Select either PC+4 or the branch target address and
Send it to the PC

Add 4 to the PC to
Calculate the
address
of the
Next
instruction
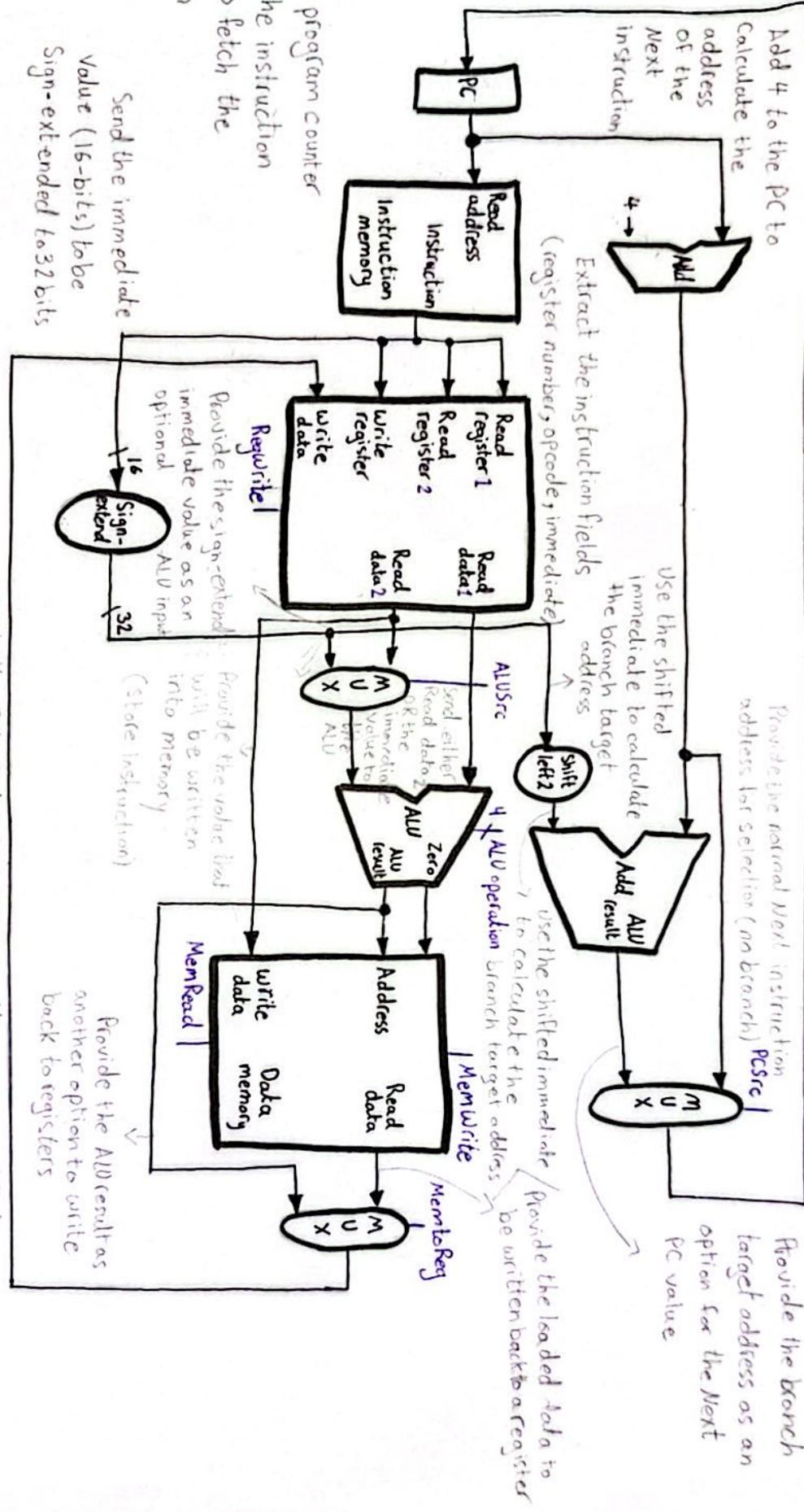
Send the program counter
value to the instruction
memory to fetch the
instruction

Send the immediate
value (16-bits) to be
Sign-extended to 32 bits

Extract the instruction fields
(register number, opcode, immediate)

PC

4

Read
address

Instruction
memory

Instruction

Read
register 1

Read
register 2

Write
register

Write
data

RegWrite

Registers

Read
data 1

Read
data 2

16
Sign-
extend
32

Provide the sign-extended
immediate value as an
optional
ALU input

Use the shifted
immediate to calculate
the branch target
address

Add

ALUSrc

Send either
Read data 2
OR the
immediate
value to
the ALU

M
U
X

ALU operation

ALU
Zero
ALU
result

Shift
left 2

Add
ALU
result

Provide the value that
will be written
into memory
(store instruction)

Provide the actual Next instruction
address for Selection (no branch)  PCSrc

use the shifted immediate
to calculate the
branch target address

Provide the loaded data to
be written back to a register

MemWrite

Address

Write
data

Data
memory

Read
data

MemRead

MemtoReg

M
U
X

M
U
X

Provide the branch
target address as an
option for the Next
PC value

Provide the ALU result as
another option to write
back to registers

Write the Selected value (ALU result or memory data)
into the Register file