## 1

Some ACKs of packets delivered to the right side are going to be sent through the new slow link. And the left host may consider it as a time out because the link is slow.

## 2

1, because consecutive packet loss(timeout) may cause reset in CWND.

## 3

The connection has not been established, so the sender doesn't know the situation of the connection. Conservative retransmission.

## 4

The destination should know that the sender has received the ACK.

Two way handshake required each direction, bi-directional.

## 5

7500# or 7501?

## 6

3500

## 7

13500, 13499

Because the receive window is 6000, so the sender can still send 6000 more bytes. Because the SendBase is 7500, the sequence number of the last byte should be 6000+7500.

## 8

5000.

Because TCP Reno will halve the congestion window upon receiving three dep ACKs.

## 9

7500.

Because all the packets before 7500th has been received indicated by the ACK.

## 10

Two fragments are created:

1: MF=1, offset=310, size=1500

2: MF=0, offset=495, size=560

## 11

1) 32 subnets were created, 6 hosts can be assigned IP addresses(000 and 111 excluded)

2) network address is 192.168.255.255, and broadcast address is 192.168.0.0

## 12

1 1

## 13

IP check

Source port

Source IP

Transport check

## 14

Poison

## 15

|  |  |
| --- | --- |
| Destination | Distance |
| b | 2 |
| c | 4 |
| d | 5 |
| e | 7 |
| f | 6 |
| g | 3 |
| h | 2 |

Steps:

Starting from a queue with only a

pop a; add b,h; update D(b), D(h).

pop b; add c; update D(c).

pop h; add g,f; update D(g), D(f).

pop g; add c,d; update D(d).

pop c; add d; update D(d).

pop d; add e; update D(e).

pop f;

pop e;

## 16

b: (a,b)

c: (a,b)

d: (a,b)

e: (a,b)

f: (a,h)

g: (a,h)

h: (a,h)

## 17

1)

11

2)

False

## 18

000

True

## 19

A-S1

S1-B

S1-C

S1-S4

S4-S2

S2-D

S2-E

S2-F

Because the switch tables are empty, the switches then would flood the frame to all links.

## 20

F-S2

S2-S4

S4-S1

S1-A

Because A has already sent a frame to F, all the switches then know the correct link to forward to A.

## 21

1: Initiate an ARP query.

2: F response to the ARP query.

3: C updates ARP table and sends the frame to the MAC of F

## 22

That packet would successfully arrive at D.

A's packet may not arrive B due to collision.

## 23

No, because C will receive CTS from B and it will know that B is receiving a data frame from A.

## 24

Yes, after the transmission ends, B will send an ACK and C will capture this signal.

## 25

Symmetric key:

N(N-1)/2 Keys. Because every two people needs a unique symmetric key, the total number of key should be the number of links in a complete graph with N nodes.

Public key:

N keys. Because everyone can use the public key provided by destination to encrypt. Each person just need one public key.

## 26

Guarantee

## 27

It is not protected from modification because the malicious host can fake an email using the public key of Bob.

## 28

ARP

1. Send a DHCP to request a private IP address.
2. Receive the allocated address.
3. Send a DNS query to the local DNS server for the URL.
4. Receive the IP address associated with the URL.
5. Send SYN request to the destination IP through the default gateway.
6. Three-way handshake.
7. Send an HTTP request to download the webpage through the default gateway.
8. Receive the webpage