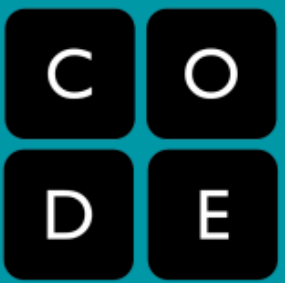
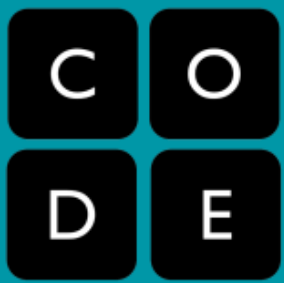


Sending Binary Messages with the Internet Simulator

Unit 1 Lesson 3 (U1.3)



BTB (Before the Bell):

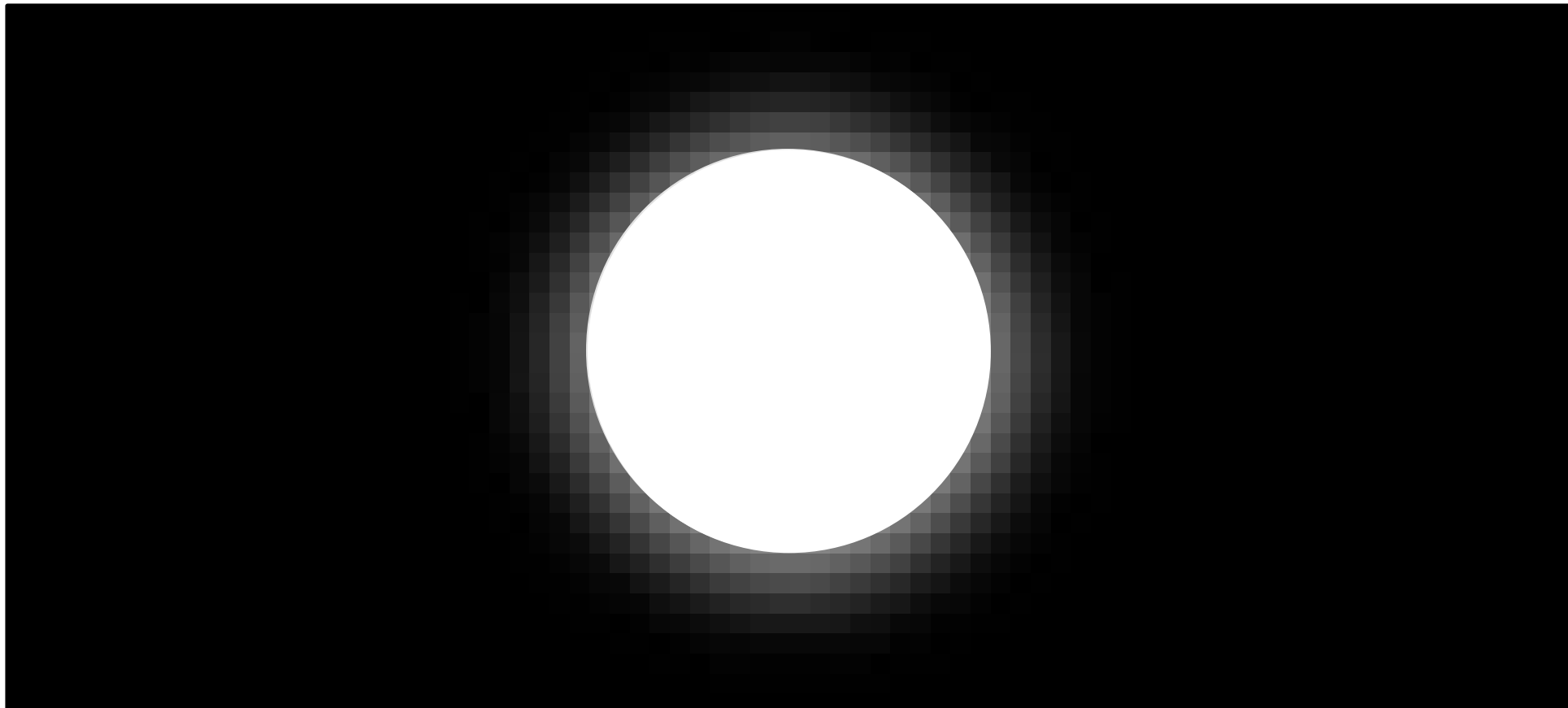
- Yesterday you made your own binary message devices.
- We learned that we could compose any number of messages by sending a sequence of states.
- In order to interpret the message we needed to know
 - ◆ which signal meant state A and which meant state B
 - ◆ some kind of mapping between sequences of signals and a possible message.
- What we were really doing was beginning to develop a communication **protocol**.

Today you're going to develop a **protocol** to solve a problem.

Imagine that you and your friend have made a binary signaling protocol using a flashlight.

The **light on is state A**, **light off is state B**.

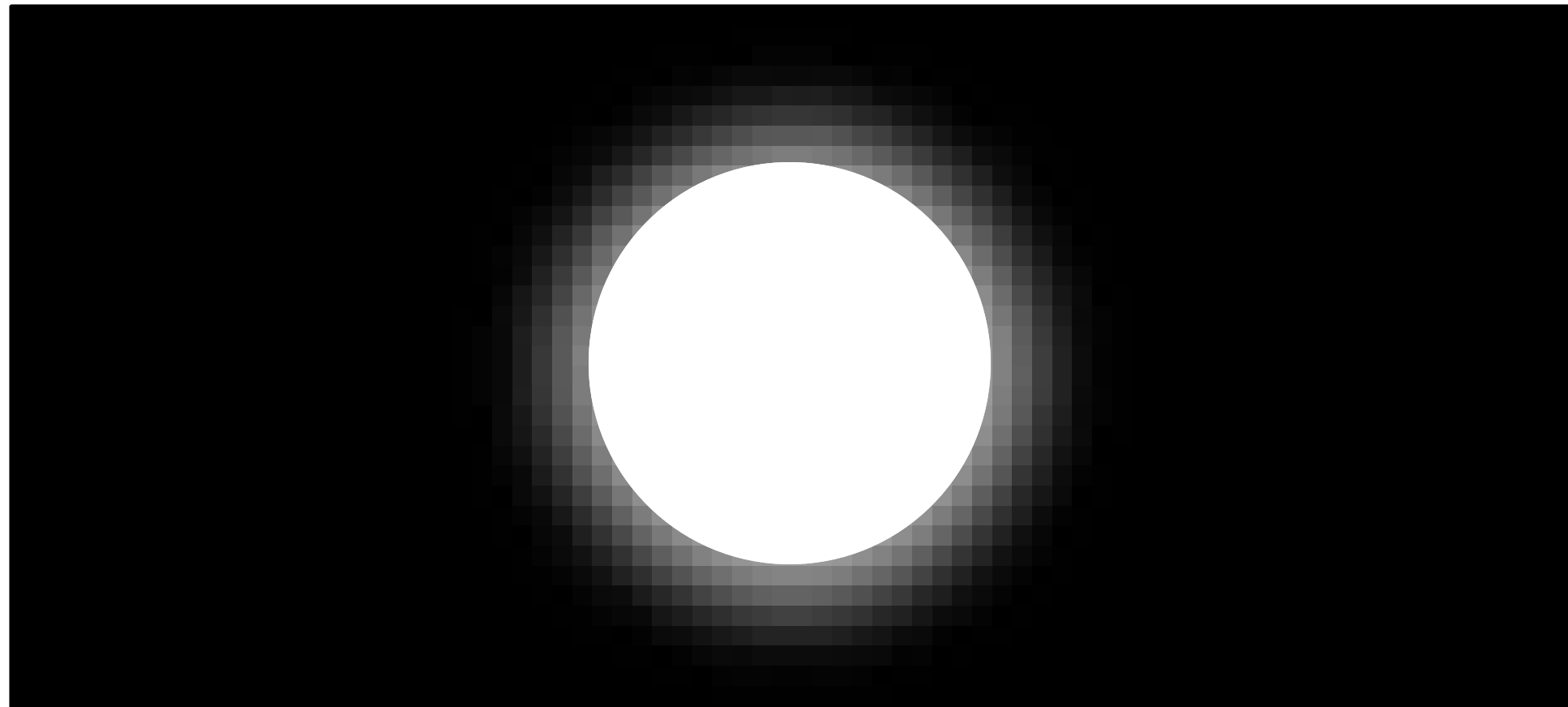
In your INB, record the message.



What was the message?

What makes it difficult to decode the message?

Uh oh! Your friend realizes he actually made a mistake encoding the message from before and decides to re-send the message. Decode this new version of the message and write it down.



First message with timing.



Second message with timing.



Did this new message make you think about your answer to the first question?

Do you want to change your answer to the first question?

What assumptions did you make in interpreting these messages?

Is this protocol specific enough to allow useful communication of a binary message?

If not what information would need to be added to it?

We need to get some terminology down so that we can speak about our problems and solutions more efficiently.

Protocol - For our purposes today a "**protocol**" is simply a set of rules *about sending, receiving and interpreting binary messages.*

Bit - We will call each element of a binary message a **bit**. "**Bit**" is short for binary digit. So for example if you have a binary message *A B B A* , we would say that is a **4-bit message**.

Today you and your partner will be developing a protocol for exchanging 2-bit messages using an Internet Simulator.

The Internet Simulator:

Your job is to explore this tool with a partner - click all the buttons, type in the text areas what you can.

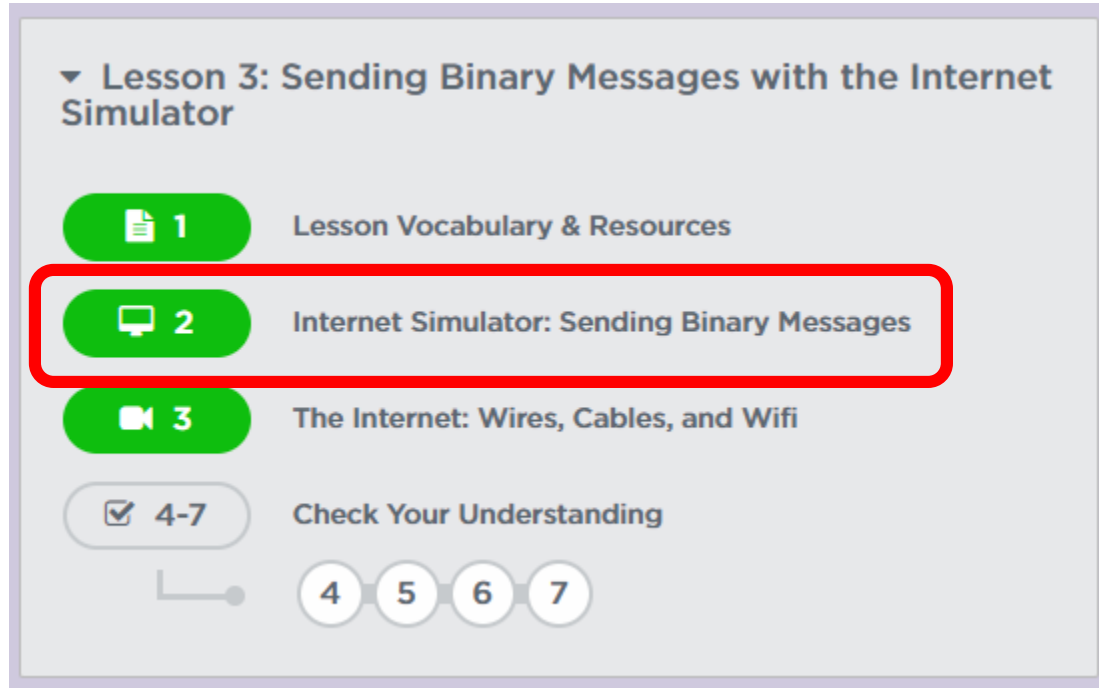
You cannot break it so don't worry.

There is a bit of a mystery in what the tool does...and doesn't do. Can you figure it out?

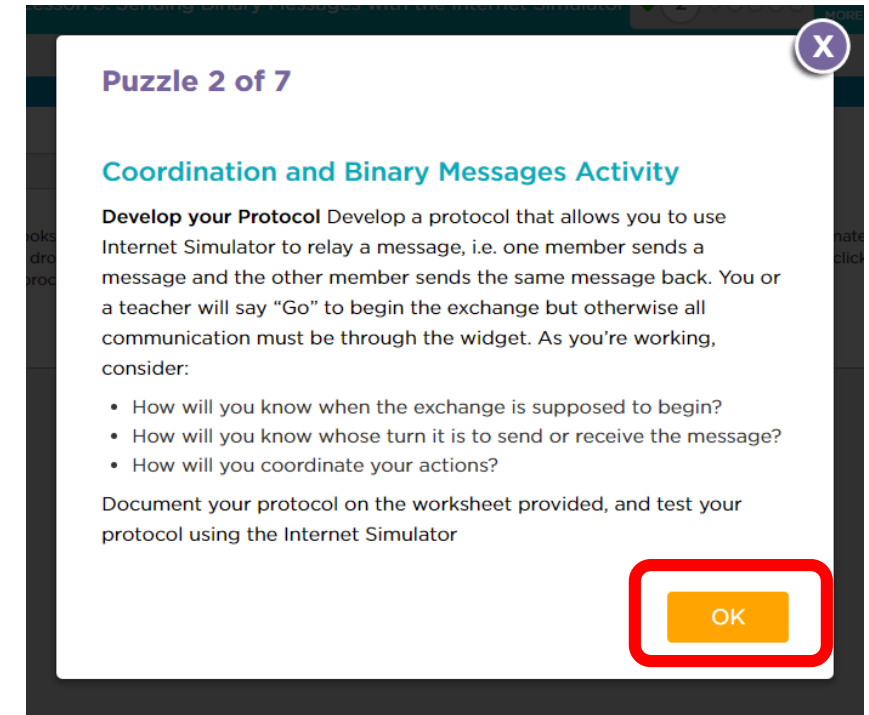
You and your partner have **5 minutes** to explore and see what you can find.



Internet Simulator: Sending Binary Messages



Don't worry about the directions, just click OK.




C O Unit 1 Lesson 3 (U1.3)
D E Sending Binary Messages with the Internet Simulator

Internet Simulator

Connect to a Peer Reset Simulation Finished!

Find your partner in the list to the right and click the 'Join' button next to their name to create an outgoing connection request.

Need help?
See these videos and hints



Internet Simulator - Part 1


| Lobby for CSP ECVHS | |
|---------------------|----------|
| MrK (mrk3) | In lobby |
| Student (student2) | In lobby |

Join

Connect to a Peer Reset Simulation Finished!

Find your partner in the list to the right and click the 'Join' button next to their name to create an outgoing connection request.

Need help?
See these videos and hints



Internet Simulator - Part 1

| Incoming connection requests | |
|------------------------------|--------------------|
| Student (student2) | Waiting for you... |

Accept

| Lobby for CSP ECVHS | |
|---------------------|----------|
| MrK (mrk1) | In lobby |

Find your partner and “Join” them in the lobby.

Then “Accept” the request.

What did you discover about the Internet Simulator?

If you still have questions, watch the [video](#).

The screenshot shows the 'Connect to a Peer' interface of the Internet Simulator. At the top right, there are buttons for 'Reset Simulation' and 'Finished!'. The main area is divided into two sections: 'Incoming connection requests' and 'Lobby for CSP ECVHS'. The 'Incoming connection requests' section shows a request from 'Student (student2)' who is 'Waiting for you...' with an 'Accept' button. The 'Lobby for CSP ECVHS' section shows 'MrK (mrkl)' who is 'In lobby'. On the left side, there is instructional text: 'Find your partner in the list to the right and click the 'Join' button next to their name to create an outgoing connection request.' Below this is a 'Need help?' section with a link to 'See these videos and hints'. A red box highlights a video thumbnail titled 'THE INTERNET SIMULATOR PART 1' with the CSP logo and the text 'Internet Simulator - Part 1' below it.

The Two-Bit Message Exchange Challenge

Rules for the Challenge:

Student pairs can decide who sends first.

Students who send first, please see me for your message.

When I say “GO”, you may send your message.

You are NOT allowed to communicate with your partner outside of the Internet Simulator...(no talking, no writing notes, etc)

When you think you have received the correct message, show the sender. The sender can **ONLY** say if the message is correct or incorrect. If it is correct, raise your hand for the next message. If not try again.

Wrap Up

[The Internet: Wires, Cables & Wifi \(6:40\)](#)

Check Your Understanding

▼ Lesson 3: Sending Binary Messages with the Internet Simulator

- 1 Lesson Vocabulary & Resources
- 2 Internet Simulator: Sending Binary Messages
- 3 The Internet: Wires, Cables, and Wifi
- 4-7 Check Your Understanding**

4 5 6 7

The screenshot shows a lesson navigation interface. The lesson title is 'Lesson 3: Sending Binary Messages with the Internet Simulator'. There are four main items listed: '1 Lesson Vocabulary & Resources', '2 Internet Simulator: Sending Binary Messages', '3 The Internet: Wires, Cables, and Wifi', and '4-7 Check Your Understanding'. The '4-7 Check Your Understanding' item is highlighted with a red box. Below this item, there is a progress indicator consisting of four circles labeled 4, 5, 6, and 7, with a line and a dot indicating the current position.

Discussion:

How has today's activity added to or altered your definition of a bit?

A major focus of today's activity was timing and coordination. What things did you need to coordinate or agree about ahead of time in order for your protocol to work?

What is the best bit rate you were able to achieve? What would it take to go faster?

How fast do you think computers transmit bits?

Vocabulary:

Bandwidth - Transmission capacity measured by bit rate.

Bit - A contraction of "Binary Digit". A bit is the single unit of information in a computer, typically represented as a 0 or 1.

Bit rate - (sometimes written **bitrate**) the number of bits that are conveyed or processed per unit of time. e.g. 8 bits/sec.

Latency - Time it takes for a bit to travel from its sender to its receiver.

Protocol - A set of rules governing the exchange or transmission of data between devices.