What did you learn from this project?

I learned how processors work, primarily. Previously I only had a loose understanding of them, and assumed they were endlessly complex, much too complex to build in one semester. As it turns out, while they aren’t simple, they are just a lot of simple components working together in clever ways.

I also learned how computers with different processors can run the same programs. Software is very interesting to me so I was glad to learn more about assemblers and compilers.

What would you do differently next time?

The main thing I would have done differently is to rethink my instruction set. I included both a jump and a jump and link instruction, but if I had it to do again I would only include a jump instruction. Since we only had 16 instructions to work with, that instruction could have been far more useful elsewhere, perhaps as an addi instruction.

What is your advice to someone who is going to work on a similar project?

The best advice, I think, is to make sure to do single cycle, as the others seem sure to get out of hand quickly.

Another piece of advice is to make sure to give a lot of thought to your instruction set’s limitations. For example, it is easy to accidentally create a branch instruction that can only branch eight instructions in either direction by only giving that part of the instruction four bits. I probably would have done this myself if I hadn’t received this advice myself from someone who did.

Lastly, make sure not to procrastinate. Work on it a little bit each day and you will have time to correct mistakes before the due date, as well as never feeling rushed.