Desktop Fan Design and Fabrication

Goal

Design, fabricate, assemble and test a small oscillating fan for a desktop.

Resources

Students use parts in their Sparkfun Tinker Kit, which contains an Arduino microcontroller, a breadboard, an assortment of electrical components and a small servo motor. The instructors will provide a DC motor, a propeller and acrylic material to be used to fabricate structural components of the fan. The acrylic will be cut with a laser cutter from two-dimensional Solidworks drawings created by the students.

Required features

1. The system must be safe. For example, there can be no potential for injury by touching spinning fan blade(s).
2. The fan should use the DC motor and propeller provided by the ME 120 instructors, and the servo motor included in the Sparkfun Tinker Kit
3. The orientation of the fan must oscillate back and forth up to 180 degrees (+/– 90°).
4. The fan must operate without requiring the user to directly interact with any computer code, for example by typing on the computer keyboard to specify the rotation angle or fan speed.
5. The user can adjust the fan speed (speed of the DC motor).

Extra points

- The fan can have an on-off switch and a second switch to start/stop the oscillation.
- The user can change the extent of oscillation (e.g. +/– 30°, +/– 45°, etc.).
- The final prototype has cool or entertaining features.
- The quality of workmanship (fit and finish) is high.
- The fan would be considered “cool” by people with no technical training.

Presentation

Bring the completed fan to class and be prepared to demonstrate it. Prepare a three minutes presentation that describes your design and that addresses the following points.

- The primary design objective for choosing the shape of your structure.
- The biggest challenge faced by your team.
- The one thing you would change (if you had more time and/or money) to make your fan design better.
- Advice you would give to a student who is about to start this project.

Documentation

One document per team is required. Your document should contain:

- A title page including your fan product name, the names of the team members, and the standard identification of the course number and due date.
- All the points addressed during the presentation (given above) with more details.
- A print out of the code used.
- At least one image of your Solidworks design/drawing, and at least one picture of your completed fan. Do not use screenshots for Solidworks images. Use the “Save As…” command to create a separate image (JPG, PNG or PDF) that you include in your word-processing document.