Doug Miller’s Coop Summary, Lutron Electronics Co., Inc.

Introduction

For the second term of my Coop, during the summer of 2011, I worked at Lutron Electronics Co., Inc. Located in Pennsylvania’s Lehigh Valley, it is just over an hour north of Philadelphia, two hours from New York City, and three hours from Ithaca. Lutron Electronics, incorporated in 1961, is a world leader in lighting solutions. Still a privately held company, it began by selling the world’s first solid-state dimmers and has since grown to offer a broad range of lighting solutions, from its stand-alone wall box dimmer to scalable whole building systems and everything in between.

Co-op Work Assignment

I was assigned to the Commercial Systems team. The Commercial Systems team supports and develops products for use in the commercial market. These products provide smart lighting solutions in places like schools, libraries, and office buildings. My specific job function was programming these smart lighting devices. The team includes both software developers and hardware developers.

Every morning began with a scrum, a stand up meeting in which all of the team members discuss their previous day, their plan for the coming day, and any information pertinent to the team. As a team member, my main responsibilities were to implement any assigned projects and perform bug fixes with any leftover bandwidth.

I worked on a number of projects for the Commercial Systems team. My first major feature was improving the code of one of our products to utilize a new frequency band. This addition would allow us to enter new markets. Eventually this project also included hygiene tasks to make it easier to retrieve the code from the Lutron source code repository in addition to various bug fixes and code improvements.

Another project I worked on was supporting another one of our devices to use a new RF demodulation chip. This chip goes between the wireless antenna and the microcontroller to turn radio signals into data the microcontroller can read. A lot of my work involved seamlessly getting the build environment to work correctly while switching between the two different radio chips.

Finally I worked on an issue in which one of our products was overheating under certain circumstances. Working closely with one of the full time hardware designers on our team, I came up with and ran a number of tests to characterize and diagnose the problem. After these I wrote the design specifications and implemented a solution to the overheating problem in software that was able to save the units from overheating in the field.

My training was mainly by immersion. Although I knew much of what I already needed to know from my previous coop term in the fall, I had plenty of support from my supervisor. As I continued working I was able to function more and more independently. I had no trouble getting questions answered; I sat right next to my supervisor and my other team members were
knowledgeable and helpful. Lutron also has a number of classes to teach Coops about Lutron products and the way that Lutron operates. These classes are useful and educational.

Assessment of Learning and Development

My work was very similar to what I have learned about in class. While it leaned towards the computer engineering side of electrical and computer engineering, a number of skills I learned as an ECE were valuable during the coop, especially from ECE 2100, CS 2110, ECE 3140 (Embedded Systems), and ECE 3150.

The coop influenced both my professional and personal development. Professionally I have gained a much great skill set including: C, RTOS design, systems, analog circuits, documentation, business etiquette, source version management, coding best practices, and agile software development. Professionally and personally I have enhanced my communication skills, become functional within a team, been able to defer to authority, and realized that it is ok to not have all the answers.

Life Outside of Co-op

Lutron provides partially subsidized housing to coops. On a previous term I lived in a ranch style house with two other coops that was a two minute walk from work. This summer I lived in 4 bedroom apartments that Lutron subletted from a local college. We each had a room to ourselves. Both of these housing situations come with a kitchen, bathrooms, furniture, desks, chairs, lamps, TV, etc. and are fully furnished including cookware and appliances. The apartments were twenty minutes away from the work location.

Lutron organized a few social activities for the coops. Those events included a mini golf event and in previous terms go-kart racing at a local go-kart track. There was also a mixer with senior management including the company owners. The coops themselves organized a number of their own events. This was facilitated because of the close proximity in which we lived together in company housing. Lutron also provides an activity stipend that the coops are free to use towards any kind of activities that they would like to spend it on. Lutron also offers intramural sports such as basketball and volleyball for those that want to exercise in a group environment outside of work.

Evaluation

One of the best features of the job was being able to get an in depth experience with one of Lutron’s products. I was also able to use knowledge of transistors and other circuit properties to aid in my diagnosis of circuit problems. Another neat aspect of the job was the fact that nothing was the same every day. Working on a large system, new opportunities, bugs, and issues arose constantly. What I was working on from week to week could change drastically.

Probably the most difficult part of the job is getting over the learning curve that comes with a new code base and learning the structure and methods of operation of a new system.
**Additional Info**

I would recommend taking advantage of Lutron’s coop shadow program. The program offers you the ability to shadow and visit with almost anyone in the company for half a day. This allows you to shadow engineers in other disciplines or even other divisions of the company.
Job Summary

I was assigned to the RadioRA 2 GUI team at Lutron. RadioRA 2 is a wireless lighting control system for residential homes. The GUI is a desktop application that dealers use to program all of the devices and components that are part of the system. My primary project was to develop a tool in the GUI that supports the "Tweaker" interface. Tweaker is an interface that allows homeowners to make programming changes to their home lighting control system and allows dealers to sync these changes back to their project files. The next release of the RadioRA 2 system will include an iPad application that homeowners can use to make these changes (e.g. the time when certain events occur, the fade and delay duration of a light fixture, the light or shade levels programmed to a keypad button, etc.). When dealers go back to service a home after the initial installation, they will need to sync these homeowner changes back to their software. This syncing tool was my primary assignment.

My first two weeks at Lutron were spent working on various exercises to become familiar with the software framework. The GUI followed the Model-View-ViewModel design pattern for WPF applications. My training involved working with C# programming, WPF, and SQL Server. After completing the practice exercises, I spent the next 2 months working on my primary project. Due to the nature of my assignment, I spent a good amount of time coordinating with the iPad and embedded development teams. This allowed me to gain a broader knowledge of the RadioRA 2 product and its underlying communication protocols.

Regarding its infrastructure, Lutron has a well-organized and large co-op program. Every co-op is assigned a supervisor and a buddy. The supervisor is an individual who works on the same team as the co-op and provides technical instruction and guidance throughout the work term. My supervisor was easy to get along with, and I felt very comfortable approaching him with questions about my assignments. The buddy or mentor is an individual who is usually not on the same team and is there to provide non-technical support, such as helping you adjust to the new working environment. Lutron provides a monthly buddy lunch where you and your buddy can go out and discuss how things are going. I found that this was a good opportunity to discuss non-work related topics such as upcoming local events and after work activities.

In addition to the supervisor and buddy pairing, there were a number of opportunities available to learn about the company and to network with co-workers. Throughout the work term, Lutron held new employee orientation events where presenters from different areas of the company came and talked about their department, what they were working on, and how their department fits in with the company as a whole. These presentations helped me understand Lutron’s corporate goals and how it operates. Along with the new employee orientation sessions, Lutron organized other events that co-ops would find beneficial. Some of
these included a networking event with senior management (where co-ops got the chance to meet the owners of the company, Mr. and Mrs. Spira, and other high level executives) and an engineering conference where different teams came forth and presented their current research and work.

Life outside the co-op was pleasant. Lutron provided partially subsidized housing that is located within minutes of the company’s campus in Coopersburg, PA. It came fully furnished with just about everything you can think of – brand new bedding (sheets, comforter, mattress cover), towels, couches, a dining table, a television, cable internet, dishes, pots and pans, cooking and eating utensils, etc. If there were any necessities missing from the house, Lutron was willing to subsidize the cost of purchasing them. Lutron also generously provided co-ops with a $75 entertainment allowance to encourage interns to go out together and explore the Lehigh Valley. Because Lutron has its own co-op program, there are always other interns working there to spend time with after work and on weekends. There wasn’t much to do in Coopersburg itself, but there are many nearby towns and cities to visit. I would highly recommend bringing a car to get around because there isn’t any public transportation. However, if this is not possible, you can still get around. Within walking distance of the Lutron housing, there is a large grocery store as well as a few restaurants.

Overall, I was very pleased with my co-op experience at Lutron. The company has a unique culture that focuses on teamwork and collaboration. Although there are various engineering teams, they all work closely together to develop high quality and innovative products. The company also takes care of its employees through training programs, facility tours, and other benefits. There are also opportunities to work in different areas and projects unrelated to the position that you initially applied for. If given the chance, I would definitely go back and work for Lutron again.
A. Co-op Work Assignment
During this work term, I was assigned to the Clear Connect Translator (CCT) Embedded team. My primary responsibility was to design and implement a serial bootloader for a Freescale HCS08QE128 microcontroller to support firmware updates. In addition to this, I worked on implementing a Linux application to master the firmware update process from an ARM processor. These projects involved the following technologies: the Freescale S08 architecture, the P&E hardware debugger, Linux system programming, and C/C++ programming.

In terms of training and supervision, I worked directly under a primary supervisor on my team who was always up to date with the work I was doing. The CCT Embedded team held daily meetings, where each team member provided updates on the progress and status of his or her current task. Through these meetings, discussions with my supervisor, and design and code reviews, I was able to continuously receive feedback from my co-workers.

B. Assessment of Learning and Development
Lutron is a great place to work if you are unsure of what career path you want to follow. The company’s co-op program encourages students to join different teams each time they start a new work term. For instance, I was a part of the RadiOLink team as a C# programmer during my first co-op term at Lutron. And this summer I transitioned to the CCT Embedded team and worked on projects that involved lower level programming and working with hardware tools.

In addition to Lutron’s work assignment flexibility, they also provide opportunities for engineers to learn about other disciplines. Co-ops are given the opportunity to shadow a full-time employee in any field that they are interested in. This summer I spent a few hours with a power systems engineer because I was interested in learning more about analog circuit design. The shadow program also extends beyond engineering. Other co-ops have shadowed employees in Lutron’s sales, marketing, and legal departments.

C. Life Outside of Co-op
Obtaining temporary housing is easy, since Lutron provides partially subsidized housing for co-ops at a very reasonable rate. During the fall and spring work terms when there are fewer co-ops, Lutron places the interns in houses that are right next to the company campus (within 5 minutes walking distance). In the summer when there are many more interns, Lutron also rents apartments that are within 20 minutes driving distance. Bringing a car is highly recommended, since there is no public transportation in Coopersburg, PA. But if that isn’t an option, there are usually plenty of other interns who carpool to work.
The co-op program at Lutron is very well-developed and exists as an integral part of the company's culture. Because of this, there are plenty of activities for interns after work and on the weekends. Some things include: mini golf, bowling, kayaking, volleyball, basketball, rock climbing, movies, concerts, and barbeques. There is never a lack of things to do or people to hang out with.

D. Evaluation
My co-op experience at Lutron was great. I gained valuable experience as an embedded engineer and was able to network and discuss career plans with co-workers and members of senior management. Working there gave me insight on how professional teams approach project development and has helped me plan important aspects of my future education. For potential co-ops, I would highly recommend applying to Lutron Electronics. The company has a unique and dynamic culture that is especially beneficial for student interns who are looking to gain a broad experience in different areas of engineering.