Lesson: Using Sliders and Button in HTML for user interaction

Lesson Objectives

Students will be able to:

- Add a slider and button to a p5.js sketch using HTML
- Access slider values to use as arguments for functions in p5.js
- Use a button to trigger a function

Suggested Duration

1 period (45 minutes)

NYS Computer Science and Digital Fluency Learning Standards

7-8.CT.4 Write a program using functions or procedures whose names or other documentation convey their purpose within the larger task.
7-8.CT.7 Design or remix a program that uses a variable to maintain the current value of a key piece of information.

Prior Knowledge

- Variables
- Making functions

Assessments

- Assess ____. Check for the ability to:
  - Set min and max values for slider in HTML code
  - Access slider value and store it in a variable
  - Use slider value to change parameter of a shape
  - Trigger a function by clicking html button

Do Now

Provide students with this link: https://editor.p5js.org/mrbombmusic/sketches/mkpDuuLbe

Have students write complete the following sentences about the code:

I notice……
I wonder……

Allow 2-3 minutes to complete.

Have students share out response.

Anticipated Responses
I notice a slider and button / there is not code in the sketch / the slider and button don't do anything
I wonder where the slider and button came from / how it works / why it doesn't do anything / how to make it do something

Direct students to click on the index.html file in the p5 web editor.
Give brief introduction to HTML

Provide students with links to these two finished sketches which will allow them to see how the slider and button could be used.
Example #1: https://editor.p5js.org/mrbombmusic/full/_D-sDui0U
Example #2: https://editor.p5js.org/mrbombmusic/full/yHti5-Y9Q

Lesson

Part 1 - Slider

1. Ask them to try and locate the code which corresponds to the slider

2. Ask Students what they see in the code for the slider
   Share responses: Id, min, max, value

3. Ask what do they think happens when we move the slider
   What is value of slider when it is all the way to the right? Left? Before we touch it?

4. Explain that we can access these values in our p5 sketch and use them to change things about our sketch.

5. First we need to be able to refer to the slider in our sketch.
   We need a variable to hold the slider so we can refer to it by name
   We can get access to the slider using the code document.getElementById()

In the parenthesis we need to include the ID of the slider.
Ask students what they think the ID of the slider is (“slider”)
Ask how they know this

Code: ***let slider = document.getElementById("slider")***

6. We can now access the value of this slider by calling ***slider.value***
   Have students console.log this in the draw function.
   See if our predictions from step 2 are correct.

7. Take a moment and try and change some of the values in the html code
   Observe changes in console. Establish what parameters mean (min, max, value)

8. Show students how to store value of slider into a variable and use that variable as the x value for an ellipse.

Code: let x = slider.value
ellipse(x, 200, 50);

Part 2 - Button

9. Ask students to find the button code.
   What is similar to slider code? What is different?

10. Establish that clicking a button can make something happen in our code.
    We can put that something into a function and call the function when we click the button.

11. Create a variable called size and initialize it with the size of the ellipse
    let size = 25;
    Use size variable as an ellipse argument
    ellipse(x, 200, size)

12. Write a function called resize.
    In this function change value of the size variable to 100.
    ```
    function resize( ) {
      size = 100;
    }
    ```

13. Go to HTML code and add ‘onclick’ to button code.

Explain that this will trigger a function when the button is clicked. You just need to add the name of the function after onclick=.

Ask student what we should put after onclick.
Answer = resize()

14. Demonstrate button press.
    Example of finished code:
    https://editor.p5js.org/mrbombmusic/sketches/SQzideoEW

Assessment

Students will make an interactive sketch where parameters of a shape can be changed using a HTML slider and button.

Mild:
Modify the existing code for the slider and button to do something different.

Example - Slider changes the size of the circle, button changes the color
This will require you to make changes in the code in the sketch.js and index.html files

Medium:
Add another slider and button to affect other parameters for the ellipse.

Example - Slider to change Y axis position, button to change color
This will require you to add additional code in the sketch.js and index.html files

Spicy:
Create one or more additional shapes in your sketch and add additional buttons and sliders to affect attributes of those additional shapes.

Example: Add a rectangle and use a slider to change the width or height
Add a triangle and use a button to change it from a right triangle to an isosceles triangle