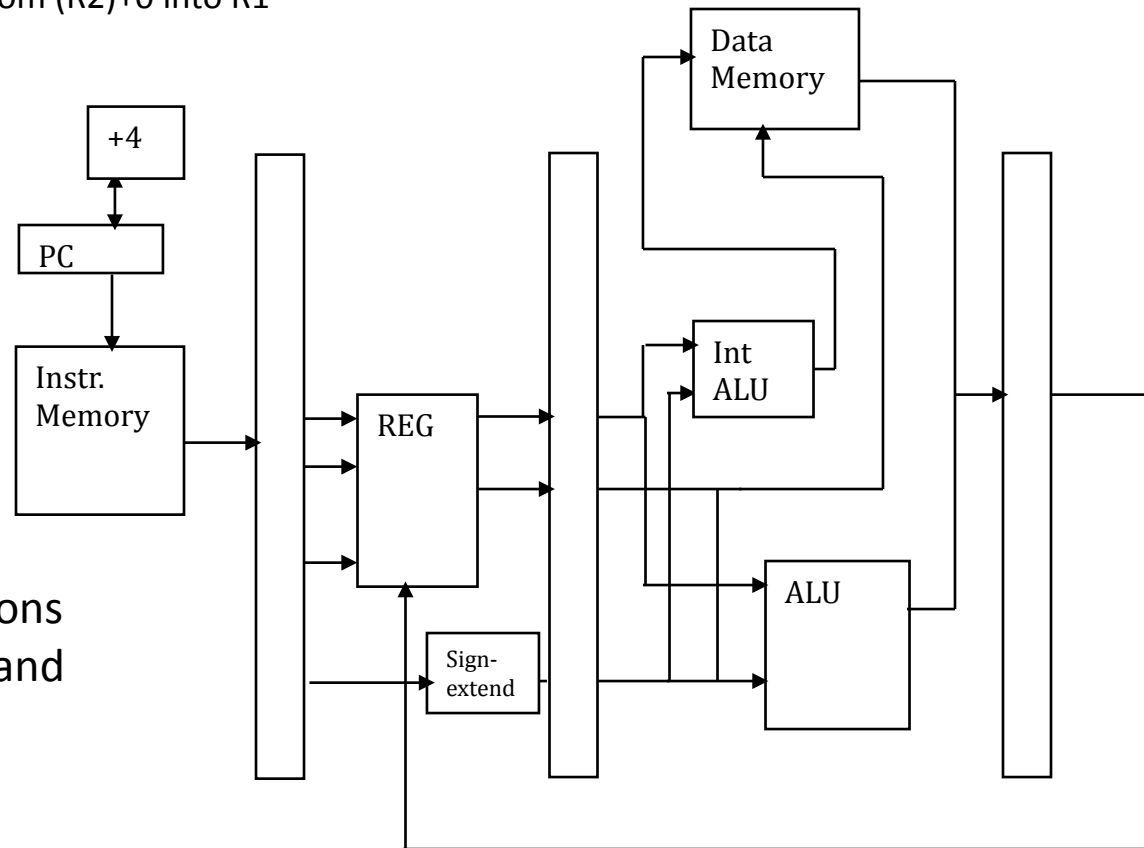


Let us use the modified pipeline that permitted data from LD to be forwarded to dependent instructions. We are not changing MIPS instruction formats, but only the pipeline structure

LD \$1, 0(\$2) :Load data from (R2)+0 into R1
 ADD \$4, \$1, \$3 : R4 = R1+R3



Now let us define equations
 To detect dependencies and
 Forward data

In MIPS, the two source operands are labeled as R_s and R_t . The destination register is labeled R_d

We will also use ALU-top-input and ALU-bottom-input to label the two inputs to ALU.

We will use “Result” to label the value produced by an instruction. Note that this value is either the output of the ALU (for arithmetic and logic instructions) or the value read from memory (for Load instructions).

If $ID/EX[IR(R_s)] = EX/WB[IR(R_d)]$ then ALU-top-input = EX/WB(result)

If $ID/EX[IR(R_s)] = EX/WB[IR(R_d)]$ then ALU-top-input = EX/WB(result)