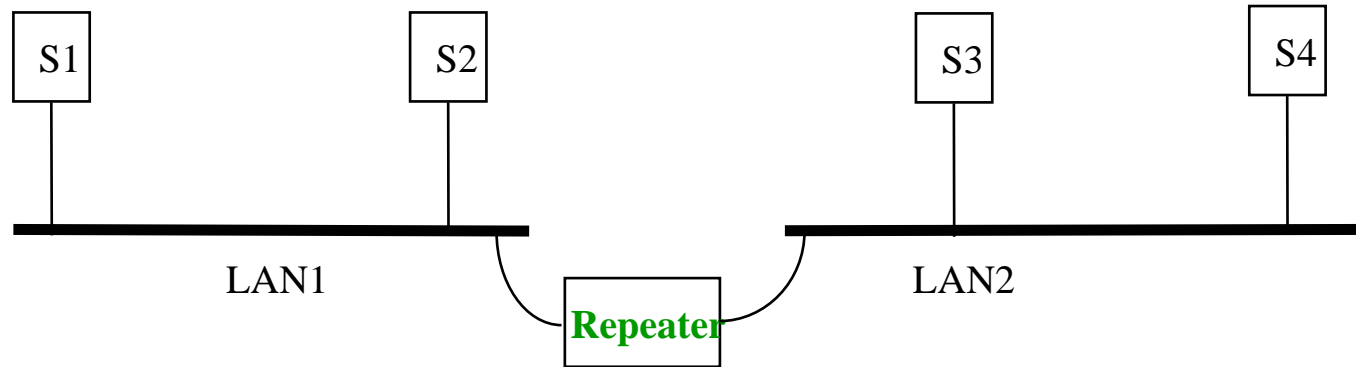# Bridges
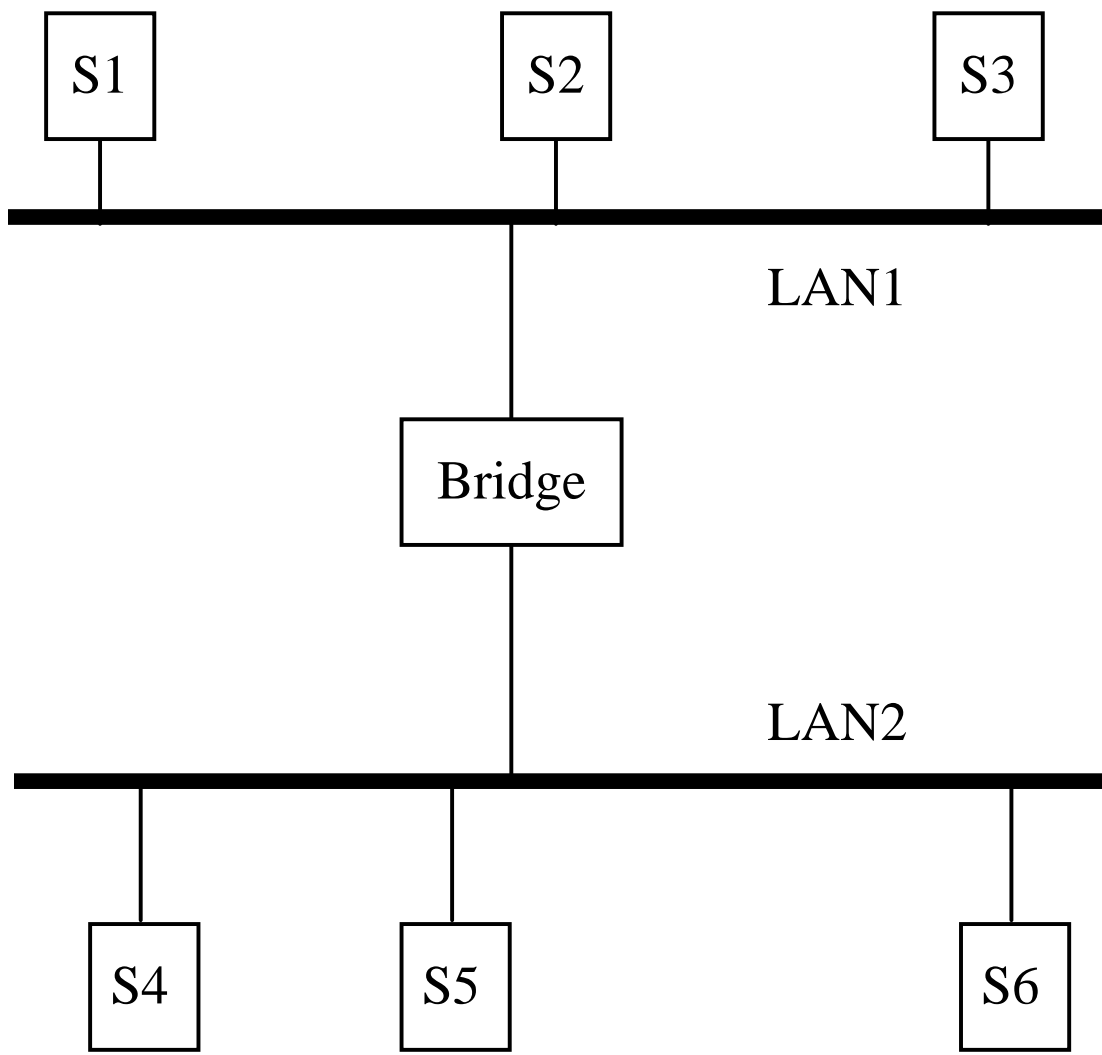
A repeater operates at the physical layer and forwards everything between the two LANs.
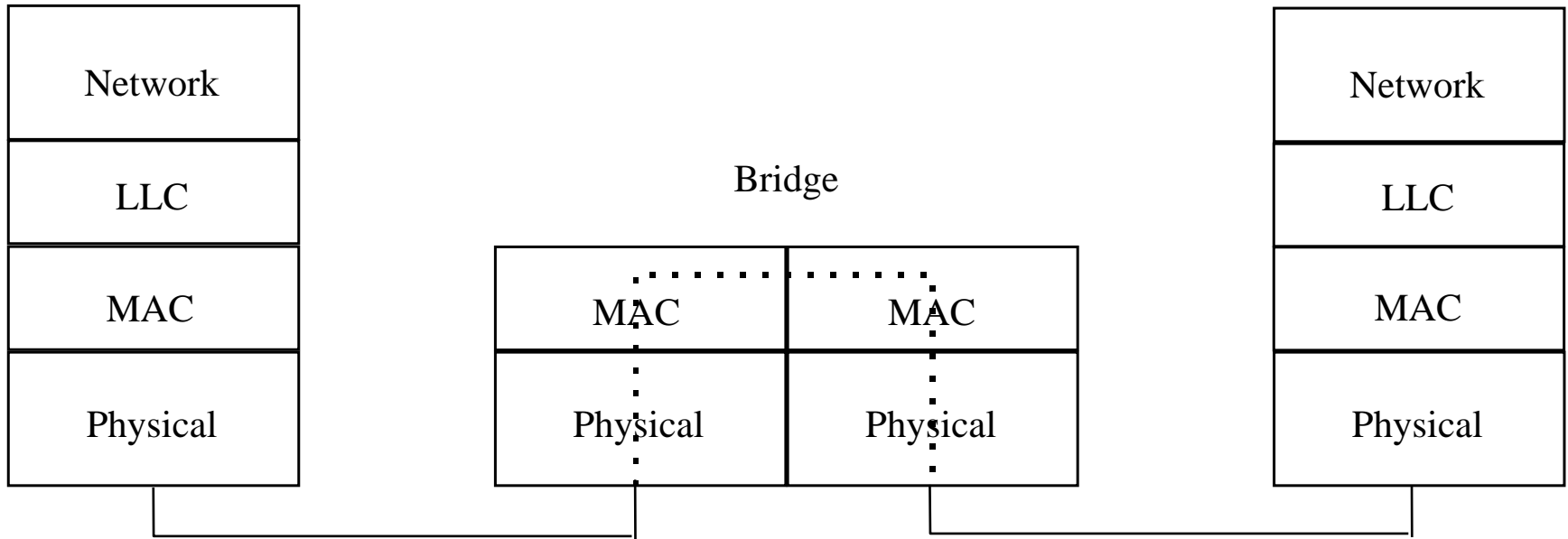
LAN1 and LAN2 are in the same collision domain.

S1  S2  S3

LAN1

Bridge

LAN2

S4  S5  S6

Leon-Garcia & Widjaja: *Communication Networks*
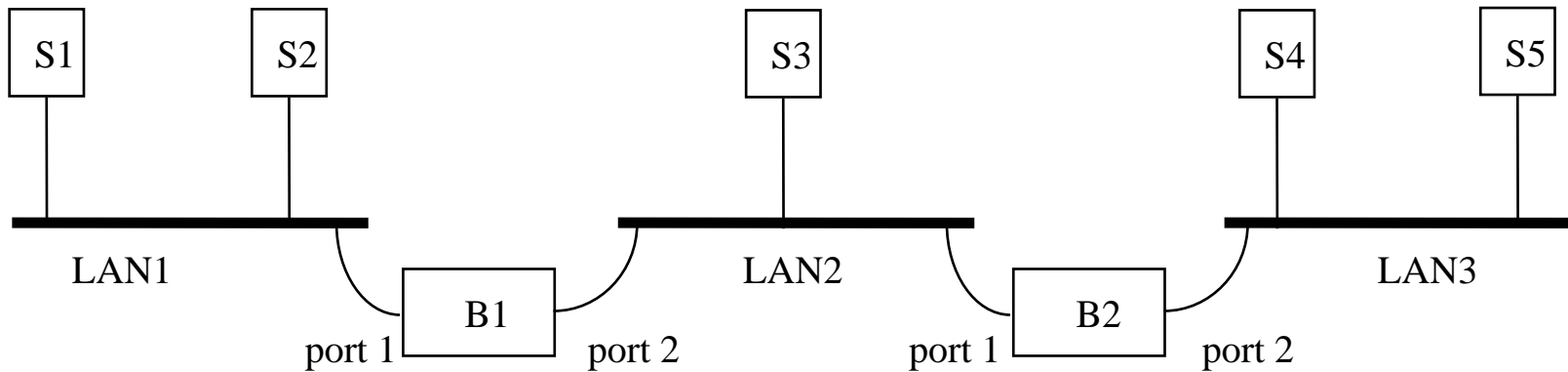
Figure 6.79

**Networks: Bridges**

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# Bridges

- Operate at the data link layer.

- Bridges use backward learning in recording source address on transmissions.

- Unlike repeaters, bridges will not forward a frame onto another LAN segment if it knows about the location of the destination node.

- *Bridge management gets more complicated when **loops** are possible in the frame route.*

# Bridge



A bridge is a store and forward device that **<u>separates</u>** collision domains.

Leon-Garcia & Widjaja:  *Communication Networks*    Figure 6.80

| S1 | S2 | | S3 | | S4 | S5 |

LAN1

B1
port 1 | B1 | port 2

LAN2

B2
port 1 | B2 | port 2

LAN3

| Address | Port |
|---------|------|
|         |      |
|         |      |
|         |      |
|         |      |
|         |      |

| Address | Port |
|---------|------|
|         |      |
|         |      |
|         |      |
|         |      |
|         |      |

Figure 6.81

**Networks: Bridges**

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S1  S2  S3  S4  S5

S1 → S5

LAN1  LAN2  LAN3

B1
port 1    port 2

B2
port 1    port 2
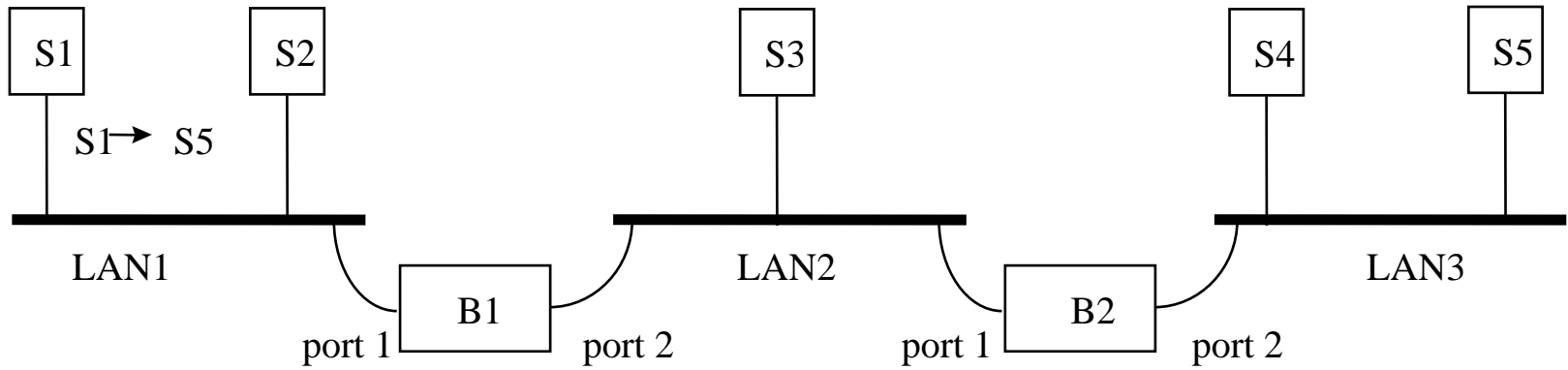
| Address | Port |
| --- | --- |
| S1 | 1 |
| | |
| | |
| | |
| | |

| Address | Port |
| --- | --- |
| S1 | 1 |
| | |
| | |
| | |
| | |

Figure 6.82

**Networks: Bridges**

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S1  S2  S3  S4  S5

S3 → S2

LAN1  LAN2  LAN3

B1  port 2  port 1  B2  port 2
port 1
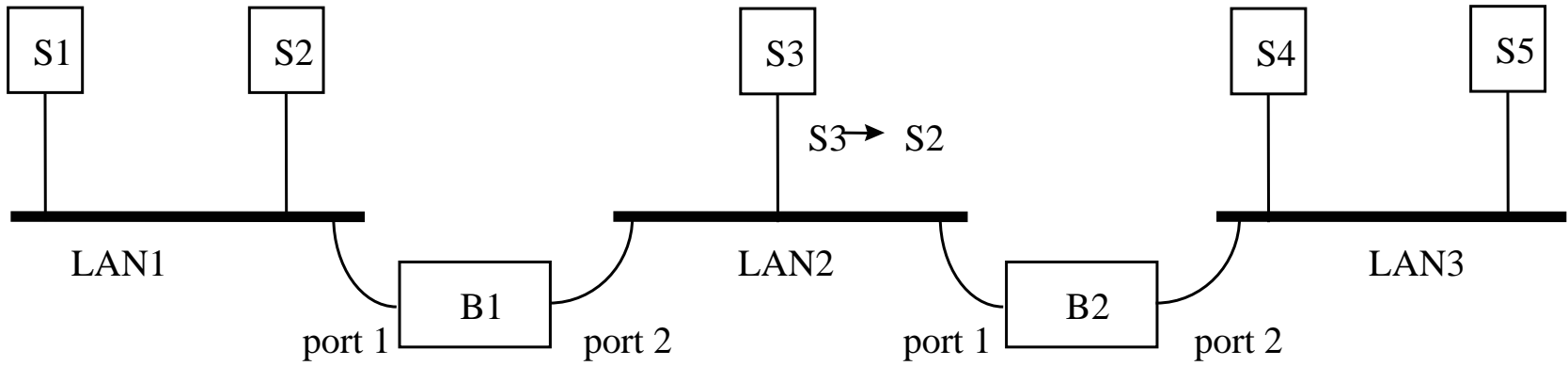
| Address | Port |
|---------|------|
| S1      | 1    |
| S3      | 2    |
|         |      |
|         |      |
|         |      |

| Address | Port |
|---------|------|
| S1      | 1    |
| S3      | 1    |
|         |      |
|         |      |
|         |      |

**Networks: Bridges**

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| S1 | S2 | S3 | S4 | S5 |

S4 → S3

LAN1          LAN2          LAN3

B1
port 1          port 2          port 1    B2    port 2
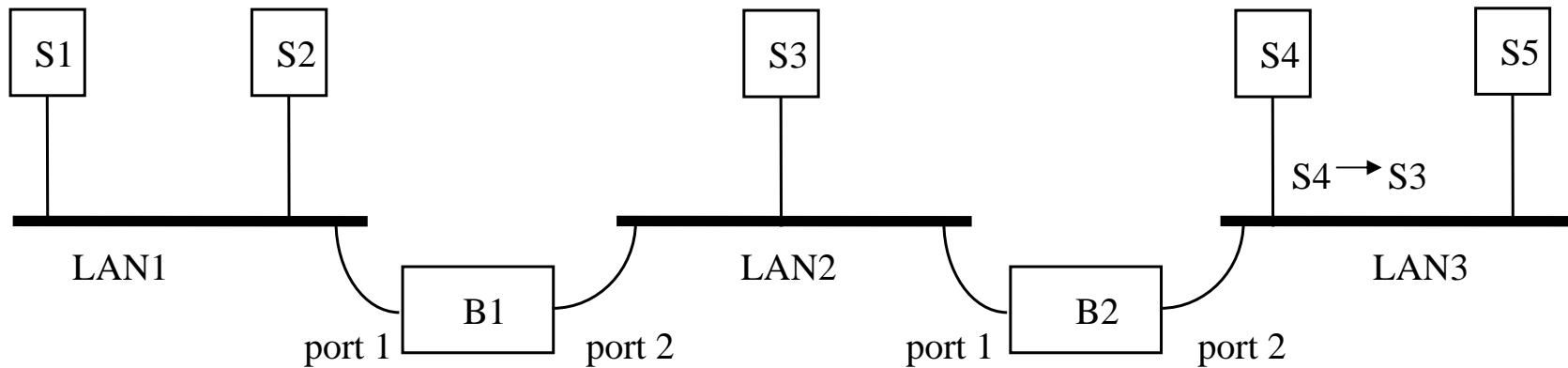
Bridge 1 does not forward the frame to LAN1

| Address | Port |
|---------|------|
| S1 | 1 |
| S3 | 2 |
| S4 | 2 |
| | |
| | |

| Address | Port |
|---------|------|
| S1 | 1 |
| S3 | 1 |
| S4 | 2 |
| | |
| | |

**Networks:  Bridges**

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S1   S2   S3   S4   S5

S2 → S1

LAN1   Bridge1   LAN2   Bridge 2   LAN3

port 1   port 2   port 1   port 2
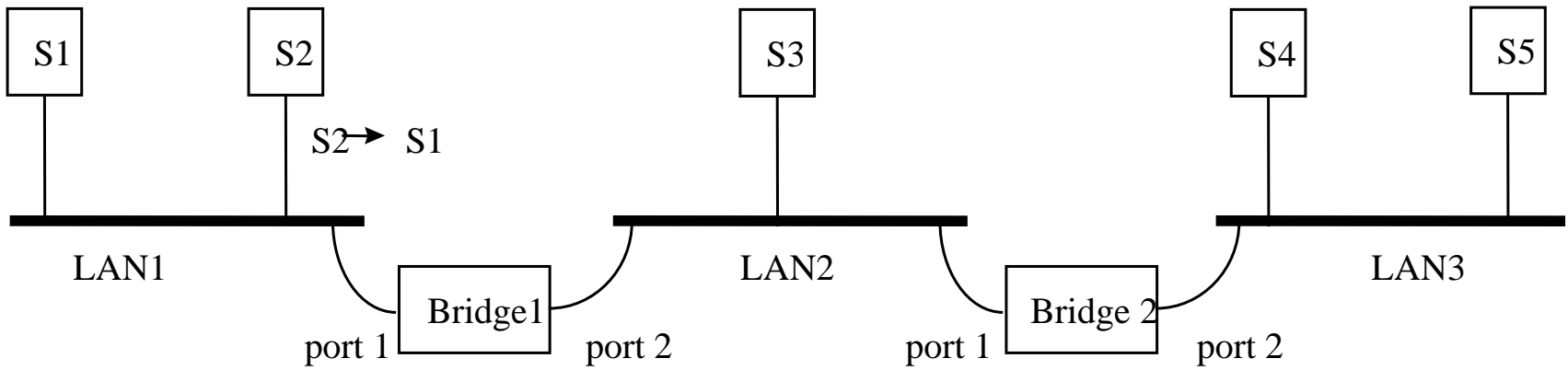
Bridge 1 does not forward the frame to LAN2

| Address | Port |
|---------|------|
| S1 | 1 |
| S3 | 2 |
| S4 | 2 |
| S2 | 1 |
|  |  |

| Address | Port |
|---------|------|
| S1 | 1 |
| S3 | 1 |
| S4 | 2 |
|  |  |
|  |  |
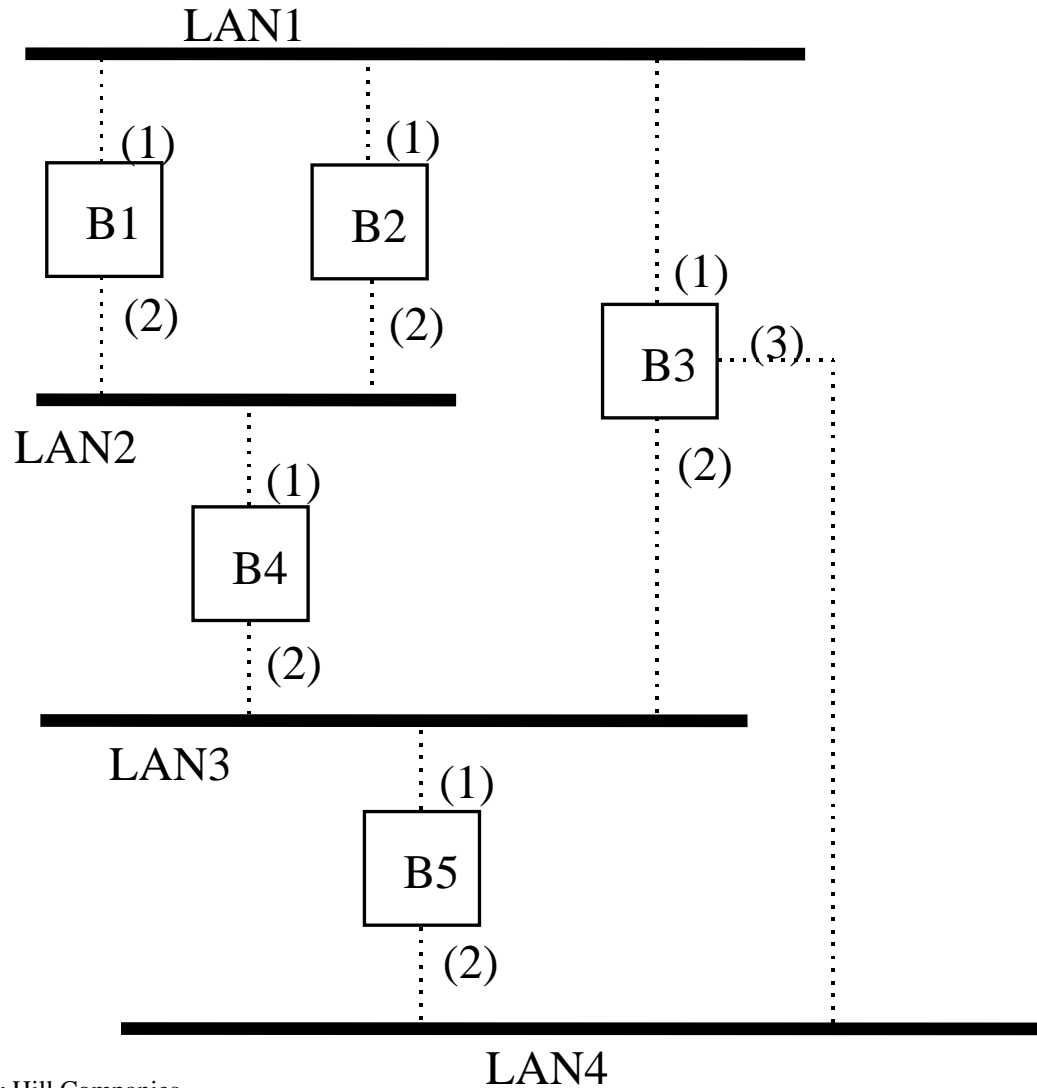
Leon-Garcia & Widjaja: *Communication Networks*

Figure 6.85

**Networks: Bridges**

# MAN with Bridge Loops



LAN1

(1)  B1  (2)

(1)  B2  (2)

(1)  B3  (3)  (2)

LAN2

(1)  B4  (2)

LAN3

(1)  B5  (2)

LAN4

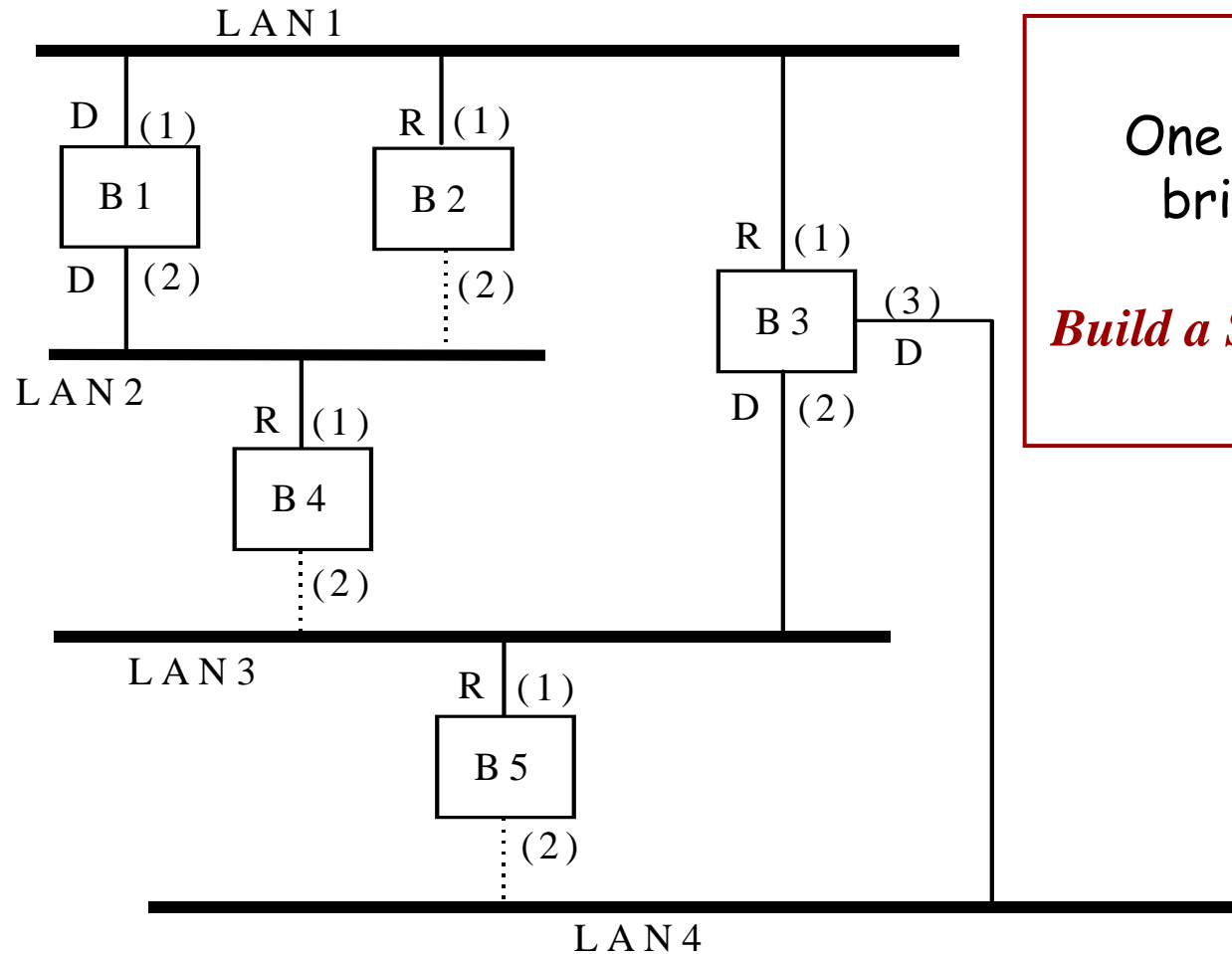Leon-Garcia & Widjaja: *Communication Networks*

Figure 6.86

**Networks: Bridges**

# MAN with Bridge Loops



One solution to bridge loops

*Build a Spanning Tree!*