Storing Text

Your Tasks
☐ Partner up ☐ Develop a protocol to represent the 50 states ☐ Get acquainted with the internet simulator ☐ Develop a protocol for sending simple text messages ☐ Develop a protocol for sending multi-word/number text messages ☐ Compare your protocol to the ASCII System ☐ Define key vocabulary ☐ Receive credit for this lab guide

☐ Partner up

This lab requires that you work with a partner. Record you and your partner's names below. Each person in your group must also be assigned a letter, A or B. Indicate this below.

Group member names	Letter assignment A or B

☐ Develop a protocol to represent the 50 states

Imagine we wanted to create a system that would allow you to represent each of the 50 states.

- What's the smallest number of bits you would need to ensure you'd have unique patterns for each of the 50 states?
- Write down how you would represent these 3 different states in your system. Then add two more of your own and indicate how your store them.

Indicate the smallest number of bits needed to represent all 50 states		
	Binary	Decimal
Vermont		
Idaho		
Arizona		

☐ Get Acquainted with the Internet Simulator

We will be using the Internet Simulator to test out your protocol. Watch the demonstration by Pluska to understand how to use this tool.

To connect with your partner using the Internet simulator, you will need to do the following,

- If you haven't already done so, navigate to http://studio.code.org to create an account
- Navigate to https://studio.code.org/join and type in their section code: **SKGWSN**
- Once you have done the above, navigate to the following link and connect with your partner: https://studio.code.org/s/netsim/lessons/3/levels/1?section_id=4893878

☐ Develop a protocol for sending simple text messages

Computers do more than numbers, they also store text. We therefore need a system for doing this.

Consider the 26 letters of the alphabet shown below. How might you store the letters using binary code?

In the space below, come up with a protocol that will enable you to represent the letters of the alphabet in binary code. Once you have decided on a protocol assign a binary representation to the letters of the alphabet.

Letter	Binary	Letter	Binary
A		N	
B		O	
C		P	
D		Q	
E		R	
F		S	
G		T	
H		U	
I		V	
J		W	
K		X	
L		Y	
M		Z	

Now, Consider the three text messages below:

- OMG
- IMO
- NP

Using the binary convention you developed above, practice sending a simple one-word text message to your partner. Without talking, each member should practice sending and receiving the messages above. Write your results below.
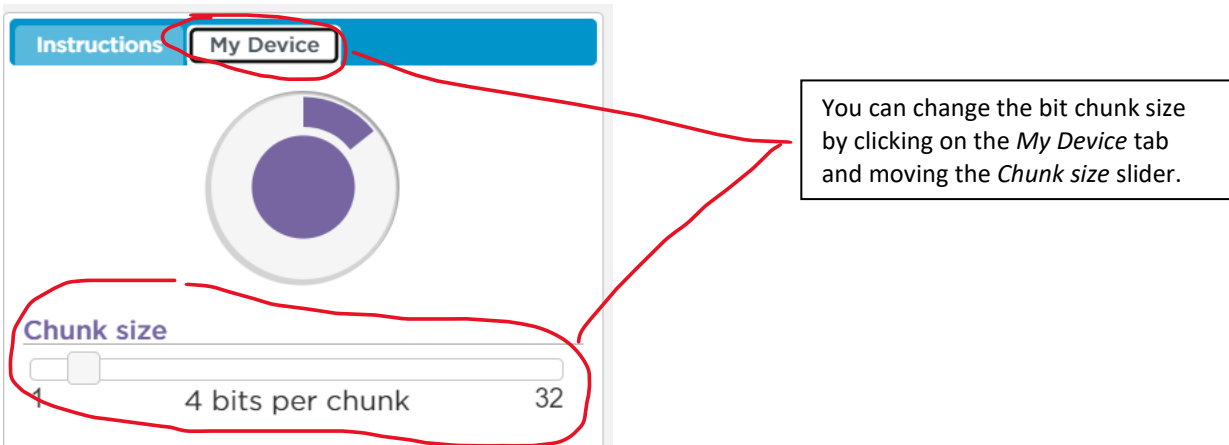
Message sent	Message received

Do not continue until you are instructed to do so my Pluska.

Challenge 1 Text Messages
Partner A do the following,   • Navigate to the following link, https://docs.google.com/document/d/1VfggXYHLYhvC5jSNQOne-pvOLy2h0dYmVEuyrDy96ws/edit?usp=sharing   • Select a message from the list and record it below. Use the protocol you developed to send the message to your partner.
Secret message (Partner A only):
Partner B do the following,   • Decode the text message you received from your partner using the protocol you developed. Write your decoded message below.
Decoded message (Partner B only):

You may have noticed that the text message you tried to send/receive had a space. You also may have noticed that the simulator chunks the bits into groups of 4.

The default chunk size is 4

You can change this to fit the type of data you want to send,

You can change the bit chunk size by clicking on the *My Device* tab and moving the *Chunk size* slider.

How might you use the chunk size feature to refine your protocol to include all the letters of the alphabet and a space?

☐ Develop a protocol for sending multi-word/number text message

More often than not, the texts you send contain multiple words and even numbers. Consider the texts below:

- SHOWS AT 8
- CYA 2NITE

Discuss with your partner a protocol for sending messages with letters, spaces AND numbers. Write your protocol in the space below.   In your protocol, indicate how you distinguish between numbers, letters, and spaces.

Now, Consider the three text messages below:

- *SHOWS AT 8*
- *CYA 2NITE*

Using the binary convention you developed above, practice one of the messages above to your partner. Without talking, each member should practice sending and receiving the messages above. Write your results below.

Message sent	Message received

  Do not continue until you are instructed to do so my Pluska.

Challenge 2 Text Messages
Partner B do the following, • Navigate to the following link, https://docs.google.com/document/d/1y0EfKZdvpFoYhyrLkXoKvaaDJGZ4jGmgrf_Ua3PRE2s/edit?usp=sharing • Select a message from the list and record it below. Use the protocol you developed to send the message to your partner.
Secret message (Partner B only):
Partner A do the following, • Decode the text message you received from your partner using the protocol you developed. Write your decoded message below.
Decoded message (Partner A only):

What if you needed to send texts that included other characters, for example <3, !!!, ?, or @?   Would the chunk size you selected by large enough? Explain how you could expand your protocol to include all the special characters on the keyboard.

☐ Compare your protocol to the ASCII System

ASCII (American Standard Code for Information Interchange) is a widely used system for character encoding. It was originally developed in 1963 as a 7-bit system allowing for 128 characters. Symbols 0-31 and 127 were reserved for control characters (e.g. "Backspace" or "Delete") with the numbers 32-126 being used for printable characters. As the 8-bit "byte" became standardized, ASCII was extended to the 8-bit format.

Following the link below to see the ASCII encoding for common characters.
 	
https://docs.google.com/document/d/15pgXcGUX7XbAAGBkHfXMMLFwDP5cTKKZ-zFIfFKu9FQ/edit
 	
Compare the ASCII system to the system you developed.
 	
    • What's similar?
    • What's different?
    • What is the chunk size of the ASCII system?

☐ Define Key Vocabulary

Use the Internet as a resource and write definitions for the following,

ASCII

Unicode

☐ Receive Credit for this lab guide

Submit this portion of the lab to Pluska to receive credit for the lab guide.