

Mid-term review



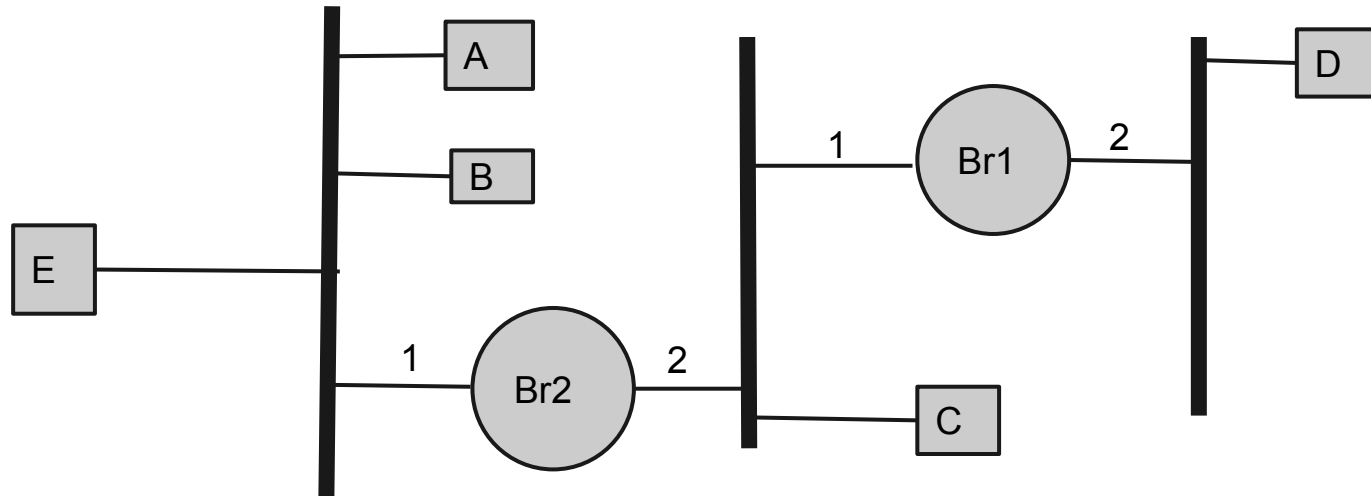
Agenda

- Cover topics after HW 2.
- Q&A.

Learning Bridges

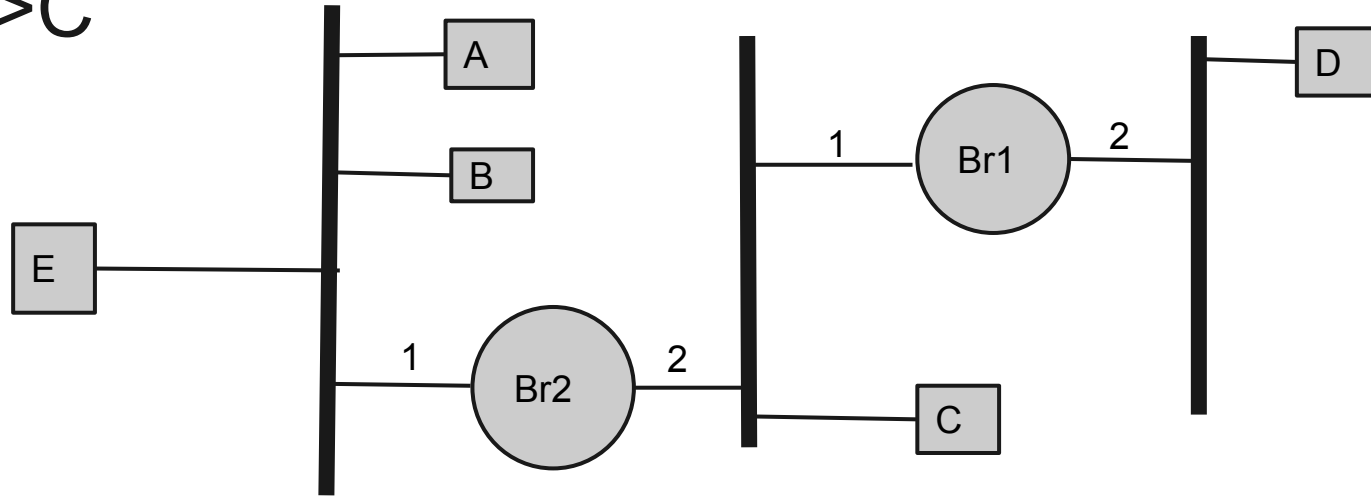
- Given a network diagram and a sequence of packets, find the current state of the bridges

Learning Bridges



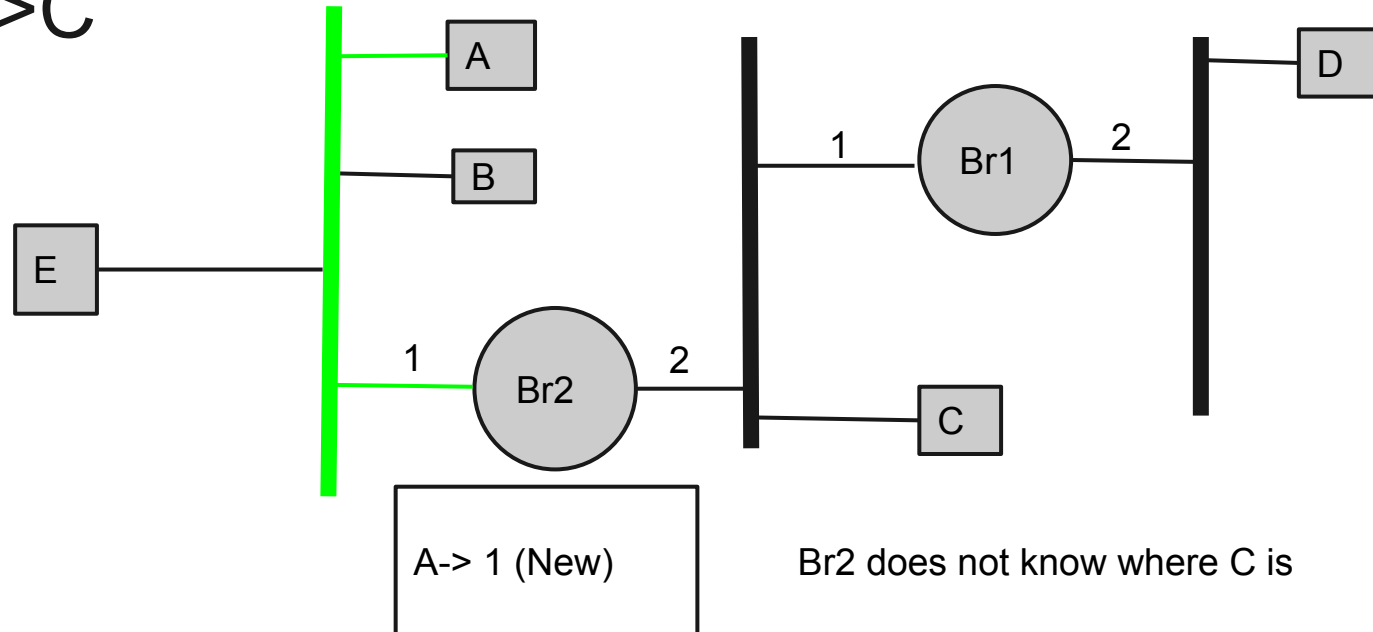
Learning Bridges

A->C



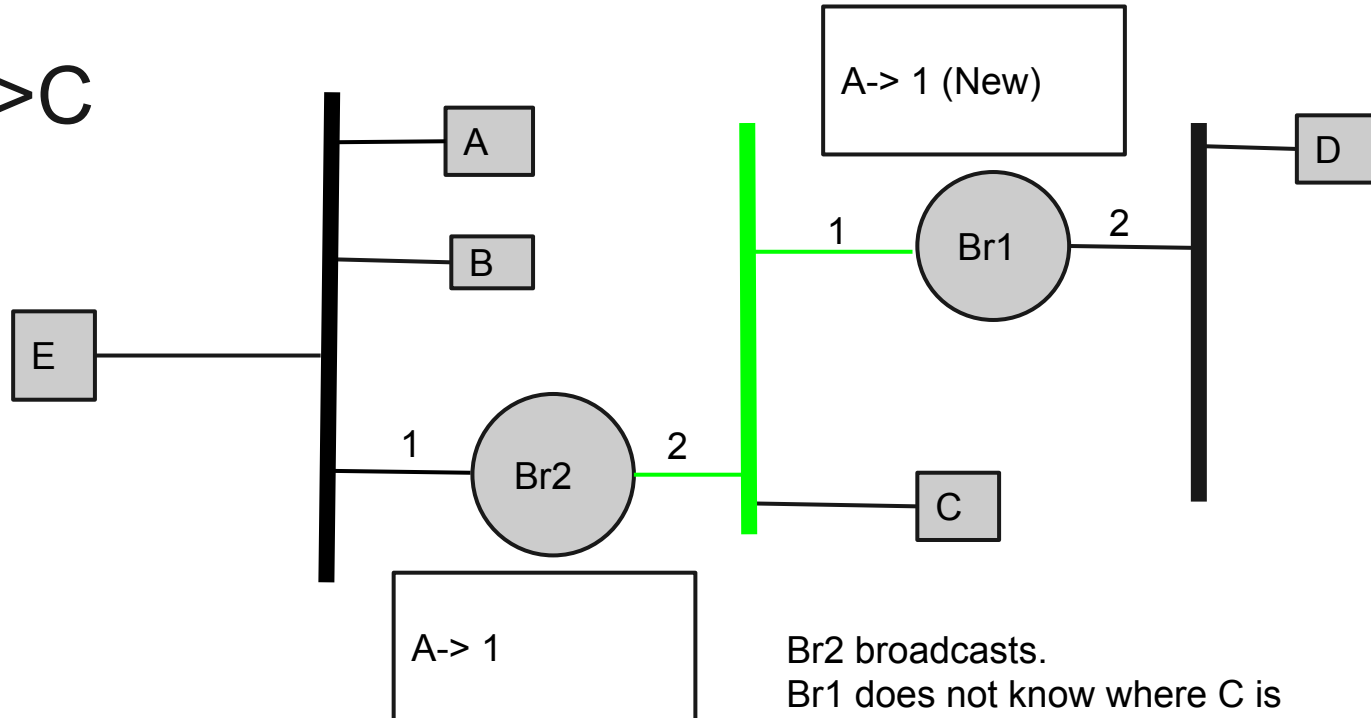
Learning Bridges

A->C



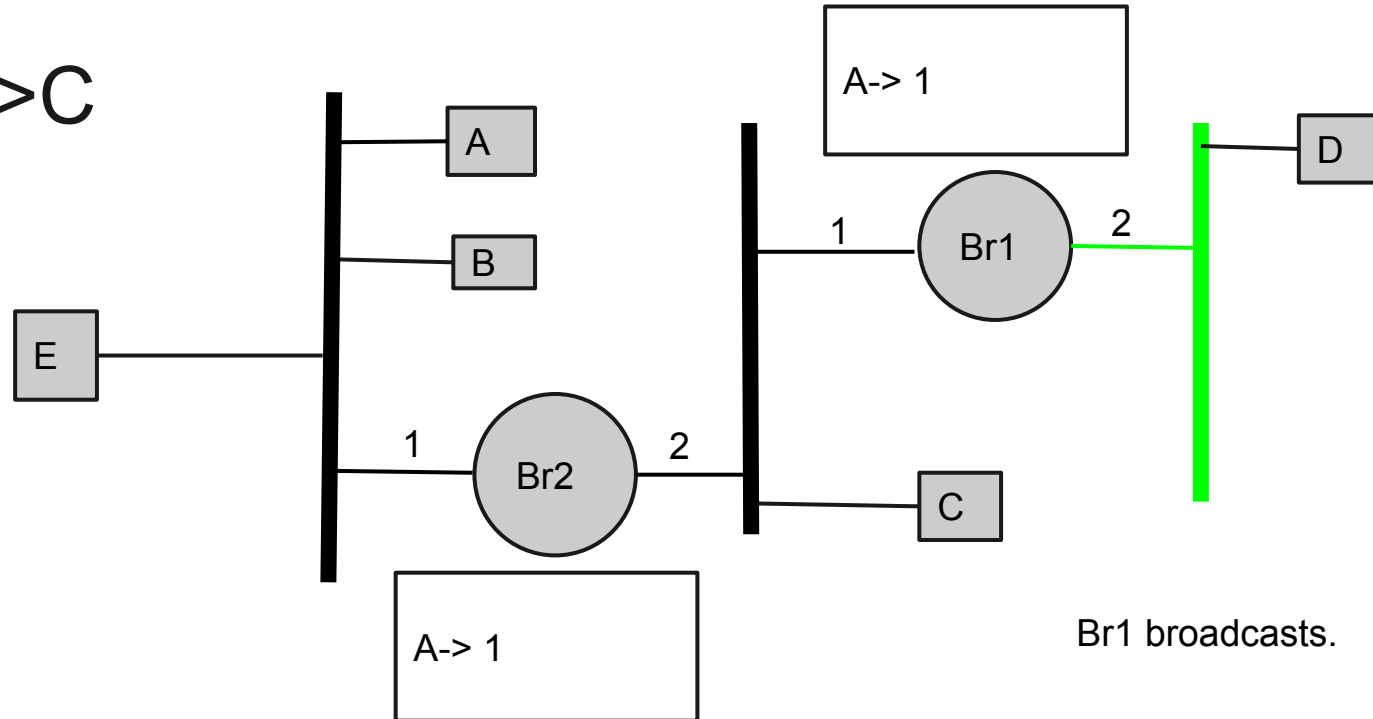
Learning Bridges

A->C



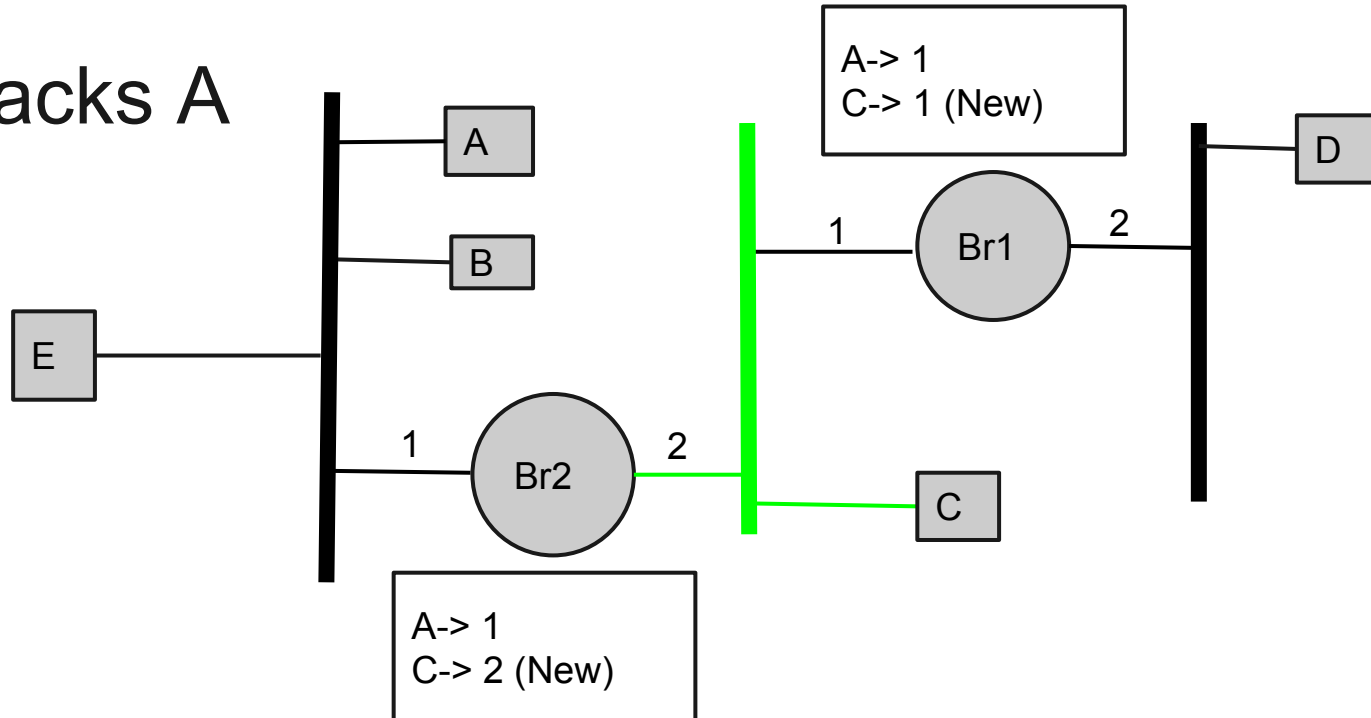
Learning Bridges

A->C



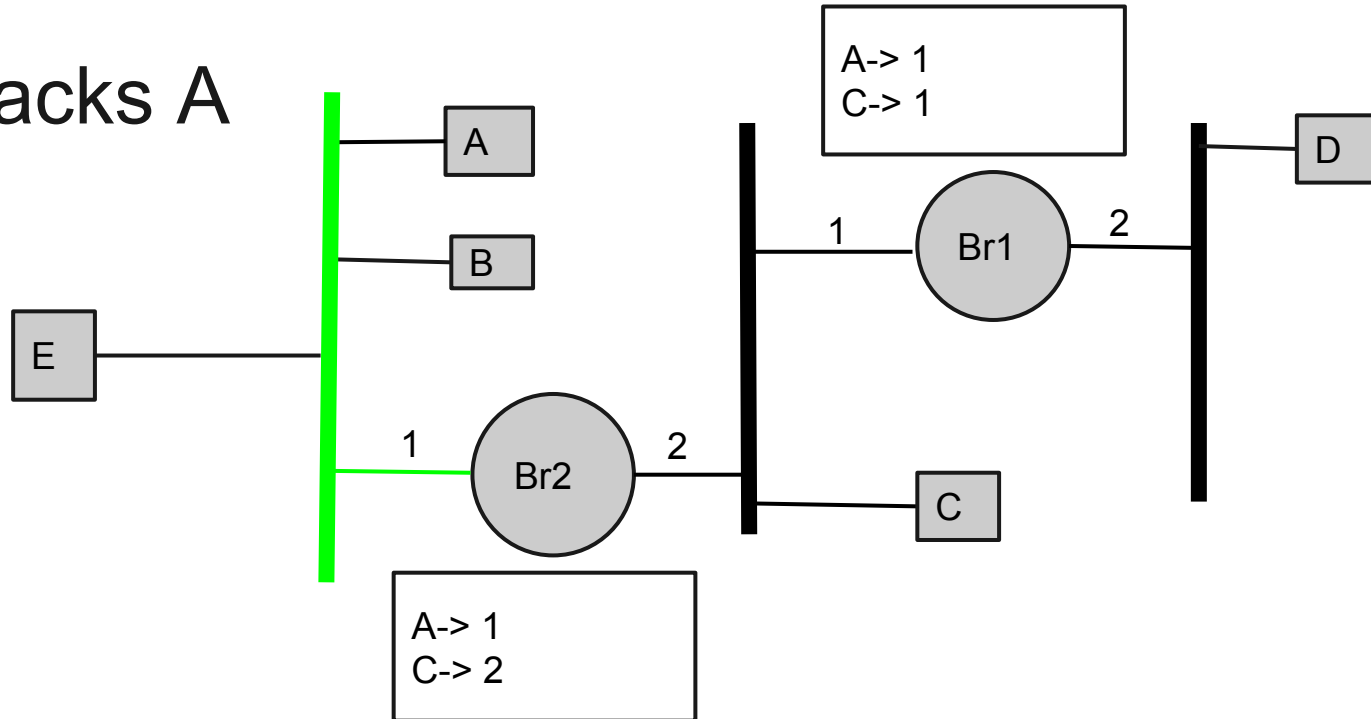
Learning Bridges

C acks A



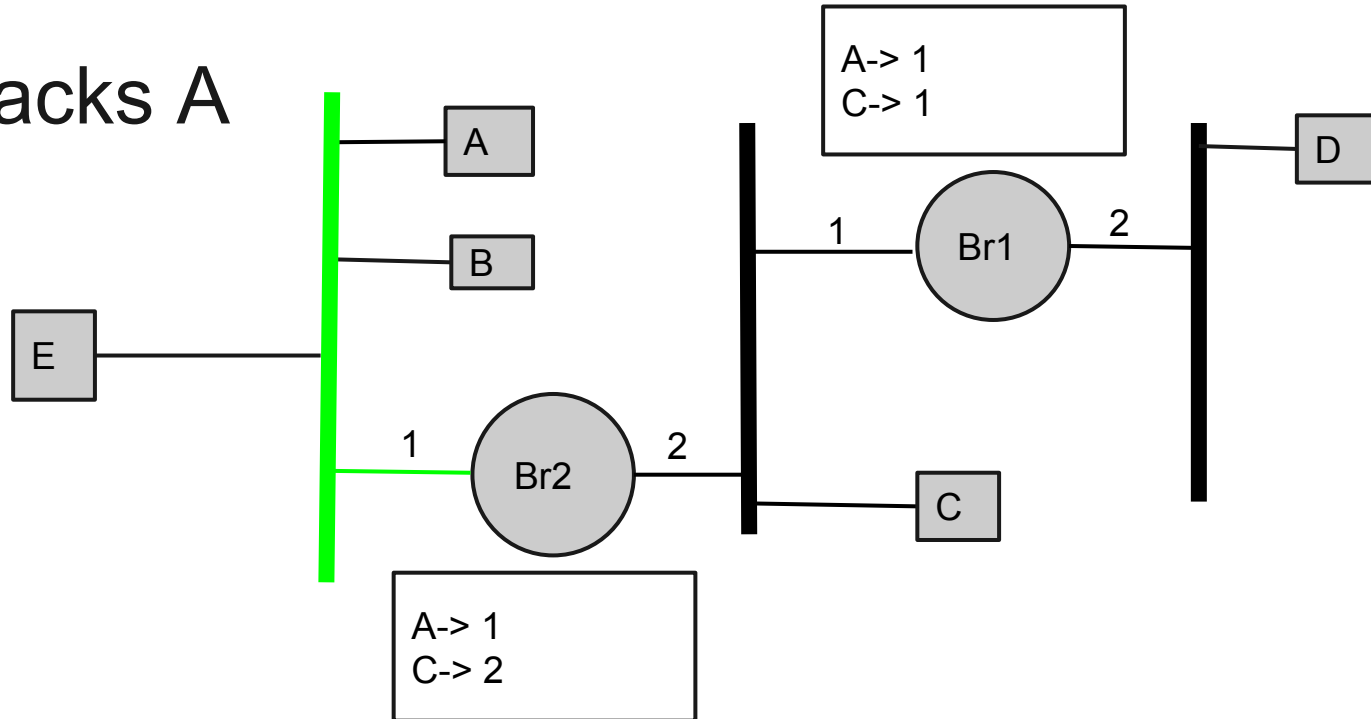
Learning Bridges

C acks A



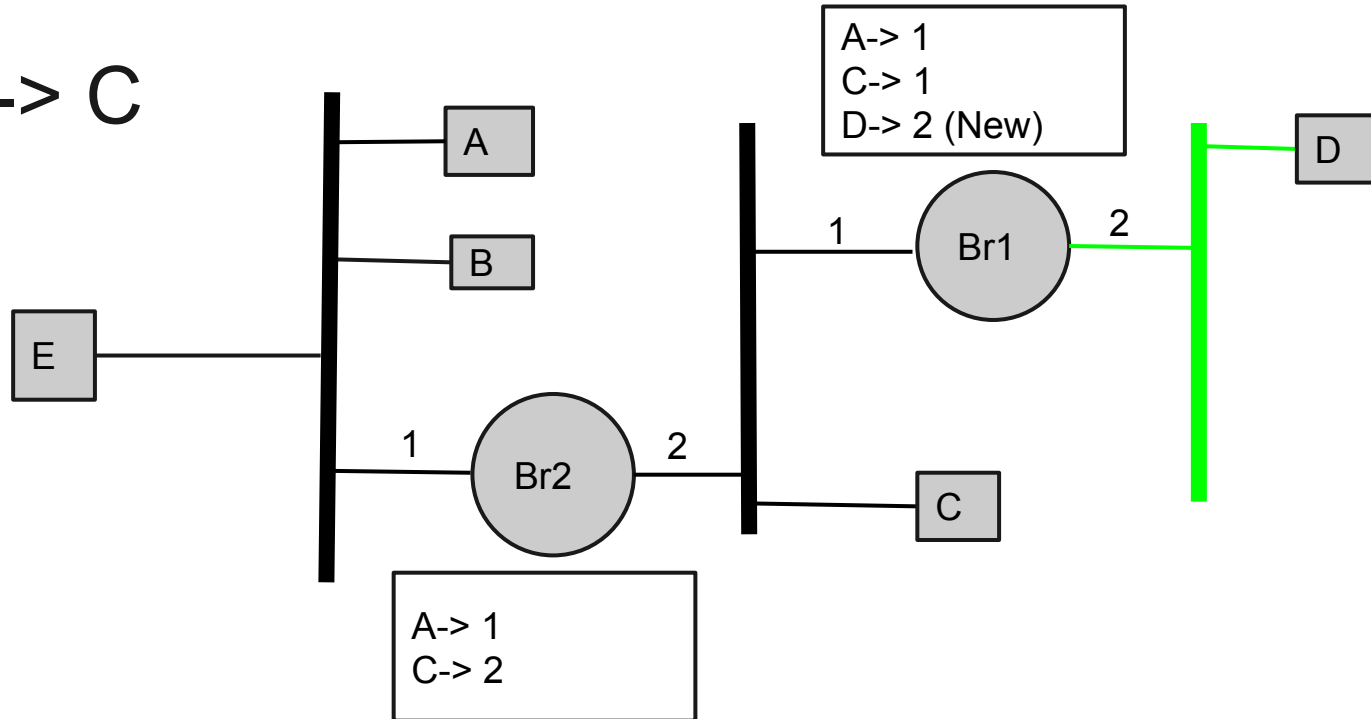
Learning Bridges

C acks A



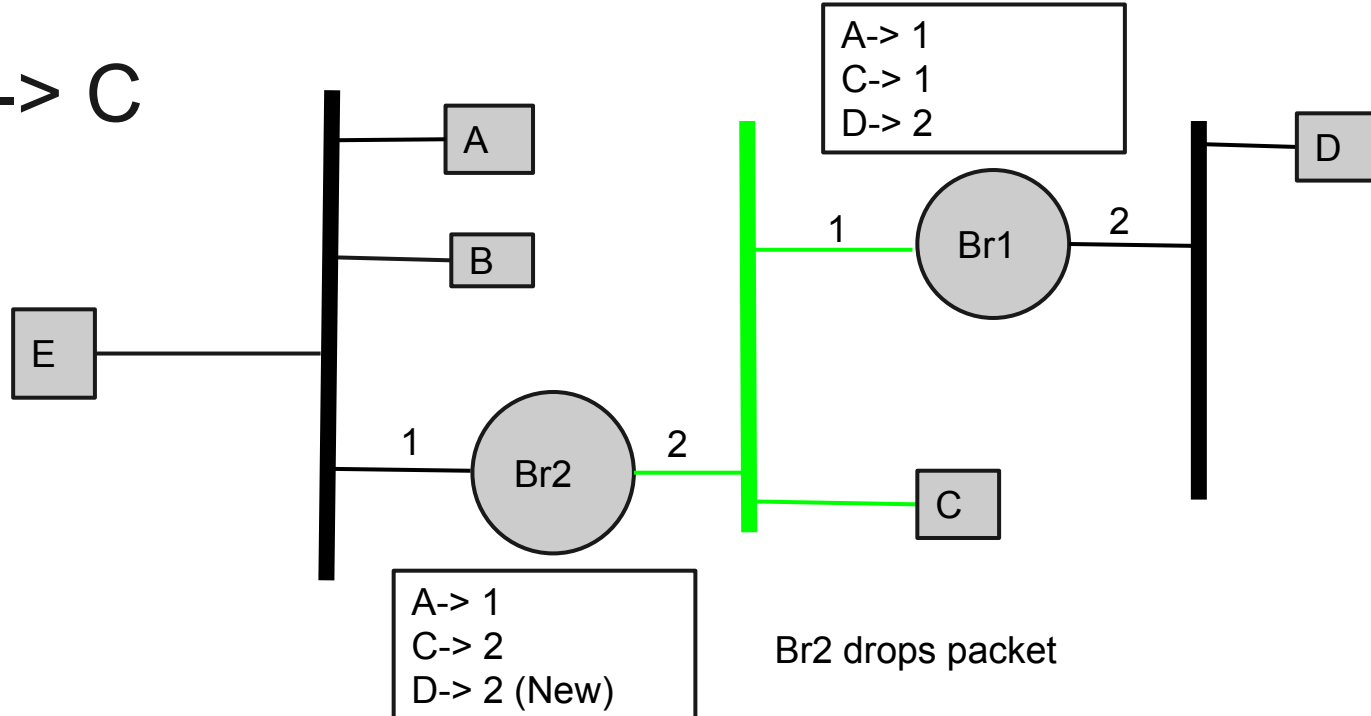
Learning Bridges

D -> C



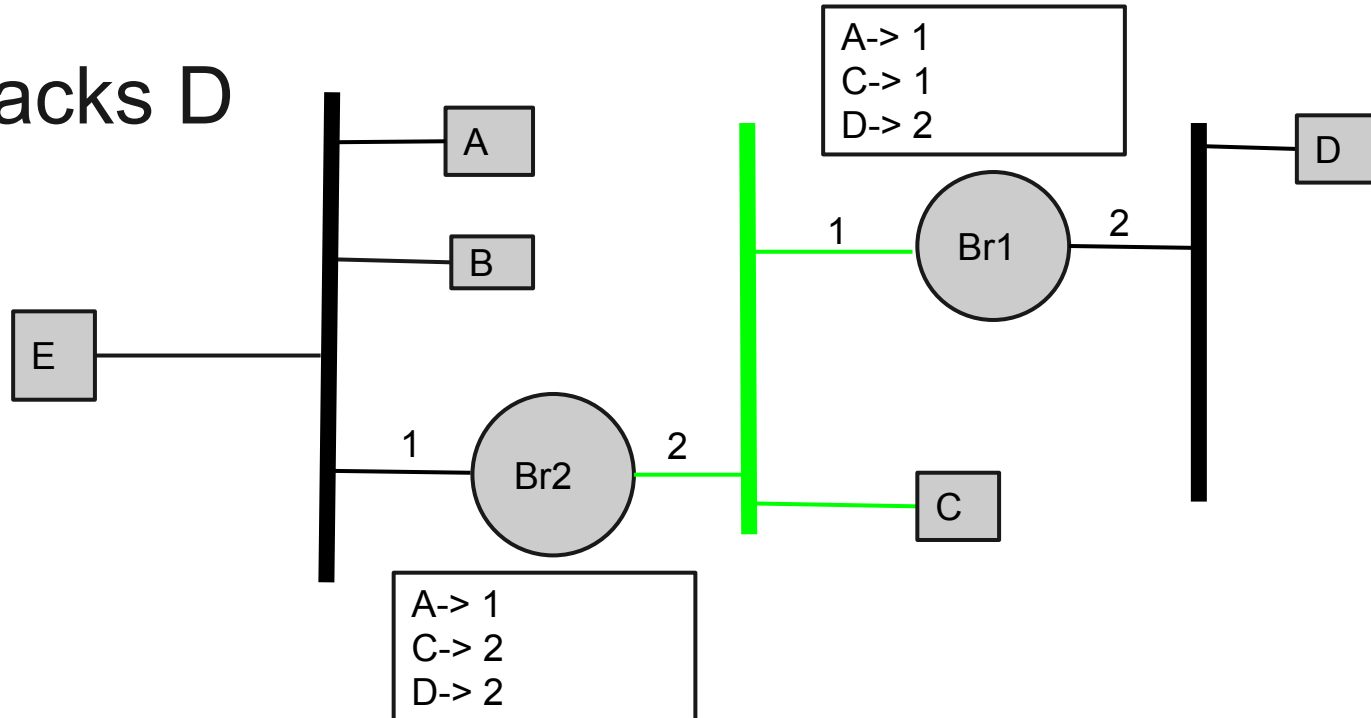
Learning Bridges

D -> C



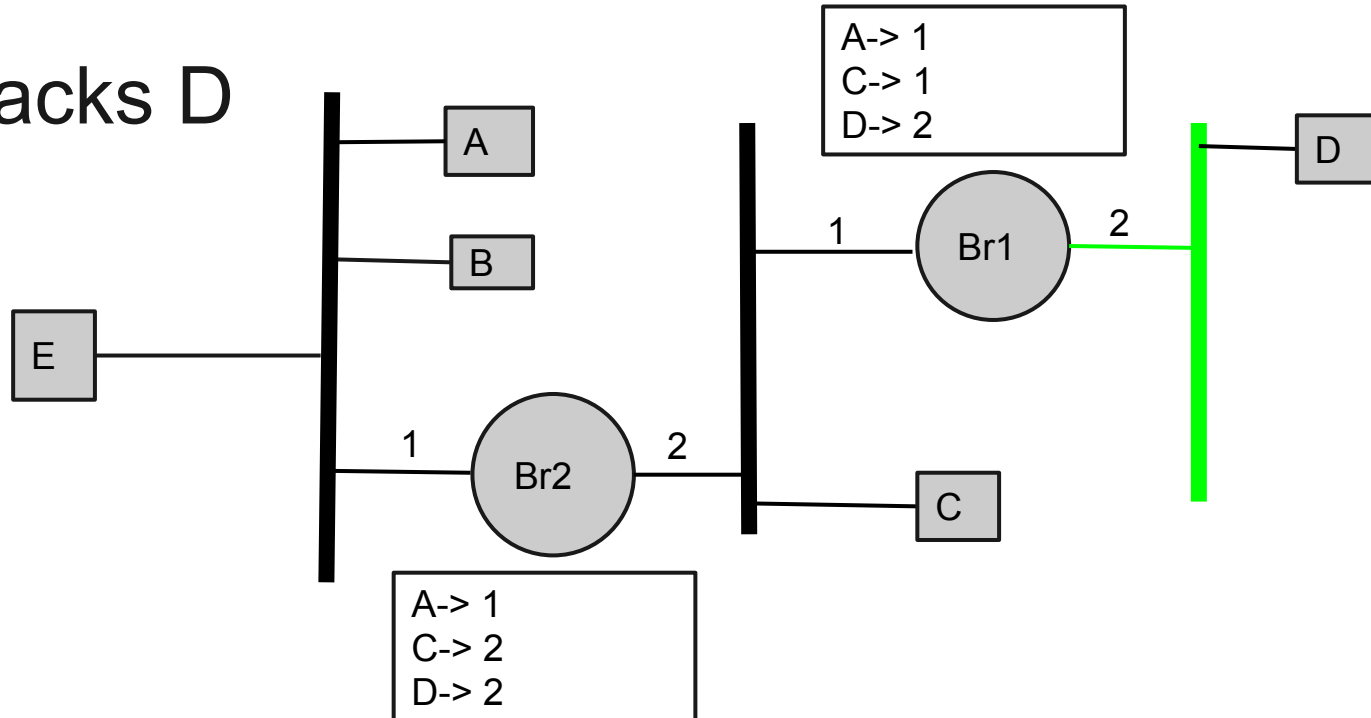
Learning Bridges

C acks D



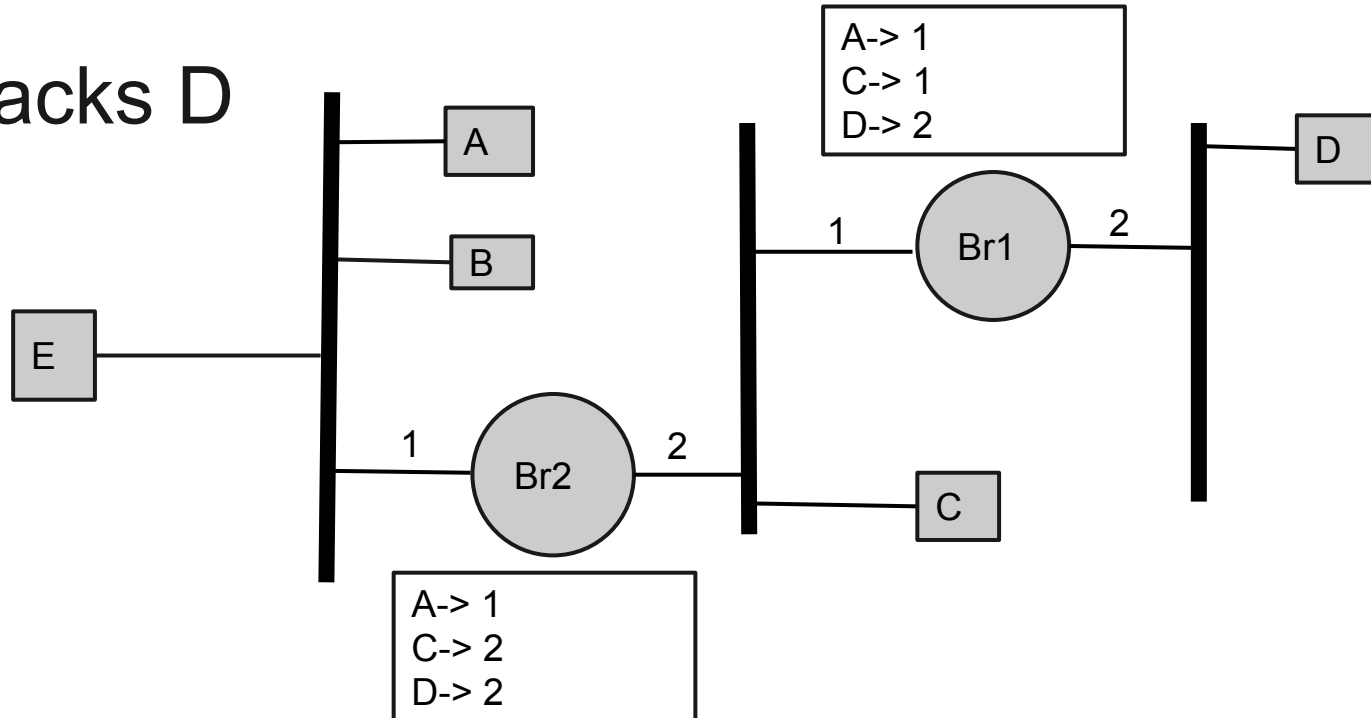
Learning Bridges

C acks D



Learning Bridges

C acks D





Fragmentation

IP frame with 4096 bytes of data and 20 bytes of header sent to IP layer. Frame has to pass through a network with MTU 576 bytes.

How many fragment frames are sent?

Fragmentation

IP frame with 4096 bytes of data and 20 bytes of header sent to IP layer. Frame has to pass through a network with MTU 576 bytes.

How many fragment frames are sent?

=> Each fragment can hold 556 bytes data and 20 bytes of header.

Fragmentation

IP frame with 4096 bytes of data and 20 bytes of header sent to IP layer. Frame has to pass through a network with MTU 576 bytes.

How many fragment frames are sent?

=> We need at least $4096 / 556 = 7.4$ frames.

8 frames required. Last frame contains 204 bytes of data.

Fragmentation

IP frame with 4096 bytes of data and 20 bytes of header sent to IP layer. Frame has to pass through a network with MTU 576 bytes.

What was the overhead of fragmentation?

=> Total bytes without fragmentation = $4096 + 20 = 4106$

Total bytes with fragmentation = $4096 + 20 \cdot 8 = 4256$

Overhead = $4256 / 4106 = 1.039 \Rightarrow 3.9\%$



Forwarding tables

Subnet	Subnet mask	Next hop
10.1.0.0	255.255.0.0	Interface 0
10.1.0.0	255.255.128.0	Interface 1
10.1.3.0	255.255.255.0	Router 1
10.1.128.0	255.255.128.0	Router 2
default		Router 3

Forwarding tables

Send packet to 10.1.3.1

Subnet	Subnet mask	Next hop
10.1.0.0	255.255.0.0	Interface 0
10.1.0.0	255.255.128.0	Interface 1
10.1.3.0	255.255.255.0	Router 1
10.1.128.0	255.255.128.0	Router 2
default		Router 3

Forwarding tables

10.1.3.1 matches 3 entries. Use most specific bit mask.

Subnet	Subnet mask	Next hop
10.1.0.0	255.255.0.0	Interface 0
10.1.0.0	255.255.128.0	Interface 1
10.1.3.0	255.255.255.0 (most specific)	Router 1
10.1.128.0	255.255.128.0	Router 2
default		Router 3

Forwarding tables

Send packet to 10.1.4.1

Subnet	Subnet mask	Next hop
10.1.0.0	255.255.0.0	Interface 0
10.1.0.0	255.255.128.0	Interface 1
10.1.3.0	255.255.255.0	Router 1
10.1.128.0	255.255.128.0	Router 2
default		Router 3

Forwarding tables

10.1.4.1 matches 2 entries.

Subnet	Subnet mask	Next hop
10.1.0.0	255.255.0.0	Interface 0
10.1.0.0	255.255.128.0 (most specific)	Interface 1
10.1.3.0	255.255.255.0	Router 1
10.1.128.0	255.255.128.0	Router 2
default		Router 3

Forwarding tables

Send packet to 10.1.200.1

Subnet	Subnet mask	Next hop
10.1.0.0	255.255.0.0	Interface 0
10.1.0.0	255.255.128.0	Interface 1
10.1.3.0	255.255.255.0	Router 1
10.1.128.0	255.255.128.0	Router 2
default		Router 3

Forwarding tables

10.1.200.1 matches 2 entries.

Subnet	Subnet mask	Next hop
10.1.0.0	255.255.0.0	Interface 0
10.1.0.0	255.255.128.0	Interface 1
10.1.3.0	255.255.255.0	Router 1
10.1.128.0	255.255.128.0 (most specific)	Router 2
default		Router 3

