COA Mini Project

Read-me File

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Problem Statement: Designing of a 32-bit RISC processor that will support all commands as per mentioned.

In this project, we have designed a 32-bit RISC Processor in Logisim that will perform basic operations like Load, Store, Move, Add, Subtract, Logical AND, Logical OR etc. It will receive set of 32-bit instructions and execute them sequentially with the help of all essential CPU components like memory, Registers and Control Unit etc. Each instruction will be completed in exactly 5 stages.

To use this design, one needs to open the main circuit in Logisim (.circ file). Then the 32- bit instructions need to be entered manually in the memory section of the circuit (RAM), which looks like:
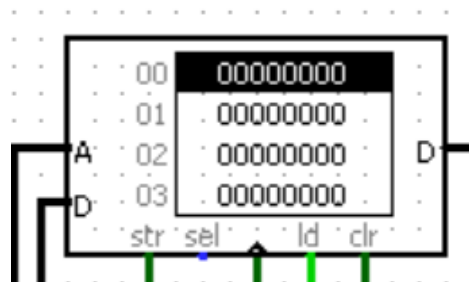
The 32 bit data in each address in the RAM can be edited by using the

👆 *Poke Tool*

To convert the required instruction in assembly language to the 32-bit machine code, refer to Encoding Scheme pdf file. A few examples to do so are as follows:

1.

ADD Ri ,Rj, Rk (Ri= R0,Rj=R1,Rk=R2):

Binary Encoding: 0100 0000 0001 0010 0000 0000 0000 0000

Hexadecimal Encoding(Assembly Code): 40120000

2.

ORI Ri, Rj, Immidiate(R1=R0,Rj=R1,Immidiate=1(Decimal)):

Binary Encoding: 1011 0000 0001 XXXX 0000 0000 0000 0001

HexaDecimal Encoding(Assembly Code): B0100001

After entering the instruction set to perform the required task in the RAM, tick the Simulation Enabled and Ticks enabled under the Simulation Tab to run the CPU circuit. Your task will be executed.