

Computer Design and Organization

Project Part I

Keep the same groups as for Assignment #3.

The first part of the project will be to extend the pipeline program whose code can be found on the Web page. 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 3 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. *Implement forwarding in the pipeline*

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.

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 (but see page 488 of H&P and Ex 6.20 for a load followed by a store).

This subpart is due Friday February 18

2. *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 Friday February 18

3. *Add a BTB to your pipeline*

The specs for the BTB are those for the *btbcon* module of Assignment #3. 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 Friday February 25

Part II of the project will be handed out shortly.