EE450 Final Exam YiRan Xu Session 2.

Tuesday, November 17, 2020 2:50 PM

True or False

1-7 F T T T T T T

8-14 F F T T F F T

15-21 T T F T F T T

22-23 T T

24. d 25 b 26 c 27 a 28. b, e 29. a

30. c

Part 2.

1. 2 Mbps

10 Mbps

50Mbps

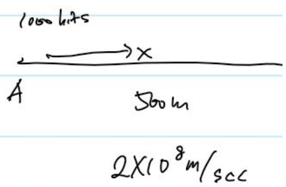
2. 0.0524%

3276800 Bytes/sec

3. 76 bits

Total length = 500+45…

4. ① 1.25×10^{-6} sec



② 5 μs

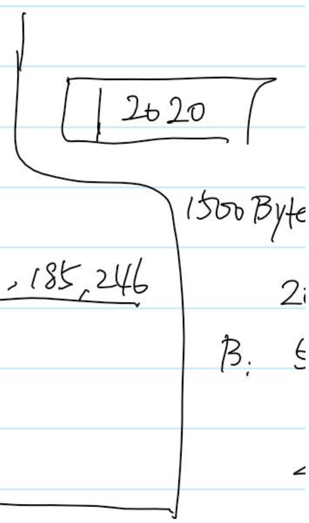
③ 4523809.5 bps

5. ① 2

② 1480, 540

③ 6

④ 0, 61, 122, 183, 185, 246



6. 3.

192.166.0000 11 /22

192.166.000100 /22

192.166.

7. a) B

b) D

c) A

d) G

e) G.

8) A → B

hidden D

Exposed: C

B → C

hidden: D

exposed: A

9)

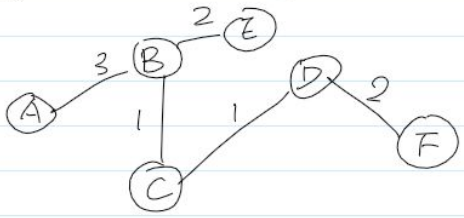
A sends to E :	2, 3, 4	Get A's info
G send to E :	1, 2, 3	Get G's info
E send to A	1	direct forward.
H send to G	drop.	

10) Router cannot be configured: R_4
can get congested $R_1, R_2, R_3, R_5, R_6, R_7$

Part 3.

Dijkstra:

	B	C	D	E	F
A	(A,3)	(A,5)	(A,9)	∞	∞
AB	-	(B,4)	(B,7)	(B,5)	∞
ABC	-	-	(C,5)	(B,5)	(C,12)
ABCD	-	-	-	(B,5)	(D,7)
ABCDE	-	-	-	-	(D,7)
ABCDEF	-	-	-	-	-



b.

R_1

Net	Dis	Next
1	0	Direct
2	2	R_5
4	8	R_2
17	5	R_3
24	6	R_4
30	2	R_5
42	2	R_4

R_4

Net	Dis
1	3
4	2
17	6
21	1
24	5
30	8
42	2

The R_1's table after

Net	Dis	Next
1	0	Direct
2	2	R_5
4	3	R_4
17	5	R_3
21	2	R_4
24	6	R_4
30	2	R_5
42	2	R_4.

Part 4 Subnetting.

CIDR 192.168.1.0/24

4 subnets { A 90 → 2^7 ; B 50 → 2^6 ; C 25 → 2^5 ; D 15 → 2^4

0 _ _ _ _ _ _ _ 7
1 0 _ _ _ _ _ 6
1 1 0 _ _ _ _ 5
1 1 1 0 _ _ _ 4

A: 192.168.1.0/25 - - - 192.168.1.127/25 128-2
B: 192.168.1.128/26 - - - 192.168.1.191/26
C: 192.168.1.192/27 - - - 192.168.1.223/27
D: 192.168.1.224/28 - - - 192.168.1.239/28

a.)

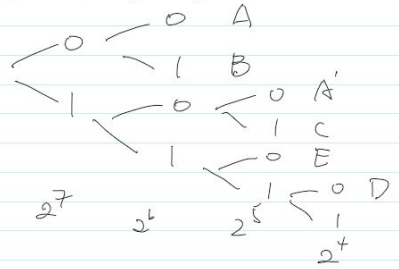
	Subnet Addr	SM	Broadcast Addr	Max # of host
A	192.168.1.0/25	/25	192.168.1.127/25	2^7-2
B	192.168.1.128/26	/26	192.168.1.191/26	2^6-2
C	192.168.1.192/27	/27	192.168.1.223/27	2^5-2
D	192.168.1.224/28	/28	192.168.1.239/28	2^4-2

Bits Remain Unused = 74 (do not count the host with all 0 and all 1s)

b) E Requires 20 address. 2^5

$2^6 + 2^5 = 96 > 90$

prefix.



As the structure shown above, the organization will use 2 different subnet /26 & /27 to Represent A

Part 5.

File: 640 MSS MSS: 1000 Bytes. SSthreshold = 64 MSS.

BW: 100 Mbps RTT = 40 msec

a) BW x Delay = 100Mbps x 40 msec Half of file: 320 MSS.

= 400 k bits

= 500

RTT:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CW	1	2	4	8	16	32	64	1	2	4	8	16	32	33	34	35	36	37
# packets	1	2-3	4-7	8-15	16-31	32-63	64-127	65	66-67	68-71	72-79	80-95	96-127	128-154	155-188	189-223	224-259	260-296

64+64

done

The Congestion will not occur to send half of 127 then.

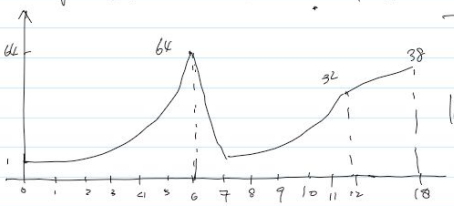
18

38

296-333

26

46



Throughput = $\frac{38 MSS}{RTT}$

= 7.6Mbps

link Utilization

$\frac{7.6 Mbps}{100 Mbps}$ = 7.6%.

No, there will be no congestion during sending the Receiving bits.

Since the increasing is linearly from now on and till 64

Part B.

BW = 10 Mbps.

BW x Delay = 10 Mbps x 40 msec = 50 Mbs.

CW = 50 mss.

RTT	0	1	2	3	4	5	6	7	8	9	10
w_c	1	2	4	8	16	32	64	1	2	4	8
packet	1	2-3	4-7	8-15	16-31	32-63	congestion happen Retransmit	64	65-66	67-70	71-78

threshold = 32

RTT	11	12	13	14	15	16	17	18
	16	32	33	34	35	36	37	38
	79-94	95-126	127-159	160-193	194-228	229-264	265-301	302-339

finished transmission.

H tasks 18 RTTs

$$\text{the throughput} = \frac{320 \times 1{,}000 \text{ Bytes} \times 8}{18 \times 40 \text{ msec}} = 3.55 \text{ Mbps}$$

$$\text{link Utilization} = \frac{3.55 \text{ Mbps}}{100 \text{ Mbps}} = 3.55\%.$$