Tutorial -9

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① Original datagram - 5000B

data = 4980B

20B - IP header

MTU = 1420B

Data = 1400B ; 20B - IP header

len = 1420	ID = 105	fragflag = 1	offset = 0
len = 1420	ID = 105	fragflag = 1	offset = 175
len = 1420	ID = 105	fragflag = 1	offset = 350
len = 740	ID = 105	fragflag = 0	offset = 525

② x - 148.76.38.19
y 153.52.17.50

RM spec Home Nw : 128.119.40.54
3C-x
2C-y

assume the round assignment of address will be as follows

192.163.1.1 - 192.163.1.32
192.163.1.33 - 192.163.1.64
192.163.1.65 - 192.163.1.96
192.163.1.97 - 192.163.1.128

Note

At x,

148.76.38.19 | 5001
→ 192.163.1.32 | 3201

148.76.19 | 5001
→ 192.163.1.64 | 3202

At 4,

153.52.17.50 | 5000
→ 192.163.1.128 | 3200

153.52.17.20 | 2001
→ 192.163.1.128 | 3201

3. So B sees TCP segment and then in IP datagram

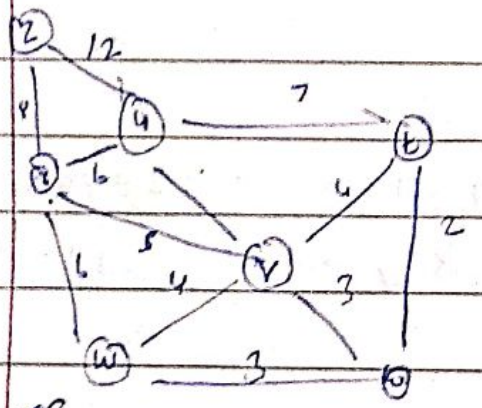
→ gets encapsulated in TCP segment and then

20B header (TCP) + 20B header (datagram) + 50B data = 90B

Overhead = $\frac{40}{90}$ × 100 = 44.44%

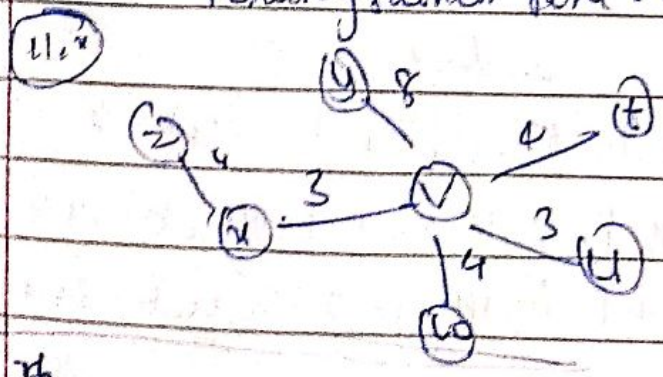
App data = $\frac{50}{90}$ = 55.55%

(d)



Step	N'	D(y) p(y)	D(t) p(t)	D(u) p(u)	D(x) p(x)	D(w) p(w)
0	v	8,v	4,v	3,v	6,v	3,v
1	vu	8,v	4,v		4,v	3,v
2	vux	8,v	4,v		4,v	
3	vuxw	8,v	4,v			
4	vuxwt	8,v				
5	vuxwty					
6	vuxwtyz					

resulting shortest path from v



forward table dest	link
u	(v, u)
x	(v, x)
t	(v, t)
w	(v, w)
y	(v, y)
z	(v, x)

If v = 7

Step	N'	D(t) p(t)	D(u) p(u)	D(x) p(x)	D(w) p(w)	D(y) p(y)	D(z) p(z)
0	v	8,v	[illegible]	2,v	4,v	3,v	∞
1	vu	8v	5,v		4,v	3,v	∞
2	vux	8v	5,v		4,x		11,y
3	vuxw	8v	5,v				11,y
4	vuxwt	8v					11,y
5	vuxwty						11,y
6	vuxwtyz						

→ vuxwty (or) vxuwtyz = Possible

→ 'u' detects v → t 11.7 and u → ... u t

⑤ Datagram len = 3820 B

IP header = 20 B

Data = 3800 B

MTU = 1400 B

1380 B – data without

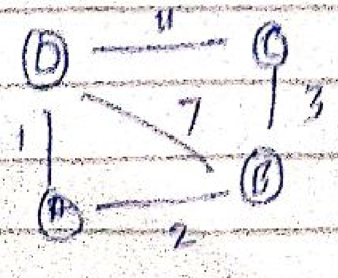
20 B – header

len = 1396 | Id = x | fragflag = 1 | offset = 0

len = 1396 | Id = x | fragflag = 1 | offset = 172 — total 3 fragments are created

len = 1028 | Id = x | fragflag = 0 | offset = 344

⑥ (a)



Dest	Next	Dist
B	B	2
C	[illegible]	∞
D	D	1

B) Dest | Next hop | Dist

A	A	2
C	C	3
D	D	7

C) Dest | Next hop | Dist

A	A	—
B	B	3
D	D	11

D) Dest | Next hop | Dist

A	A	1
B	B	7
C	C	11

A, C, D → B

Dest	Dist	hop
A	2	A
C	3	C
D	3	A
B	0	B

B, D → C

Dest	Dist	hop
A	5	B
B	3	B
D	10	B
C	0	C

A, B, C → D

Dest	Dist	hop
A	5	B
B	3	B
C	0	C
D	6	B

A, B, C → D

Dest	Dist	hop
A	1	A
B	3	A
C	6	A
D	0	D

Initial stage of routing table

	A	B	C	D	E
A	0	7	∞	∞	1
B	7	0	1	∞	∞
C	∞	1	0	2	∞
D	∞	∞	2	0	2
E	1	8	∞	2	0

D → D

	A	B	C	D	E
A	0	7	∞	∞	1
B	7	0	1	∞	8
C	∞	1	0	2	∞
D	∞	∞	2	0	2
E	1	8	∞	2	0

B → A

	A	B	C	D	E
A	0	7	8	∞	1
B	7	0	1	∞	8
C	∞	1	0	2	∞
D	∞	∞	2	0	2
E	1	8	4	2	0

B → A

	A	B	C	D	E
A	0	7	5	3	1
B	7	0	1	2	8
C	2	1	0	2	∞
D	∞	∞	2	0	2
E	1	8	4	2	0

C → B

	A	B	C	D	E
A	0	7	∞	3	1
B	7	0	1	3	8
C	∞	1	0	2	∞
D	∞	∞	2	0	2
E	1	8	4	2	0

D → C

	A	B	C	D	E
A	0	7	5	3	1
B	7	0	1	3	8
C	8	1	0	2	4
D	3	3	2	0	2
E	1	8	4	2	0

D → E

	A	B	C	D	E
A	0	7	5	3	1
B	7	0	1	3	8
C	8	1	0	2	4
D	3	3	2	0	6
E	1	5	4	2	0

(d)

B/

Dest	A	B	C
A	7	9	6
C	12	10	1
D	10	10	3
E	8	8	5

D/

Dest	B	E
B	7	6
C	8	5
D	10	3
E	12	1

D/

Dest	C	E
A	8	3
B	3	10
C	2	11
E	9	2

E/

Dest	A	B	D
A	1	18	12
B	8	8	5
C	9	9	4
D	11	11	2