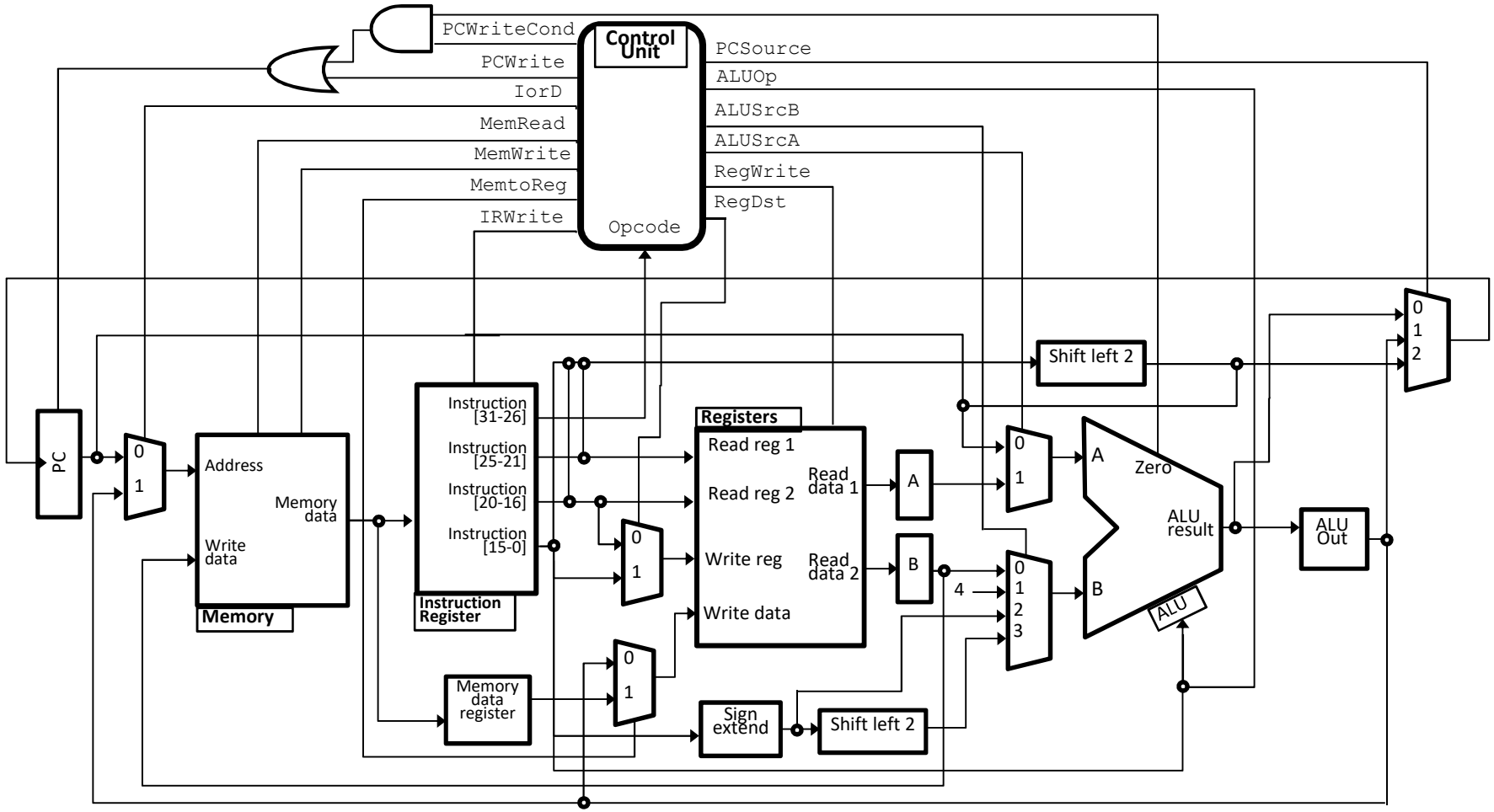
PCWriteCond
PCWrite
IorD
MemRead
MemWrite
MemtoReg
IRWrite
Control Unit
Opcode
PCSource
ALUOp
ALUSrcB
ALUSrcA
RegWrite
RegDst
PC
0
1
Address
Memory data
Write data
Memory
Instruction [31-26]
Instruction [25-21]
Instruction [20-16]
Instruction [15-0]
Instruction Register
Memory data register
Registers
Read reg 1
Read reg 2
Write reg
Write data
Read data 1
Read data 2
A
B
4
Shift left 2
Sign extend
Shift left 2
Zero
ALU
ALU result
ALU Out
0
1
2
3

- `PCWrite`: Write the ALU output to the PC.
- `PCWriteCond`: Write the ALU output to the PC, only if the Zero condition has been met.
- `IorD`: For memory access; short for “Instruction or Data”. Signals whether the memory address is being provided by the PC or an ALU operation.
- `MemRead`: The processor is reading from memory.
- `MemWrite`: The processor is writing to memory.
- `MemToReg`: The register file is receiving data from memory, not from the ALU output.
- `IRWrite`: The instruction register is being filled with a new instruction from memory.
- `PCSource`: Signals whether the value of the PC resulting from an jump, or an ALU operation.
- `ALUOp` (3+ wires): Signals the execution of an ALU operation.
- `ALUSrcA`: Input A into the ALU is coming from the PC (value=`0`) or the register file (value=`1`).
- `ALUSrcB` (2 wires): Input B into the ALU is coming from the register file (value=`0`), a constant value of 4 (value=`1`), the program counter (value=`2`), or the shifted program counter (value=`3`).
- `RegWrite`: The processor is writing to the register file.
- `RegDst`: Which part of the instruction is providing the destination address for a register write (`rt` instead of `rd`).