

Processor Design CS 3220

Real Project 3 Report

**Yoel Ivan
Partner: Wenduo Yang**

Approach

Our approach to this assignment is to divide the work by stages, each person worked on one stages. On this project, we mostly just adding a buffer, decides what signal need to be passed into the buffer, and did some rewiring. We decided to immediately implement the processor with forwarding since it sounds easier than having to stall and creates bubbles, and it indeed requires less change to the design which means less bugs. After the coding part, we tried to use SignalTap to debug our design, but it did not works and we decided to just use modelsim and LED's.

Problems

First problem we encountered is when we noticed addition was sometimes done multiple times even though there is only one instruction. The cause was ForwardingUnit always forward even when it was not supposed to. We fixed it by adding a one bit input, so the ForwardingUnit also take account the write enable signal. Another problem is somehow the design works perfectly on the modelsim, but when programmed into the board, nothing happened. We fixed this problem by downloading a fresh copy from T-Square and replace all the files we changed. With the fresh copy, we able to get the design the correctly compiled into the board, but it still does not executes correctly. We fixed the problem by

extending the reset period and downclocking the clock frequency. Basically the main problems are the clock frequency, which made us debug for hours.

Contributions

I wrote the code for the second stage of the pipeline and the forwarding unit, and also debug the design.