**CPU Design Project – Part 6 – Hardware Implementation and a Working Processor Demo**

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

By doing this project , I choose multiple cycle ,I am enchanted by the filed of computer architecture. We learned Von Neumann architecture by designing memory. We learned knowledge about the component of CPUs, and designed multiple cycle datapath which is more efficient and consume less energy than the single cycle. We also finished the datapath diagram with the hazard control. we implement the control unit and add hazard detection into the datapath. And we write VHDL code and test VHDL models of each individual component. We also learned how to write top-level, the top-level work with a single memory. By using modelism we simulated the whole CPU which can fulfill all the tasks that are needed. In the last part we use quartus to compile, simulate and run on the FPGA .

**What would you do differently next time?**

This time , we designed multiple cycle datapath and run on the FPGA. Nest time , I think I probably would prefer to try pipeline datapath which is more interesting and efficient, however, it would be more challenging. This time we finally worked as a team to work this project out , next time I prefer to do it myself to see if I can get this done by myself. But to be honest, I really appreciate that team work is permitted because team work is much more efficient than single work.

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

First, we strongly recommend that the one who does this project should record the alternation and every chance. If the alternation and change are not carefully recorded and the error cannot be fixed, it is hard to return to its original status without reprogramming everything.

Second, we are strongly recommend that one should learn the VHDL ahead of time, because the VHDL is used in many part of this project and it takes a lot of time to write and compile the code without errors for the starters.

Third, we recommend new students to choose multiple cycled implementation, because the multiple cycle is of significance in this course. Doing is project of multiple cycle can help us understand the knowledge better. The multi-cycle is more complex than the single cycle, so if one mater the multiple cycle, he or she will also find it is easy to mater single cycle or multicycle.