

CSM151B HW4
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4.7

1.

Opcode = $(101011)_2 = (43)_{10}$

This is a load/store function

$$R_s = (00011)_2 = 3$$
$$R_t = (00010)_2 = 2$$

Address = $(00000000000010100)_2 = 20$

Thus, the instruction is `sw $s2, 20($s3)`.

The input of sign-extended is:

0000 0000 0000 0000 0000 0000 0001 0100

The output of the shift left is:

(XXXX 1000 1000 0000 0000 1010 0000)₂, where XXXX is the most significant 4 bits of PC+4

2.

ALU control input is:

Function field of instruction: $(010100)_2 = (43)_{10}$

It's a SW instruction

ALUOp is 00

Input1 of ALU is $(00011)_2$

Input2 of ALU is (000000000000000000000000010100)₂

3.

The new PC is PC+4 The data path is shown in the diagram attached below.

4.

Two muxes at branch: PC+4

Mux before the registers: Can be either 00010 or 00000

Mux before the ALU: 0000 0000 0000 0000 0000 0000 0001 0100

Mux after data memory: Random bits from “read data” port

5.

ALU input 1: $(-3)_{10}$

ALU input 2: (20)10

Top left adder: current PC and 4

add(ALU result): $pc + 4$ and $(80)_{10}$

6.

Read register 1: 00011

Read register 2: 00010

Write register: 00010 or 00000 (don't care)

Write data: don't care
RegWrite:0