Simple CPU

IF

Adder
in_a
in_b
result

Branch Target Buffer

Branch Predictor

P C
clk

Instruction Memory
address
instruction

clk

IF/ID

ID

Hazard

Control Unit
opcode
jump
branch
mem_read
mem_to_reg
alu_op
mem_write
alu_src
reg_write

Register File
rs1
rs2
writereg
writedata
wen
readdata1
readdata2
clk

Immediate Generator
instruction
sextimm

clk

ID/EX

clk   rstn

EX

Adder
in_a
in_b
result

Branch Control Unit
branch
check
taken

ALU
in_a
in_b
alu_func
check
result

ALU Control Unit
alu_op
funct7
funct3
alu_func

Forwarding

clk

EX/MEM

MEM

Data Memory
mem_write
mem_read
maskmode
sext
address
write_data
read_data
clk

clk

MEM/WB

WB

You should add ports, wires, and MUXs to complete the diagram