Announcements

- HW 5 is online
- I’m away on Thursday afternoon and Friday
- Midterm:
  - Evening of March 15th
  - At 6 p.m. or 7:30 p.m. in Biology 112
  - 75 minute exam
  - (old) Sample midterms are available online
- Review session 3/14; 8PM; Bio 202
Today’s Plan

- Ethernet slot time
- Overloading
- Recursive classes
ETHERNET TRANSMISSION ALGORITHM

CARRIER SENSE MULTIPLE ACCESS WITH COLLISION DETECTION
Binary Exponential Backoff

After detecting a collision:

- Pick a random number between 0 and $2^{\text{attempts}} - 1$ slots
- Wait that many “time units” and then try again.
AMAZING ANIMATED DEMONSTRATION!!!
A chooses between 0 and 1

B chooses between 0 and 1
Suppose $A$ chooses 1.

Suppose $B$ chooses 0.

Given the scenario, the diagram illustrates the relative timing and distance between two points, $A$ and $B$, with $\frac{\ell}{c}$ and $\frac{\ell}{c} - \varepsilon$ representing the time intervals and $\ell$ representing the distance between them.
Suppose

A chooses 1

Suppose B chooses 0
Suppose A chooses 1

Suppose B chooses 0
Summary of Ethernet

- **Carrier Sense** = Wait if network idle
- **1-persistence** = If waiting, start when idle
- **Collision Detection** = Stop and Backoff
- **Minimum packet transmission time** = $2 \times \text{max propagation time} = \text{waiting slot time}$
- **Backoff** = Delay random # between 0 and $2^{\text{failures}} - 1$ slots after collision
Overload
public class HistoryList {

    private boolean empty = false; // true if nothing in list
    private String firstWebsite;   // The first web site in the list
    private HistoryList restOfWebSites; // The rest of the list of web sites

    // Create an empty list
    public HistoryList( ) {
        empty = true;
    }

    // Create a larger list from a new website and an existing list
    public HistoryList( String newSite, HistoryList existingList ) {
        firstWebsite = newSite;
        restOfWebSites = existingList;
    }

    // Produces a single String containing all the entries in the list
    // separated by new lines.
    public String toString() {
        if ( empty ) {
            return "";
        } else {
            return firstWebsite + "\n" + restOfWebSites.toString();
        }
    }
}