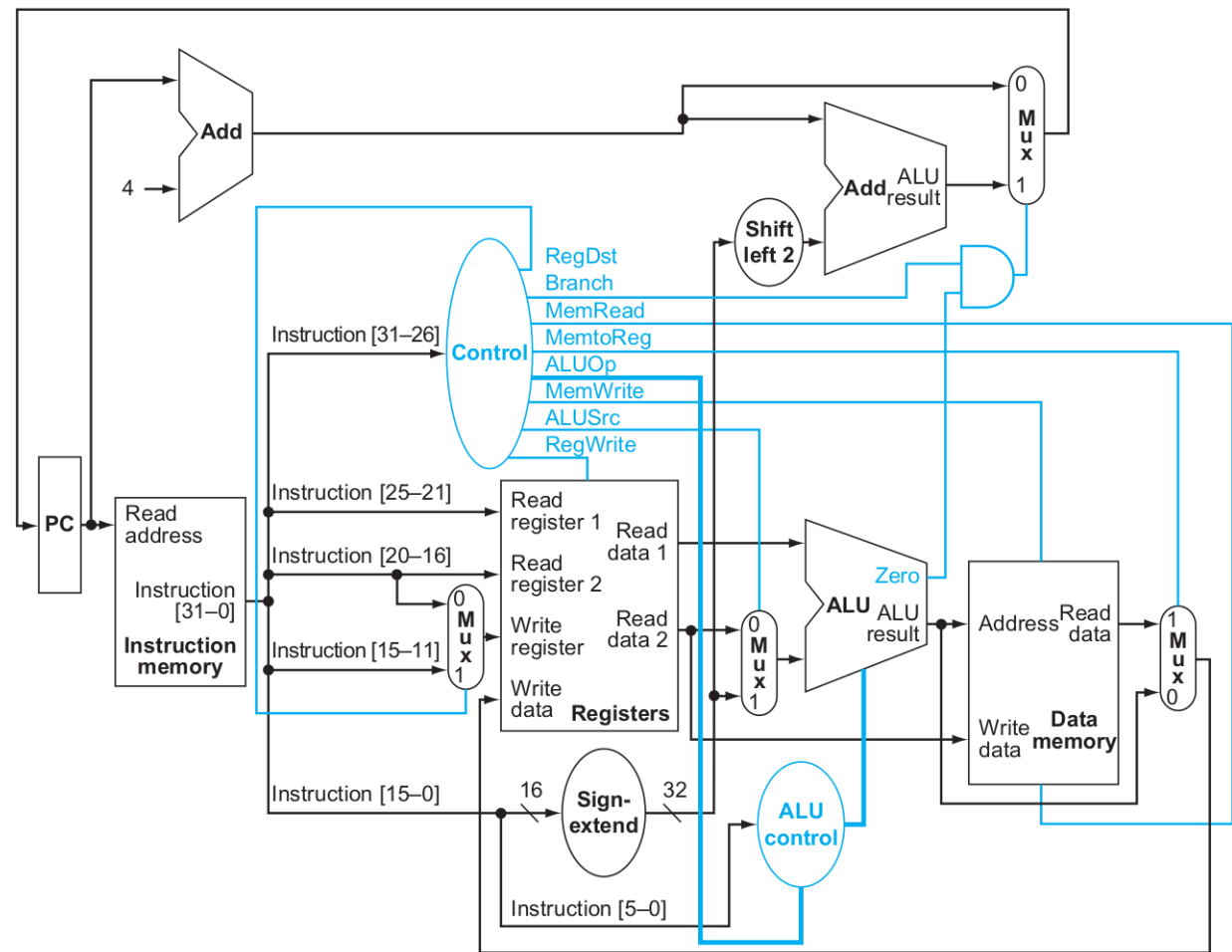


Student Name: _____

Student No: _____

1. A full datapath with a control unit is given in the figure below. Highlight the functional components that will be active for the `sw $t1, 100($t2)` instruction. Also, mention which control bits will be set.

(10)



2. You want to design a control unit for a set of instructions consisting **lw, sw, add, sub, AND, XOR**. What is the minimum number of bits of opcodes needed? What is the minimum number of bits that will be needed to be fed from the main control unit to the ALU control unit? Draw the combinational circuit for the ALU control unit. Your implementation must be as compact and optimized as possible. [Hint: It does not necessarily have to adhere to the standard MIPS convention.] (10)