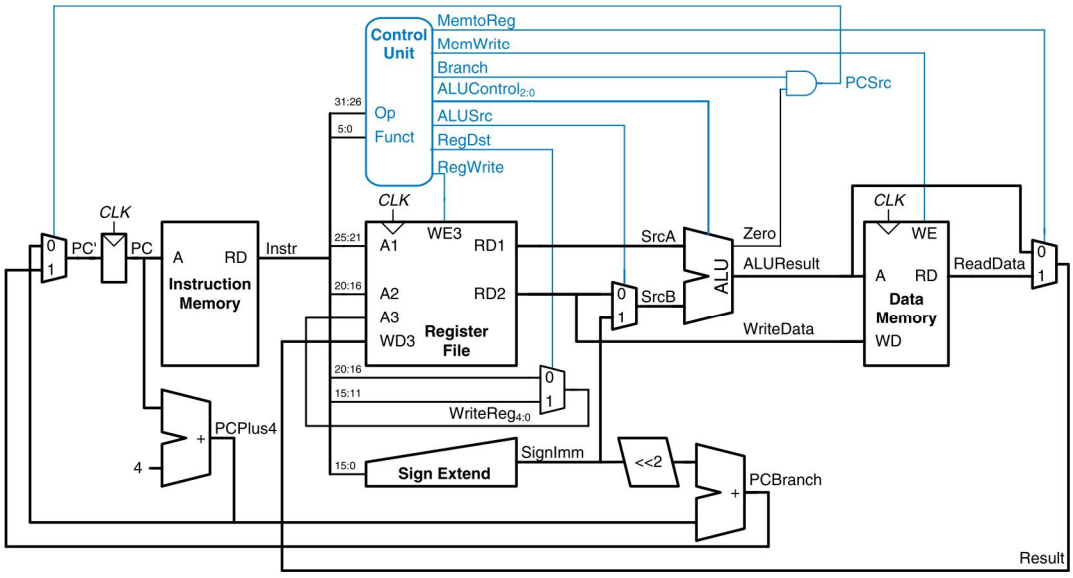

Figure 7.11 Complete single-cycle MIPS processor

Table 7.1 ***ALUOp*** **encoding**

ALUOp	Meaning
00	add
01	subtract
10	look at `funct` field
11	n/a

Table 7.2 is a truth table for the ALU decoder. Recall that the meanings of the three *ALUControl* signals were given in Table 5.1. Because *ALUOp* is never 11, the truth table can use don't care's X1 and 1X instead of 01 and 10 to simplify the logic. When *ALUOp* is 00 or 01, the ALU should add or subtract, respectively. When *ALUOp* is 10, the decoder examines the `funct` field to determine the *ALUControl*. Note that, for the R-type instructions we implement, the first two bits of the `funct` field are always 10, so we may ignore them to simplify the decoder.

The control signals for each instruction were described as we built the datapath. Table 7.3 is a truth table for the main decoder that summarizes the control signals as a function of the opcode. All R-type instructions use the same main decoder values; they differ only in the