Project Conclusion

Introduction
The ELEC 5200, Computer Architecture, Fall 2010 semester project as a whole went well. This project presented an amazing opportunity to learn a level of detail about microprocessors that was heretofore unimagined. Being given a basic series of steps, in the form of project parts, gave me a fantastic foundational understanding of the design, implementation, and operation of microprocessors, and of computer operation in general.

Discussion
The first part of the project was, for me, the most challenging. I had never considered the number of design decisions that were required to create and implement an instruction set architecture. However, being the most challenging part also meant that I learned the most from this part. I found that creating an instruction set architecture requires an inherent understanding of processor operation.

The next three parts, designing and implementing the datapath and control units were also challenging. However, having taken the mindset of ‘not reinventing the wheel’, I was able to accomplish these steps without too many setbacks. Again, I learned a great deal about the overall operation of processors and the intricacies associated therewith. The primary lesson being how a processor breaks down an instruction into a series of mathematical operations.

Synthesis, the last step, did not work for me. I attempted over multiple days to synthesize and test my design on hardware. However, various compiler and synthesis tool problems (not to discount the operator-error attribution) prevented me from being able to do so. I was still satisfied with my design though, as it performed flawlessly in simulation for the various programs and instructions it was asked to do.

Conclusions
Given the opportunity to complete this project again I would only ask/recommend a couple of changes. First, that more class time be dedicated to discussing the project and whatever problems or concerns are associated with it. Often the professor would ask for feedback about the project, but this was done only on an informal and impromptu basis. It is my opinion that time be specifically structured into the lectures to accommodate the project since I felt I learned equally from the project and lectures. Finally, I would recommend using
different synthesis tools and design software if that is an option. I understand that our current tools are based on price (free) and availability of hardware. It is, though, my recommendation that an effort be made to find a more suitable software package. Doing so may enable students to learn more from the project by preventing them from spending time dealing with cumbersome software.

Overall, this project was a great learning experience and even somewhat enjoyable. I would gladly do this project again and recommend that any who take this project do so with an eye toward learning.