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CS320

5-5-17

Individual project report

My individual project was about learning the basics of microcontrollers and to then create a simple project with that knowledge and various sensors. I decided to use an Arduino Uno board and make something like an amateur weather station, in the sense that the board would have sensor modules attached that let the Arduino sense the environment around it, and output an analysis to the attached LCD screen I borrowed from YCP.

My original designs called for the abilities to sense temperature, humidity, ambient and direct light, ambient air pressure, and wind speed. The program I wrote for the Arduino would take in all that information, and construct a crude analysis of the weather around the device, i.e. night, cloudy, windy, bright, etc. The analysis would then be written on a screen along with the labeled raw data. However, as with all projects, plans have to be modified as you progress along. For example, barometric pressure sensors were a tad out of budget range so that capability was cancelled, and I had to borrow a screen from another YCP professor for the same reason. Wind speed didn't make it into the final project either, because I didn't have the time or materials to construct the cupped rotor on ball bearings, despite having the sensor for inside the contraption. The full weather forecast dwindled into max and min statistics for each aspect sensed, such as the temperature and ambient brightness, due to not having enough diverse data input.

The most frustrating aspect of this project, besides being unable to complete my original design, was the one error I was getting towards the end of the project. It took me 2 days to figure

it out, but it turns out that variables defined in the “setup” method do not persist to the “loop” portion of the code. Getting the Screen to work was pretty hard too, since I had to scour a lot of documentation to understand how to input the commands properly. On the other hand, the most satisfying thing about this project was when I finally got the screen to display properly, because that meant the rest of the project was just coding what to do with the data inputs which is the part I’m most comfortable.

From this project, I learned the interactions between the physical hardware and the higher-level code. I can apply this knowledge to future projects where other physical components are interfaced. I also learned that physical components need attention, and can potentially be the source of errors instead of the code, for example the photoresistor sensor chip being installed backwards. That gave some really weird data until it was corrected.

I feel like I should get a 93% on this project. Some parts were easier than expected, and some were more challenging. However, ignoring the details of the actual project, the assignment was to put in effort to investigate and learn about something related to computer science previously unknown. I feel like I have accomplished that goal and can confidently say I’m walking away with a decent package of new information about the computing world. I would like to give myself a 100%, but I realize I could have adapted my designs to include another new thing, like a motor for example, so I feel that a 93% is a more fair number for my actual results.