CAD Familiarization Part 3

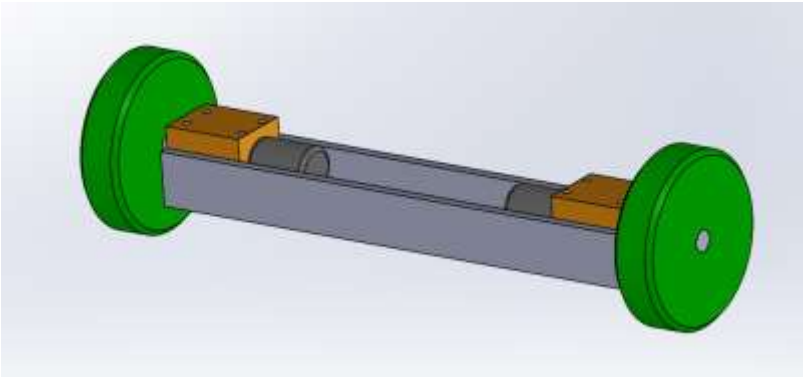
Objective
The intent of this assignment is to further familiarize students with the basics of CAD.

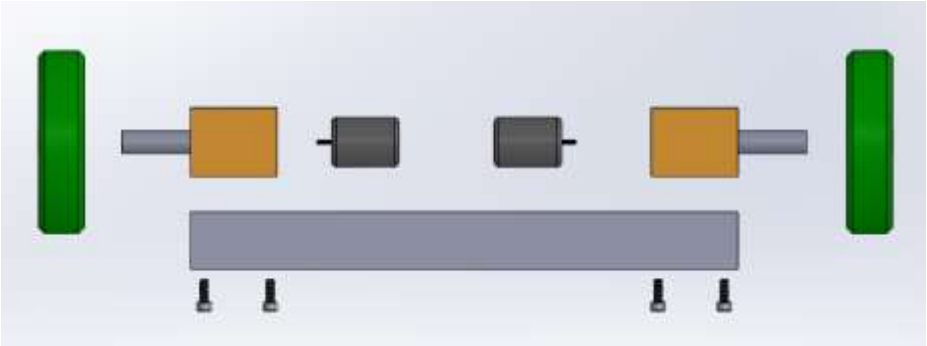
Prerequisites
You must have completed CAD Familiarization Parts 1 & 2 during the Systems Engineering course before performing the current assignment, which requires you to create a more complex assembly than before.

Activities
1. Work with a complex assembly of parts and mates.
2. Create working drawings for a complex assembly.

Deliverables
Deliver a set of drawings for the assembly that contains the following. **Please submit all drawings in PDF form, as one single PDF.**
1. Page 1: A complete parts list table, indicating in separate columns: item/line number, quantity, source/supplier, part/model number, and description. There should be a line number for each unique item to be referenced in the exploded view on page 2. Also include an isometric view of the assembly.
2. Page 2: Generate an exploded view of the model showing parts (numbered) and/or sub-assemblies (should be able to see approximately 5 separate parts). There should be leading lines representing the mating methods for each part.
3. Page 3: Provide a multi-view (3-view perspective, and cross-sectional) of your assembly. The cross-sectional should indicate a critical mating section.

The Assembly
You will need to find an assembly with **5 or more unique parts**. Try to use something that has a sensor, motor, and fasteners (to be as close to a robot as possible). For example, here is a basic robot drive train with 5 unique parts:





You have your choice of several options for this assignment:

- Replicate a robot drive similar to the one shown above. The parts used are:
  - P60 gearbox (datasheet attached to the assignment)
  - RS380 motor (datasheet attached to the assignment)
  - U Channel Chassis
  - 10-32 Bolts from McMaster-Carr
  - Custom 4" Wheel
- Any other robot from the lab, as long as it has 5+ parts.
- Your project. This assumes that your robot will have multiple parts and require assembly. This requires that your project be well planned enough to CAD the robot before the due date of this assignment.

Notes

- You do not need to use any specific piece of CAD Software. There are even open source platforms you can use if you're willing to deal with their somewhat lower quality.
  - You can access SolidWorks on the cluster computers or you can get a 1-year student license for $25 from the CMU bookstore.
  - You can use SolidWorks by:
    - Going to a computer cluster on campus: http://www.cmu.edu/computing/services/teach-learn/tes/locations.html, where any Windows cluster should have SolidWorks ready to go;
    - Installing Virtual Andrew (http://www.cmu.edu/computing/services/endpoint/software/managed-desktops/how-to/virtual-andrew.html) on your own computer, logging into the virtual machine, and executing SolidWorks from the virtual machine;
    - Purchasing get a 1-year student license for $25 from the CMU bookstore.
  - SolidWorks tutorials are here: http://www.solidworks.com/sw/resources/solidworks-tutorials.htm.
- Don't sweat the details. This assignment is intended for you to do a larger assembly representing something more real-world. If the parts assemble correctly and look accurate then the intricacies of the part, including very accurate dimensions, do not matter.
  For example, screws in CAD are often just represented with cylinders and a head, as below:

- Some good Dimensioning Style Guides:
    - http://www.pages.drexel.edu/~rcc34/Files/Teaching/MEM201%20L5-Fa0809-SpDimensions_RC.pdf
    - http://www.pltwcalifornia.org/view-content/61/Rules-for-Dimensioning.html
    - http://metal.brightcookie.com/2_draw/draw_t5/htm/draw5_2_1.htm
- A video on multiview drawings:
    - https://www.youtube.com/watch?v=Evgg0L4KMl8