for the first three datagrams are 1, but it is 0 for the last one.

Chapter4 P19

Solution: The following Table 2 shows the flow table entries in s2 that implement the forwarding behavior mentioned in the problem.

Match	Action
Ingress Port = 1; IP Src = 10.3.*.*; IP Dst = 10.1.*.*	Forward(2)
Ingress Port = 2; IP Src = 10.1.*.*; IP Dst = 10.3.*.*	Forward(1)
IP Dst = 10.2.0.3	Forward(3)
IP Dst = 10.2.0.4	Forward(4)

Table 2: Flow table entries in s2

Chapter5 P5

Solution: The distance table entries at node z is shown below by the order of steps.

from \ cost to	u	v	x	y	z
v	∞	∞	∞	∞	∞
x	∞	∞	∞	∞	∞
z	∞	6	2	∞	0

Table 3: Step 1

from \ cost to	u	v	x	y	z
v	1	0	3	∞	6
x	∞	3	0	3	2
z	7	5	2	5	0

Table 4: Step 2

from \ cost to	u	v	x	y	z
v	1	0	3	3	5
x	4	3	0	3	2
z	6	5	2	5	0

Table 5: Step 3

Chapter5 P6

Solution: Let d be the length of the longest path without loop on the graph. Since a node can know the smallest cost to the other nodes within n+1 hops at the n'th iteration, after d-1 iterations the distributed algorithm must converge. For any path longer than d, there must be a loop and removing it can get smaller cost.

Chapter5 P14

Solution:

a. To learn prefix x Router 3c needs the inter-AS routing protocol, i.e. eBGP.

b. Router 3a leans about x from iBGP.

c. Router 1c learns about x from eBGP.

d. Router 1d learns about x from iBGP.

Chapter5 P16

Solution: By only advertising the information of its reachability to D at its East Coast peering point, ISP C let B carry the traffic across the country.