**Lesson 11** Button Game Final Project

**How can we use interaction to make a game fun?**

| **Overview** | |
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| The final project is a button game that synthesizes students’ learnings from this unit. In particular, students will think about facilitating meaningful interaction such that players understand how to play the game and also find it fun! | |
| **Concepts** | |
| Students will apply the following concepts from Unit 2 in their button games:   * Variables * Conditionals * Logical Operators * += Operator * Mouse Events * Randomization * Frame rate * Images * Concatenation | |
| **Suggested Duration** | |
| Five to seven periods (225 - 315 minutes) | |
| **Blueprint Foundations Student Outcomes (**https://blueprint.cs4all.nyc/outcomes/) | |
| Abstraction Prototype | **Explain why** I chose to include the specific components of my prototype over others. |
| Algorithms  Prototype | **Demonstrate** the benefit of using an event, conditional or loop in my prototype. |
| Algorithms  Communicate | **Compare and contrast** how conditionals or loops were used in classmates’ prototypes. |
| Programming  Prototype | **Describe the changes** I made after testing at least three parts of my program. |
| Networks Prototype | **Explain how** I used at least three different markup tags to build a website. |
| Networks Communicate | **Present** my thoughts, ideas, or interests through a website built using markup. |
| **Vocabulary** | |
| * N/A | |
| **Planning Notes** | |
| * Create a rubric for the final project that you will cover with your students before they begin independent work. * This is the [final project packet](https://drive.google.com/open?id=18u5A0ScuDc0vNAD7G0LVVtinED-n1qcx0pPpNouRrCk) for Unit 2, which is very similar to the one from Unit 1. After completing page 1 as a class, students should be able to complete each worksheet with minimal guidance from you.   + Make extra copies of pages 2, 4, and 7 (if using larger feedback groups)   + Provide pens/colored pencils/markers   + Assign pairs or small groups for the Test/Evaluate phase on page 5   + Assign groups for the Feedback phase on page 7 * Students will likely need to refer to past projects in order to code the game. If their past work is missing or incomplete, you may send them solutions to some key activities (listed in the **Resources** section below). | |
| **Resources** | |
| * Lesson 7: [Moving Button](https://editor.p5js.org/mparker/sketches/qCQ-bZv5l)   + Illustrates how to randomize the x and y position of a clickable button * Lesson 8: [Frame Rate](https://editor.p5js.org/mparker/sketches/A0b7IDbQ9)   + Illustrates how to use the random() function inside the draw loop by adjusting the frame rate * Lesson 9: [Loading Images](https://editor.p5js.org/mparker/sketches/Is2hZ-siC)   + Illustrates how to load, display, and cite images that were uploaded into the Sketch Files of a p5 project * Lesson 10: [Bad Button Game](https://editor.p5js.org/mparker/sketches/IyErjVwWq)   + Illustrates how to display game instructions using the text() function and update the score when a button is pressed | |
| **Suggested Pacing** | |
| * Day 1: Explanation of instructions/rubric and button game design   + Pages 1 and 2 of packet * Day 2: Finding images, writing pseudocode, beginning to code in p5   + Pages 3 and 4 of packet * Day 3: Coding button game in p5   + Page 4 of packet * Day 4: Testing and coding improvements in p5   + Pages 5 and 6 of packet * Day 5: Build Presentation Page using HTML and CSS   + Page 7 of packet * Day 6: Peer feedback and self-reflection   + Pages 8 and 9 of packet | |

| **Do Now (Day 1):** |
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| **[Design Journal]** Share [this sketch](https://editor.p5js.org/mparker/present/DNhPfaMm2) with students and explain that it is a bare-bones version of the game they will make for their final project. Students should answer the following:   1. How is the game played? 2. What could be added to make the game less confusing? 3. What could be added to make the game more fun?   After Day 1, students should begin to work on their games as soon as they come in. |
| **Discussion (Day 1): Instructions, Rubric, and Project Packet Overview** |
| * Distribute the [final project packet](https://docs.google.com/document/d/18u5A0ScuDc0vNAD7G0LVVtinED-n1qcx0pPpNouRrCk/edit) and your rubric to students. Fill out the first sheet as a class and answer any questions about the rubric. * **Instructions:**  Explain to students that while the game components of their final projects will be the same as the one in the Do Now, they will also need to include messages to the player to make the game less confusing! They should make a game that…  1. Constantly moves a button to a random position on the screen 2. Increases the player’s score when the button is clicked 3. Resets the score to 0 when the player clicks the mouse but misses the button 4. Gives instructions on how to play and lets the player know when they lose  * **Extensions:** After students have finished a basic version of the game, ask them how they could challenge themselves to make the game more fun! Some examples are:   + Make the button an image instead of a rect(), and add a background image   + Make the button speed up every time it is clicked (and reset the speed when the player loses)   + Display a special message to the player when they reach a certain score * **Interaction:** Fill out the table with your students. Often these actions and responses will be *controlled by conditional statements*, but some (like “starts the game”) may not be. For example:  | **What action does the player make?** | **How does the program respond?** | | --- | --- | | * Starts the game by pressing the “play” button | * Displays instructions on how to play the game * Moves button to random locations on canvas | | * Clicks the button | * Increases the score | | * Clicks the background instead of the button | * Displays losing message and final score * Resets score to 0 | |
| **Teacher Demo** |
| * N/A |
| **Final Project: Button Game** |
| * **Day 1**   + Students should create their initial game designs on page 2 of the project packet. If they finish early, they can spend the rest of the period searching for images to use in their games. * **Day 2**   + Students should spend no more than 10 minutes searching and citing their images on page 3. Most of the day should be spent on planning their pseudocode.   + Make sure to assess students’ pseudocode before allowing them to begin coding in p5. You may also choose to have students review each other’s pseudocode before turning it in to you. * **Day 3**   + Students should spend the entire period coding their button games and recording their process on page 4. * **Day 4**   + Students should work in their assigned pairs or small groups and test each other’s games. They should use the feedback to answer the questions on page 5. Then they should plan their improvements on page 6 and make updates to their game in p5. * **Day 5**   + Students should make a presentation page for their games using HTML and CSS. These pages should include:     - The name of the project     - The name of the student     - A description of the project     - Image citations * **Day 6**   + In their assigned groups, students will rotate and play each other’s games while filling out the feedback sheet on page 7. Students will use the feedback to help them fill out the self-reflection sheet on page 8. |
| **Wrap Up (Day 6)** |
| * As a class, debrief on the final project with your students:   + What was fun about this project?   + What was challenging? What debugging strategies did you use to get unstuck?   + Give specific shout-outs to fellow students for feedback that was insightful, or for help that you got from a neighbor while coding. * Make sure students turn in their project packets to you before they leave. |