Labsatory Assignment Number 2 for CMPE 118

Due by 4:00pm on Tuesday, April 26, 2005
Pre-Lab Due by 5:00pm on Friday, April 22, 2005

Purpose:
This lab is intended to acquaint you with:

- Using AutoCAD as a visualization tool.
- Developing parts in AutoCAD
- 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, hot-glue guns, hot-glue sticks, Xacto knifes, 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.

1. Set yourself up at any workstation that has AutoCAD LT installed (all the machines in BE115 do) and follow the AutoCAD design tutorial available at:
   
   http://www.3d-cadcea.co.uk/html/index3.htm

2. Create the object described in the tutorial also become familiar with the commands 3dpoly and pedit

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. 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. Using AutoCAD (or any other drafting program, Visio, 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.

2. Build the foamcore box that will sit atop the platform. Use lap joints at the edges.

3. Build the foamcore column. Use a lap joint to close the column.

4. Figure out how you are going to attach the column to the base and to the platform.
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1.5) Using AutoCAD, 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.

1.6) Using AutoCAD, create 3-1/2” wheels to be mounted on the motor shafts. These will need to be at least three layers of foamcore.

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

### 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 fabulous foamcore handout, and you printouts from the above drafting part, to prepare your part designs for cutting using a sharp Xacto knife.

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

- 2.3) Cut the parts from Foamcore (be careful with the Xacto knife).

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

- 2.5) Glue to parts together (NOT the motors). Demonstrate it to Rob, Eric or Gabriel.

In the report: Include printouts of the DXF files that you created to help you cut out the foamcore.

### 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.