

ECE597 Homework 3: Temperature Sensors and Etch-a-sketch

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Introduction

This report is going to give a brief explanation about homework 3: Temperature Sensors and Etch-a-sketch. On this assignment, the idea was a support for future uses, connecting and getting responses from temperature sensors, as well a deeper implementation of Etch-a-sketch program. Having all the actions being fully successful without big problems.

The Assignment

The idea of the assignment was to plug Temperature sensors on the protoboard and creating an interface with the BeagleBone get some responses back, showing the ambient temperature in Celsius and in Fahrenheit as well. One of the most difficult parts of this assignment was the hardware connection, since all the sensors use the same bus, the i2c bus from the board, saying that this was the hardest part doesn't mean that it was extremely hard. Using only some connections and analyzing the datasheets of the BeagleBone as well of the sensors, it was easy to determinate were each connection should go. Using only some jumpers, resistors and the sensors, it was pretty straight forward to do it.

On the software part, using shell scripts to get the responses from the sensors was really easy, only some commands and all the responses were showing in the screen. To do the program to set the limits of the temperature of the sensors and to get the temperature, the easiest way, and the way I chose, was to write a JavaScript program that has as function to call the shell script, on determinate ports/pins, so it will show and set the information properly.

To the second part of the assignment, the Etch-a-sketch, connecting the bicolor matrix of LEDs was similar with the setup made for the temperature sensors, so it was easy to do and really fast the matrix as being turned on and off for tests. So the new idea here was how to interface with that, using the Etch-a-sketch created to homework 1 and deeper developed on the homework 2. A fun thing about it is that since the beginning of the development of this program 3 programming languages were used, at homework 1 a simple C program was written, but for the homework 2 the better way of doing to interface with buttons was with JavaScript, so all the code was redeveloped on JavaScript, and now for the third homework, the best interface, using some built libraries, is using Python, so again, all the program was rewrote in Python.

Even with this change in programming languages, the code was easy to do, since the idea was the same, adapting to Python was straight forward and the new features were most coded using inbuilt libraries. This way, with only adding some lines to the original code, it was created the Etch-a-sketch with a bicolor matrix of LEDs using buttons to 'walk' and light up the LEDs. The idea of using this code to different matrix sizes is a persistence idea, with only small changes in the code, it can be adapted to any size matrix wanted.