

## Team “Shades of Green” Pre-Proposal

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### Purpose

To regulate room temperature by automatically adjusting the blinds, in order to decrease the amount of energy used for heating and cooling.

### Overview

Appropriately-placed windows have been used since the time of ancient Rome to harness solar energy to heat houses. But when the sun goes down, it's nice to cover the window to insulate it against the cold outside. Nowadays we have window blinds, which help regulate temperature as long as they are properly adjusted, but it's easy to forget to adjust your blinds, and that's where this project steps in.

To decide when to adjust the blinds, the system will use a thermostat and a number of sensors (of temperature and possibly light) to tell whether opening the blinds will push the room temperature toward or away from the desired temperature. The unit will use a motor connected to a mechanical arm to twist the blinds open, shut, or somewhere in between. Also, it will be able to determine the state of the blinds on its own, so error won't compound to throw off the system. One way to do this self-calibration would be for the mechanism to twist the blinds in either direction until it feels a stopping force, recording how far it turns.

Of course, the user may want a setting different from the one the computer decides is optimal, so we will integrate a timed manual override that will shut off the computer for the desired amount of time. We will also allow the user to choose the time of day at which the blinds may first open, so the user won't necessarily have to wake up with the sun. Mostly with the intent to add some mechanical complexity, we will create a module to raise and lower the blinds at the user's discretion, or if that's still not enough, we could find a way to open the window, too.

In order to keep with the theme of conserving energy, we'll investigate the feasibility of using solar energy to power the unit. We'll build a unit that will work on unmodified Olin College blinds that should be easily adaptable to similar blinds in homes or offices. It should be unobtrusive both in size and in noise of operation, and should be easily programmable by the user.

These ultimate goals lend themselves to a tiered approach with a number of intermediary goals. Our first level would be to create a system that would measure the outside light intensity, compare it to the inside temperature and a desired temperature,

and open or close the blinds depending on those inputs. The next level would be making it so that the degree to which the blinds are open or closed depends upon the difference in temperature sensed. Next we would work on implementing a manual or time dependent override, so that it would be possible to shut your blinds when desired. At that point we'll have worked on the project long enough to have a better idea of what next step to take.