Project Title: **Smart Pill Bottle**
Team: Joshua Goldberg, Gil Lederman, Vicenc Rubies Royo, Parsa Mahmoudieh
EECS 149/249A Project Charter, Fall 2014

**Project Goal**
The goal of our project is to create a smart pill bottle that can detect how many pills are left, automatically unlock when the prescribed individual is attempting to open it, and record adherence statistics.

**Project Approach**
We will create a state machine that will focus on detecting the user's presence as he or she attempts to open the bottle. We wish to accurately detect this event to unlock the bottle, and then detect when the bottle is closed and lock the lid. When the bottle is at rest, we will measure how full the bottle is and display this to the user.

**Resources**
We will likely use either force sensors or proximity sensors to measure the level of pills (or potentially liquid) in the bottle. We will use an accelerometer to detect when the object is at rest and sitting flat on its bottom, so that we do not take any measurements while the bottle is moving. We will fix LEDs to the outside of the bottle to display to the user the level of pills left in the bottle. To lock the lid, we will use a miniature actuator such as a solenoid or servo. Either the proximity of the user's cellphone in conjunction with attempted opening, or a thumb print sensor will be used to unlock the lid so that the bottle's contents can be retrieved. The mbed FRMD KL25Z from Freescale will likely be our microprocessor of choice to process sensor readings and control the LEDs and locking actuator. We will also use WiFi (ie TI CC3000) or Bluetooth (ie Bluesmirf) to connect to a user's phone to detect user's presence. We will also use this connection to send adherence data to a user so they can track their usage. If we use WiFi, the device will also be able to send data to a server so that a family member or doctor could monitor usage.

**Schedule and Deadlines**
10/31 – Sensor testing and selection
11/7 – Bottle design and construction
11/14 – Basic actuation and sensor reading
11/21 – Prototype testing and refinement
12/5 – Design state machine on mbed
12/12 – Build Android app and data transfer layer
12/17 – Presentation and final report

**Risk and Feasibility**
Ideally we will determine the exact number of pills, however given our budget and time limitation we may only be able to determine the level left in the bottle. Also, the locking mechanism may prove more difficult than expected because we lack significant mechanical design experience. Also, if we fall behind on our deadlines, we may not have time to build an Android app to record and display data to the user.