

# **Computer Architecture, Section 379: Homework #3**

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## 1

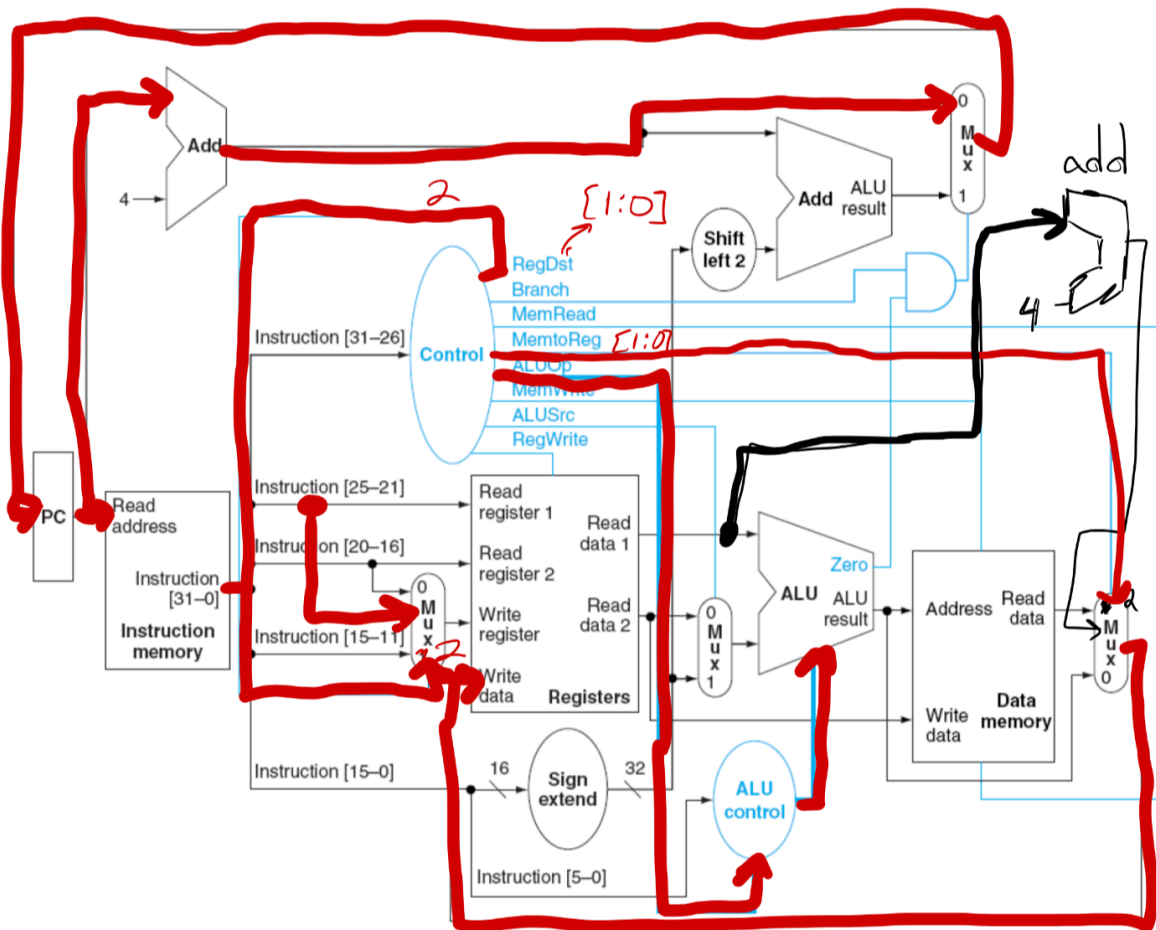
**Given:** Modify the single-cycle datapath (page 3/3) by implementing the instruction ‘SWI’ (store-word-and-increment). Below is the syntax. The instruction below will store the value in \$t0 to memory location at address (\$s0+88). Then, it will increment \$s0 by 4.

**SWI \$t0, 88(\$s0)**

This is the encoding of the instruction above:

unique	s0	t0	88
opcode (6)	rs (5)	rt (5)	offset (16)

Draw the changes on the datapath diagram and provide the values of all the control signals.



## 2

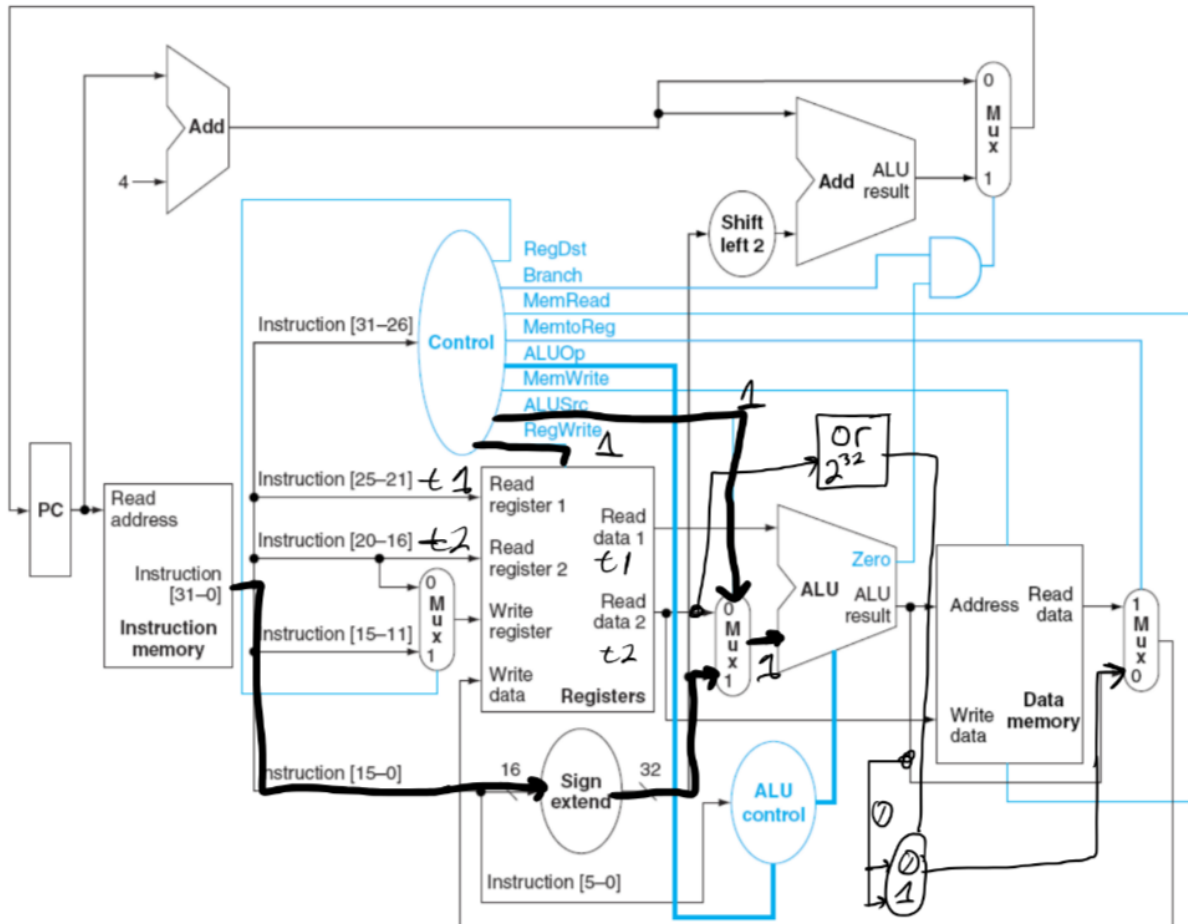
**Given:** Modify the single-cycle datapath by implementing the conditional move instruction ‘MOVNZ’ (move-if-not-zero). Below is the syntax. The instruction below will move \$t1 into \$t0 if \$t2!=0. Otherwise, \$t0 will be set to “0”.

### MOVNZ \$t0, \$t1, \$t2

This is the encoding of the instruction above:

unique	t1	t2	t0	0	0
opcode (6)	rs (5)	rt (5)	rd (5)	shamt (5)	funct (6)

Draw the changes on the datapath diagram and provide the values of all the control signals.

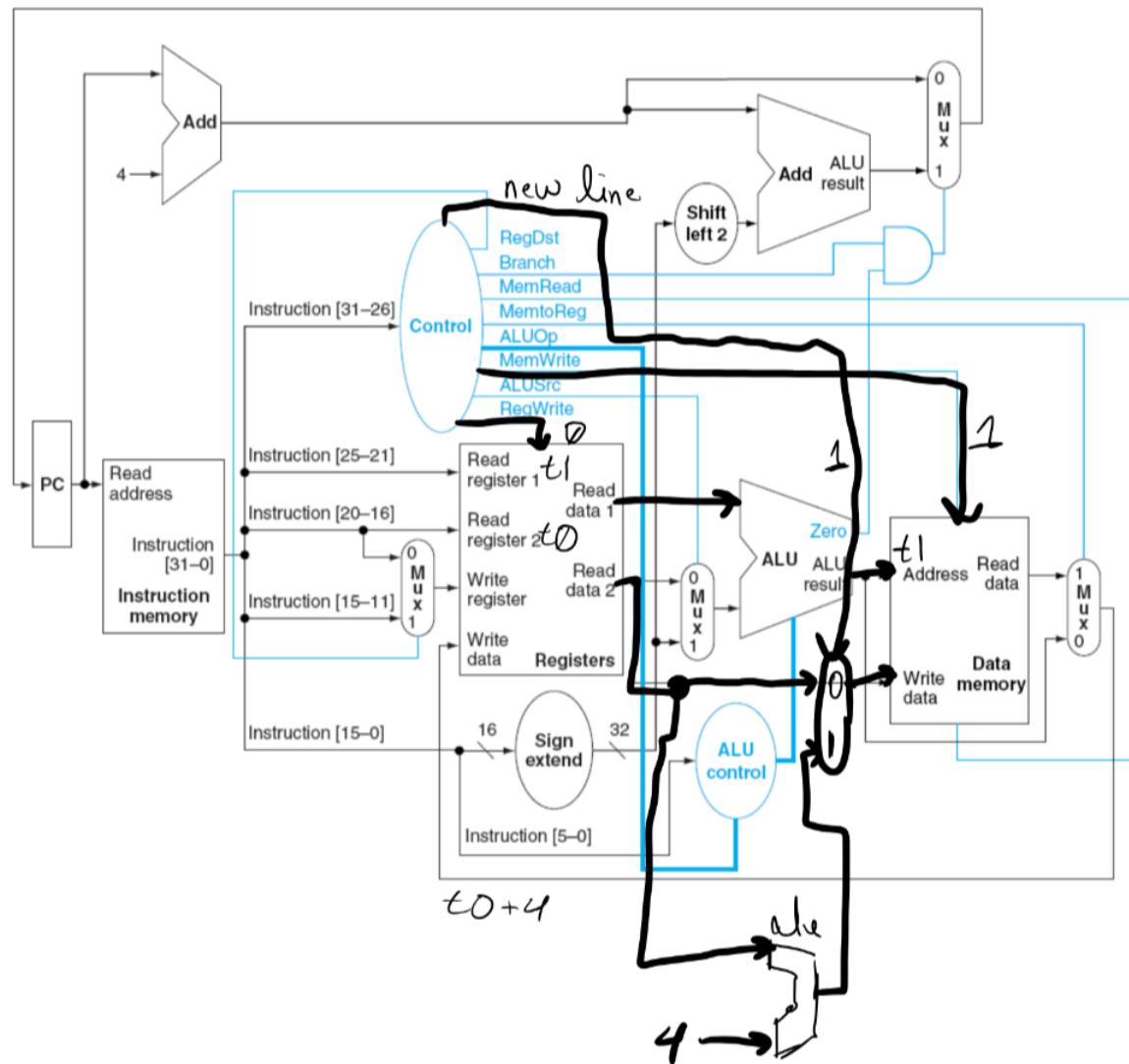


3

**Given:** This instruction stores (\$t0+4) into the memory at address \$t1- what is the suitable format used and based on that , modify the datapath

swr4 \$t0,\$t1

Draw the changes on the datapath diagram and provide the values of all the control signals.



4

**Given:** Modify the datapath to implement 'load word and increment' (lwi), provide instruction example, suggest suitable instruction format used and based on that format, modify the datapath.

Draw the changes on the datapath diagram and provide the values of all the control signals.

