Unit testing:

Cutting point-After button task reads from the fifo:

1. Test that a fifo read from an empty fifo returns false.-Pass
2. Test that a fifo read from a fifo returns the correct value.-Pass
3. Test that the rail gun charge gets calculated correctly.-Pass

Cutting point-After physics task updates values periodically.

1. If capsense force is not equal to 0, check if the horizontal position of the platform is correct.-Pass
2. For satchels, check that the proper number of satchels are in the air at all times.-Pass
3. Check that the vertical position of the satchels was updated correctly.-Pass
4. If something collides with a wall, check that its velocity changed sign.-Pass
5. If the shield was activated during the physics update, check if any satchels in range were properly destroyed.-Pass
6. When a satchel reaches the ground, check that the satchel’s x-position is on target. Pass

Cutting point-after the display/LED task updates periodically

1. Check that the left LED turns on and off at the correct duty cycle.-Pass
2. After the castle evacuation time expires, check the left LED is constantly on.-Pass
3. Check that the Pulse width for the right LED is relatively equal to the current force magnitude.-Pass

Functional Tests:

1. Press the left/right side of the CAPSENSE slider and check if the platform moves to the left/right. Pass
2. The outer quarters should cause the right LED to stay constantly lit while the inner quarters should have the LED blink on and off evenly. -Pass
3. Pressing two sections of the CAPSENSE slider on opposite sides combines their effective force, potentially canceling each other out. -Pass
4. If BTN1 is released, a force field should appear on the display and destroy any satchels in range.
5. Pressing and holding BTN0 then releasing should fire a projectile with speed increasing as you hold the button, maxing out after 5 seconds. -Pass
6. If the generator does not have enough power for the shield or the railgun nothing should happen. -NotRun
7. Hitting the Castle foundation (2 pix wide) should reduce the castles health by 1, while hitting the Castle wall (1 pix wide) should reduce the castles health by 2 - Pass
8. After the castle has less than half health (rounding down), the left LED should start blinking. -Pass
9. After depleting the castle’s health completely or after the evacuation sequence ends and the left LED is completely on, the game should take the user to a victory screen. -Pass
10. The platform hitting a satchel or railgun shot, a wall too fast, or running out of energy while the castle is not in an escape function should take the user to a game over screen. Pass

Project Summary:

This week, I finalized my functional tests and implemented the button reading task and railgun physics and display for my game.

Summary Effort/Estimate:

I have 100% of my current work (45 estimated hours out of 45 total) in 84.4% of the budgeted time (38 hours spent out of 45 hour estimate) For the work that has been completed, I took 0.844x (38 actual hours/45 estimated hours) as much time as I estimated.

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| --- | --- | --- | --- | --- |
| Task | Estimated Effort | %Estimate | Actual Effort | Status |
| Task Diagram | 3 hours | 6.66 | 2.75 hours | Complete |
| Unit Testing | 8 hours | 17.77 | 4 hours | Complete |
| Platform Phys | 5 hours | 11.11 | 5 hours | Complete |
| Satchel Phys | 5 hours | 11.11 | 4.75 hours | Complete |
| Railgun Phys | 5 hours | 11.11 | 6 hours | Complete |
| **Display Task** | **12 hours** | **26.66** | **12 hours** | **Complete** |
| **Button Task** | **5 hours** | **11.11** | **2.5 hours** | **Complete** |
| CAPSENSE Task | 2 hours | 4.44 | 1 hour | Complete |
| Total Complete | 45 hours | 100 | 38 hours | 45 hours budgeted |

* Display Task
  + Overall, this was my longest task to fully implement mostly because it needed to be updated alongside most other items as new things were implemented. In addition, there were a lot more functions for this task than I initially thought, like stopping timers or setting certain values or LEDs when the game is not currently being played. Overall, I am pleased with how my visuals for the game turned out
* Button Task
  + This task wasn’t too bad to set up since most of the previous labs delt with properly handling the buttons. There was a bit of an issue with having the shield button only respond to one type of button input but I was able to sort it out quickly.