LABORATORY ASSIGNMENT NUMBER 2 FOR CMPE 118

Due by 4:00pm on Tuesday, January 31, 2006
Pre-Lab Due by 5:00pm on Thursday, January 26, 2006

Purpose:
This lab is intended to acquaint you with:
- Using SolidWorks as a visualization tool.
- Developing parts in SolidWorks/CorelDraw
- Cutting parts using the Laser Cutter
- Working in Foamcore

Minimum Parts Required:
There is a selection of motors set out in the lab that you may use as the motors to develop your motor mounts. The motors are just for use as props in this lab. I want them back. Foamcore, 3/16” MDF, hot-glue guns, hot-glue sticks, eXacto knives, lots of blades.

Pre-Lab:
Complete the following exercises AFTER you have read through the lab assignment and BEFORE starting to work on the parts of the lab.

☐ Set yourself up at any workstation that has SolidWorks installed (all the machines in BE115 do) and follow the SolidWorks design tutorial available at:

http://www.me.cmu.edu/academics/courses/NSF_Edu_Proj/Statics_Solidworks/index.htm

Create the object described in the tutorial (truss); also become familiar with the environment.

In the report:
Include a shaded printout of the part from the tutorial.

Part 1 Designing A Simple Motorized Platform

Reading:
Fabulous Foamcore.

Assignment:
You are to design, capture the design and assemble a simple motorized platform. The platform should have a flat base made from two layers of Foamcore and it should carry two DC gear-motors and an H-Bridge Module (2” x 2” electronic part). The motors should be mounted to the base using motor mounts constructed of Foamcore. The mounts should attach to the base using ‘Tab in Slot’ construction. The motor mounts should provide more robust support than the simple planar design shown in class. The H-Bridge Module should be attached to the top of the base near the motors. Also mounted to the platform should be a 6” diameter 8” tall circular column, constructed of foamcore and centered on the base. Sitting atop the column should be a smaller platform, also made of foamcore. The platform should have the shape of a square box of about 1” depth and be centered on the platform.

☐ 1.1) Using SolidWorks (or any other drafting program, Visio, CorelDraw, etc.) to construct simple 3-D shapes to represent the base, motors, motor driver board, column and platform. Create an assembly of these parts to explore how they will fit together.

☐ 1.2) Using the Fabulous Foamcore handout, and a sharp eXacto knife (be careful!), build the foamcore box that will sit atop the platform. Use lap joints at the edges.

☐ 1.3) As above, build the foamcore column. Use a lap joint to close the column.

☐ 1.4) Figure out how you are going to attach the column to the base and to the platform. You may want to do this BEFORE you actually build them.
1.5) Using SolidWorks, create the parts necessary to assemble the motor mounts that you designed and mount them to the base. The finished base should be roughly circular with recessed cutouts to provide room for 4” wheels to be mounted on the motors. You will need to move the 2D shapes to CorelDraw for part 2 of this lab.

1.6) Using SolidWorks, create 3-1/2” wheels to be mounted on the motor shafts. These will need to be at least three layers of foamcore, or two layers of MDF. You will need to move the 2D shapes to CorelDraw for part 2 of this lab.

**In the report:** Include a printout of the model from part 1.1 and the individual parts from parts 1.5 and 1.6.

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**Part 2 Implementing A Simple Motorized Platform**

**Reading:** None.

**Assignment:** Take the design that you created in Part 1 and implement a prototype of the platform.

2.1) Using the laser cutter handout, to be distributed later, and you printouts from the above drafting part, to prepare your part designs for cutting using the laser cutter. (Note that the laser cutter is driven from CorelDraw, so you will need to get your parts into that program).

2.2) Have your output files reviewed by Rob, Eric or Gabriel.

2.3) Cut the parts from 3/16” MDF (Medium Density Fiberboard), using the Laser Cutter.

2.4) Assemble the parts of the platform. Do not glue. Demonstrate it to Rob, Eric or Gabriel.

2.5) Fit/glue the parts together (NOT the motors). Demonstrate it to Rob, Eric or Gabriel.

**In the report:** Include printouts of the SolidWorks/CorelDraw files that you created to help you cut out the foamcore/MDF.

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**Lab #2**

**Time Summary**

Be sure to turn this in with your lab report

This information is being gathered solely to produce statistical information to help improve the lab assignments.

**Pre-Lab**

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**Part 1**

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**Part 2**

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**Report**

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