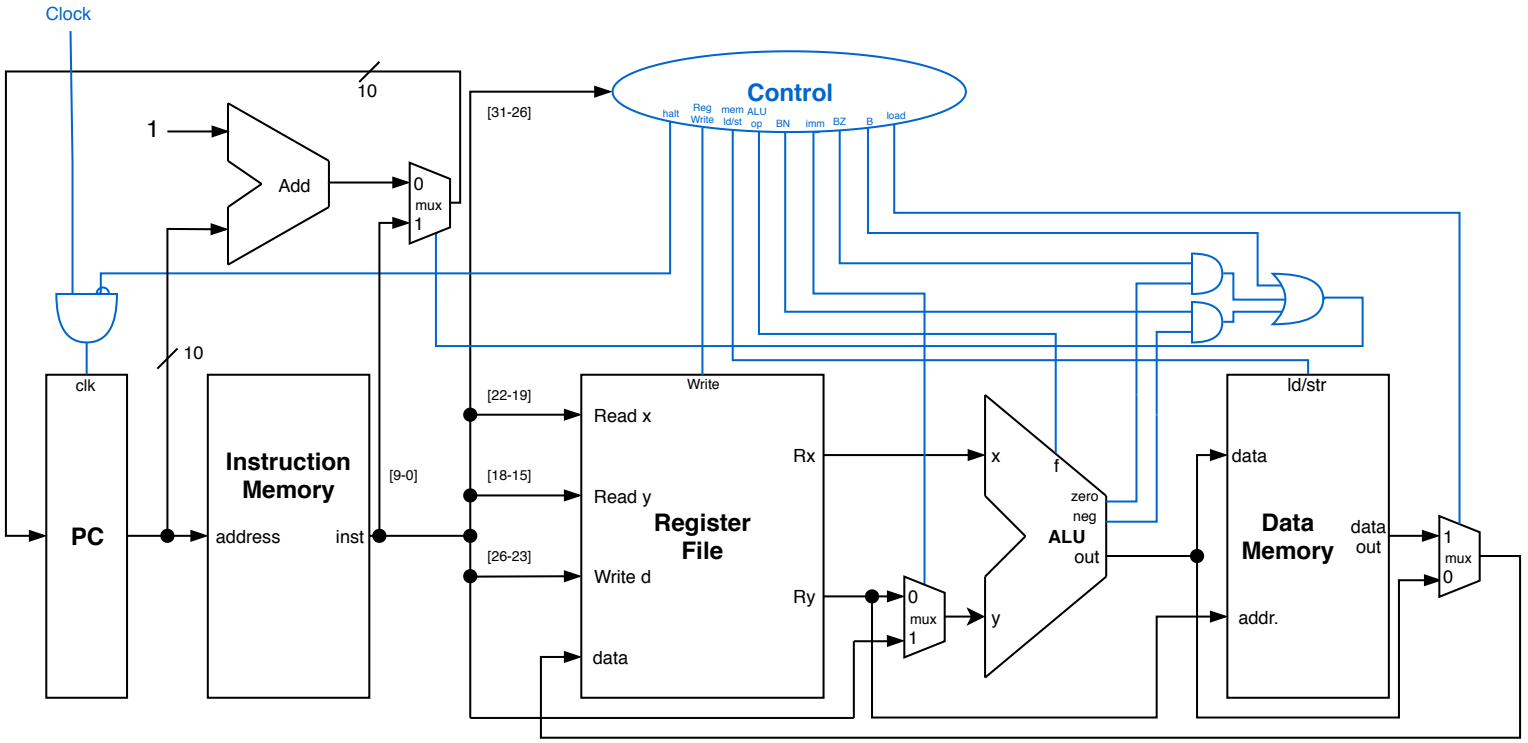
CPU Data and Control Path Diagram

The following is an approximation of the control and data paths for the floating point processing unit.

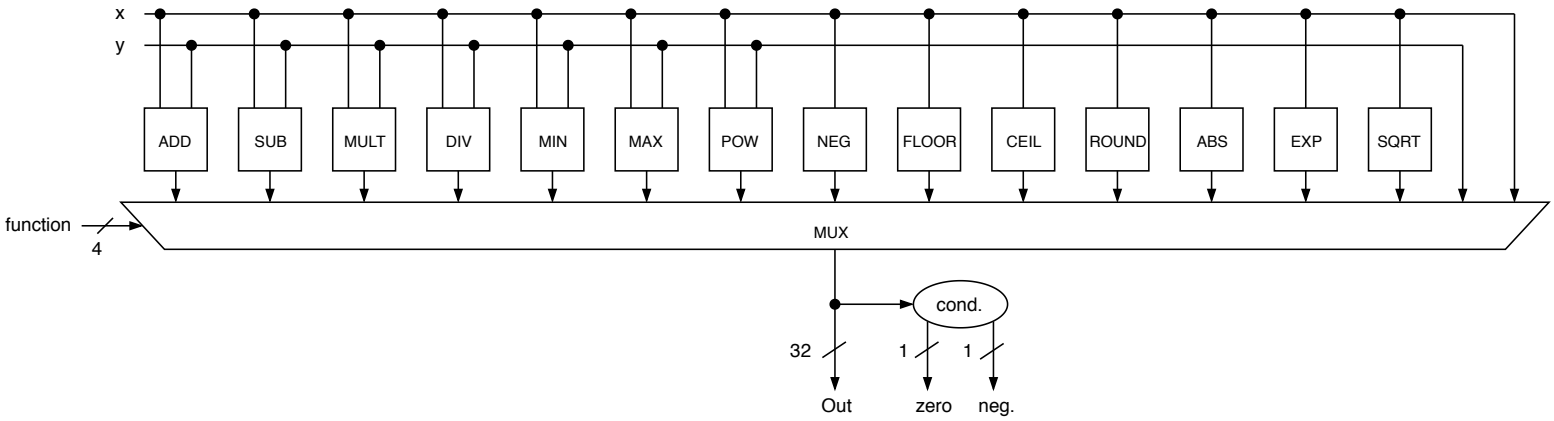


A multiplexer is used between Ry data output of the register file and the ALU in order to choose between the register Ry itself and the integer value of the `POW` instruction. For the `MOVE` and `STORE` instructions, an x input bypass function was added to the ALU to allow for a copy of Rx to move through to write-back. For the `LOAD` instruction, the output of data memory shares the path of ALU output, selected by a multiplexer.

The program counter by default incremements by one, unless the input is overriden by a branch command. The ALU flags for negative or zero, AND'ed through their corresponding control signals and passed to the PC multiplexer. The `B` instruction bypasses any AND and always sets this mux select to 1 unconditionally.

An AND gate at the PC clock with one of its inputs inverted allows the clock signal through, but closes the path on the halt signal from control. A 1KB instruction memory unit is given, therefore 10 bits are used to address instruction memory.

ALU Diagram


x
y
ADD
SUB
MULT
DIV
MIN
MAX
POW
NEG
FLOOR
CEIL
ROUND
ABS
EXP
SQRT
function
4
MUX
cond.
32
1
1
Out
zero
neg.