CSE 471 Autumn 1998

Computer Design and Organization

Project Part I

This project is to be done in groups of two.

The first part of the project will be to extend the pipeline program whose code can be found on the Web page. On the Web page, you also have copies of slides that explain the most important features of the code. Recall that the code is a faithful rendition of Figure 6.30 page 470 of H&P Second Edition.

Part I of the project will have 4 subparts.

All additions/modifications that you make to the original pipeline.v code should be thoroughly commented. Otherwise, your project won't be graded

1. *Understanding the pipeline.v program*
Of course this is mandatory if you want to proceed any further! In particular, using either interactive mode, or system statements such as "$display", or simply following the code, look at what happens when you have data hazards and branches.

You don't need to turn in anything for this part.

2. *Implement forwarding in the pipeline*
After this implementation, the only stalls due to data hazards should be when the result of a load is immediately needed by the following instruction.

Figures 6.43 and 6.46 in H&P, as well as the text in 6.4 and 6.5 should help you for your implementation.

This subpart is due Monday November 23rd

3. *Move the branch target computation in the ID stage and the branch detection in the EX stage.*
Do NOT use the implementation of Figure 6.51 which resolves the branch during the ID stage and which is slightly flawed. The Zero test should be done during the EX stage.

This subpart is also due Monday November 23rd

4. *Add a BTB to your pipeline*
The specs for the BTB are those for the *btbcon* module of Assignment #2. Of course, you might have to clock it and you might want to change its interface to the pipeline. This subpart is left "underspecified" on purpose.

This subpart is due Wednesday December 2nd

Part II of the project will be handed out shortly.