Weekly Updates - 2/26/19

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Team P.V.I.R
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Team Members: Stephanie Chan, Elizabeth Fuller, Adrian Munoz
Nelson Raphael, and Lemek Robinson

Motor Testing (2/22/19)

- DC Brushed Motors; need connectors on battery and power side of speed controller
- Testing with 4 batteries in series
- ISSUES:
  - DUE pwm problems
    - FIX: Needed to change the PWM frequency to 490 in a header file (variant.h in app data)
  - Transitioning to higher speeds isn't smooth
  - 8 AWG wire is too thick - switch to 12 AWG so it can connect to speed controller
  - Add 20 [Amp] fuse for current control

Controller Functions

- General movement (Fwd, rev, left, right)
  - Independent control over left and right motor
- Rotate "lazy susan"
  - Control the stepper motor
- lift/lower camera
  - Control the motor for the pulley
- "Reset" brings the camera back to a default position
- Toggle speed control
  - Need to be using very slow speeds normally
- Capture an image
  - Useful for gauges

Take photo

Toggle Speed control

"Reset" to default position

Control Right Motor

Lazy Susan and Pulley Control

Control Left Motor
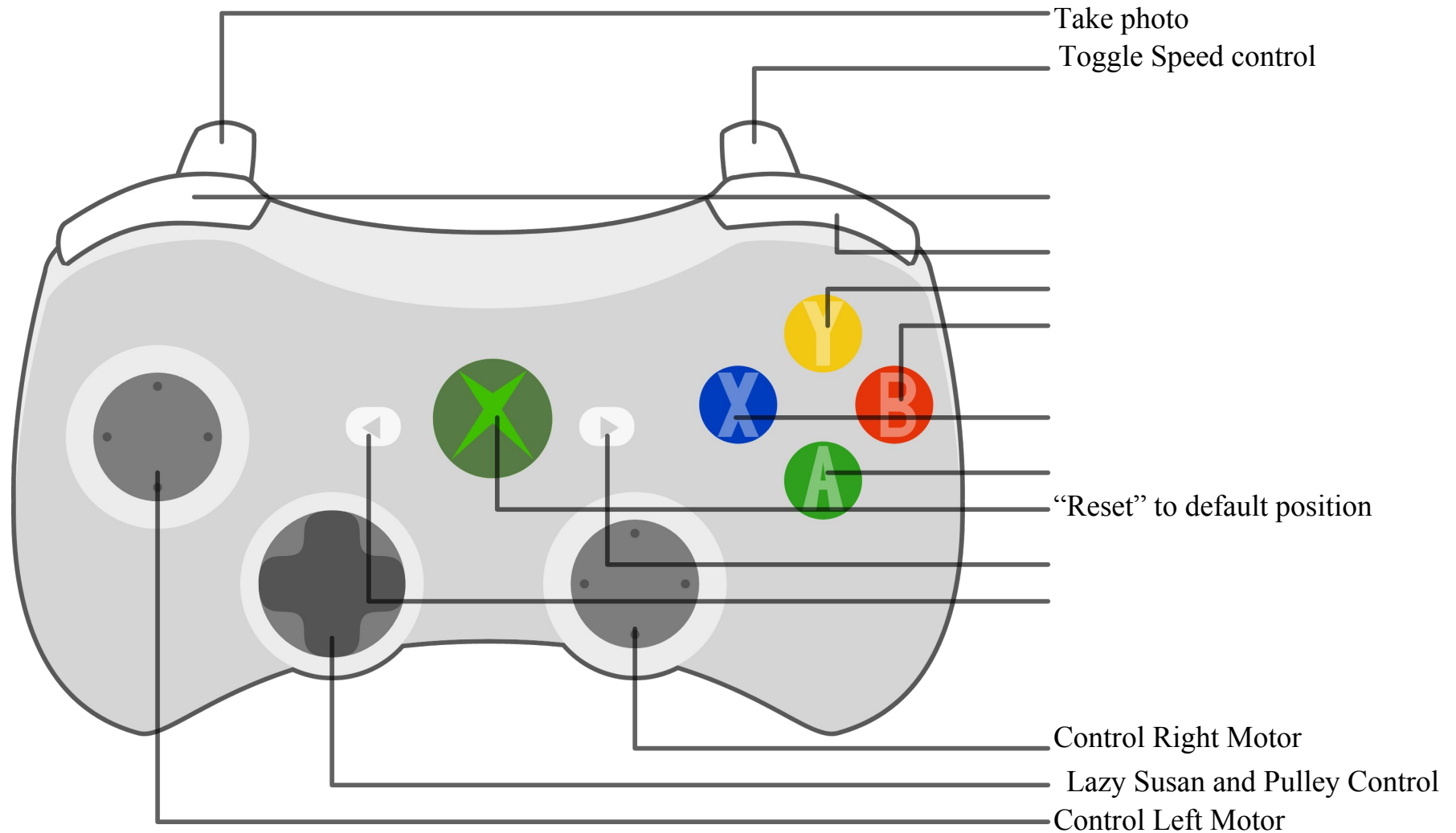
Up to Date Schematic with current parts

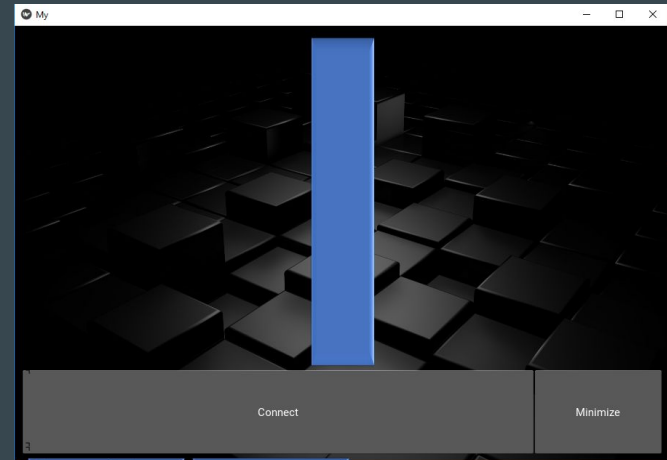▬may or may not need the extra row of batteries in parallel
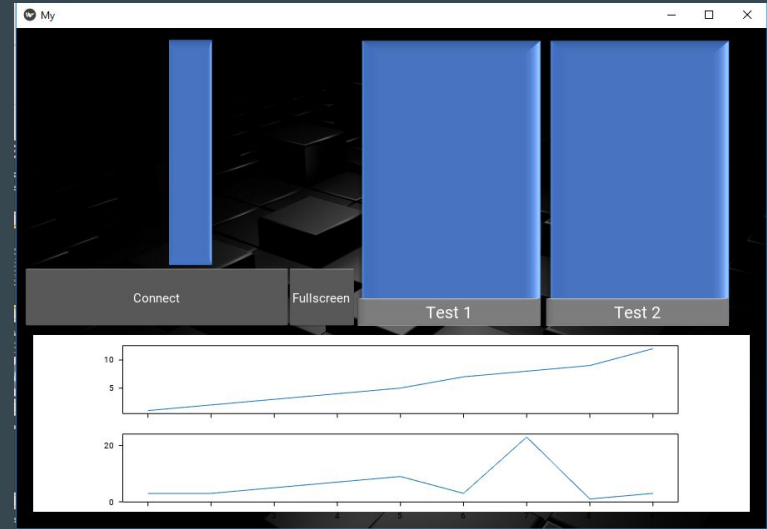
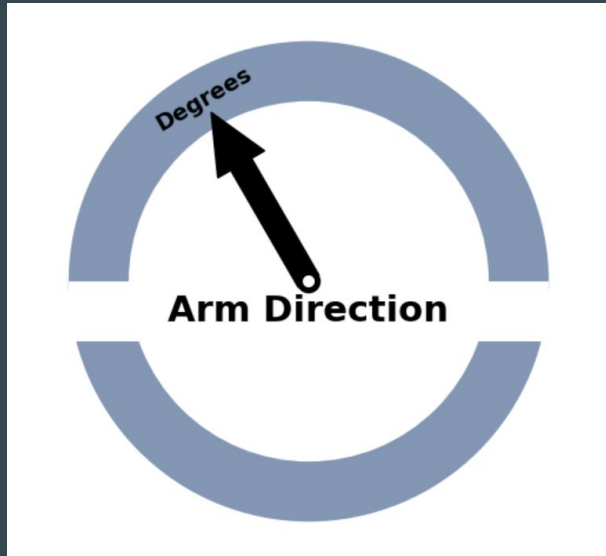-Next is forming connection between DUE and RPi, adding more sensors,
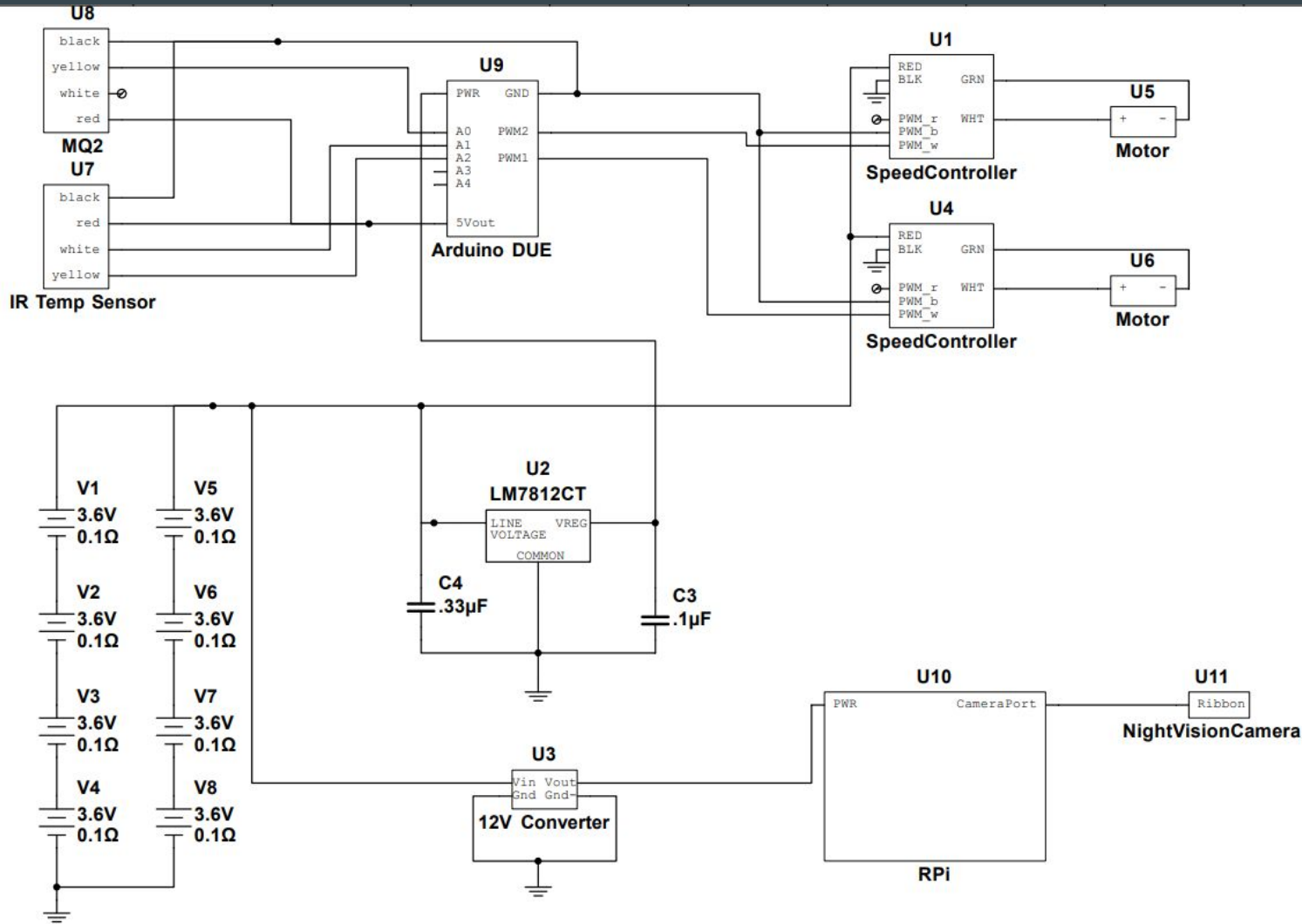
GUI

Working Aspects:

- Live Streaming
- Log-in window functions
  - Error messages
  - Allows Log-in
- Data Logging
- Error Catching, Formatting, Clean up
- Page Navigation (unnecessary)
- Live Line Plot working
- Fullscreen camera

Gauge Graphic

- Static Gauge
- Can have a 360° rotation
- Infinite number of sections

Mechanical Arm Update

- Rods connecting top plate set of pulleys will be made using a 3 ft rod purchased from Macmaster
- ¾ inch spacers placed under middle ring of the turn table for height adjustment
- ⅛ inch metal plate placed above rotating turn table to mount t-slots.
- The GT2 belt will be connected to 3 pulleys: the top 2 pulleys above the top platform and the pulley attached to the bottom vertical pulley attached to the t-slot.

Mechanical Arm Update
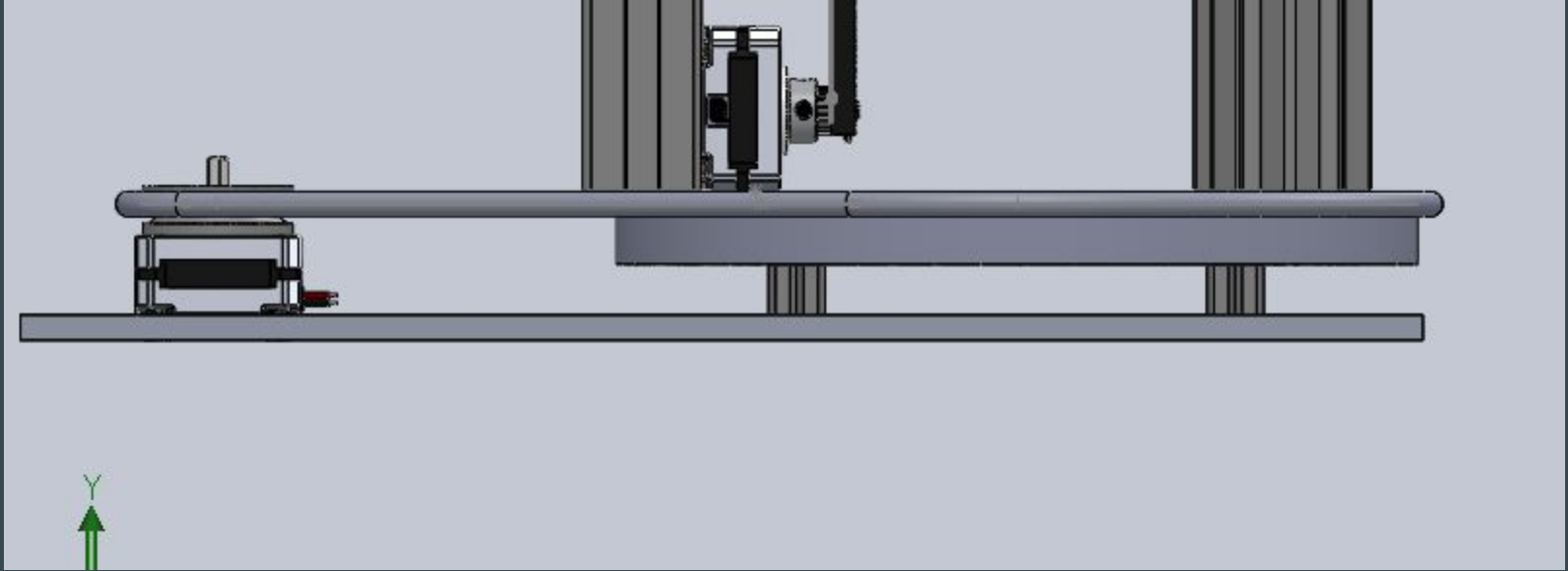
Mechanical Arm Update
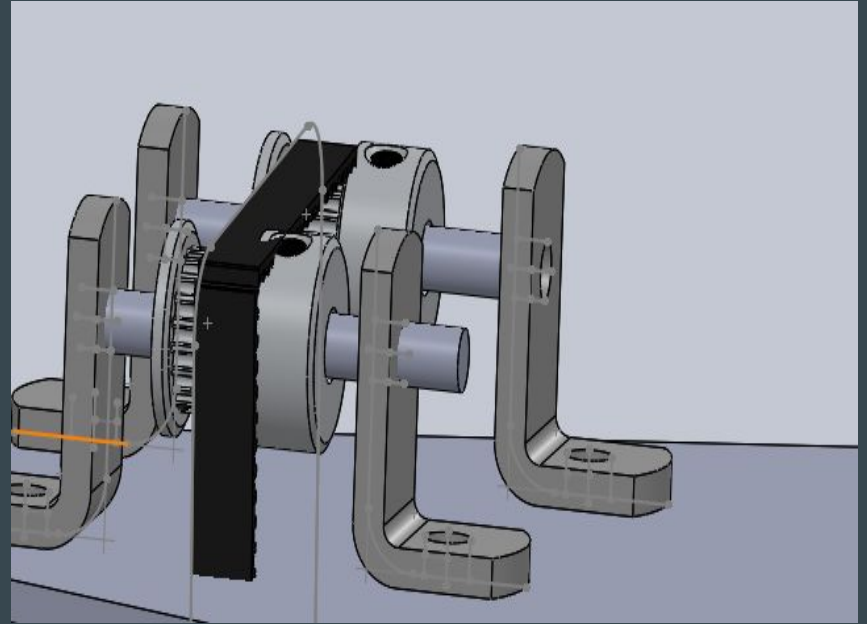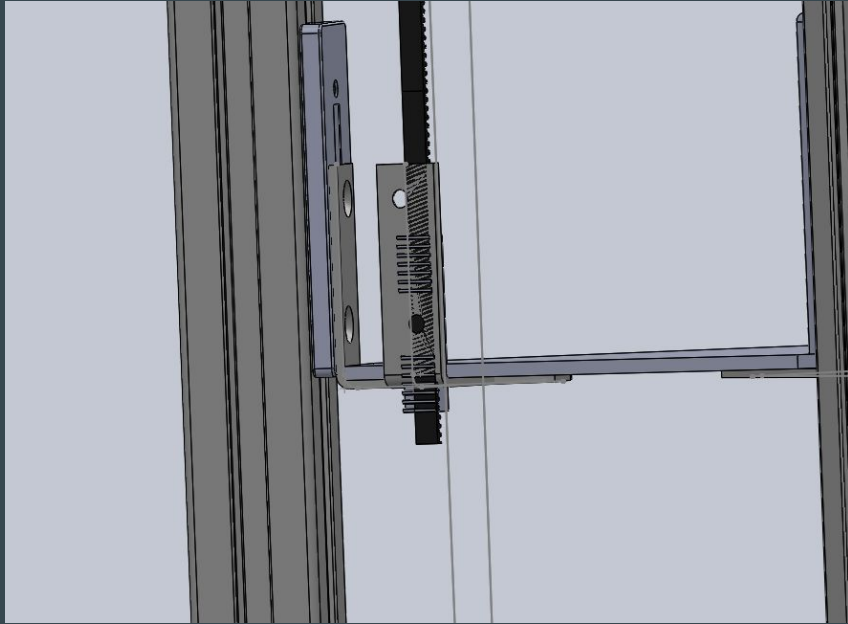
Stepper Motor Controller

- Nema 17 is 2 phase
- Will need 2 motor controllers
- [Qunqi L298N Motor Drive Controller Board Module Dual H Bridge DC Stepper For Arduino](#)
- $6.89 each
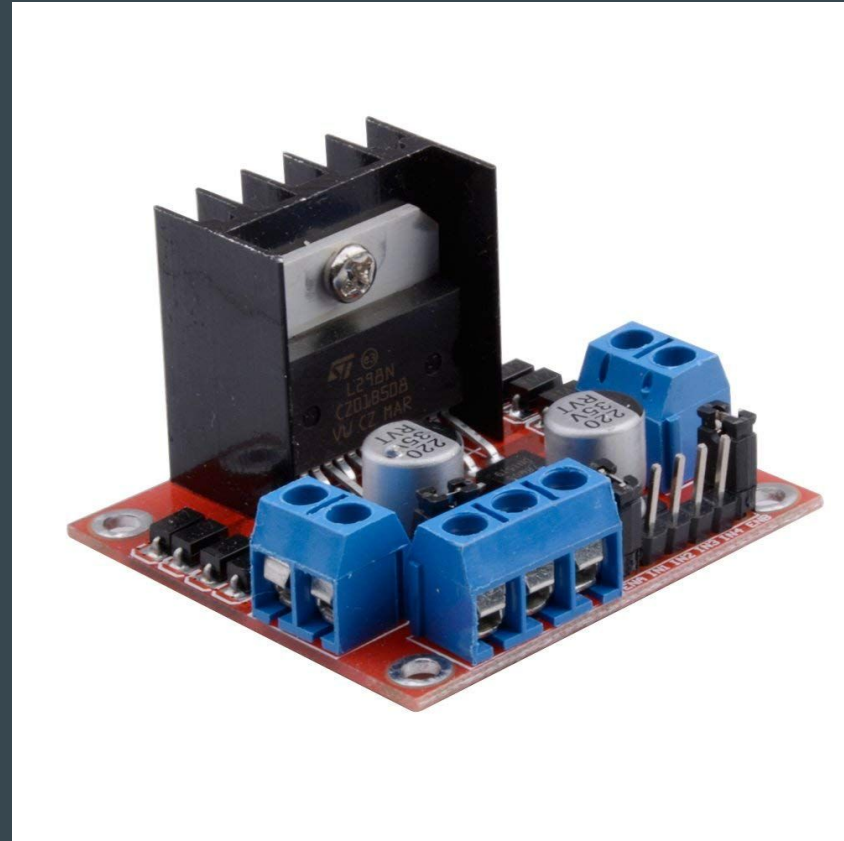
MQTT Communication Update

- Successfully achieved sending information both ways
- Successfully transmitted controller input to subscribing device
  - Latency present
- Successfully transmitted emulated sensor data transmission to the subscribing device
- Building a class for packaging sensor information for the GUI to receive
  - List format is better for manipulation on the GUI side
- Adjusting scripts to be in the OOP format

MQTT Communication Update

- Video for Sensor Data test
- Emulated sensor readings to develop a string format
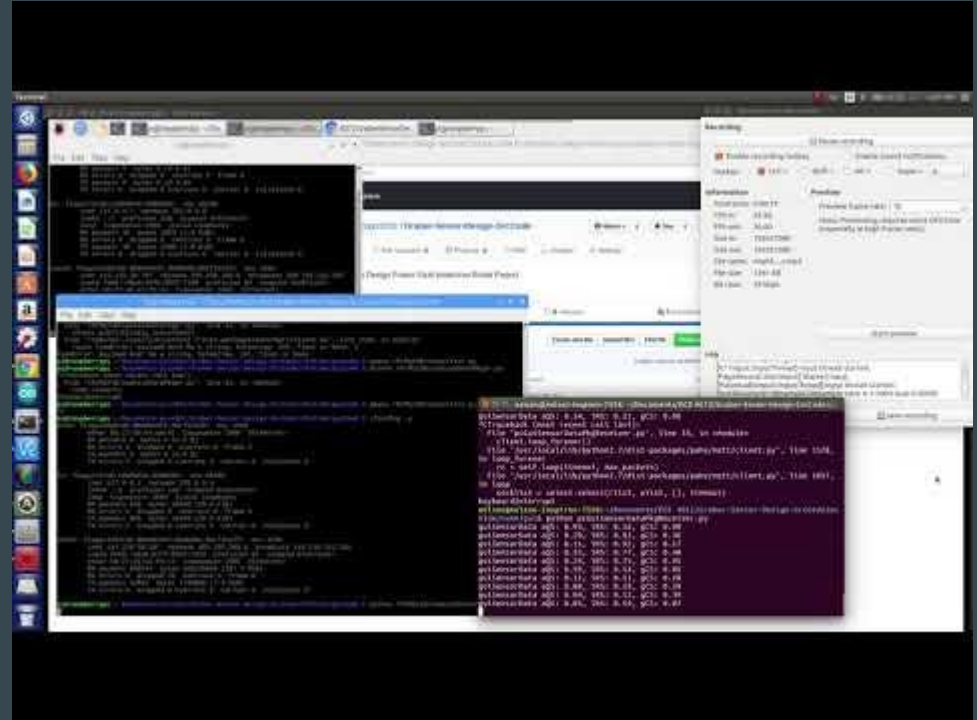
MQTT Communication Update

- Demonstration of the simultaneous communication
- Allows for controller inputs to be sent during sensor info transfer

MQTT Communication Update

- Controller inputs are sent over the wireless MQTT connection
- Latency needs to be decreased
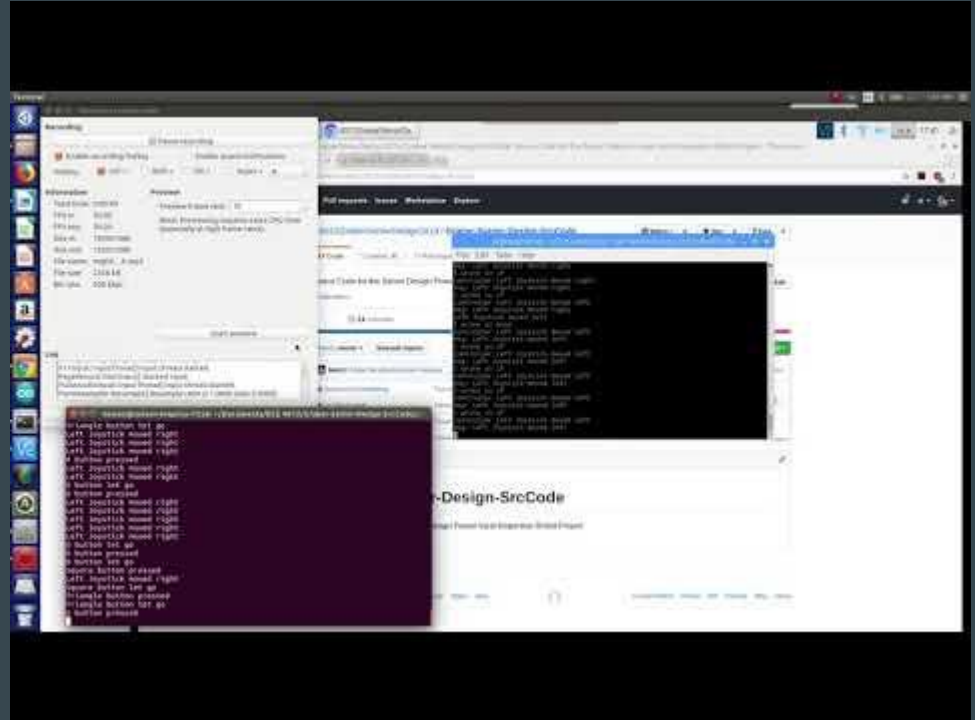
Order 1 Status

The following parts have been ordered:
- 2 Grove MQ2 Gas Sensor ($7.53)
- 2 Grove Infrared Temperature Sensor ($9.90)
- 1 30pcs Protoboard set ($10.85)
- 1 130pcs Jumper Wire Kit ($7.89)
- 1 3pcs Solderless Breadboard ($7.99)
- 1 Arduino DUE board ($37.40)
- 1 Waveshare RPi Camera F Module ($25.99)
- 1 Sandisk 32gb micro SD card ($8.90)
- **2 Parallax Carbon Monoxide Sensor ($5.99)**

Total of Parts that have come in: $133.88 (parts ordered from Amazon and Digikey)
Order Total: $145.86 (assuming first link was used for remaining items)

Order 2 Status

- 8 Samsung 30T 21700 Battery ($7.99)
- 2 EFAN 4 Channel Battery Charger ($9.97) (Note: Only one came in)
- 4 21700 Battery Tray ($5.25)
- 1 10ft Ethernet Cable ($5.99)
- 1 8" Aluminum Lazy Susan ($17.00)
- 1 USB Breakaway cable for Xbox 360 ($3.99)
- 1 6061 Aluminum plate 12" x 12" , ¼" thick ($47.11)
- 1 6061 Aluminum plate 12" x 24", ⅛" thick ($43.12)

Order Total: $220.07

Order 3 Status

- 1 Test Pressure Gauge (2-½")($1.61)
- 1 General Purpose Pressure Gauge (2-½") ($3.59)
- 1 Liquid Filled Pressure Gauge (2-½") ($4.85)
- 1 Xbox 360 Controller, Wired USB controller ($16.99)
- 4 T-slot sliders ($5.50)
- 3 30mm x 30mm T-slotted profile 6ft ($19.23)
- Timing Belt Kit (Includes timing belt, pulleys, tension spring, clamp mount) ($12.99)
- 5 Zinc-plated steel corner bracket 2" x 2" ($0.92) (Note: Steinberg also ordered the item from the additional link which costs $9.99 for 16 L-brackets)
- 1 6061 Aluminum plate 12" x 12", ¼" thick ($43.12)

Order Total: $167.44 (Note: The additional $9.99 was NOT included in this calculation)

Budget Update

Order 1 Total: $145.86
Order 2 Total: $222.07
Order 3 Total: $167.44

Grand Total: $ $535.37 (assuming first link was used for remaining item)
Remaining Budget: -$35.37
(Again, note: additional $9.99 was not included in this calculation)

Items to be Discussed

- Task Status: Arm CAD design, Sensor Package Schematic, Control System Design
- Plates for the Robot lid is slightly too short
- Action Items for the week
  - Begin Xbox 360 controller setup/ continue with Arduino serial communication
  - Begin adding meeting transcripts/ summaries to the website
  - Get connectors for battery holders/speed controller connection

Design Notebook Information

ECE4012 Tentative Deliverables

Assignment	Student Deliverables Due Dates
Confirm Project Groups Identify Your Group Leader & Web Master	ASAP
Proposal & Presentation Planning: Meet with & Review Advisor Feedback	Week 1
Progress Report Emails	Initially ASAP then Weekly before Wednesday beginning Week 2
Oral Proposal Presentation	Before the end of Week 2
Submit any Revised Proposal	Before the end of Week 2
Project Summary: Revised to Advisor	Before the end of Week 2
Start Purchasing & Building...	After Advisor approves Proposal documents
Initial Web Site Posting including ECE4011 TRPs, Written Proposal, Proposal Presentation, Project Summary...	One week after notification from lecture instructor of web space availability
Design Notebooks	Before March 15 Friday
Spring Break	March 18-22
Design Notebooks	Before April 25 Thursday
Final Presentation	As specified by Advisor, often at Expo
Capstone Design Expo	Probably April 23 Tuesday ~4-8pm
Final Project Demonstration	Before May 2 Thursday, see your Advisor for details
Final Project Report: doc pdf	Before May 2 Thursday, on your web site
Final Project Summary	Before May 2 Thursday, on your web site
Completed Web Site	Before May 2 Thursday
Teamwork & Professionalism	Always

Design Notebooks

ECE4012 Design Notebook Grading

There are two Design Notebook submissions for grading this semester.

Details for submitting online will be provided shortly prior to the assignment due dates..

Design Notebook discussion

Project Notebook Grading Rubric

Points		
3		Each page is numbered, dated and signed
1		The notebook does not have removable pages
1		All blank pages/areas are marked Intentionally Left Blank
4		Your name, projects name, contact info, and team members contact info are recorded on the cover or inside of the cover
1		All Notebook entries are in chronological order
1	11	All notebook entries are in ink, i.e., no pencil entries allowed
3		Record team meetings dates, those present, and meeting highlights
2		Detailed meeting notes (if project has software component this includes documenting coding progress and source code locations)
1		Document information resources accessed (websites, books, scientific papers, professors, industry professionals, etc..)
3		Record design ideas in the form of block diagrams, sketches, etc.
3	12	Documentation of Engineering Results and Data (test plans, raw data, analysis and discussion of results)
2		Generate to-do items and place a box in the left hand margin ahead of listed item
3		Include check boxes for your and your team's and list individual responsibilities and deadlines
1		Check off to-do items when they are completed and write in completion date
1	7	To-do items should run chronologically through the notebook as your design work progresses
3	3	Professionalism (general organization, neatness, professional language)
33		Total