

Project 3: Designing a 32-bit CPU

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1 Introduction

This goal of this project is to design a stripped down version of the MIPS processor. The processor will be a 32-bit version of the processor discussed in class and the text book, however, its instruction set will be a small subset of the MIPS processor's full capability.

OpCode [31:26]	Function Field [5:0]	Instruction
100011 ₂	—	lw
101011 ₂	—	sw
000000 ₂	100000 ₂	add
000000 ₂	110000 ₂	sub
000100 ₂	—	beq
000001 ₂	000001 ₂	nand
000010 ₂	000010 ₂	andi
000011 ₂	000001 ₂	or
000011 ₂	000010 ₂	ori

Table 1: CPU Instruction Set

2 Design

2.1 Architecture

2.2 Behavior

3 Analysis

4 Simulation Results

5 Conclusion

The design and implementation of an 32-bit CPU was a success. An architecture was designed and a behavior was successfully put into practice. All requested functionality was achieved. This 32-bit CPU can now be used in further projects.