**Problems**

**Plant Height Detection System**

Our initial design for the plant height detection system involved using a laser to determine the highest point that the plant blocked the light. The laser would sweep horizontally until it had scanned the length of the grow tray and then decrement vertically and perform the sweep again. However, this system turned out to be unfeasible and an alternate solution was required. We have now decided to determine the height of the plant by processing images acquired from a webcam using the Raspberry Pi. This benefits our project as we no longer have the space to fit in a scanning system as the dimensions of our project have changed. However, none of us have experience with image processing; subsequently, much of next quarter must be spent getting this to work.

**DHT22**

When we began work with the DHT22, we tested the chip using Arduino code provided by Adafruit Industries. However, when we implemented this code using Atmel Studio 6 and writing it in C, the sensor would not respond to our requests for data. After five different total overhauls of the code, we determined that too much time was being wasted on getting this sensor to work. Instead, we found a Python library that works well with the Raspberry Pi and got the sensor working within 20 minutes of programming.

**Door Restrictions of Our Enclosure**

Originally, we had a plan for a bigger enclosure so we can comfortably fit a 3x3 ft. grow table in our enclosure. We realized that in order to fit an enclosure through a door, we had to make it smaller. We decided instead to use a 2 x 2 ft. grow table, allowing us to make our enclosure a little smaller. With some careful measurements, Wayland’s dad helped us design an enclosure that fits through all standard doors. Additionally, wheels were added at the bottom, allowing the otherwise heavy structure to become mobile.

**Counter EMF of Pumps**

Once we had written code to get the water pump working, we tried testing it by connecting the power of the pump through a switch-relay that was controlled by our board. A switch was then flipped on and the water pump ran for the desired ten seconds of testing. However, once the timer shut off the pump, the switch (which was being read as “high”) went low for a millisecond and the system would reset itself once it acknowledged the switches true state. After researching relays, we determined that there was a harsh counter EMF that was being generated when the relay was suddenly shut off. In an effort to fix this error and protect our board from damage, we created a circuit that uses two diodes and a bypass capacitor to prevent most of the counter EMF. We also created new code to deal with this occurrence which doesn’t go back to the initialized “OFF” state without polling the switch a few seconds after the pump shuts off.