EC413 Lab – Single Cycle CPU

Overview

The purpose this lab is to learn in-depth how a CPU works. Given the basic single-cycle MIPS CPU, you will add, debug, and test several new features.

Tasks

1. Synthesize the project and generate outputs for the given instruction sequence. [Pre-lab]
2. Add instruction SLT. Hint: you only need to modify the ALU and ALU control logic.
3. Add instruction ADDI. You do not need to general support for I-Format ALU instructions. Hint: you can do this without adding any new hardware, i.e., just by modifying the control.
4. Add instruction J. Use the implementation in the text. [Start in pre-lab]
5. Add instruction BNE.
6. Add instruction LUI.

Extra Credit

Implement I-Type versions of the ALU instructions.

Report

For each task, describe what you did. If you added hardware (BNE, LUI), submit a modified diagram.