Documentation of MIPS Single Cycle Processor

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1 Introduction

MIPS Single Cycle Processor is one of the most basic processor. It contains some basic hardwares like ALU, Adder, RegisterFile, Memory and Control Unit. It has 6 basic instructions to get a brief idea about how a processor works. Instructions are ADD, ADDI, SUB, AND, OR, BEQ and JUMP.

2 Specifications of implemented Processor

- 32-bit Instruction length
- 16-bit Data and Address length
- 128KB Register with 16-bit word length
- 128KB Memory with 16-bit word length
- 1Kb Instruction Length
- 16-bit ALU with ADD, SUB, AND, OR Operations

3 Dependencies

Following programs are needed to run the simulation.

ModelSim Simulator is used to simulate the behavior of processor. A script file for ModelSim will be generated by Python Program which will load Instructions in Instruction Register.

Python 2.7 is used to create script file for ModelSim Simulator by taking instructions as Input.

4 How to use

- Enter Instructions of you program using Python Program `Mnemonics.py`
- Enter `LOAD` to generate script file for ModelSim
- Enter name of Script to save.
- Open ModelSim and change your current directory to Script/
- Enter `do <filename>.fdo` This will initialize IR of Processor with instructions added in Python Program.
- Click `Run` or enter command `run` in Transcript of ModelSim

5 Instruction Set