Project Title: **Proper Respect**
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EECS 149/249A Project Charter, Fall, 2014

Project Goal
This project will create a figure to place in a professor's office that, when the professor enters the office, will bow to show proper respect.

Project Approach
The project will model arrival and presence of the professor as a state machine governed by a combination of sensor inputs, focusing on the timing of entry and control of a robotic actuator. The goal will be to accurately detect arrival through a doorway and to time the reaction of the robot for maximum effect.

Resources
Our plan is to use the mbed FRMD KL25Z from Freescale as the processor core driving servos (either Bioloids from the stock in 204 Cory or servos from the Invention Lab supply) inserted into a stuffed animal of some sort. The first step in the project will be to identify a suitable wireless network and wireless sensors to use. One candidate is XBee (see http://developer.mbed.org/cookbook/XBee). The first goal will be to integrate a door opening sensor communicating wirelessly with the mbed. A second input will be a motion sensor attached directly to the mbed processor. Combining these two sensor inputs, we plan to realize a state machine that will attempt to distinguish between types of events such as "new arrival to an empty room," "opening the door to welcome a visitor into an already occupied room," and "departure, leaving an empty room." Time permitting, we will integrate additional sensors to improve accuracy.

Schedule
- October 21: Project charter (this document)
- October 28: Choice of platform finalized after discussion with GSIs.
- November 4: Statecharts simulation model with logic and timing for controller.
- November 11: Installed software for development, hello world servo control
- November 18: *Mini project update*: Demonstrate sensor comm and servo action.
- November 25: Measured sensor accuracy, modify simulation model.
- December 2: Actuation in response to door sensor, timing of network measured.
- December 9: System testing, measure false positives, assess timing effectiveness.
- December 16: Demonstration video made, powerpoint prepared.
- December 17: Final presentation and demo.
- December 19: Project report and video turned in.

Risk and Feasibility
There are many unknowns. Servos may be hard to control for natural movement. Parts leading to the easiest solution may exceed the budget. Network interfaces may be difficult to control, particularly the timing. Software may not port easily to the chosen platform.