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ECEN 3753

Project: Planning

**Test Plan and results:**

* **Week 1:** At least 2 Desirable “Cutting Points”
  + Cutting the output of the physics task is something that is a cutting point that will test the overall functionality of the game. Most of the game play logic is going to be coded here, it is essential that this logic is tested.
  + Cutting at LED task. I think this implementation might be more complicated than initially thought. I would like to make sure I can properly display force magnitude and damaged caused using the LEDs.
* **Week 2:** Create your unit testing plan, utilizing three “cutting points” for testing
* **Week 3:** Reviewed and described unit tests and speculated whether each would Pass or Fail based on my current implementation.
* **Week 4:** Carefully specified my functional tests. I summarized hypothetical unit and real functional test results.
* **Week 6:** Update summary, and add tests as I identify more that make sense to ensure the project works as expected.

**Project Status:**

* Accurate statement of functionality deliverables and usability so far
  + Week 1: This week I did the project planning. The task diagram and risk register are completed. I have identified 2 cutting points for unit testing. Actual implementation has not taken place yet.
  + Week 2: This week I created my unit testing plan. I began working on implementing and working through the physics task. I began with creating a flowchart for the task and expanding what I already has mapped out for the project. That work became the basis on where to start. It also gave me perspective and where the cutting points would best be placed.
  + Week 3: This week I created I evaluated my unit testing plan. I have begun coding and implementing based on my flowcharts and task diagrams. The focus of this week has been the implementation of my physics task.
  + Week 4: This week I continued to work on the implementation and execution of project tasks. To be able to advance unit and functional testing, I need the physics task to function with at least some desired behavior. I am currently losing LCD task functionality. I have changed something in the code and now nothing appears on screen when I try and run tests.
  + Week 5: This week I identified essential tests that will ensure my project will work as inspected.
* Summary of effort and estimate numbers
  + Week 1: I have completed 5% of my currently scoped, estimated work (3 estimated for work completed thus far/54 total estimate) in 11% of the budgeted total-project time. (6 hours spent, of 54-hour total estimate). For the work that has been completed, I took 2x (6/3) as much time as I estimated.
  + Week 2: I have completed 27% of my currently scoped, estimated work (15 estimated for work completed thus far/54 total estimate) in 33% of the budgeted total-project time. (18 hours spent, of 54-hour total estimate). For the work that has been completed, I took 1.2x (18/15) as much time as I estimated.
  + Week 3: This week I completed 20% of my estimated work 28% of the initially estimated time. (12.5 actually spent/ 54-hour total estimate). For the work that has been completed, I took 1.7x (12.5/7) as much time as I estimated.
  + Week 4: This week I completed 15% of my estimated work 23% of the initially estimated time. (20 actually spent/ 54-hour total estimate). For the work that has been completed, I took 2.8x (20/7) as much time as I estimated.
  + Week 5: This week I completed 14% of my estimated work 77% of the initially estimated time. (15 actually spent/ 54-hour total estimate). For the work that has been completed, I took 1.5x (15/10) as much time as I estimated.

**List of In-scope work items:**

* Completed Week 1: I completed the task diagram and planning framework for this project. It is important for implementing the project. The more detailed and accurate the diagram is, the easier it will be to code the project.
* Completed Week 2: I completed a unit testing plan. I also began implementation on the physics task. Initially some time was spent on writing the unit test for the assignment, after lecture and learning we will not be required to write the unit, I had moved my focus to the physics task. The following are my three cutting points as part of my unit testing plan:
  + The Projectile physics test:
    1. Functional test: We want to check that, given the right conditions, the projectile’s position can register a hit to either the foundation, castle, or canyon base. We are only concerned about the vertical position of a fired projectile when it reaches the left barrier.
    2. Summary of Tests: A hit to the foundation should free the prisoners and we should see a timer started as a result. A hit at the canon should result in no change in play other than a decrement in availability energy. A hit at the castle should result in the decrease in the health of the castle or destroy it completely.
  + Satchel Charges:
    1. Functional test: We want to test if a charge, at the same horizontal as the platform when landing, destroys the platform and ends the game or misses and a new satchel is generated We are not so much concerned with energy available, projectiles, or castle strength. We are concerned with the horizontal or x-axis position of the satchel charge when it lands after being generated.
    2. Summary of Tests: The desired results are either the horizontal position of the satchel and platform do not match up and a new satchel is generated, or they do match up and the game ends because the platform is destroyed.
  + Shield Generation
    1. Functional Tests: We want to check if the shield will protect the platform if a satchel is present. The conditions are that there is enough energy to generate a shield and the satchel will land on the platform. We want to observe the results when a satchel lands on the platform and a shield is generated.
    2. Summary of Tests: The result that should be observed is that the satchel has no impact and a new one is generated. The result should be the same as if the satchel missed the platform.
* Completed Week 3/4:
  + Unit Test grades
    1. The projectile physics test: Pass, I think I am able to get the desired hit marker on the left barrier. I do not think a main concern now is whether the results trigger the timer for the jailbreak, the end of the game, or has no effect.
    2. The Satchel charges test: Fail, I think there are more moving parts in this than I am accounting for. I am not sure if I should split this into two cases to test whether there is a shield to protect the platform.
    3. Shield generation test: Pass, I think the cases are covered enough to get the desired results. I am just concerned with the case that the shield is generated when a satchel is present. The platform is either destroyed or nothing happens.
  + Functional Tests:
    1. Button 1: Button 1 does not know it is a shield and neither does the associated task. We are just concerned with testing whether the output (which will be used by the physics tasks) of the task is registering a button push when the button is physically pushed.
    2. Button 2: Button 2 should return how long the button is pressed. No matter how long the button is pressed, a time should be generated. This time length used in the physics task for its function in the game. A general test is to hold the button for increasing lengths and see if the output reflects those increases.
    3. Task Slider: This one is simple to test. We want the touch slider to reflect the position of the railgun platform. We want this task to return the slider position. This slider position will be used to become the platform position in the physics task. We just need to verify the output is consistently accurate.
* Completed week 5: I have continued to work on implementing my project. I am struggling with a little bit of everything. I am putting a focus on the physics task. Once the physics task is set, the rest I think will be easier when falling in order.
  + Functional Tests:
    1. Energy Consumption test: If you press button 1 more than 5 times, the total amount of energy available should be zero. The platform should no longer be able to generate a shield and be destroyed by the next satchel.
    2. Shield Test: If you press button 1 when the satchel is present, the satchel will be destroyed. Another satchel will then be destroyed.
    3. Full Discharge test: Holding button 2 for more than 5 seconds will power the railed gun to discharge the projectile at full strength. The consequent shot will be at full power.
    4. Low Discharge test: Holding button 2 for less than a second will power the rail gun to its lowest strength. The resulting shot will not have enough power to clear the platform. The expected result is the destruction of the platform and end of game.
    5. Slider Position Control test: If you tap the slider once to the left and once to the right, the platform will be in the same exact position it was in before changing position.
    6. Position Boundary test: If you keep moving the slider to the right towards the boundary, contact with the right-side boundary will result in the platform “bouncing off” with displacement equal in the left direction.
    7. Prison Break Test: With the correct input parameters resulting in a projectile to strike the castle at the foundation: A jailbreak will be triggered, and the prisoners will be free. The screen will say “Jailbreak” and the game will end.
    8. Castle Destruction Test: With the correct input parameters resulting in a projectile to strike the castle at the foundation at the top: the castle will be destroyed. The screen will say “Castle Destroyed” and the game will end.

In Scope Work Items:

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| Task | Estimate Effort | % of Estimate | Actual Effort | Status |
| Button Task | 4 Hours | 8% | 5 Hours | Complete |
| Touch Slider Task | 3 Hours | 6% | 6 Hours | Complete |
| Display Task | 10 Hours | 18% | 8 Hours and counting | In Progress |
| Physics Task | 20 Hours | 36% | 22 hours and counting | In Progress |
| Unit Testing | 10 Hours | 18% | 10 Hours | Complete |
| LED Task | 4 Hours | 8% | 2 hours and counting | In Progress |
| Week 1 Planning | 3 Hours | 6% | 6 Hours | Complete |