

Peter McCarthy
Sewanee: McGriff-Burton Math and Computer Science Internship
Summer 2014

During the Summer of 2014 I interned with Sewanee's Computer Science department working on wireless sensor networks. I spent many hours sitting in front of a computer writing code and debugging it, but I also got to create the sensors that I used throughout the projects. Computer Science is not just writing code, it includes hardware as well. Computer Science is the foundation for many things that people use every day that I believed were simple, but are quite complex. I worked for six weeks on projects that moved me in steps towards more complicated networks. This internship gave me the opportunity to understand the amount of work it entails to create technology and it confounds me how people at top corporations (Apple, Google, Microsoft, Intel, IBM, etc) create new ideas and build them in a way that all people can use them.

My internship with Professor Stephen Carl allowed me to do almost all the work, along with some supervision when I could ask him for help if I got stuck. This made me think about all the aspects to create the wireless networks. While I was working I noted all my information on a website: http://dokuwiki.sewanee.edu/doku.php?id=arduino:wireless_sensor_networks_2014

By using this website I kept track of my work which allows future students who intern with Sewanee's Computer Science Department to use the information for help. For example, I used Marcellin Nshimiyimana's website for help:

<http://arthur.sewanee.edu/marcen0/HTML5T/arduino/index.php>

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This internship taught me discipline and the ability to concentrate on a project for a long period of time. I learned more about my working habits and when I am most productive. The knowledge that I gained about myself will allow me to become better at computer science.

I have worked on computer science projects before, but nothing tested my patience and my persistence like these projects. Each project that I completed helped me move toward more complex networks. The projects that I completed/attempted were: Set-Up and Test, Push Button Control, Led Switch, Binary Die, Dice Game, Temperature, Twitter Temperature, Time Server, Sending Email, Email, Infrared Sensor, Burglar Alarm, Temperature, Humidity, and Dew, Chatting, Doorbell, and XBee Temperature. Each project needed its own code and its own hardware set-up. Some needed two computers, the internet to interact with, and power that came from a computer or battery. The projects tested my knowledge of coding, hardware, and my ability to understand how hardware works with software.

The projects did not always work out the way I wanted or how they were described to work. I solved many of these problems and others I did not. The problems that I ran into are on the Bugs, Obstacles, and Issues page of my website. For example the first problem that occurred was that Mac OS X Mavericks has a new usb driver that breaks communication between DMXIS/D-PRO and any Enttec USB-DMX interface. The computer was not able to work and communication with the Arduino hardware that was connected to the computer through the usb port of the computer. This stops the Arduino software and the application Processing to communicate with the Arduino through the use of a serial terminal. Without a way for the

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Arduino to communicate with the computer, the device is not able to work and programming the device is not possible. After resolving this problem I was able to move forward in the development of the wireless sensor networks.

Technology moves at such a fast rate that even some of the solutions that I found at the beginning of the summer are outdated now. This is what makes technology so much fun and the study of computer science to be so interesting. The evolution of even small technologies like wireless sensor networks that work on big scales today are changing so quickly that it is hard to even imagine what can even be next.

One example of a project that I did that everybody uses is the temperature program where I found the temperature with the sensor and then sent it to a website to show the numbers and a graph of the temperature over time. This seems extremely simple because we use it every day, but is actually quite difficult setting up the sensor and coding it to send the information to the page on the website and having enough code so that the website knows what to do with the information. Things that we think are simple that we take for granted are actually quite difficult to code and create.

There were many points throughout the internship I wondered if this project was even possible to be done. There were times when I sat in front of the computer for days looking at code trying to figure out why it would not work. I knew that the hardware would work, but the code for some reason would not. Many of the times the problem was the fast upgrading of how hardware accepts code and what languages the compiler accepted as good code. The problems

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even sometimes went the other way when the code worked, but the hardware did not. There were many times on the website where I say that you cannot use this line of code and it has to be changed to this because the software compiler does not like it anymore. These problems tested my knowledge and taught me a lot that will help me become a better programmer.

This internship showed me I want to major in computer science. I still don't know if this is the type of computer science that I want to do for a career, but it showed me that I enjoy this and that I want to do more. This internship was a great experience and it taught me a lot and showed me that computer science is truly what I like to do.