1. a. Without: 400+200+30+120+350+30 = 1130ps

   With: 400+200+30+120+350+30+300 = 1430ps

   b. $\frac{1130*1}{1430*0.95} \approx 0.83$

   c. Cost-Without: 3890

   Cost-With: $3890 + 600 = 4490$

   $\frac{4490}{3890} \approx 1.13$

   $\frac{1.13}{0.83} = 1.39$
2. lw + sw = 35%

   addi + beq + lw + sw = 80%
3. a. RegDST=1, RegWrite=1, ALUOP=ADD, other = 0

   b. PC, Instruction Memory, MUX, Register, ALU

   c. Branch, Data Memory
4. We need a register file handler tohandle register and use a Mux to choose the read value between register(R-type) and Sign extension(Mem). And send all to ALU to calculate the result. After that, we have a Data Memory to handle memory operation, and a Mux to choose the result between ALU and Data Memory.