Individual Progress Report Prototype 1

Project Details

Project name	Cat’s Conundrum
Course Number	EGEN310 Multidisciplinary Design
Reporting period	September 2017 - October 2017
Report Author	Brock Ellefson
Date Due	10/22/17

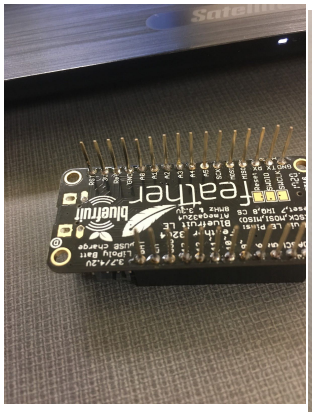
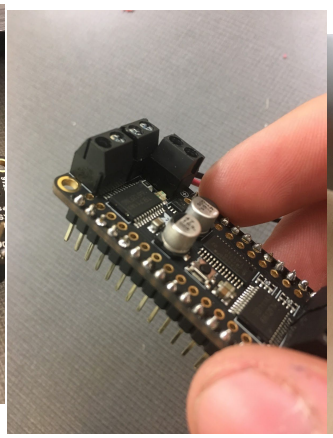
Summary

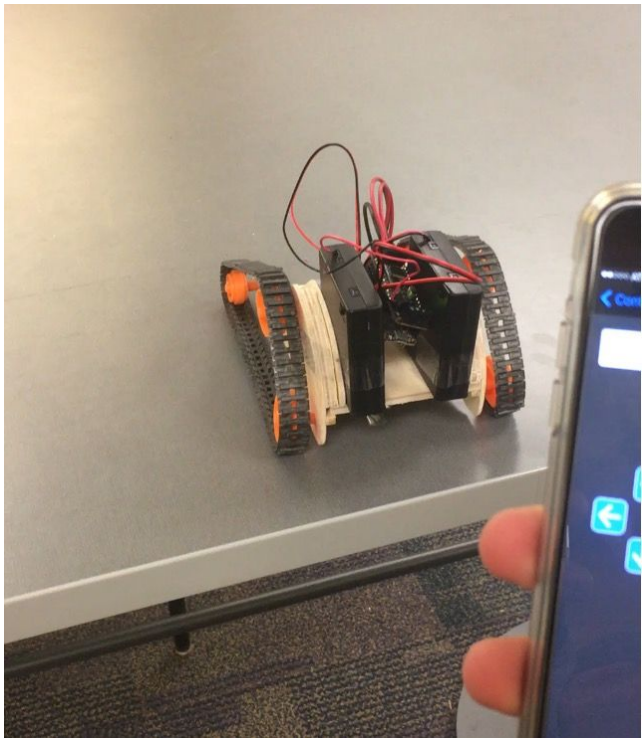
For multiple weeks, our team was focusing on moving our ideas from a conceptual imaginary state into a concrete design. After picking the main board and its motor board companion, I soldered the required parts to them and began slowly integrating each part with the next. First was just the FeatherBoard32u4 interfacing with my computer properly. Then moving onto the board interfacing with the FeatherWing and motors properly. Finally interfacing all of these components with bluetooth connection instead of a direct in-line cable. All of these are small steps towards the big picture, full integration with all of the GUI objectives fully operational. As of right now, we can control the car with raw data and code.

Unfortunately, the GUI I’ve been trying to implement has not been cooperating and not been fully integrated yet, so for the time being, we are using an open-source Arduino-Official bluetooth controller while we work on our own GUI’s bugs. This will allow the ME and CI to work on and test the car without running into bugs electronically while I continue to work on the GUI.

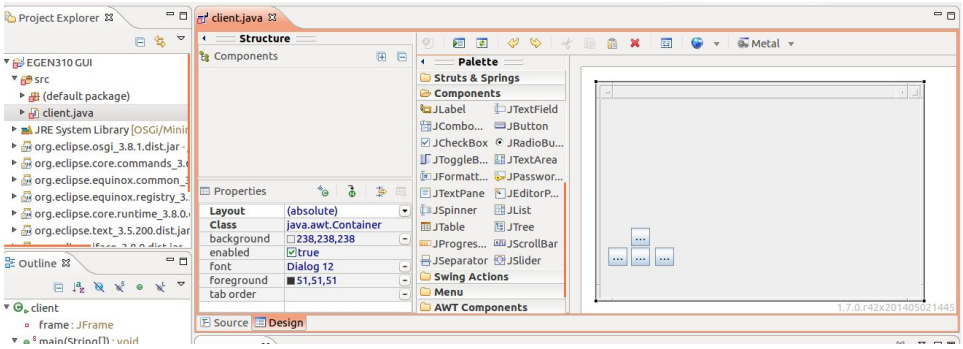
Activities

Status	**Achieved**
Objective	Purchase Electronic Components
My Time on this task	2 Hours
Other Members	N/A
Progress	During our proof of concepts, we were debating whether or not to use an Arduino or a Raspberry Pi as our on board CPU. Initially we were going with the Pi, but after some mild testing we decided to go with an Arduino Featherboard. After this decision I researched what motor board to integrate with the feather board. I found out about the Featherwing DC Motor + Stepper motor board, a nice motor shield that is small and compatible with the Featherboard. Then, since our group is lacking an Electrical Engineer and a Computer Engineer, I figured out how much voltage would be needed to power the two boards, as well as the motors.
Outputs Created	Arduino FeatherBoard 32u4 Arduino FeatherWing Motorboard (DC + Stepper) 4x AA Battery Pack 2x AA Battery Pack Wires of appropriate gauge Breadboard
System Integration Considerations	Making sure that all parts are independently working (i.e. not duds, manufacture issues). Also have compatible OS to be able to code GUI and BLU modules (since Tina’s computer is from China, she was unable to connect to the board).
Challenges/Lessons learned	Figuring out the correct power needed to power both boards and both motors without frying the Featherboard was interesting. With time however, the correct voltage was applied and the motor + board pair was operational

Status	**Achieved**
Objective	Soldering of the pinouts to the board, wires to motors, icp address, and JCT connection port to battery pack
My Time on this task	2 Hours
Other Members	N/A
Progress	I’ve never attempted soldering before, so most of the current soldering attempts have been while I was learning it on the fly. I soldered 2 female pinouts on the Feather32u4 and 2 male pinouts on the FeatherWing. Wires were also soldered to the 2 individual motors> Finally a JCT port was soldered onto a battery pack for easy connection to the Feather32u4
Outputs Created	  
System Integration Considerations	It integrated fine, may need to resolder some parts on the Motorboard. But overall, all parts were tested and functioned as expected.
Challenges/Lessons learned	Soldering can overheat and kill circuits if done carelessly, so making sure I didn’t fry either boards or wires while soldering for the first time was challenging.

Status	**Achieved**
Objective	Wiring the board to motors, and running off battery packs
My Time on this task	2 Hours
Other Members	Yalan Yin
Progress	Wired the motors to the M3 and M4 ports on the FeatherWing, and wired the battery packs to their respective boards.
Outputs Created	All electronics wired properly 
System Integration Considerations	All the electronics and battery packs add a lot of weight that wasn't accounted for. We need to figure out a way to either make the car be able to handle more weight, or get lighter parts.
Challenges/Lessons learned	Giving the boards more power than they can handle can cause them to overheat and fry themselves. It was imperative that I got the correct voltage on these devices.

Status	**Achieved**
Objective	Motor Integration With Board
My Time on this task	30 Min
Other Members	Yalan Yin
Progress	After getting all the components wired and integrated, began testing the motor board actually controlling the motors. Installed the Arduino IDE and began testing the motor board to motor connection via the DCMotor test module. Then began making unique file to integrate with the GUI in the future
Outputs Created	Motor movement and arduino scripts
System Integration Considerations	Once again, making sure that all parts are independently working (i.e. not duds, manufacture issues). Also have compatible OS to be able to code GUI and BLU modules (since Tina's computer is from China, she was unable to connect to the board). Also to make sure that our script all be able to integrate nicely with GUI so we can have full wireless control over the car.
Challenges/Lessons learned	The Arduino IDE has many libraries and packages that needed to be installed in order to make the motors powered. Figuring out how to use these libraries will be critical for bluetooth integration.

Status	**In progress, Challenges Not solved**
Objective	GUI Integration
My Time on this task	5 Hours
Other Members	N/A
Progress	Applying some test code to the board to get it to interface with the two DC motors. Then moving on to bluetooth integration with the motors. However our own GUI/Bluetooth files are not in working condition yet.
Outputs Created	GUI prototype implementation 
System Integration Considerations	Make sure the GUI can control the car comfortably. Make sure that the bluetooth is connecting the gui to the featherboard. Possibly increase size of directional buttons, or implement movement scrollers.
Challenges/Lessons learned	I'm having a lot of difficulties with the GUI to arduino implementation. I'm going to have to set aside time every week to work on this. I need to get Tina helping me with this two, two CS majors are better than one.

Status	**Complete**
Objective	Created Video, Edited Video For prototype 1
My Time on this task	2 Hours
Other Members	All
Progress	Filmed Tests, Interview
Outputs Created	Prototype 1 Video
System Integration Considerations	N/A
Challenges/Lessons learned	Editing a video takes a while