PC_Control Unit

PC
00 = PC+4
if Jump = 1 → NextPC = J_Target.
if BTaken = 1 → NextPC = B_Target.
Jump
BTaken
NextPC
J_Target
B_Target

Control Unit
opcode
ALUsrcA
ALUsrcB
ALUop
Branch
Jump
MemWrite
MemRead
Mem2Reg
RegWrite

Branch Logic
NZCV
BTaken
Branch
funct3

CLK
RST

Program Counter
NextPC   PC

Instruction Memory
address   I_RD

Instruction Decoder
Instr.
opcode
funct3
funct7
rs1
rs2
(Destination Register)   rd
imm

ALU Control
ALUop
funct3
funct7
ALUcontrol

Register File
CLK
RegWrite
Read Address 1
Read Address 2
Write Address
Write Data
RD1
RD2

Data Memory
CLK   RST
MemWrite
MemRead
WriteData   D_RD
Address

ALU
ALUcontrol
srcA
srcB
NZCV
ALUresult
to PCC
to DM

00
01

00
01

to ALUsrcA

PCplus4 (+)
PC   PC+4
4

Immediate Sign-Extension
imm
ex-imm

to RegF

00   ALUresult
01   Data Memory
10   PC+4

강현우, KHWL2024-2025
KHWL_RV32I

The very first RV32I Design.
37 Instructions are operable.
CSR&Debug instr. should be
added further.

2024.12.15(日) ~ 2025.01.05(日)