

## ME 120 Fan Project – Part 1

Due 11 February 2016

This project is to be completed by a team of two students.

The fan project is 10 percent of the course grade. Components of the fan project are worth a total of 60 points with an additional potential of up to 15 bonus points. The point distribution for the fan project is as follows.

5 points	Hand sketches
20 points	Solidworks drawing for the laser cutter
15 points	In-class demonstration of fan operation
20 points	Documentation/presentation of fan design and operation
15 points	Bonus point potential for creative fan design and/or strong technical implementation.

A design with strong technical implementation (for bonus points) would have minimal use of glue, duct tape or other ad hoc fastening measures. It would have easy-to-use controls, on/off button(s), and a modest amount of bling (e.g. LEDs). The best bling is tied to necessary function.

The hand sketches (problem 1) are to be turned in, in class, at the start of Lecture 12.

**Solidworks drawings (problem 2) are due via the D2L dropbox *before* the start of Lecture 12. Don't forget to check the D2L website often after submission in case the TA needs you to redo your parts.**

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### 1. **Hand sketch.** (in teams of two but at least one sketch per person)

Collaborate with a partner to create the physical design of a structure for the desktop fan. Create at least two hand sketches (at least one per person) that show the physical features of the structure for the fan. The hand sketches should be simple, free-hand drawings that communicate the essence of the design. Use of a straight edge is encouraged, but not required. The objects in the sketch should be to approximate scale. This is not a CAD drawing. Rather, it is the kind of sketch an engineer might spontaneously draw to explain a physical object to another engineer.

Label the sketches with the names of both team members, along with the standard identification of the course number, assignment number and due date. This document also serves to identify your team.

The design of your desktop fan must satisfy the following criteria

- The entire apparatus must be safe, i.e., it should not cause physical harm to people.
- The fan must include the servo and DC motors from the Sparkfun Inventor's Kit (V3.2) and the propeller supplied by the instructor (2.5" to 3" in length).
- The main structural components must include acrylic pieces cut by the MME laser using Solidworks drawings submitted to the D2L dropbox.
- The structure must support the DC motor, which drives the propeller.
- The structure must support the servo motor, which causes the direction of the air flow to oscillate.

The structure should support the two motors and propellers and be adjacent to the Arduino and breadboard that provide the electrical power and control logic. The Arduino and breadboard do not need to be attached to the acrylic structure, but it will be convenient to provide a rigid base to which the structure and the electronics can be attached.

## 2. **SolidWorks Drawing** (one per team of two)

Complete a Solidworks drawing of the structural supports for your desktop fan. The structural parts will be cut from a 1/8 inch thick acrylic sheet. Start with the template that you download from the class web site (linked from Lecture 11), and follow the instructions given in Lecture 10. Make sure you use **ONLY ONE** acrylic sheet for your entire project (see below).

Each student team should submit a drawing via the D2L dropbox. To receive full credit, a Solidworks drawing that can be cut on the laser must be received in the D2L dropbox by the deadline written above. Any drawing submitted after the deadline will have a reduced score.

Drawings will be inspected before the parts are cut. If, in the judgment of laser operator, a drawing cannot be used for a cut, or if it does not meet other specifications (say for size limits) then you will receive feedback on the D2L site saying that your part was rejected.

If your part cannot be cut, then it is not considered "submitted" even if it was uploaded to the D2L site before the deadline. Therefore, it is in your interest to submit parts before the deadline so that any flaws can be corrected, and you can submit a completed drawing before the deadline.

In addition to common sense limits on the drawing and design, please make sure your drawings have the following features

- All parts must fit in a rectangular area that is either 6 inches by 3 inches, or 12 inches by 1.5 inches.
- Make sure that all edges to be cut are in the Cut layer. Those edges will be cut completely through.
- Do not leave annotations, dimensions or initials in the Cut layer.
- Within the 18 square inch area limit, you may include as many sub-parts as you wish. The sample design had two separate parts: one for the servo support and one for the DC motor support.

Save your Solidworks file with a name having the following pattern

**ME120\_fan\_parts\_Lastname1\_Lastname2.SLDDRW**

(Example: **ME120\_fan\_parts\_Smith\_Jackson.SLDDRW**) The file name *should have no spaces* in it. Use underscores instead of spaces. The SLDDRW extension is automatically added by SolidWorks.