a)

node	A	B	C	D	E	F
	Distance to nodes					
A	—	∞	3	8	∞	∞
B	∞	—	∞	∞	2	∞
C	3	∞	—	∞	1	6
D	8	∞	∞	—	2	∞
E	∞	2	1	2	—	∞
F	∞	∞	6	∞	∞	—

b)

node	A	B	C	D	E	F
	Distance to nodes					
A	—	∞	3	8	4	9
B	∞	—	3	4	2	∞
C	3	3	—	3	1	6
D	8	4	3	—	2	8
E	4	2	1	2	—	7
F	9	∞	6	∞	7	—

c)

node	A	B	C	D	E	F
	Distance to nodes					
A	—	6	3	6	4	9
B	6	—	3	4	2	9
C	3	3	—	3	1	6
D	6	4	3	—	2	9
E	4	2	1	2	—	7
F	9	9	6	9	7	—

HW 4 & Solution Page 2019

2) Link state for node D (Dest, Cost, next)

Link State Packets

A: (C,3,C) (D,8,D) B: (E,2,E)

C: (A,3A) (E,1,E) (F,6,F) D: (E,2,E) (A,8,A)

E: (B,2,B) (D,2,D) (C,1,C) F: (C,6,C)

Confirmed	Tentative
(D,0,-)	(E,2,E) (A,8,A)
(D,0,-), (E,2,E)	(A,8,A), (B,4,E) (D,~~2~~,E) on list
(D,0,-), (E,2,E) (C,3,E)	(C,3,E) (A,~~8~~,A), (B,4,E), (A,6,E), replaced by
(D,0,-), (E,2,E), (C,3,E), (B,4,E)	E ~~D,E~~ E on list, (F,9,E)
(D,0,-), (E,2,E), (C,3,E), (B,4,E) (A,6,E)	(A,6,E), (F,9,E), E on list
(D,0,-), (E,2,E), (C,3,E), (B,4,E) (A,6,E)	(F,9,E), C on list, D on list
(D,0,-), (E,2,E), (C,3,E), (B,4,E), (A,6,E), (F,9,E)	C on list, list is empty

Routing Table for D:

DEST	COST	NEXT
A	6	E
B	4	E
C	3	E
D	—	—
E	2	E
F	9	E

3) link cost is 1 per hop

Forward table at A

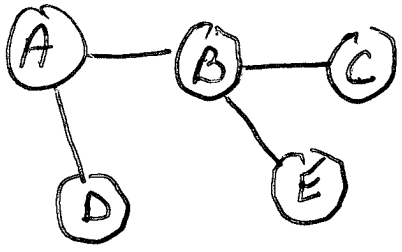
Node	Cost	Next
B	1	B
C	2	B
D	1	D
E	2	B
F	3	B

at node F

Node	Cost	Next
A	3	E
B	2	C
C	1	C
D	2	E
E	1	E

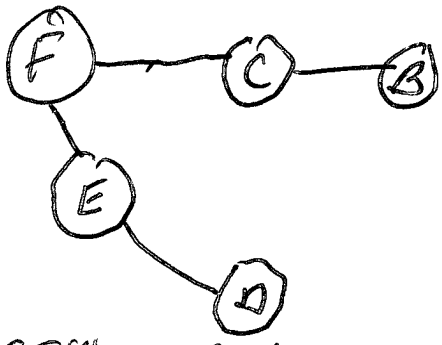
COST of 1 - direct neighbor
COST of 2 - node is connected to the next node indicated

From Table A



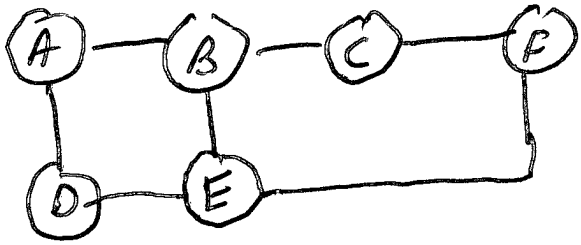
Still need F

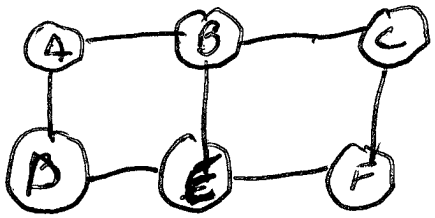
From Table F



Still need A

Connect Nodes B, C, D, and E From the two graphs





4) Using table 3.18

a) 128.96.39.10

mask 255.255.255.192 ⇒ 128.96.39.0 no match

mask 255.255.255.128 ⇒ 128.96.39.0 match

Send on interface 0

b) 128.96.40.12 No need to check mask for 192.4.153.0 since it is wrong network

mask 255.255.255.128 ⇒ 128.96.40.0

Send on R2

c) 128.96.40.151

mask 255.255.255.128 ⇒ 128.96.40.128

No match so send to default

Send to R4

d) 192.4.153.17 – only need to check mask 255.255.255.~~128~~ 192

apply mask 255.255.255.~~128~~ 192 ⇒ 192.4.153.0

Send to R3

e) 192.4.153.90

Apply mask 255.255.255.~~128~~ 192 ⇒ 192.4.153.64

No match so use default

Send to R4

5) hex #'s used for address, start with longest mask

a) C4.5E.13.87

mask of /20 ⇒ FF, FF, F0.00

13 ⇒ 0001 0011
F0 ⇒ 1111 0000
1 0

So masked address is C4.5E.10.0

match, so next hop is B

b) C4.5E.22.09

for /20 ⇒ C4.5E.20.0 no match
for /14 ⇒ C4.5C.0.0 no match
for /12 ⇒ C4.50.0.0 match

next hop is A

c) C3.41.80.02

Since starts with C3, no match for /20, /14, /12

for /2 C0.0.0.0 no match
for /1 80.0.0.0 match so next hop is E

5 (cont)

d) 5E.43.91.12 Since starts with 5E, no match for /20, /14, /12

for /2 40.0.0.0 match

Next hop is E

e) C4.6D31.2E

for /20 ⇒ C4.6D30.0 no match

for /14 ⇒ C4.6C.0.0 no match

for /12 ⇒ C4.60.0.0 match

Next hop is C

f) C4.6B.31.2E

for /20 C4.6B.30.0 No match

for /14 C4.68.0.0 match

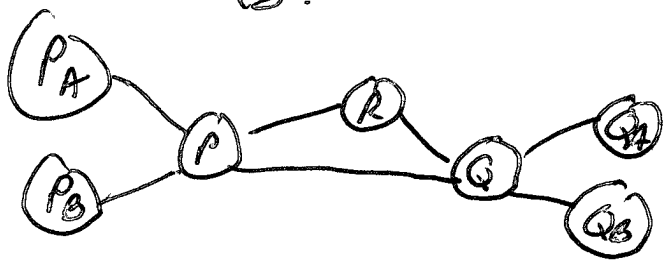
Next hop is D

6) P: C1.0.0.0/8 Q C2.0.0.0/8 R: C3.0.0.0/8

In P: P_A C1.A3.0.0/16
P_B C1.B0.0.0/12

In Q Q_A: C2.0A.10.0/20
Q_B: C2.0B.0.0/16

a) all routers connected



Router P

address	next hop
C2.0.0.0/8	Q
C3.0.0.0/8	R
C1.A3.0.0/16	PA
C1.B0.00/12	PB

Router Q

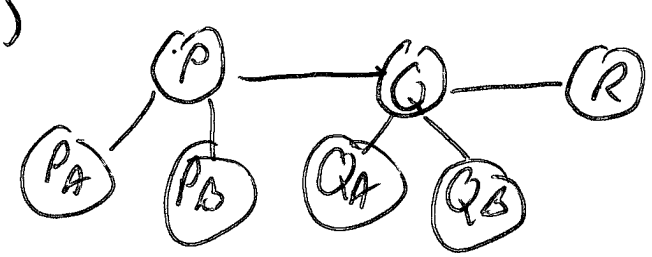
address	next hop
C1.0.0.0/8	P
C3.0.0.0/8	R
C2.0A.10.0/20	QA
C2.0B.0.0/16	QB

Router R

address	next hop
C1.0.0.0/8	P
C2.0.0.0/8	Q

R does not need entries for P_A, P_B, Q_A, Q_B because it has an entry for P and Q already

b)



Tables for P and R
Q is same as above

Router P

address	next hop
C2.0.0.0/8	Q
C3.0.0.0/8	Q
C1.A3.0.0/16	PA
C1.B0.0.0/12	PB

Router R

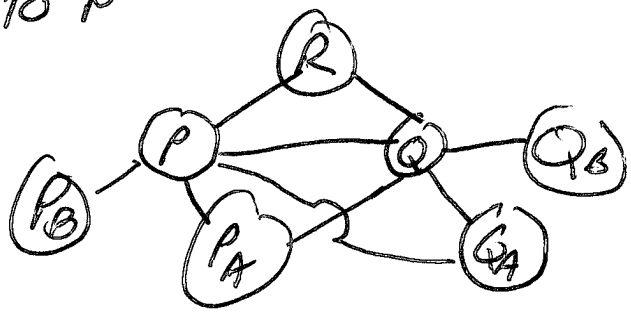
address	next hop
C1.0.0.0/8	Q
C2.0.0.0/8	Q

These are the only two entries that change

6 cont)

c) P_A gets direct link to Q ignore router R

Q_A gets direct link to P



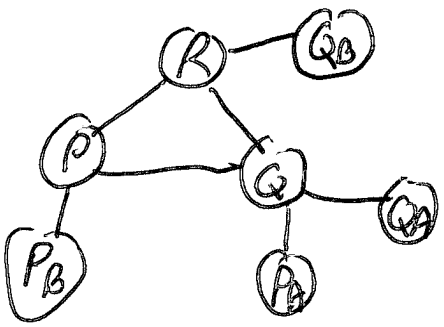
Router P

address	nextHop	
C2.0.0.0/8	Q	} Q_A has longer mask, so packets for Q_A will go to Q_A instead of Q
C2.0A.10.0/20	Q_A	
C1.A3.0.0/16	P_A	
C1.B0.0.0/12	P_B	
C3.0.0.0/8	R	← not required

Router Q

address	Next Hop
C1.0.0.0/8	P
C1.A3.0.0/16	P_A
C2.0A.10.0/20	Q_A
C2.0B.0.0/16	Q_B

7)



in MIT Problem move is transparent since both networks have a mask of /16

Router P

C2.0.0.0/8	Q
C3.0.0.0/8	R
C1.A3.0.0/16	Q
C1.B0.0.0/12	PB
C2.0B.0.0/16	R

Router Q

C1.0.0.0/8	P
C3.0.0.0/8	R
C1.A3.0.0/16	PA
C2.0A.10.0/20	QA
C2.0B.0.0/16	R

Router R

C1.0.0.0/8	P
C2.0.0.0/8	Q
C1.A3.0.0/16	Q
C2.0B.0.0/16	QB