

Homework 4
Datapaths
Max Points: 45 points

Directions

This assignment is due Thursday, October 20 for all three sections. Submit your solutions on a separate sheet of paper. You may use SPIM and a calculator as required.

Learning Objectives

In the process of completing this homework assignment, students will develop their abilities to

- Design datapaths to support machine language instruction sets by specifying the interconnections between components and the behavior of the associated control units.

Problems

Figure 5.28 of Patterson and Hennessy, which is a datapath that supports multicyle implementations of most R-type instructions, as well as `lw`, `sw`, `beq`, and `j`, is posted on the course ANGEL site as a PDF. For each of the MIPS instructions listed below, print a copy of the datapath and modify it so that it supports the RTL descriptions of these instructions that are provided in the solutions to Homework 3 posted on the course ANGEL site.

- a. [10 pts] `jr`
- b. [10 pts] `sll`
- c. [10 pts] `lui`
- d. [5 pts] `mfc0`
- e. [5 pts] `mtc0`
- f. [5 pts] undefined instruction