

Week 3 Statement on Project Standing

In week three I completed the angle task, the throttle task, the rocket design, and the display task. The rocket design is a squatty triangle. I am aiming more for a UFO landing game than a classic rocket. It required a good amount of math and trigonometry to figure out how the rocket's vertices would move for various angles. The other tasks were ones that I already had frameworks for so it did not require significant thought. The lcd functions to display the polygon played nicely this time.

I have completed 44% of the scoped work, (15/34hr) in 41% of the initial time estimate (14/34). The display task took less time than expected so I am a little ahead. I am not overjoyed yet because I have completed the easy items so far and still have a lot of hard work to do.

Scoped Work

Work Item	Description	Estimated Time	Status
Project Planning	Create an initial task diagram and documents for week1. Have an idea of project design.	2 hrs	Complete
Data Structure Setup	Setup initial data structures for rocket, message queue, angle setpoint, and throttle setpoint.	2 hrs	Complete
Writing Unit Tests	Write initial unit tests. Should fail until further development. Challenge in porting in data needed between cutpoints.	3 hrs	Complete
ITC and Shared Resource Setup	Establish the structures needed between tasks, such as semaphores, timers, mutexes, and the tasks themselves.	1 hr	Complete
Angle Task	Develop code for angle task to pend on semaphore from button ISR and write to angle setpoint.	0.5 hrs	Complete
Throttle Task	Develop code for throttle task to pend on semaphore from timer and write to throttle setpoint.	0.5 hrs	Complete

LED/PWM Task	Develop code to drive LED's based on PWM. PWM code itself is created in a separate work item.	0.5 hrs	Not Yet Complete
Rocket Design	Practice with the micrium graphics library to design how the rocket will look and what are the meaningful points.	1 hr	Complete
Display Task	Develop code for display task to take data from rocket data structure and display the rocket. Challenge is to display the rotation of the rocket graphic, here the math is done to move the vertices of the rocket.	5 hrs	Complete
Physics Task	Develop code for physics task. This is the bulk of the project. Includes programming kinematic equations to computing the acceleration, thrust, fuel, position, and rotation of logic. Will also be responsible for knowing if a win or loss has occurred.	8 hrs	Not Yet Complete
PWM config	Create the routines necessary to program configurable PWMs using software timers. Needed by LED task.	2.5 hrs	Not Yet Complete
Configurability Implementation	Program a home screen on the game that takes in input via the buttons. Also takes config either through config file or changing settings in project code.	3 hrs	Not Yet Complete
Debug	Built in time to debug. After all previous work items complete it is expected that the project is not fully functional without substantial debug work.	5 hrs	Not Yet Complete

Completed this Week

Angle Task:

Changes the set angle with each button input and modifies the angle setpoint which is protected with a mutex. Based on work from previous labs.

Throttle Task:

Changes the throttle based on slider input and modifies the throttle setpoint which is protected with a mutex. Based on work from previous labs. Task is awakened from a semaphore post from an OS timer.

Rocket Design:

Designed a rocket to be a “squatty” triangle. Hoping to mimic a UFO shape. It was done this way because the shape is made of two 3-4-5 triangles next to each other, which made the trigonometry easier as I was drawing it out. This also makes it clear what the orientation of the ship is.

Display Task:

This task does the math of translating and rotating the rocket ship. It required me to draw out many many triangles but using the sin and cos functions from the C math library it made it all pretty simple. I also decided to draw a ground line with a target on it so the objective of the game is to land on the target.

Started work on PWM functions.