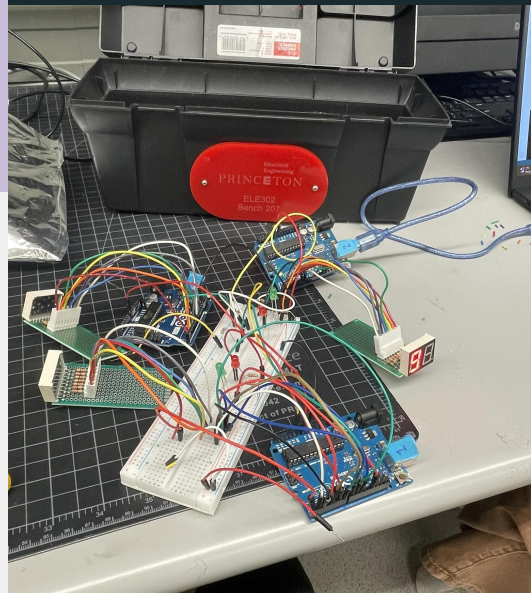
COS 583: Final Project

Model of Metcalfe and Bogg's Ethernet



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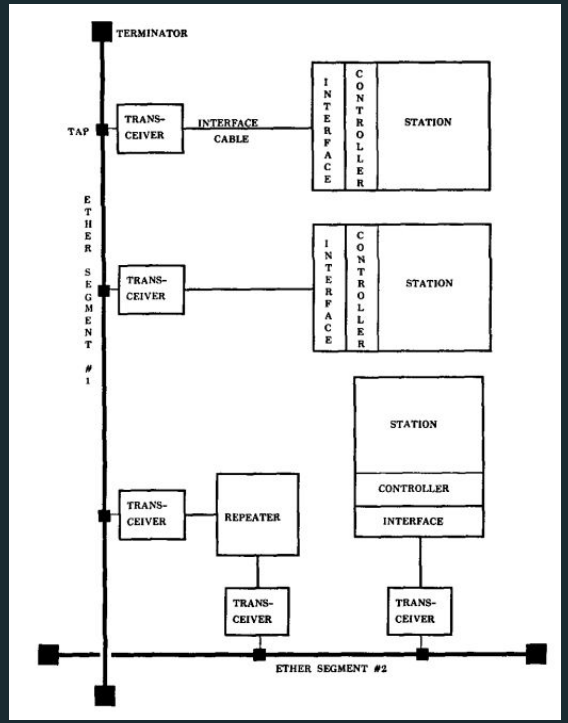
Rena Feng

Collision Detection



"Sharing of the Ether is controlled in such a way that it is not only possible but probable that two or more stations will attempt to transmit a packet at roughly the same time. Packets which overlap in time on the Ether are said to collide; they interfere so as to be unrecognizable by a receiver. A station recovers from a detected collision by abandoning the attempt and retransmitting the packet after some dynamically chosen random time period" (397).

"Binary Exponential Backoff" (400)

Collision Detection

Bus Based

“Ethernet has central interconnection through the Ether and distributed control among its stations” (397).

“Ethernet's shared communication facility, its Ether, is a passive broadcast medium with no central control” (395).

Carrier Detection

“Because a station can sense the carrier of a passing packet, it can delay sending one of its own until the detected packet passes safely” (398).

“With carrier detection, collisions should occur only when two or more stations find the Ether silent and begin transmitting simultaneously . . . This will almost always happen immediately after a packet transmission during which two or more stations were deferring” (398).

Interference Detection

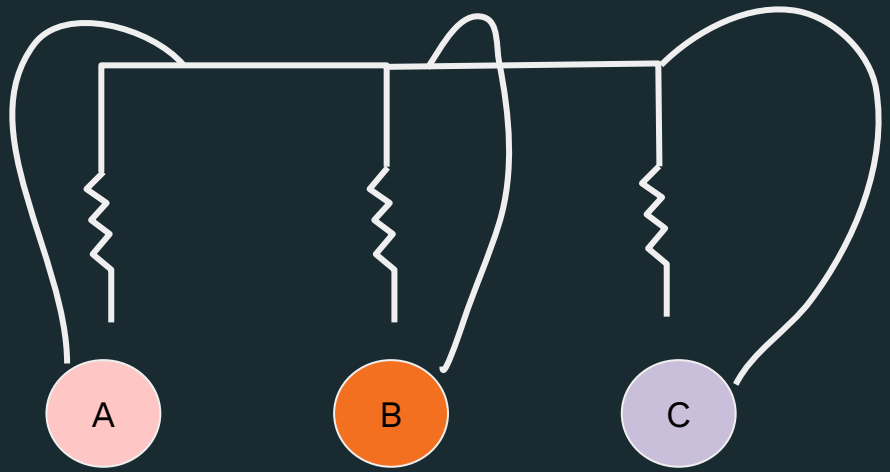
“Interference is indicated when the transceiver notices a difference between the value of the bit it is receiving from the Ether and the value of the bit it is attempting to transmit” (398).

Collision Consensus Enforcement

“When a station determines that its transmission is experiencing interference, it momentarily jams the Ether to insure that all other participants in the collision will detect interference and, because of deference, will be forced to abort” (398).

Bus Design

Collision Detection

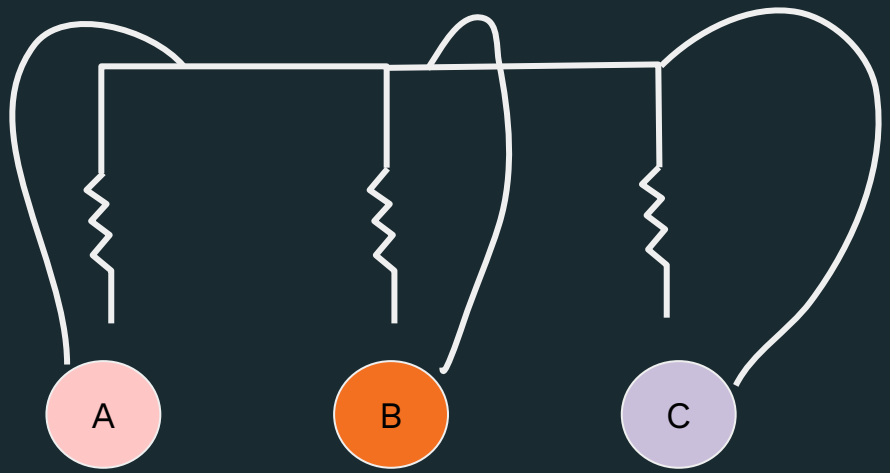


Case 1: 5V 0V 0V

Bus Voltage: 5/3 V → **NO CONFLICT**

Bus Design

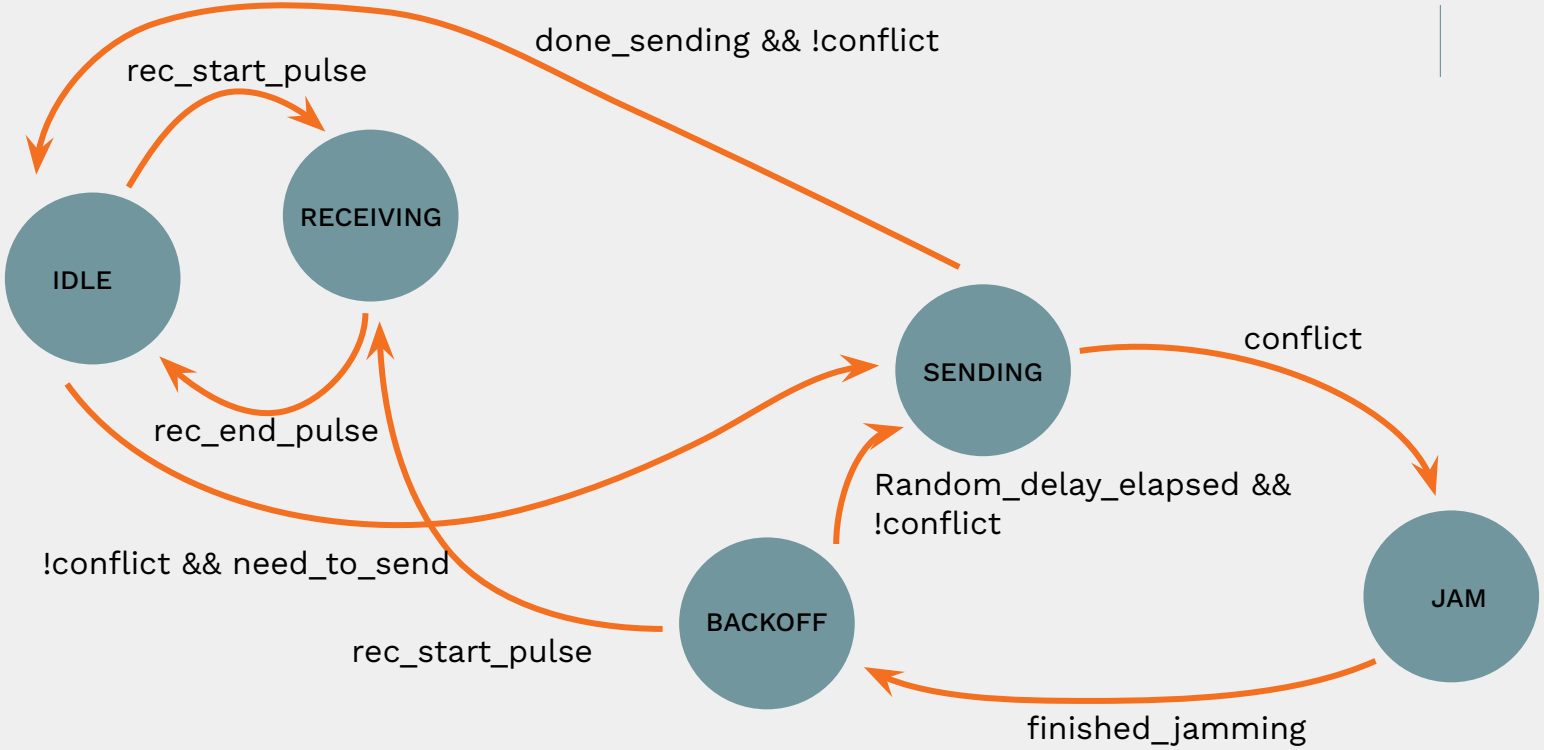
Collision Detection



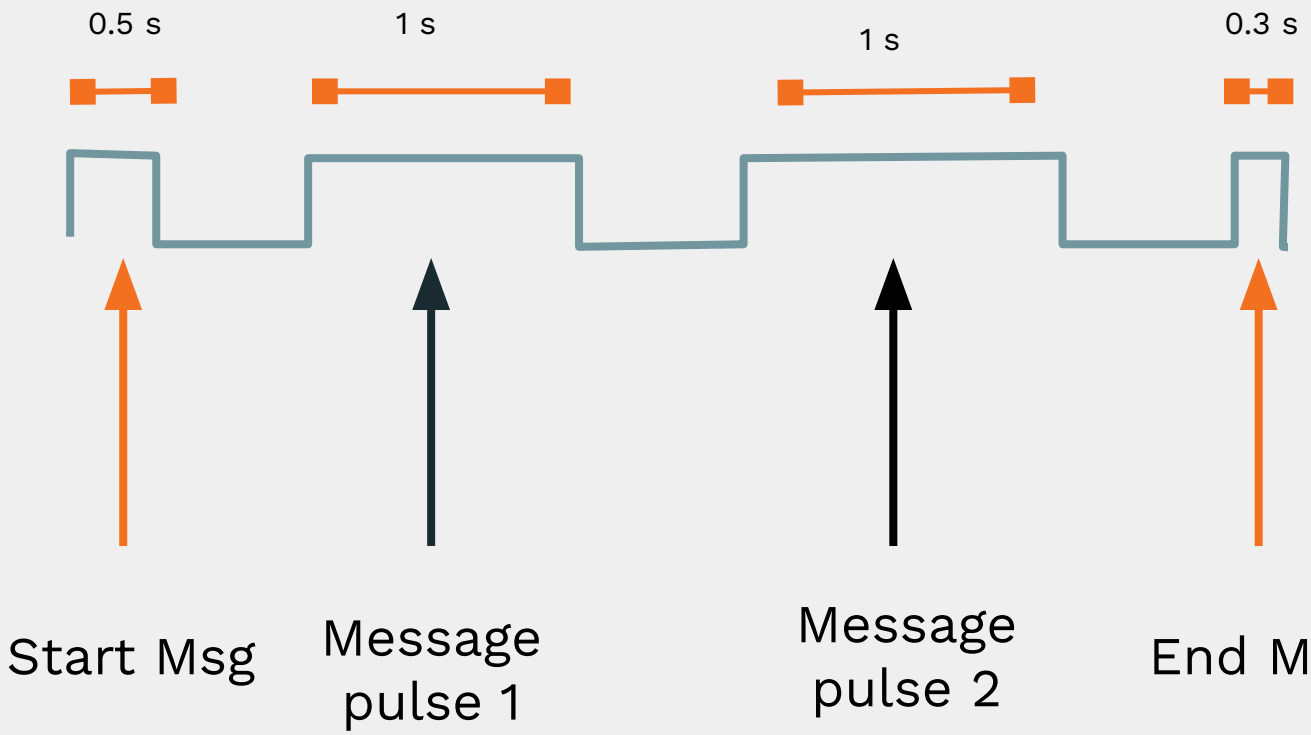
Case 2: 5V 0V 5V

Bus Voltage: 10/3 V → **CONFLICT**

Simplified FSM



What do our messages look like?

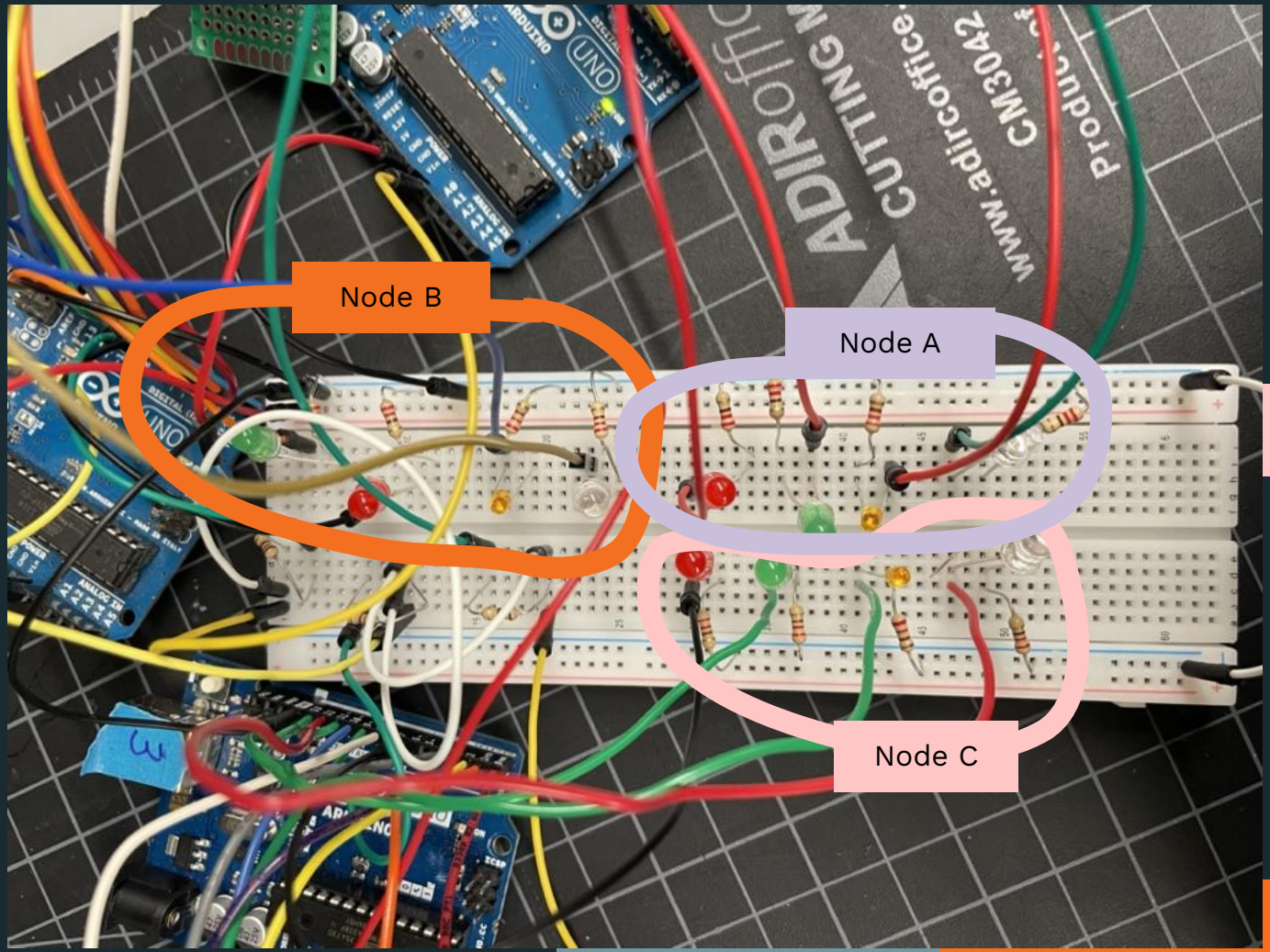


Message pulses

Start/end of a message

Possibly receiving

Jam



Busy Network Demo