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# FACULTY OF ENGINEERING & TECHNOLOGY

## DCS-503 Computer Networks

## Lecture-22

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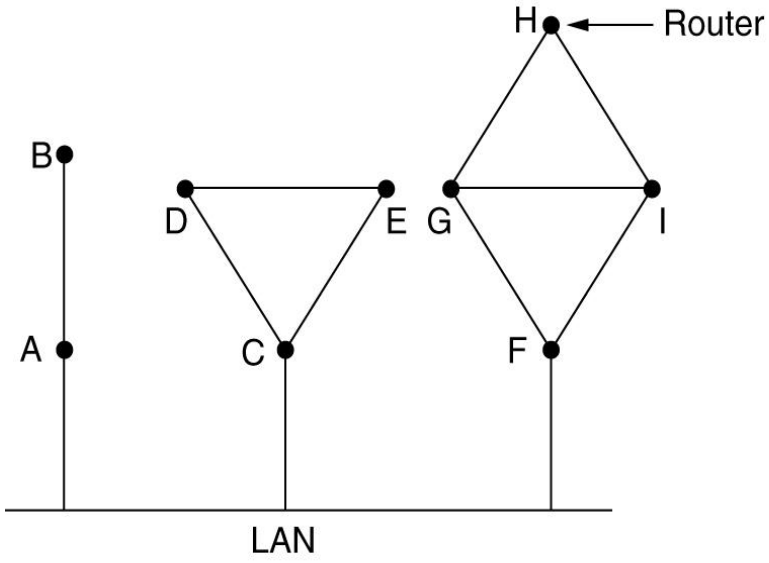
# OUTLINE

- LINK STATE ROUTING
- LINK STATE ROUTING : MEASURING LINE COST
- LINK STATE ROUTING : BUILDING LINK STATE PACKETS
- LINK STATE ROUTING : DISTRIBUTING THE LINK STATE PACKETS
- HIERARCHICAL ROUTING

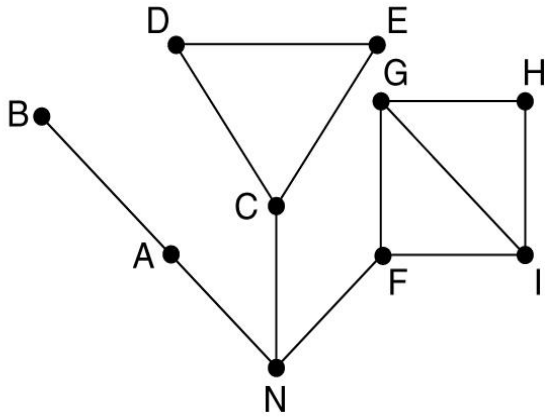
# LINK STATE ROUTING

## Each router must do the following:

- Discover its neighbors, learn their network address.
- Measure the delay or cost to each of its neighbors.
- Construct a packet telling all it has just learned.
- Send this packet to all other routers.
- Compute the shortest path to every other router



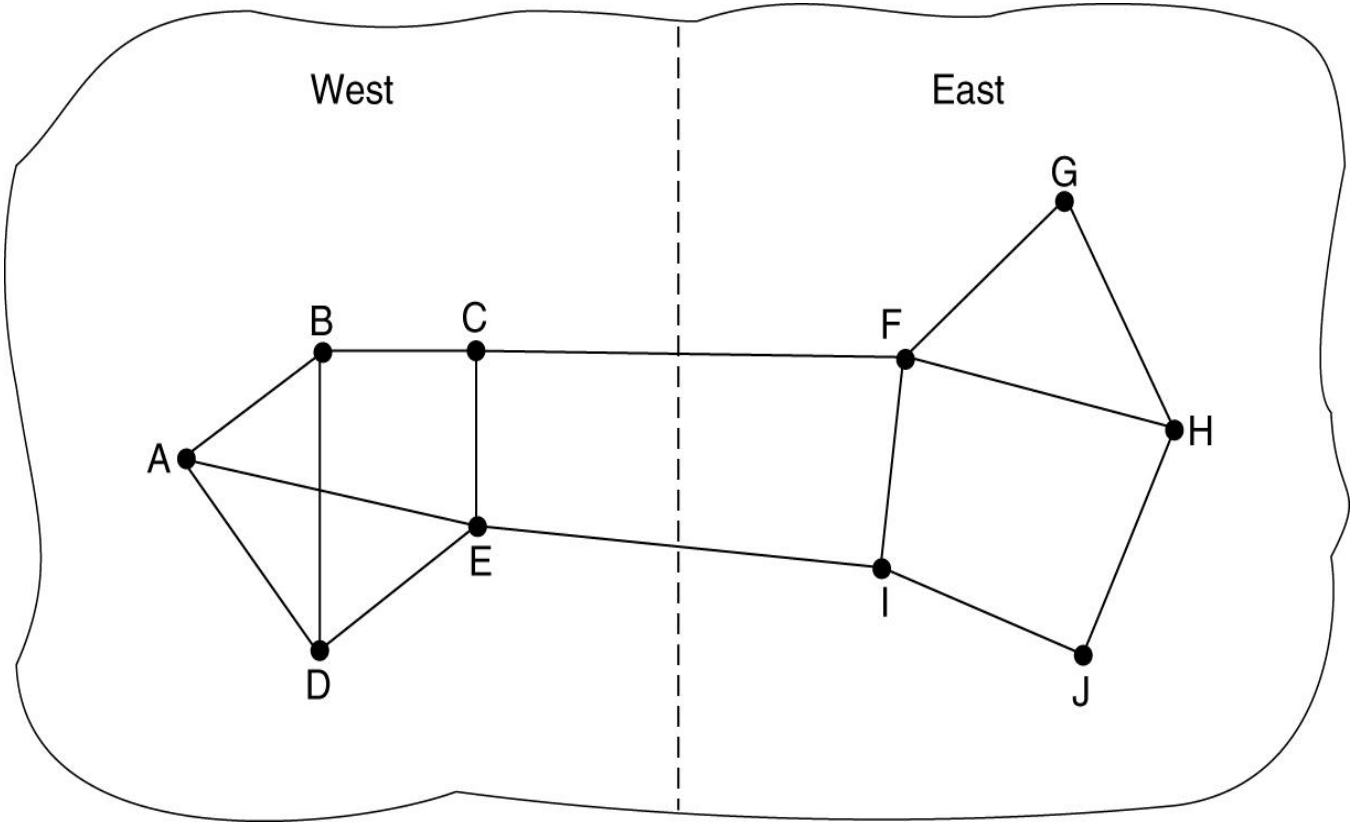

(a)



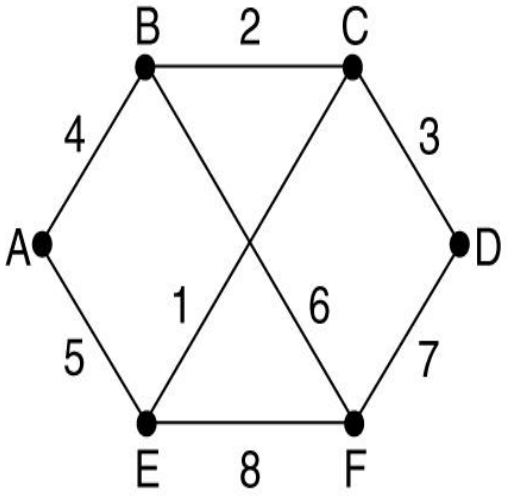

(b)

# LINK STATE ROUTING : MEASURING LINE COST

**A subnet in which the East and West parts are connected by two lines**



# LINK STATE ROUTING : BUILDING LINK STATE PACKETS




(a)

Link State Packets

| A | |
|---|---|
| Seq. | |
| Age | |
| B | 4 |
| E | 5 |

| B | |
|---|---|
| Seq. | |
| Age | |
| A | 4 |
| C | 2 |
| F | 6 |

| C | |
|---|---|
| Seq. | |
| Age | |
| B | 2 |
| D | 3 |
| E | 1 |

| D | |
|---|---|
| Seq. | |
| Age | |
| C | 3 |
| F | 7 |

| E | |
|---|---|
| Seq. | |
| Age | |
| A | 5 |
| C | 1 |
| F | 8 |

| F | |
|---|---|
| Seq. | |
| Age | |
| B | 6 |
| D | 7 |
| E | 8 |

(b)

(a) A subnet.

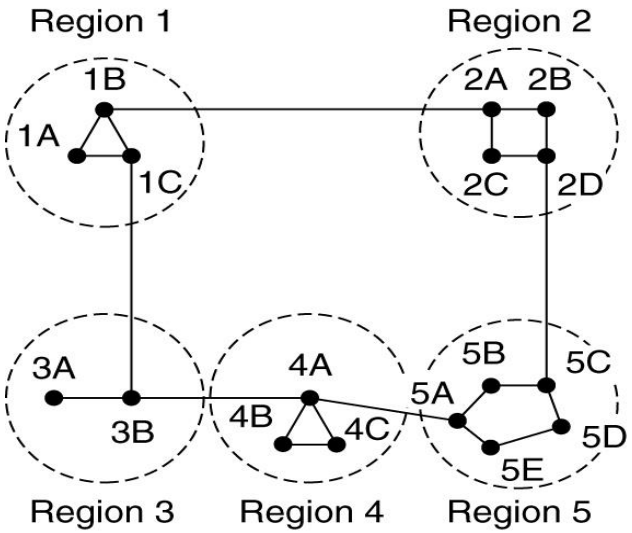
(b) The link state packets for this subnet.

# LINK STATE ROUTING : DISTRIBUTING THE LINK STATE PACKETS

**The packet buffer for router B in the previous slide**

| Source | Seq. | Age | Send flags | | | ACK flags | | | Data |
|---|---|---|---|---|---|---|---|---|---|
| | | | A | C | F | A | C | F | |
| A | 21 | 60 | 0 | 1 | 1 | 1 | 0 | 0 | |
| F | 21 | 60 | 1 | 1 | 0 | 0 | 0 | 1 | |
| E | 21 | 59 | 0 | 1 | 0 | 1 | 0 | 1 | |
| C | 20 | 60 | 1 | 0 | 1 | 0 | 1 | 0 | |
| D | 21 | 59 | 1 | 0 | 0 | 0 | 1 | 1 | |

# HIERARCHICAL ROUTING




(a)

Full table for 1A

| Dest. | Line | Hops |
|---|---|---|
| 1A | – | – |
| 1B | 1B | 1 |
| 1C | 1C | 1 |
| 2A | 1B | 2 |
| 2B | 1B | 3 |
| 2C | 1B | 3 |
| 2D | 1B | 4 |
| 3A | 1C | 3 |
| 3B | 1C | 2 |
| 4A | 1C | 3 |
| 4B | 1C | 4 |
| 4C | 1C | 4 |
| 5A | 1C | 4 |
| 5B | 1C | 5 |
| 5C | 1B | 5 |
| 5D | 1C | 6 |
| 5E | 1C | 5 |

(b)

Hierarchical table for 1A

| Dest. | Line | Hops |
|---|---|---|
| 1A | – | – |
| 1B | 1B | 1 |
| 1C | 1C | 1 |
| 2 | 1B | 2 |
| 3 | 1C | 2 |
| 4 | 1C | 3 |
| 5 | 1C | 4 |

(c)

# Multiple Choice Question

## MUTIPLE CHOICE QUESTIONS:

| Sr no | Question | Option A | Option B | OptionC | OptionD |
|---|---|---|---|---|---|
| 1 | In a network, If P is the only packet being transmitted and there was no earlier transmission, which of the following delays could be zero? | Propagation delay | Queuing delay | Transmission delay | Processing delay |
| 2 | Firewalls are often configured to block _____ | UDP traffic | TCP traffic | Sensitive traffic | Best-effort traffic |
| 3 | Ethernet frame consists of _____ | MAC address | IP address | Default mask | Network address |
| 4 | What is start frame delimeter (SF in ethernet frame? | 10101010 | 10101011 | 0 | 11111111 |
| 5 | MAC address is of _____ | 24 bits | 36 bits | 42 bits | 48 bits |

# REFERENCES


- http://www.engppt.com/2009/12/networking-fourozan-ppt-slides.html