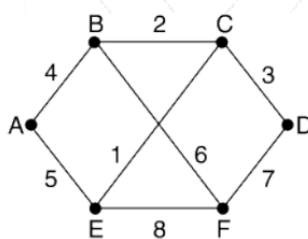


Homework assignment 2

Exercise 7.

Consider the network of Fig. 5-12(a). Distance vector routing is used, and the following link state packets have just come in at router D: from A: (B: 5, E : 4); from B: (A:4, C: 1, F: 5); from C: (B: 3, D: 4, E: 3); from E: (A: 2, C: 2, F : 2); from F : (B: 1, D:2, E: 3). The cost of the links from D to C and F are 3 and 4 respectively. What is D's new routing table? Give both the outgoing line to use and the cost.



(a)

Link		State		Packets	
A	B	C	D	E	F
Seq.	Seq.	Seq.	Seq.	Seq.	Seq.
Age	Age	Age	Age	Age	Age
B 4	A 4	B 2	C 3	A 5	B 6
E 5	C 2	D 3	F 7	C 1	D 7
	F 6	E 1		F 8	E 8

(b)

Figure 5-12. (a) A network. (b) The link state packets for this network.

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1. Links directly from D:

- Link D→C has a cost of 3.
- Link D→F has a cost of 4.

2. Link-state information received at **D**:

- **From A** -> B:5, E:4
- **From B** -> A:4, C:1, F:5
- **From C** -> B:3, D:4, E:3
- **From E** -> A:2, C:2, F:2
- **From F** -> B:1, D:2, E:3

Steps to Build the Routing Table for **D**

We'll calculate the minimum cost from D to each other router using the direct links and the information in the link-state packets.

1. Route to **A**:

- Path $D \rightarrow C \rightarrow B \rightarrow A$:
 - $D \rightarrow C$ (cost 3) +
 $C \rightarrow B$ (cost 3) +
 $B \rightarrow A$ (cost 4) +

 $= 3 + 3 + 4 = \mathbf{10}$
- Path $D \rightarrow F \rightarrow B \rightarrow A$:
 - $D \rightarrow F$ (cost 4) +
 $F \rightarrow B$ (cost 1) +
 $B \rightarrow A$ (cost 4) +

 $= 4 + 1 + 4 = \mathbf{9}$
- **Minimum cost: 9 via F.**

2. Route to **B**:

- Path $D \rightarrow C \rightarrow B$:
 - $D \rightarrow C$ (cost 3) +
 $C \rightarrow B$ (cost 3) +

 $3 + 3 = \mathbf{6}$
- Path $D \rightarrow F \rightarrow B$:
 - $D \rightarrow F$ (cost 4) +
 $F \rightarrow B$ (cost 1) +

 $4 + 1 = \mathbf{5}$
- **Minimum cost: 5 via F.**

3. Route to C:

- Direct path $D \rightarrow C$ with a cost of 3.
- **Minimum cost: 3 via C.**

4. Route to E:

- Path $D \rightarrow C \rightarrow E$:

$$\begin{array}{l} \circ \quad D \rightarrow C \text{ (cost 3) } + \\ \quad C \rightarrow E \text{ (cost 3) } + \\ \quad \text{-----} \\ \quad 3 + 3 = \mathbf{6} \end{array}$$

- Path $D \rightarrow F \rightarrow E$:

$$\begin{array}{l} \circ \quad D \rightarrow F \text{ (cost 4) } + \\ \quad F \rightarrow E \text{ (cost 3) } + \\ \quad \text{-----} \\ \quad = 4 + 3 = \mathbf{7} \end{array}$$

- **Minimum cost: 6 via C.**

5. Route to F:

- Direct path $D \rightarrow F$ with a cost of 4.
- **Minimum cost: 4 via FFF.**

Summary of D's New Routing Table

Destination	Outgoing Line	Cost
A	F	9
B	F	5
C	C	3
E	C	6
F	F	4