**Mini Vending Machine** By: Abraham Kuruvila   
 SID: 861150563  
 Email: [akuru003@ucr.edu](mailto:akuru003@ucr.edu)

**High level description of custom lab:**  
 A user will make a selection of what they want from an Android app. A Bluetooth module will communicate the user input to the microcontroller. The user then inserts the proper amount of money into the coin inserter. If the proper amount was inserted, checked by sensors, the system will dispense the appropriate selection using motors to spin a coil that sends out the selection. The system will mechanically filter out any coins that are not quarters.

**User guide:**

Once a selection has been picked on the app, the user must commit to it. They cannot pick another selection until they have paid, and the system has dispensed that item. Any input will be ignored by the system while it is waiting for the user to pay or if they system is dispensing an item.

**Technologies and components used in custom lab:**

* Atmega1284 microcontroller
* IR Sensor
* Bluetooth Module
* 3x Stepper Motors
* Samsung Galaxy S3 for Android App

**Link to demo video:**

<https://www.youtube.com/watch?v=4SXVJSBKhz0>

**Source Code:**

akuru003\_project:

<https://drive.google.com/drive/folders/0BwjR7EQeIi2sWUVWbTVGek5LYUU>

There is only one source code file for this project. In this file, there are 3 state machines. One state machine waits and receives the information from the user using bluetooth. The second machine checks to make sure that the user entered the proper amount into the machine. The last state machine makes sure the proper motor spins for the proper selection.

**Images explaining how components were connected to the microcontroller:**

Pictures:

<https://drive.google.com/drive/folders/0BwjR7EQeIi2sb1ZxYXJsSkd4Smc>

Breakdown of inputs and outputs on microcontroller:

Port A: Pins A0-A3 used for motor that moves selection 1.

Port B: Pin B0 used for input from IR Sensor

Port C: Pins C0-C3 used for motor that moves selection 3. Pins C4-C7 used for motor that moves selection 2.

Port D: Pin D0 and D1 used for Usart capability for bluetooth module.

Pins 10 and 11 along with pins 30-31 are used for Vcc/gnd inputs to the microcontroller.

Extra voltage source used for the motors.

**Cited Sources:**

No external code was used. I wrote everything myself.