

Overview Document: Multicycle Design

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Because different instructions have different datapaths and each datapath takes a different amount of time, we extended the UST-3400 to a multi-cycle design. The clock of the multi-cycle is 5 times faster than the clock of the single-cycle. We created a counter for the number of cycles and set each instruction to add the specific amount of cycles it takes to execute (specified in the project description). To run, we sent assembly code through our assembler to obtain the machine code. Then, the machine code was passed into the multi-cycle simulator and produced the results. We then calculated the speedup by finding the execution time of the multi-cycle and single-cycle (see Performance Analysis).

Difficulties:

The most difficult part of this project was writing the assembly code to test the simulator. We overcame this by using loops to heavily run the instructions we wanted to dominate the cycle count.

Shortcomings:

There are no shortcomings that we are aware of.