Final Report

What happened:

In this lab we built a thermometer measurement system prototype. The system consisted of a third box device to collect thermometer readings and a computer application for a user interface and to graph the data. For the third box we used a Raspberry PI microcontroller to read the thermometer, display the temperature in binary on the set of LEDs, and send data to the computer interface. The program in Raspberry PI was written in python. For the LED display and push button/power switch control, we used GPIO to detect the input signal and then output the voltage to turn on the LEDs. If we click the virtual button in the computer interface, it will write ‘True’ in the checkbutton.txt. The raspberry Pi will read the file and turn on the LEDs if it’s True. After we received data from the temperature sensor, we saved all data into savedData.txt and updated the last data to the datafile.txt. Every time when we write the temperature data, we also write the current time into time.txt. The time file is used for user interface to detect if the third box is off. Also, If we detect the temperature sensor is not plugged into the third box by reading the temperature sensor’s output, we will notify the user that there is an error condition by flashing all LEDs. The computer application was also done using Python. For the graphing we used the matplotlib library, for the GUI we used the tkinter library, to send a text message we used the twilio library, and to send/receive data to/from the Raspberry PI we used the paramiko library.

Who worked on what:

Graph building, gui button controllers: Cole

Circuit design and build: Pengyang

Thirdbox cut and construction: Pengyang and Yao ma

Tools carry in/out: Cole and Pengyang

Application UI design: Junyan

Software environment installation: Junyan and Pengyang

Circuit schematic design: Pengyang

Integration: The whole group

Application performance improvements: The whole group

Test procedure and other documentation: Cole and Yao Ma

Progress report: The whole group

Final report: The whole group

Success/Failures as a group:

For our group we did well on scheduling meetings each week. Usually we met three times a week to discuss our project and work on the project as a team. We usually met on monday, wednesday and friday around noon. Also, we attempted to make our group more efficient by discussing ideas regularly and making decisions early. For the next projects, we can make the discussion and decision process faster by beginning our project earlier to give our team more time to do deal with potential problems we don’t solved at beginning of the project.

As our team contains international students, we had some issue caused by cultural differences. And some issues on the communication methods we used, they were not that familiar to each team member.