Final Project Midterm Proposal Workflow and Details

Logistical Items:

Teams:

- Design teams are the group you work with each week in laboratory. It is highly recommended to exchange contact information with your teammates, as the majority of final project work will be completed outside of class.

Due Dates:

- The midterm design proposal is due Friday November 9 by **midnight**. The document should be submitted to canvas in the correct location. Teams must **submit one document per team.**

Writing Requirements/Grading Documents:

- The midterm prompt document is listed in Canvas under Files > Final Project > Reports Handout 10-27-2018. The document lists grading details as well as specific descriptions as to what is expected in each subsection of the report. Report outlines are given in the document which should serve as support for students

Outside of Class Time Resources:

- Lab assistant support is available during after hours every weekday 6:00-10:00 PM. Student must sign up for after hours via *Signupgenius*. All hardware will be made available to students during after hours.
- TA staff is available for support during office hours in Covell 140; office hour times and staff are listed in Canvas. Hardware **is not made available** during office hours.

Canvas:

- All final documents are available in Canvas (located at Files > Final Project) for students to review. Canvas is where documents should be submitted for the reports.

Suggested Design Workflow:

The workflow shown below is simply a suggested approach to approaching the design solution and producing midterm design reports.
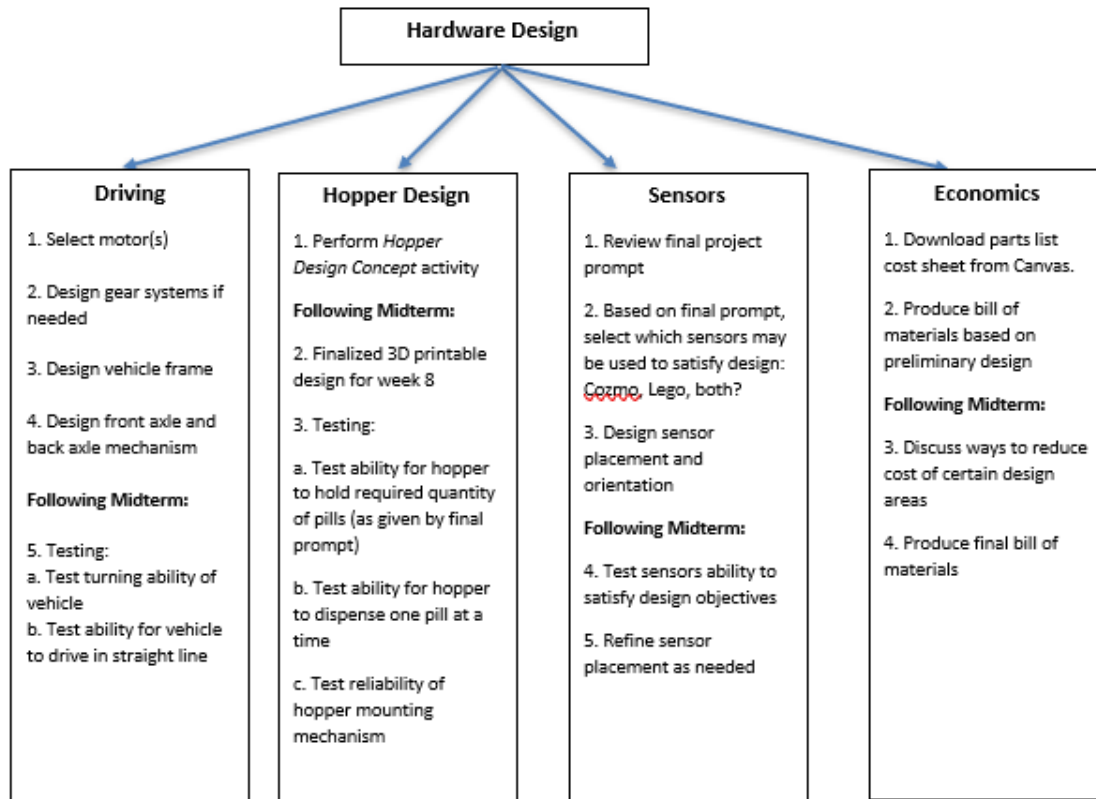
Logistics:

Because the majority of the project will be worked on outside of recitation time, it is important for teams to meet regularly and plan out weekly objectives and goals. Below is a helpful jumping off point for weekly activities.

1.) Start up a location to share documents and work in parallel online. Google drive is a very good

option for this.

2.) Gather as a team at regular time(s) weekly to share individual and team progress.

3.) Sign up for after hours regularly to test programs and hardware assemblies.

4.) Produce helpful outlines for assembling Legos (if needed) for the sake of the competition day.

5.) Edit portions of reports as required by design changes.

6.) Update Gantt charts based on team progress.

   a.) A helpful template of the Gantt chart has been posted in Canvas. Teams are not

   required to use this template, however, it is simple, self-explanatory, and available.

7.) Set team and individual goals for following week for design solutions and reports.

8.) As always, ensure each team members' thoughts and opinions are **heard and respected**.

Hardware Design:

The following flow chart lists some key aspects of the mechanical portion of the design project, and a suggested workflow for them. Note, some portions of the following workflow may be best performed after the midterm proposal is submitted; these objectives are separated with "following midterm" line. Note, beginning on **Monday October 29, pills and a sample test field will be available in Rogers 222** for students to perform testing.

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                        │   Hardware Design   │
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Driving	Hopper Design	Sensors	Economics
1. Select motor(s)	1. Perform *Hopper Design Concept* activity	1. Review final project prompt	1. Download parts list cost sheet from Canvas.
2. Design gear systems if needed	**Following Midterm:**	2. Based on final prompt, select which sensors may be used to satisfy design: Cozmo, Lego, both?	2. Produce bill of materials based on preliminary design
3. Design vehicle frame	2. Finalized 3D printable design for week 8		**Following Midterm:**
4. Design front axle and back axle mechanism	3. Testing:	3. Design sensor placement and orientation	3. Discuss ways to reduce cost of certain design areas
Following Midterm:	a. Test ability for hopper to hold required quantity of pills (as given by final prompt)	**Following Midterm:**	4. Produce final bill of materials
5. Testing:		4. Test sensors ability to satisfy design objectives	
a. Test turning ability of vehicle	b. Test ability for hopper to dispense one pill at a time	5. Refine sensor placement as needed	
b. Test ability for vehicle to drive in straight line	c. Test reliability of hopper mounting mechanism		

Software:

One approach could be looping through the following steps:

- Locate the container of color corresponding to first pill color detected
- Transport the pill to the container
- Put the pill inside the container
- Go back to the first step

Advanced thinking: As the goal of this project is to correctly sort as many pills as possible in a certain period of time, the key question will be: How to save time?

- Can you store locations of pill containers based on color?

Think hard, and again, you are welcome to use either Lego Mindstorm or Cozmo, or both, to complete this task.