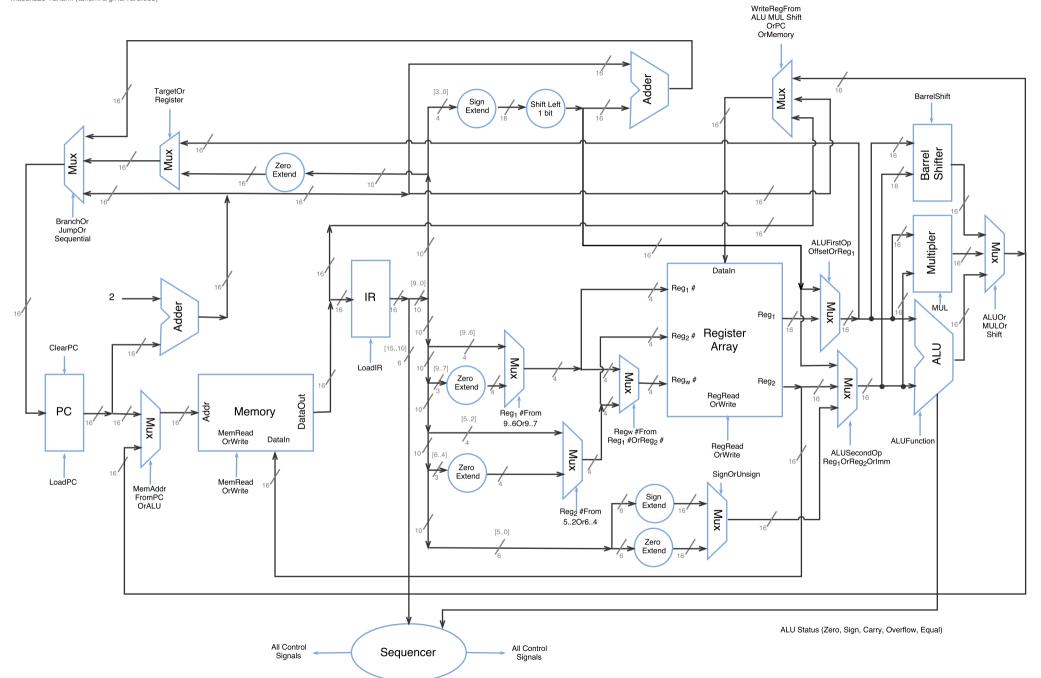
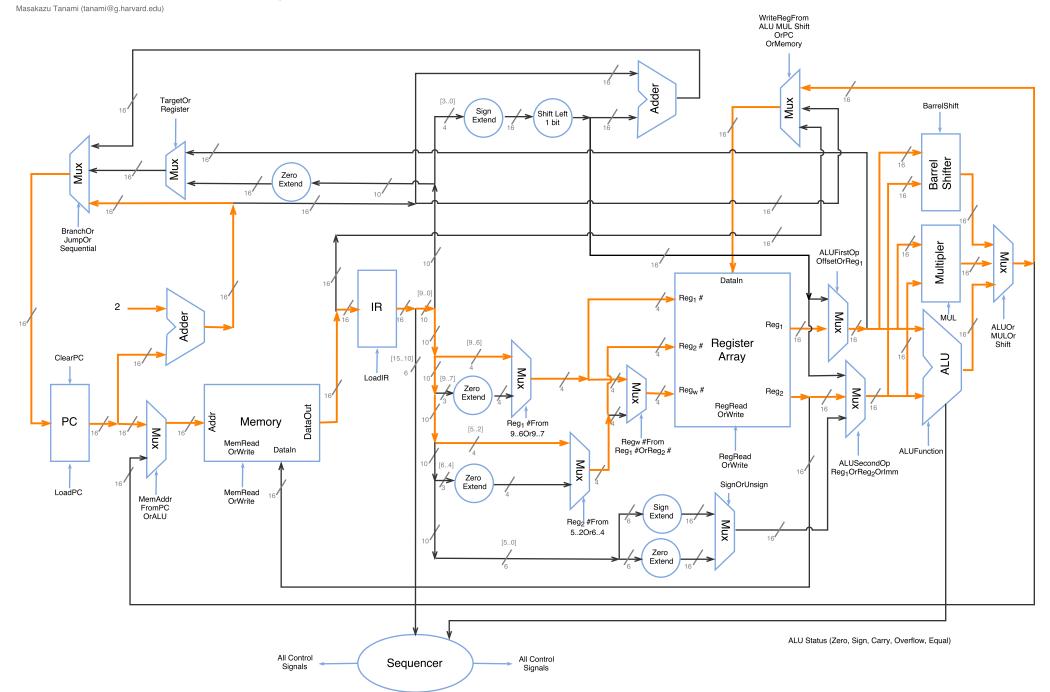
#### MIN16 Datapath

Masakazu Tanami (tanami@g.harvard.edu)



# MIN16 Datapath (ALU R-type)



### MIN16 Datapath (ALU I-type)

All Control

Signals

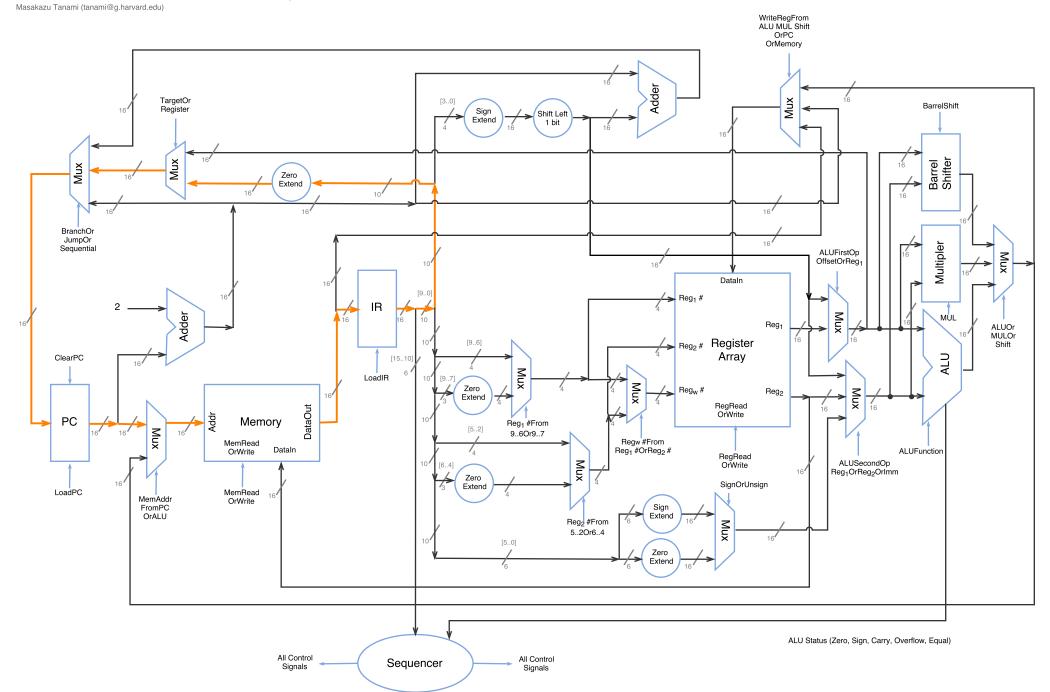
Masakazu Tanami (tanami@g.harvard.edu) WriteRegFrom ALU MUL Shift OrPC OrMemory Adder TargetOr Register Mux BarrelShift Sign Extend Shift Left 1 bit Mux Barrel Shifter Zero Extend BranchOr JumpOr Multipler Sequential ALUFirstOp OffsetOrReg<sub>1</sub> DataIn IR Adder MUL Reg<sub>1</sub> ALUOr MULOr Reg<sub>2</sub># Register ClearPC Array [15..10 LoadIR Zero Reg<sub>2</sub> Extend RegRead OrWrite PC Memory Reg<sub>1</sub> #From 9..6Or9..7 MemRead Regw #From DataIn Reg<sub>1</sub> #OrReg<sub>2</sub> # OrWrite ALUFunction RegRead OrWrite Mux ALUSecondOp Reg<sub>1</sub>OrReg<sub>2</sub>OrImm Zero SignOrUnsign LoadPC MemRead MemAddr OrWrite Sign FromPC OrALU Extend Reg<sub>2</sub> #From Mux 5..2Or6..4 Zero Extend ALU Status (Zero, Sign, Carry, Overflow, Equal)

All Control

Signals

Sequencer

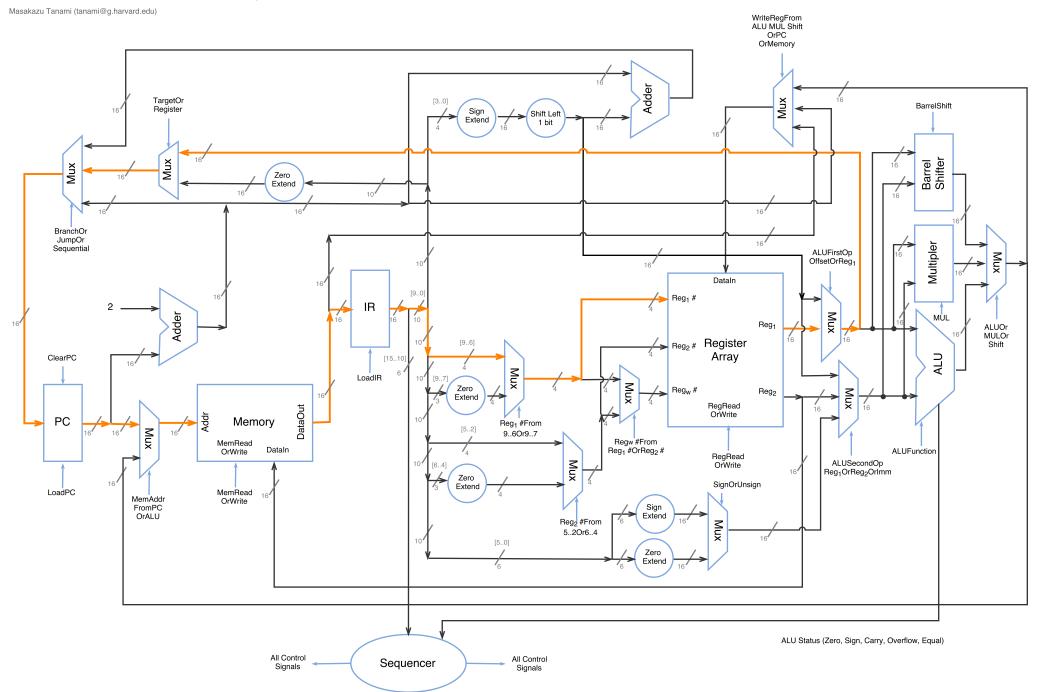
# MIN16 Datapath (Jump J-type)



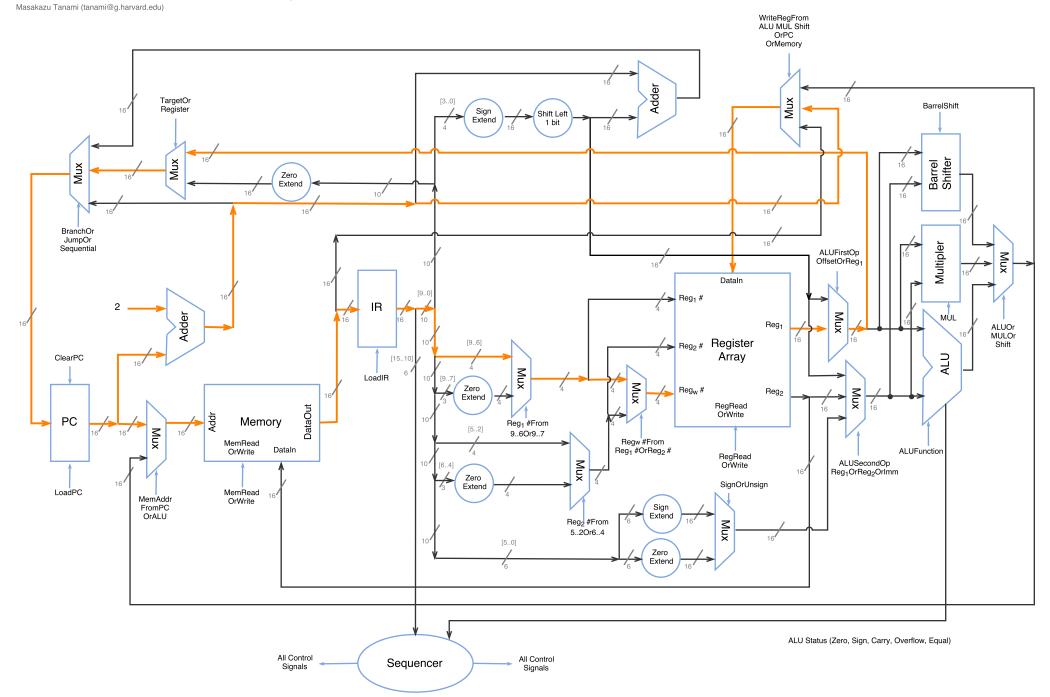
# MIN16 Datapath (JAL J-type)

Masakazu Tanami (tanami@g.harvard.edu) WriteRegFrom ALU MUL Shift OrPC OrMemory Adder TargetOr Register Mux BarrelShift Sign Extend Shift Left 1 bit Mux Barrel Shifter Zero Extend BranchOr JumpOr Multipler Sequential ALUFirstOp OffsetOrReg<sub>1</sub> DataIn IR Adder Reg<sub>1</sub> ALUOr MULOr Reg<sub>2</sub># Register ClearPC Array [15..10] LoadIR Zero Reg<sub>2</sub> Extend RegRead OrWrite PC Memory Reg<sub>1</sub> #From 9..6Or9..7 Regw #From MemRead DataIn Reg<sub>1</sub> #OrReg<sub>2</sub> # OrWrite ALUFunction RegRead OrWrite Mux ALUSecondOp Reg<sub>1</sub>OrReg<sub>2</sub>OrImm Zero Extend SignOrUnsign LoadPC MemRead MemAddr OrWrite Sign OrALU Extend Reg<sub>2</sub> #From Mux 5..2Or6..4 [5..0] Zero Extend ALU Status (Zero, Sign, Carry, Overflow, Equal) All Control All Control Sequencer Signals Signals

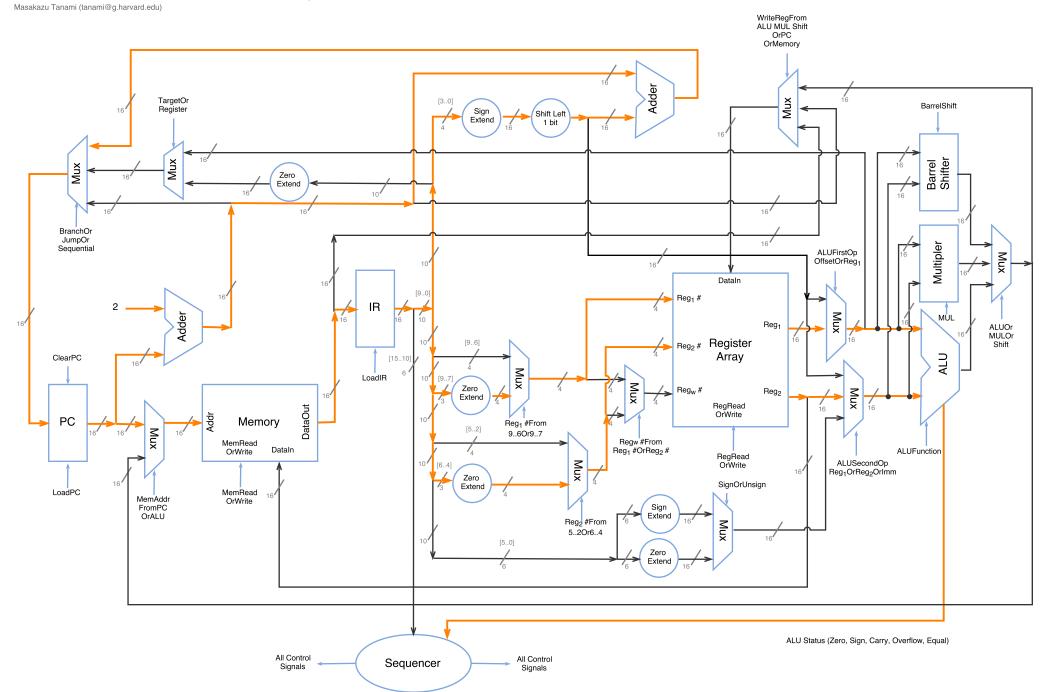
#### MIN16 Datapath (JR R-type)



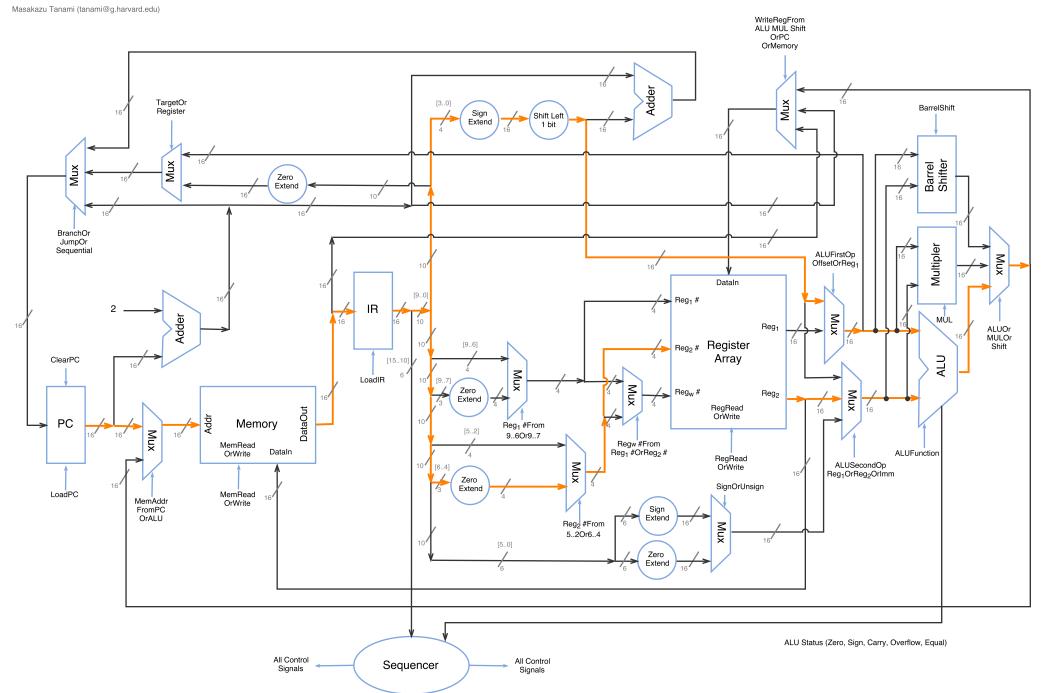
### MIN16 Datapath (JALR R-type)



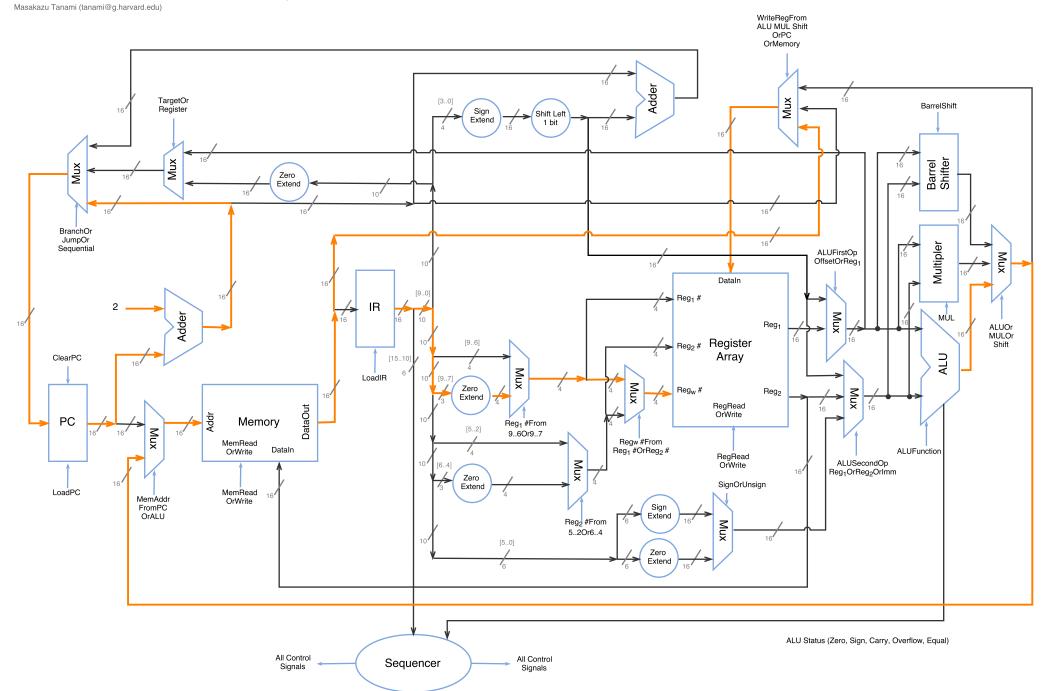
# MIN16 Datapath (Branch O-type)



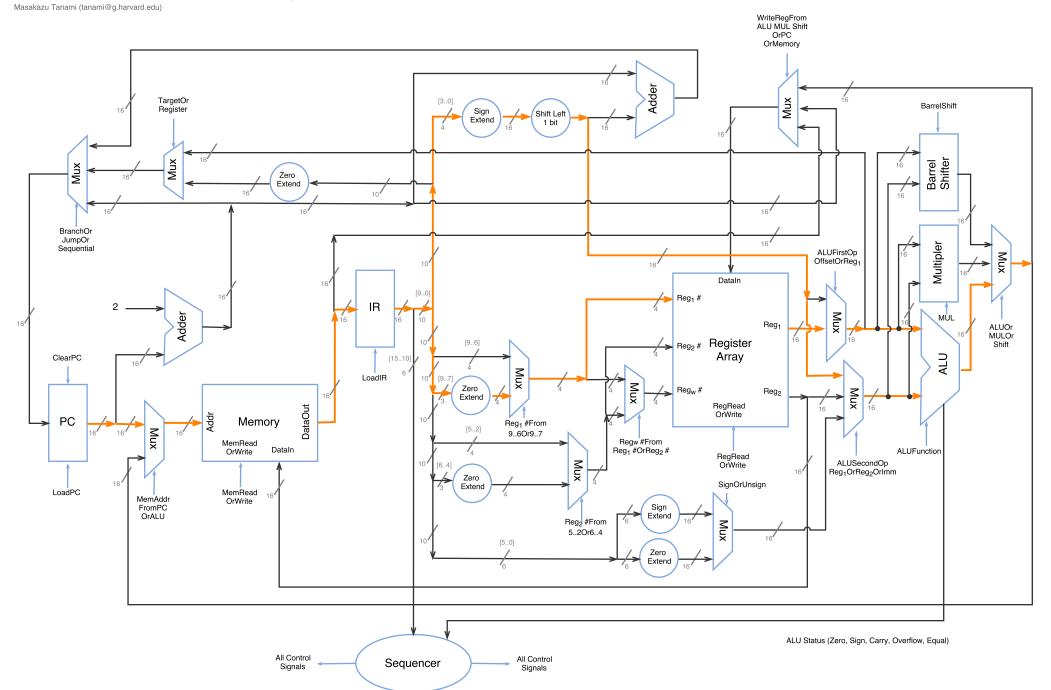
### MIN16 Datapath (Load O-type) (1)



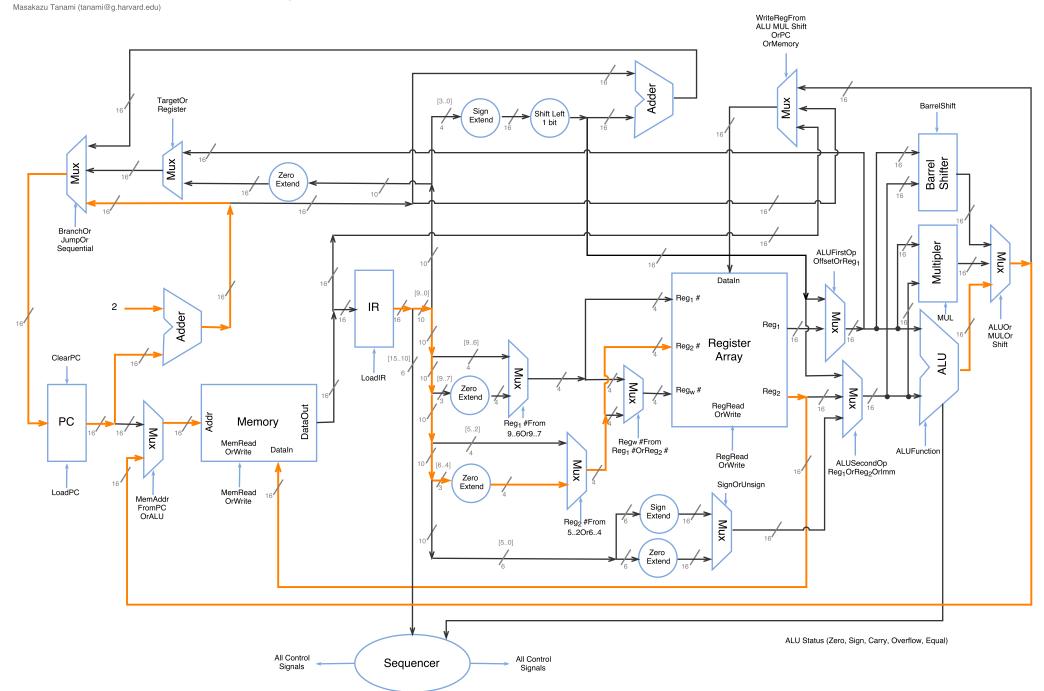
### MIN16 Datapath (Load O-type) (2)



### MIN16 Datapath (Store O-type) (1)



### MIN16 Datapath (Store O-type) (2)



#### MIN16 Datapath (MFHI, MTLO, MTHI, MTLO R-type)

