CPU Design Project- Part 6

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1. **What did you learn from this project?**

This project give us an opportunity to learn some basic knowledge about computer process unit, and let us do some design about CPU. In designing datapath we learned how dose machine code transfer data in computer, and how to realize instruction functions. And in control unit we know the details about CPU works and how to coordinate hardwares in CPU to do correct action about every instructions. Doing this project also help us learn VHDL and get familiarized with the tools Modelsim and Quartus II. Except for those basic CPU knowledge, language and simulation skills the most important is that through the six part project we can learn how to do a design work step by step.

**(b) What would you do differently next time?**

If we have chance do this project again , we will try to implement it with a pipeline datapath, which is more efficient in long programs and would offer improvements over single and multicycle architecture. Also, we can add another ALU, comparator and other hardwares to decode stage so that some branch instructions can require less clock cycles. Besides, we would like to design a better ISA, so that it would be more convenient for us to design the datapath and control unit.

**(c) What is your advice to someone who is going to work on a similar project?**

To complete this project well, first it is better to read the whole parts of design requirements and then chose suitable instruction set for the first part of the project. If the instruction set is complex, the design of datapath and control unit is more difficult and it may cause more troubles. And second is learning VHDL by oneself as soon as possible. Another, it is good to test each component in the board after simulating it. It could help to verify the simulation of the each part components in the datapath. The beginning could be hard and time-consuming, especially if you haven’t known and haven’t worked on VHDL or Verilog before. But trying to learn the new language and to solve kinds of troubles, this project will be a good experience in your study.