

Zachary Derwin

RTOS SP23 Final Project

Summary Statement

All required deliverables are functional except for PWM signal for LED0 from force.

Summary Effort

I have completed roughly **95%** of my expected project scope. I have completed roughly 28 hours of work in total for the project out of my originally scoped 46 hours..

List of In-Scope Items

- **Project planning: 2 hours**
 - Create task diagram and scope work
- **Project Framework: 4 hours**
 - Create all task functions, ITC resources, and other necessary resources
- **Implement input: 3 hour**
 - Source code from previous projects to get input from buttons and slider using interrupts
- **Validating Input: 2 hour**
 - Test that hardware input is being added to message queue
- **Physics Engine Framework: 3 hours**
 - Create all functions and variables needed for the task
- **Data Structures: 3 hours**
 - Implement different data structures for each data component following project guidelines
- **Physics Engine Output: 6 hours**
 - Physics Engine implementation including ITC and references to data structures
- **Physics Output Validation: 2 hours**
 - Testing physics engine for correct output to data structures
- **Framework for display task and led driver: 6 hours**
 - Declare functions and initialize necessary resources
- **Fully implement and test output tasks: 4 hours**
 - Implement task functions for both the LCD output and led driver and test functionality, create ITC to pull from data structures
- **Begin testing: 2 hour**
 - Test proper functionality of project and attempt full playthrough of game
- **Debug: 5 hours**

- Inevitably spend time making lots of adjustments and digging through code to find out where they need to be made to make sure game meets project requirements
- Optimize game settings: 4 hours
- Choose some creative liberties and begin iterating to make the game more playable and balanced

Solution Analysis

Slider input is at 5 (highest). Physics and LCD are both set to 10 and Led Output is set to 15. There are no conflicts, everything is functioning smoothly.

My code is somewhat space efficient, I think I could consolidate the physics engine a little bit and streamline some of the code there.

Overall my physics engine works very well. It is not the cleanest and I struggled the most with tuning it (ie unit calculations). After the initial implementation, things did not react to input the way I wanted them to and I had to change a lot of constants to get the gameplay where I wanted it.

I ended up taking a ton of liberties on the configuration data and only loosely followed the project guidelines. While this approach might not earn me a full grade, I do think it was a better approach overall because I was not bottlenecked into a specific implementation strategy, I was able to apply my own thinking and lessons learned throughout the semester.

If I had more time, I would like to figure out the PWM functionality and maybe add a few more bells and whistles such as object collision with the escaping prisoner (satchel, cart, railgun shot) or a game menu upon startup.

