



# RAMA UNIVERSITY

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## FACULTY OF ENGINEERING & TECHNOLOGY

### BCA-302 Computer Networks

#### Lecture-20

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Assistant Professor

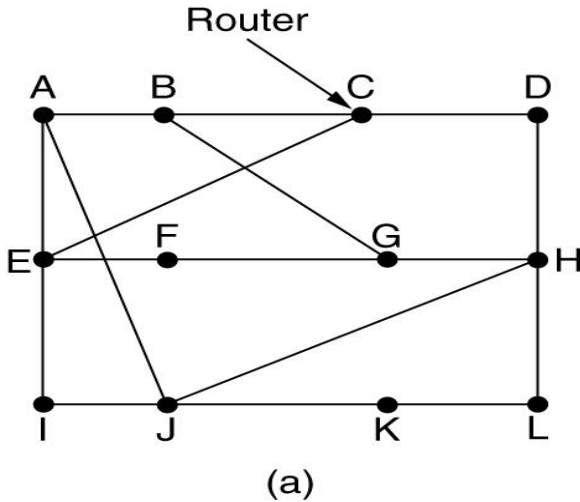
Computer Science & Engineering

# OUTLINE

- **THE NETWORK LAYER PROBLEM PACKET SWITCHING**
- **THE NETWORK LAYER PROBLEM : CONNECTIONLESS SERVICE**
- **THE PROBLEM NETWORK LAYER : CONNECTION-ORIENTED SERVICE**
- **CONNECTIONLESS VS. CONNECTION-ORIENTED**
- **SHORTEST PATH ALGORITHM**



# DISTANCE VECTOR ROUTING



(a) A subnet.

To	A	I	H	K	New estimated delay from J	
					↓	Line
A	0	24	20	21	8	A
B	12	36	31	28	20	A
C	25	18	19	36	28	I
D	40	27	8	24	20	H
E	14	7	30	22	17	I
F	23	20	19	40	30	I
G	18	31	6	31	18	H
H	17	20	0	19	12	H
I	21	0	14	22	10	I
J	9	11	7	10	0	-
K	24	22	22	0	6	K
L	29	33	9	9	15	K

JA delay is 8      JI delay is 10      JH delay is 12      JK delay is 6

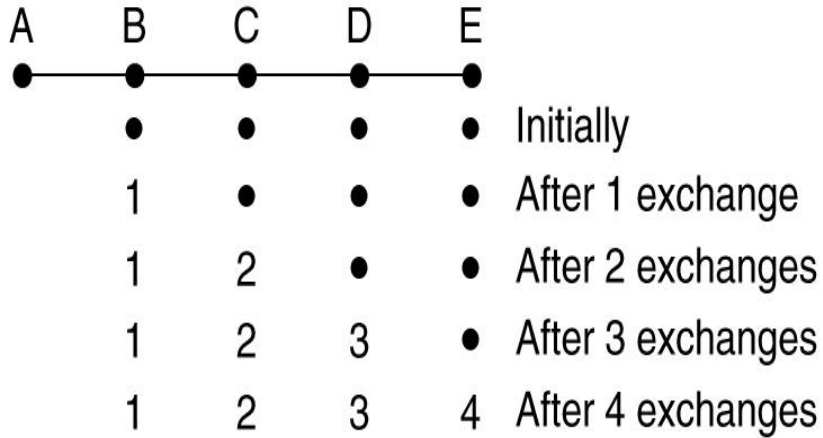
Vectors received from J's four neighbors

New routing table for J

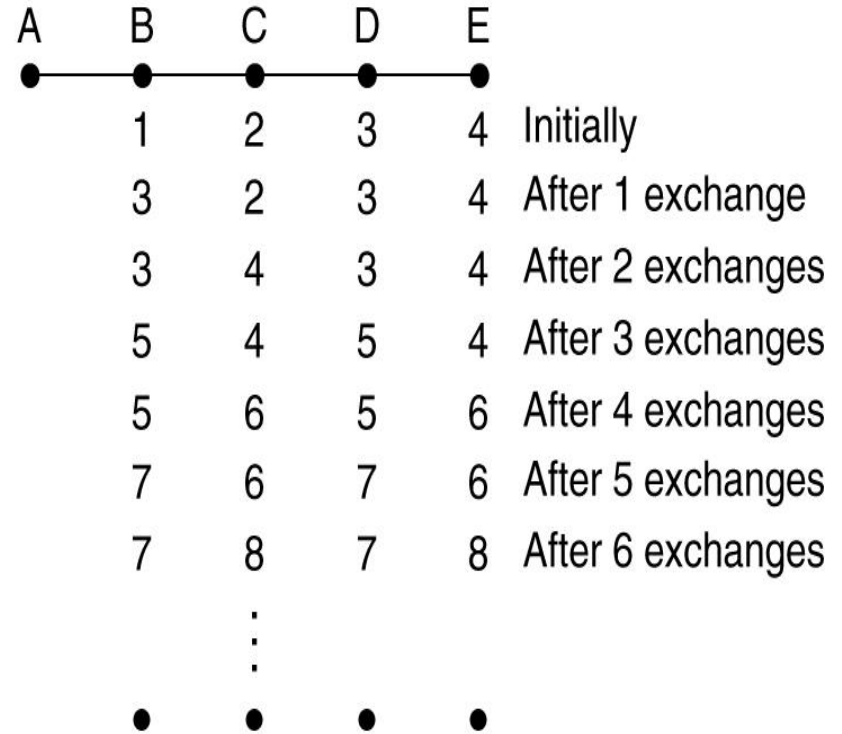
(b)

(b) Input from A, I, H, K, and the new routing table for J.

# THE COUNT-TO-INFINITY PROBLEM



(a)

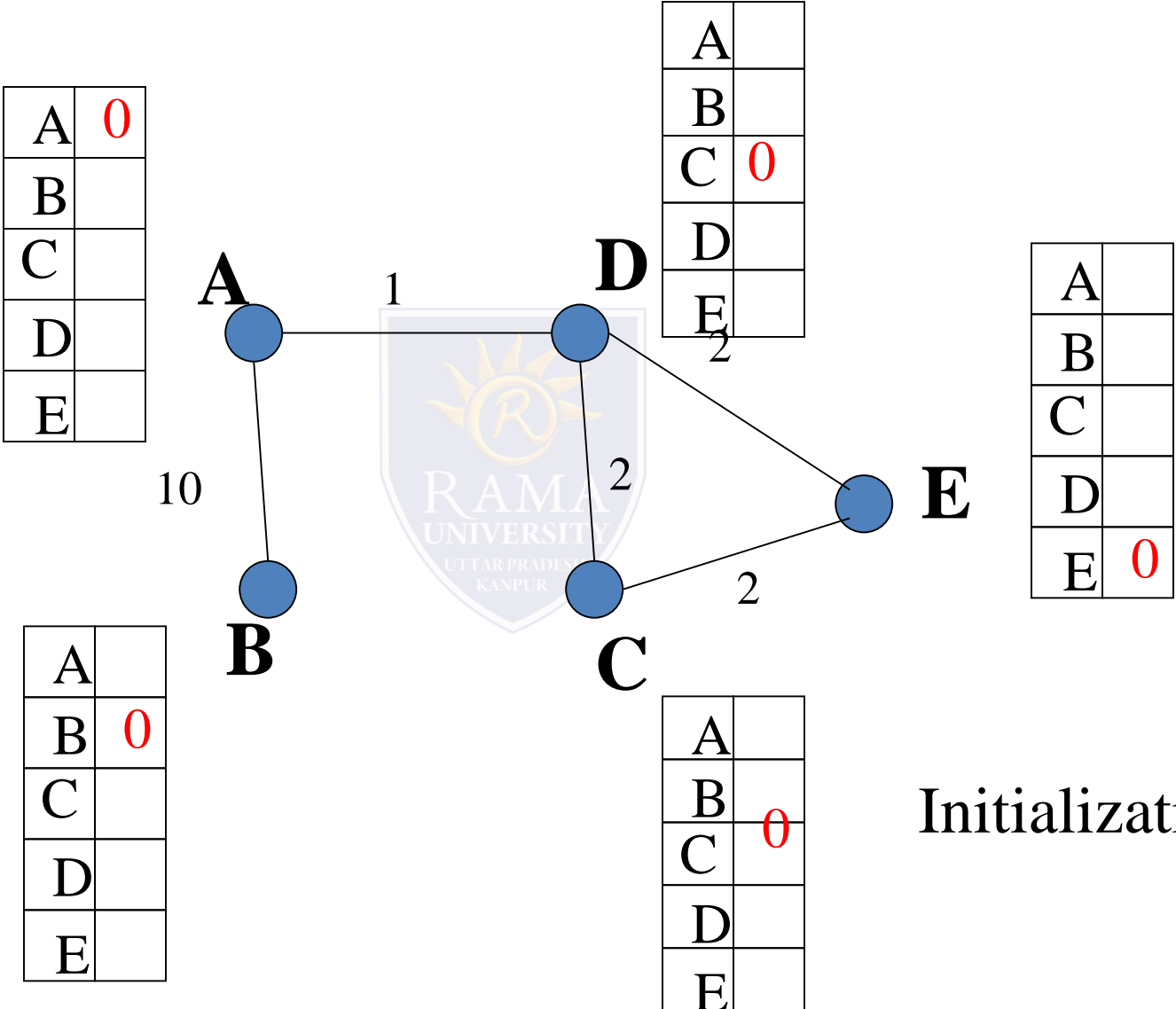


(b)

### 3 Distance Vector Routing (3): Loop-Breaking Heuristics

- Set infinity to a limited number, e.g. 16.
- Split horizon
- Split horizon with poison reverse

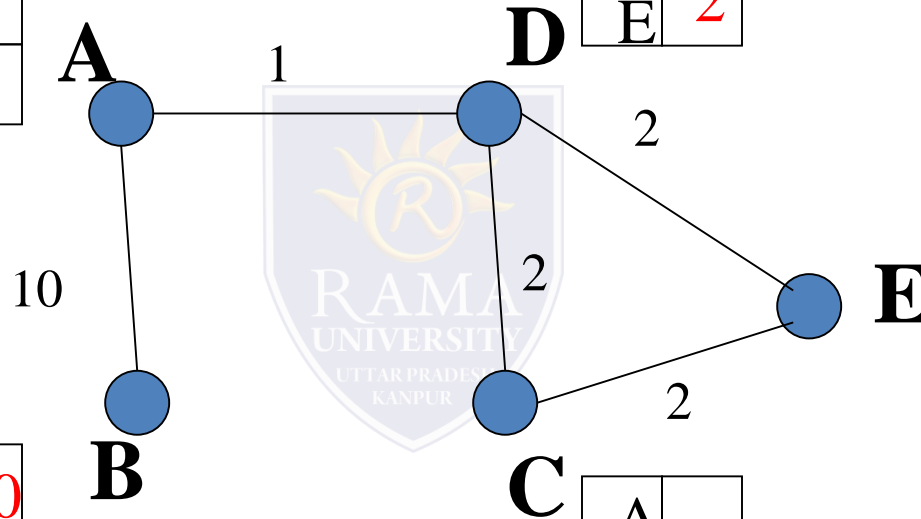
# Example



Initialization

A	0
B	10
C	
D	1
E	

A	1
B	
C	2
D	0
E	2



A	
B	
C	2
D	2
E	0

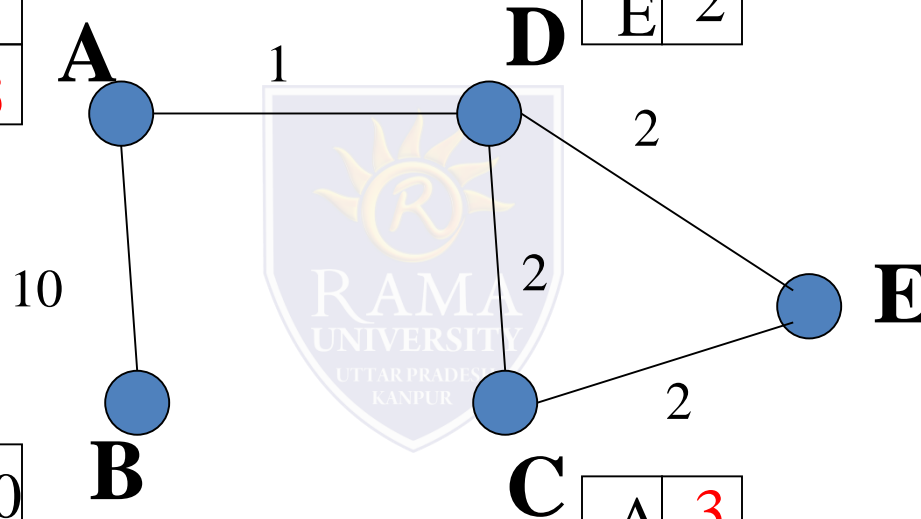
A	10
B	0
C	
D	
E	

A	
B	
C	0
D	2
E	2

Direct Neighbours

A	0
B	10
C	3
D	1
E	3

A	1
B	11
C	2
D	0
E	2



A	3
B	
C	2
D	2
E	0

A	10
B	0
C	
D	11
E	

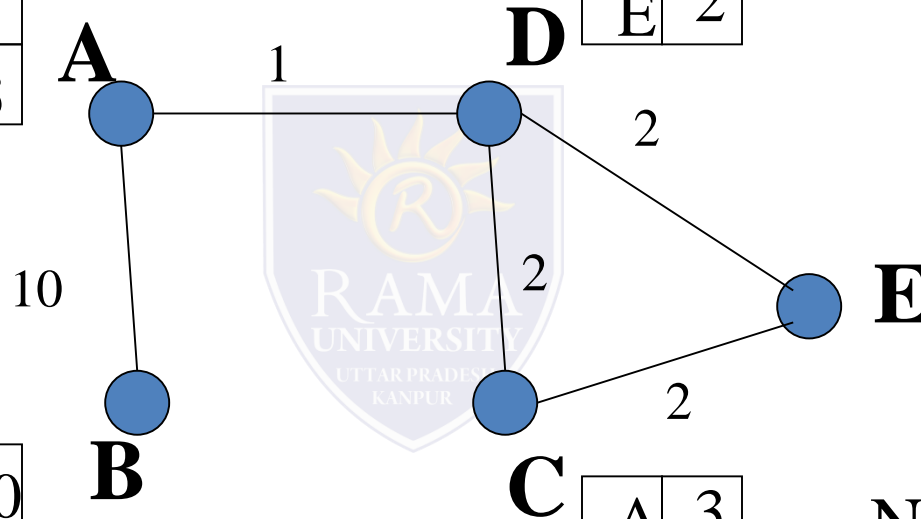
A	3
B	
C	0
D	2
E	2

Neighbours  
of neighbours



A	0
B	10
C	3
D	1
E	3

A	1
B	11
C	2
D	0
E	2



A	10
B	0
C	13
D	11
E	13

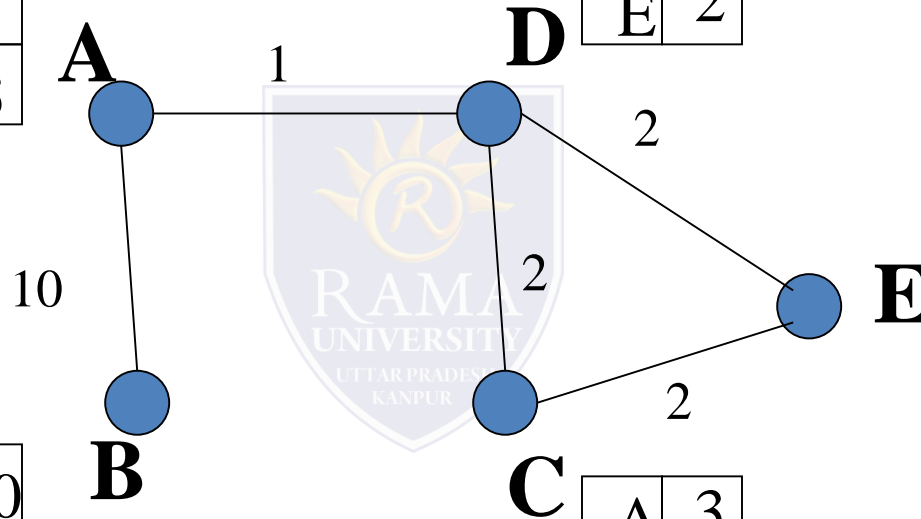
A	3
B	13
C	0
D	2
E	2

A	3
B	13
C	2
D	2
E	0

Neighbours  
of neighbours  
of neighbours

A	0
B	10
C	3
D	1
E	3

A	1
B	11
C	2
D	0
E	2



A	10
B	0
C	13
D	11
E	13

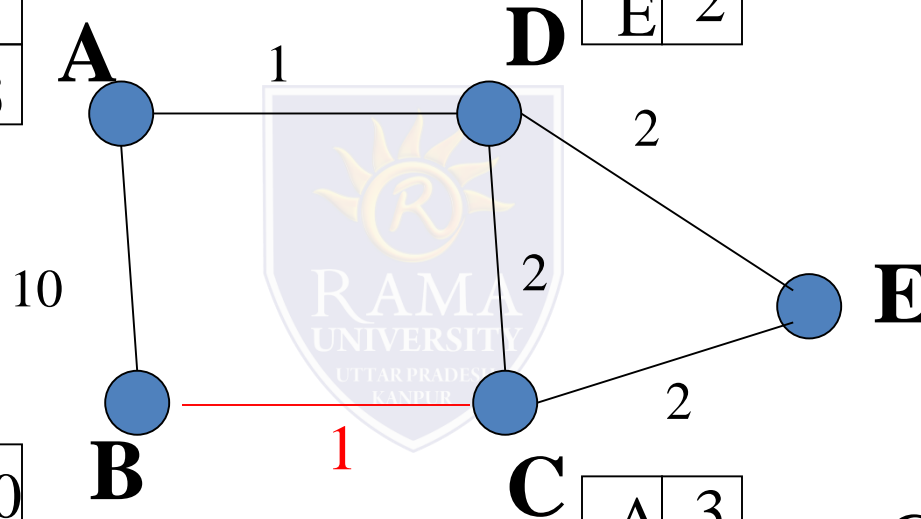
A	3
B	13
C	0
D	2
E	2

A	3
B	13
C	2
D	2
E	0

Stable  
convergence

A	0
B	10
C	3
D	1
E	3

A	1
B	11
C	2
D	0
E	2



A	3
B	13
C	2
D	2
E	0

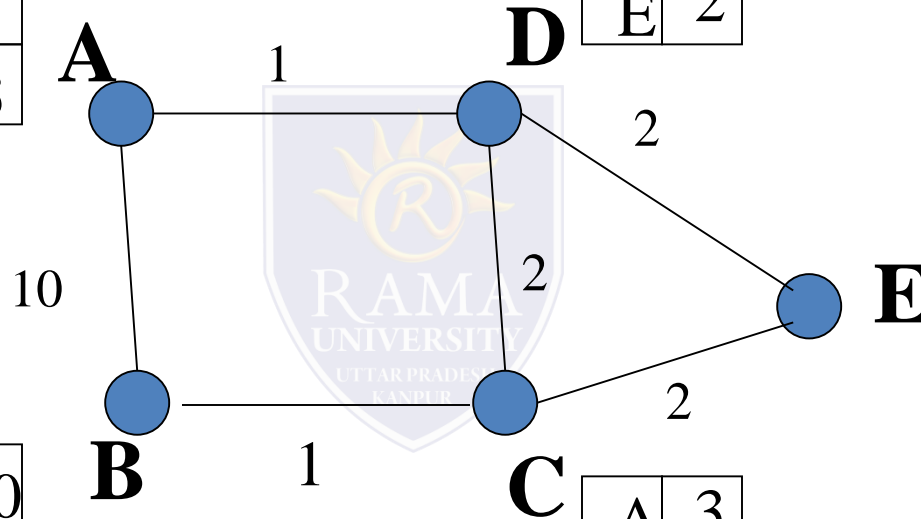
A	10
B	0
C	13
D	11
E	13

A	3
B	13
C	0
D	2
E	2

Good news:  
A new link!

A	0
B	10
C	3
D	1
E	3

A	1
B	11
C	2
D	0
E	2



A	3
B	13
C	2
D	2
E	0

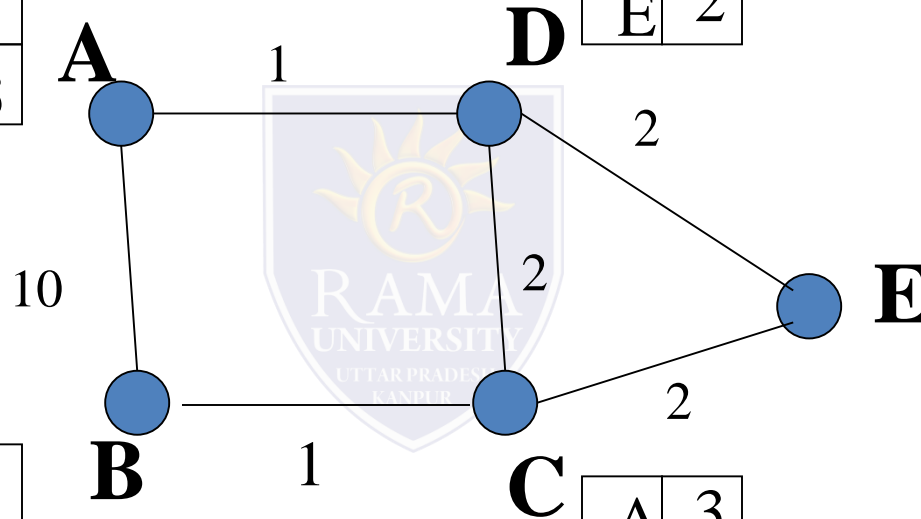
A	10
B	0
C	1
D	11
E	13

A	3
B	1
C	0
D	2
E	2

Direct endpoints know

A	0
B	10
C	3
D	1
E	3

A	1
B	3
C	2
D	0
E	2



A	3
B	3
C	2
D	2
E	0

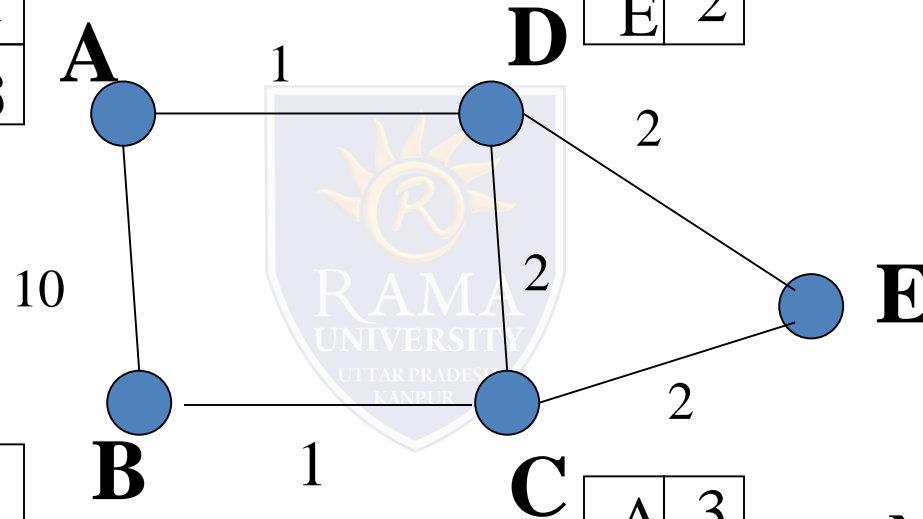
A	4
B	0
C	1
D	3
E	3

A	3
B	1
C	0
D	2
E	2

Neighbours know

A	0
B	4
C	3
D	1
E	3

A	1
B	3
C	2
D	0
E	2



A	4
B	0
C	1
D	3
E	3

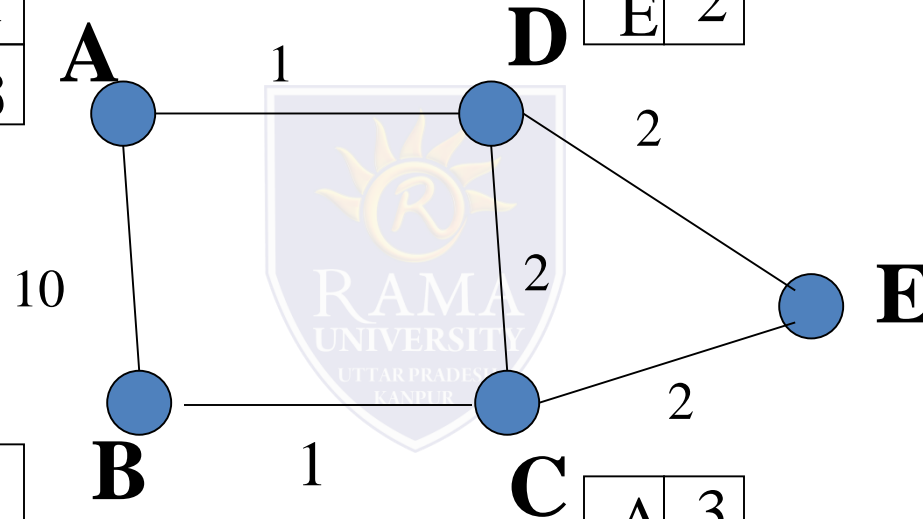
A	3
B	1
C	0
D	2
E	2

A	3
B	3
C	2
D	2
E	0

Neighbours  
of neighbours  
know

A	0
B	4
C	3
D	1
E	3

A	1
B	3
C	2
D	0
E	2



A	4
B	0
C	1
D	3
E	3

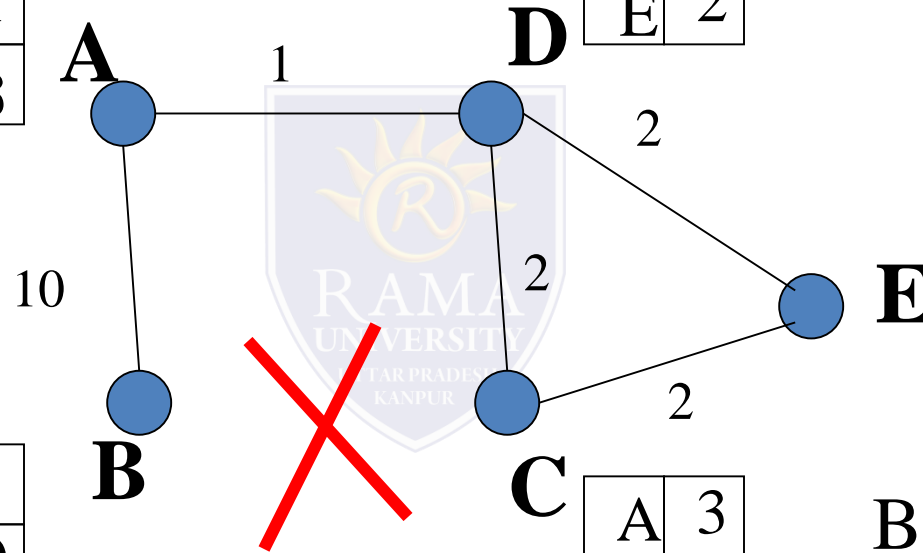
A	3
B	1
C	0
D	2
E	2

A	3
B	3
C	2
D	2
E	0

A happy and stable network

A	0
B	4
C	3
D	1
E	3

A	1
B	3
C	2
D	0
E	2



A	3
B	3
C	2
D	2
E	0

A	4
B	0
C	1
D	3
E	3

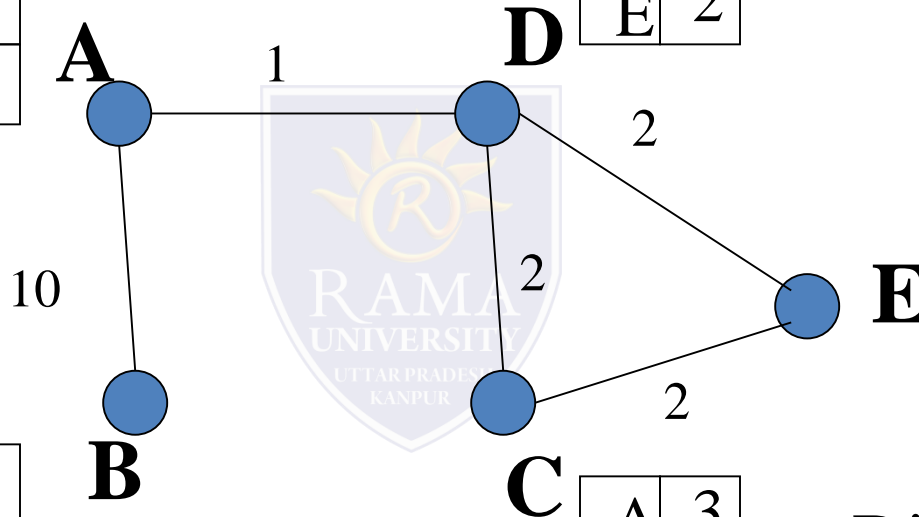
A	3
B	1
C	0
D	2
E	2

Bad news:  
Link crash!!



A	0
B	4
C	3
D	1
E	3

A	1
B	3
C	2
D	0
E	2



A	3
B	3
C	2
D	2
E	0

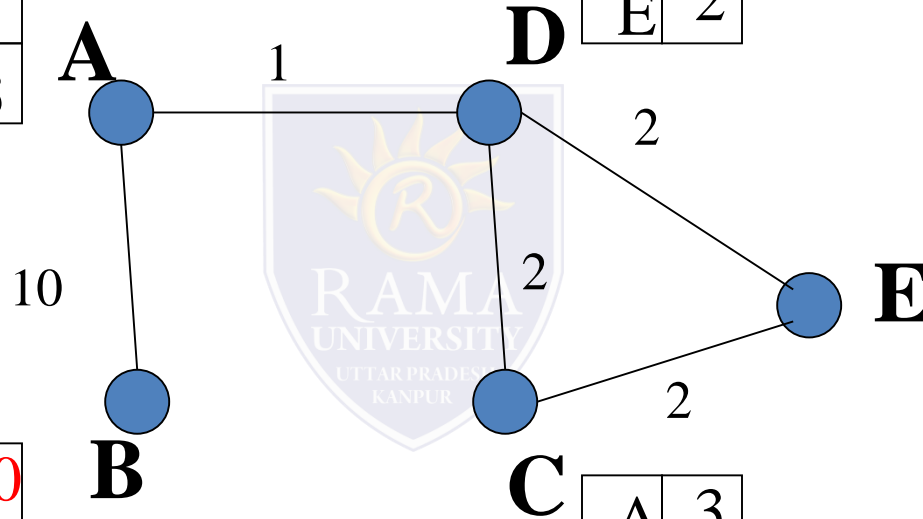
A	
B	0
C	
D	
E	

A	3
B	
C	0
D	2
E	2

Direct endpoints know

A	0
B	4
C	3
D	1
E	3

A	1
B	3
C	2
D	0
E	2



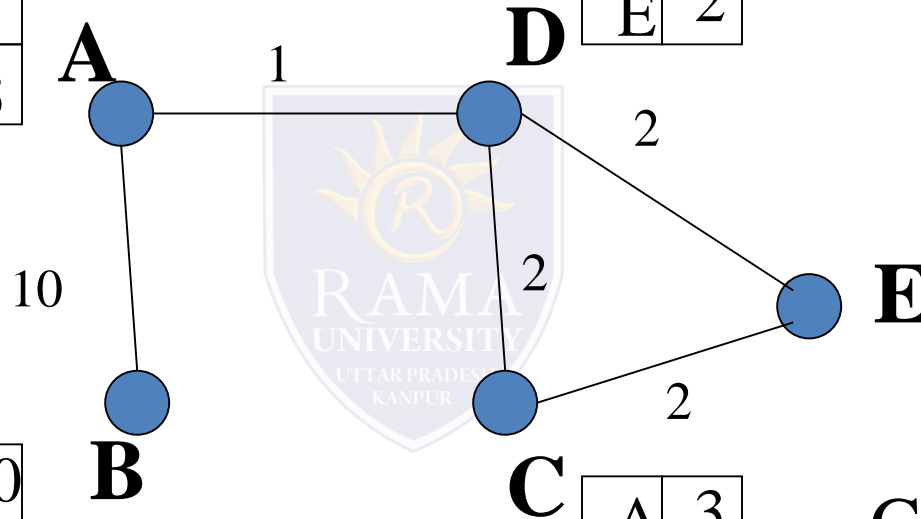
A	10
B	0
C	
D	
E	

A	3
B	
C	0
D	2
E	2

A	3
B	3
C	2
D	2
E	0

A	0
B	4
C	3
D	1
E	3

A	1
B	3
C	2
D	0
E	2



A	3
B	3
C	2
D	2
E	0

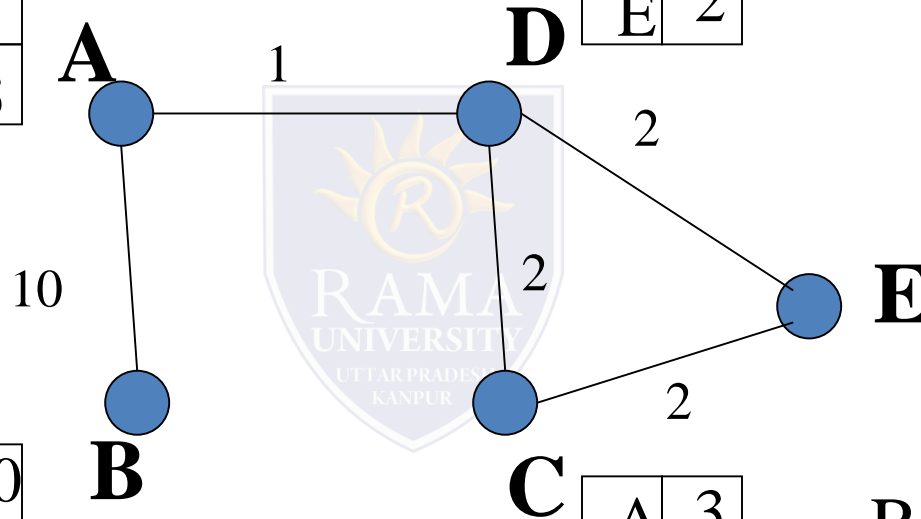
A	10
B	0
C	13
D	11
E	13

A	3
B	5
C	0
D	2
E	2

Get help  
from  
neighbours

A	0
B	4
C	3
D	1
E	3

A	1
B	7
C	2
D	0
E	2



A	10
B	0
C	13
D	11
E	13

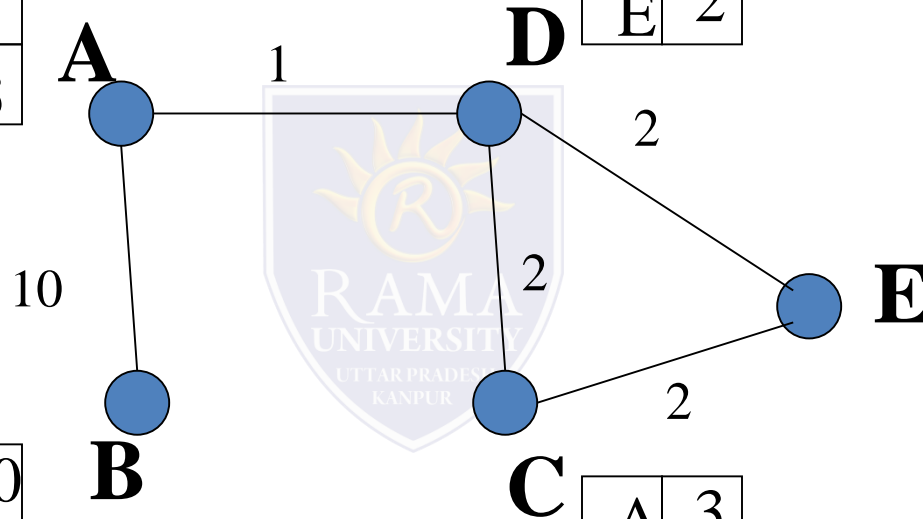
A	3
B	5
C	0
D	2
E	2

A	3
B	7
C	2
D	2
E	0

Routing loop  
(due to  
inconsistent  
state info)

A	0
B	8
C	3
D	1
E	3

A	1
B	7
C	2
D	0
E	2



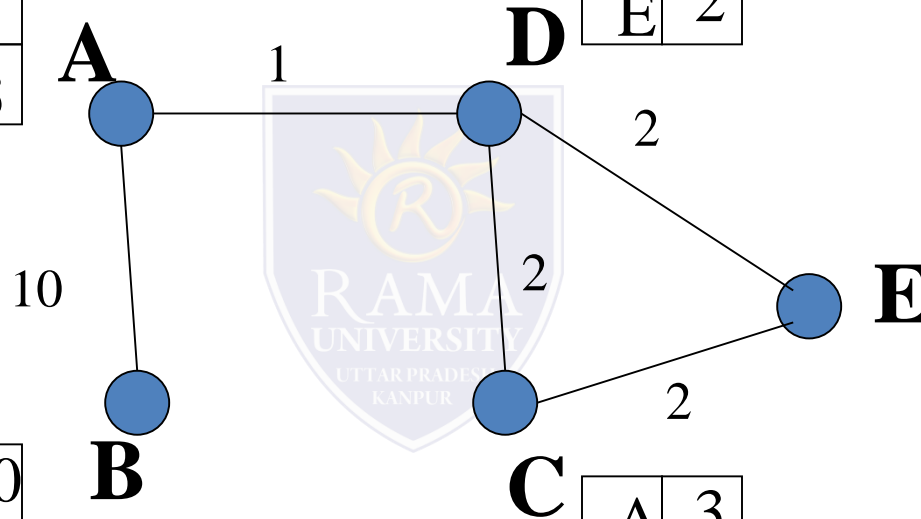
A	10
B	0
C	13
D	11
E	13

A	3
B	9
C	0
D	2
E	2

A	3
B	7
C	2
D	2
E	0

A	0
B	8
C	3
D	1
E	3

A	1
B	11
C	2
D	0
E	2



A	10
B	0
C	13
D	11
E	13

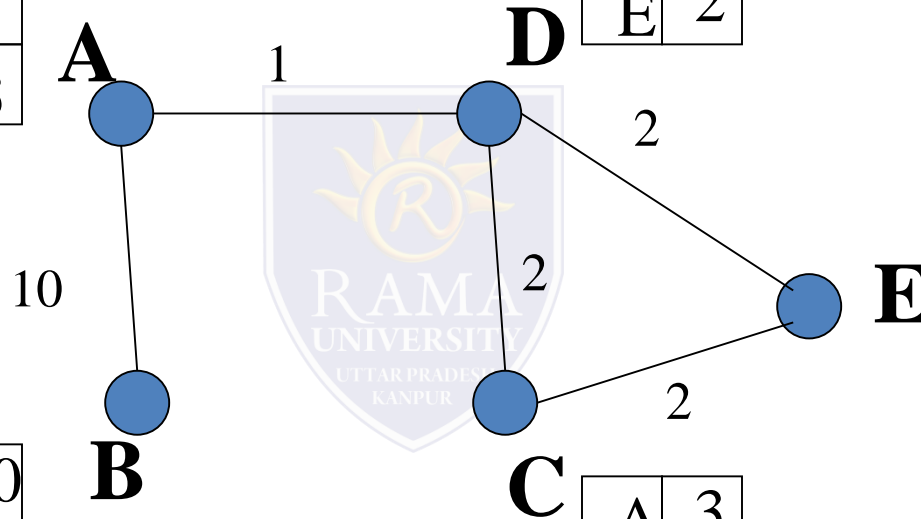
A	3
B	9
C	0
D	2
E	2

A	3
B	11
C	2
D	2
E	0

Counting to infinity...

A	0
B	10
C	3
D	1
E	3

A	1
B	11
C	2
D	0
E	2



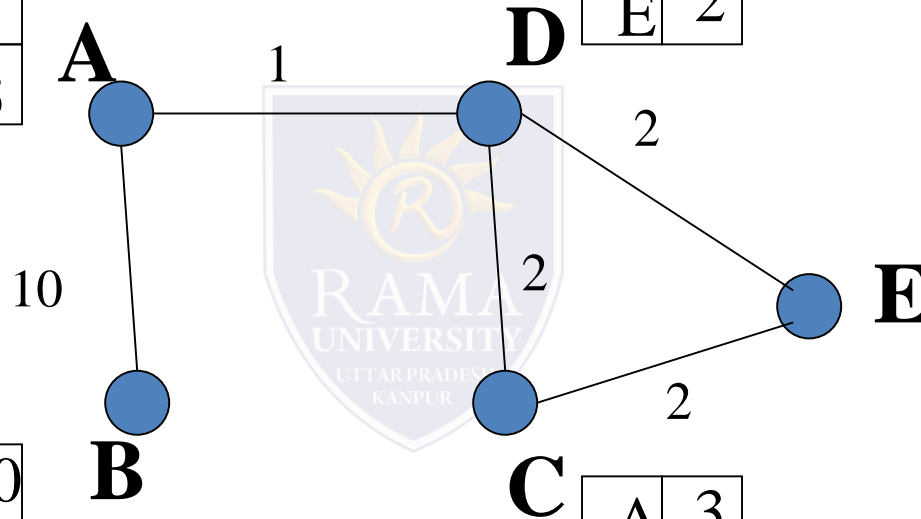
A	10
B	0
C	13
D	11
E	13

A	3
B	13
C	0
D	2
E	2

A	3
B	11
C	2
D	2
E	0

A	0
B	10
C	3
D	1
E	3

A	1
B	11
C	2
D	0
E	2



A	10
B	0
C	13
D	11
E	13

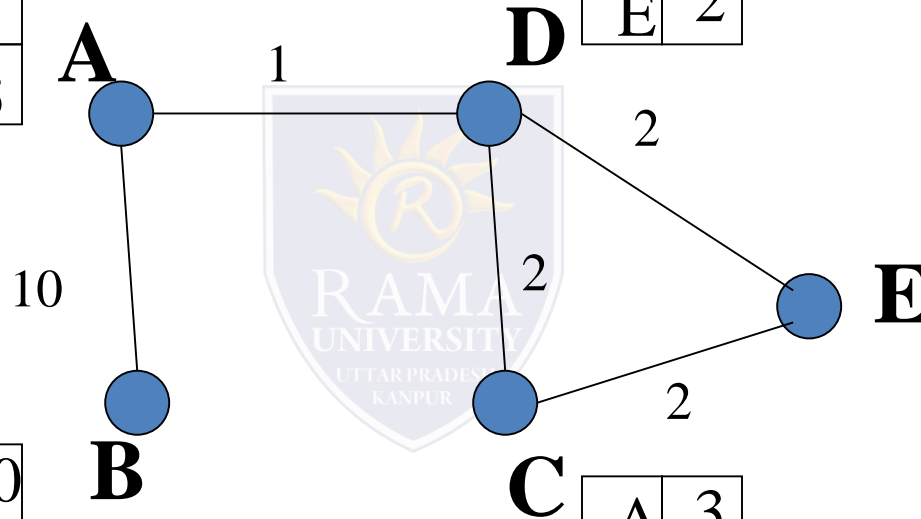
A	3
B	13
C	0
D	2
E	2

A	3
B	13
C	2
D	2
E	0



A	0
B	10
C	3
D	1
E	3

A	1
B	11
C	2
D	0
E	2



A	3
B	13
C	2
D	2
E	0

A	10
B	0
C	13
D	11
E	13

A	3
B	13
C	0
D	2
E	2

Stability  
again

# Multiple Choice Question

## MUTIPLE CHOICE QUESTIONS:

Sr no	Question	Option A	Option B	OptionC	OptionD
1	The combination of _____ and _____ is often termed the local address of the local portion of the IP address.	Network number and host number	Network number and subnet number	Subnet number and host number	Host number
2	Which of the following are Gigabit Ethernets?	1000 BASE-SX	1000 BASE-LX	1000 BASE-CX	All of the mentioned
3	_____ is a collective term for a number of Ethernet Standards that carry traffic at the nominal rate of 1000 Mbit/s against the original Ethernet speed of 10 Mbit/s.	Ethernet	Fast Ethernet	Gigabit Ethernet	Gigabyte Ethernet
4	_____ is another kind of fiber optic network with an active star for switching.	S/NET	SW/NET	NET/SW	FS/NET
5	A local telephone network is an example of a _____ network.	Packet switched	Circuit switched	Bit switched	Line switched

# REFERENCES

- <http://www.engppt.com/2009/12/networking-fourzan-ppt-slides.html>

