

NOP-select-control-IF = 1'b0 \rightarrow In general case.

(2)

\rightarrow If $u(15:12) @ ID == JAL, JLR, JRI \rightarrow 16'b1$

\rightarrow If $u(15:12) @ EX == BEE \rightarrow 16'b1$.

NOP-select-control-ID

\rightarrow only FOR BEE = 1'b1.

Basically

① If $u(15:12) @ ID == JAL, JLR, JRI$
 \rightarrow NOP-select-control-IF = 1

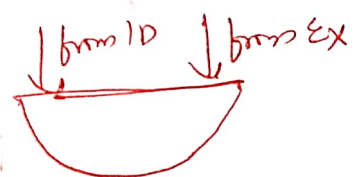
② If $u(15:12) @ EX == BEE$ (Taken)

\rightarrow NOP-control-IF = 1

NOP-control-ID = 1

Multiple Drivers

\Downarrow
Use AND gate



NOP-select-control-IF.

②. @ ID stage.

always @ ()

if (ccis:0) == jal)

nop-select-for-uf-from-id = 1

pc-control-from-id = 2'b01

pc-next-from-id = pc + imm(8:0)

else if (cc == jlr)

nop-select-for-uf-from-id = 1

pc-control-from-id = 2'b01

pc-next = ~~RFID2~~ RF-D2-forwarded.

else if (cc == jri)

//

//

pc-next-from-id = RF-D1-forwarded + imm(8:0).

④ @ Ex

if (cr @ ex == branch && taken == 1) \rightarrow taken = (rs1 == rs2)

nop-select-for-uf-from-ex = 1

nop-select-for-~~uf~~from-ex = 1
 \hookrightarrow ~~uf~~ \hookrightarrow ~~uf~~ 1

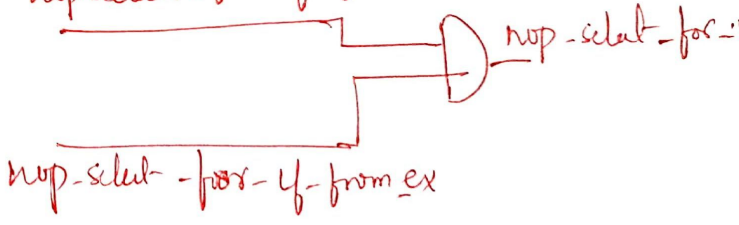
pc-control-from-ex = 2'b10

pc-next-from-ex = pc + imm

else
 $\{$ normal all 0.

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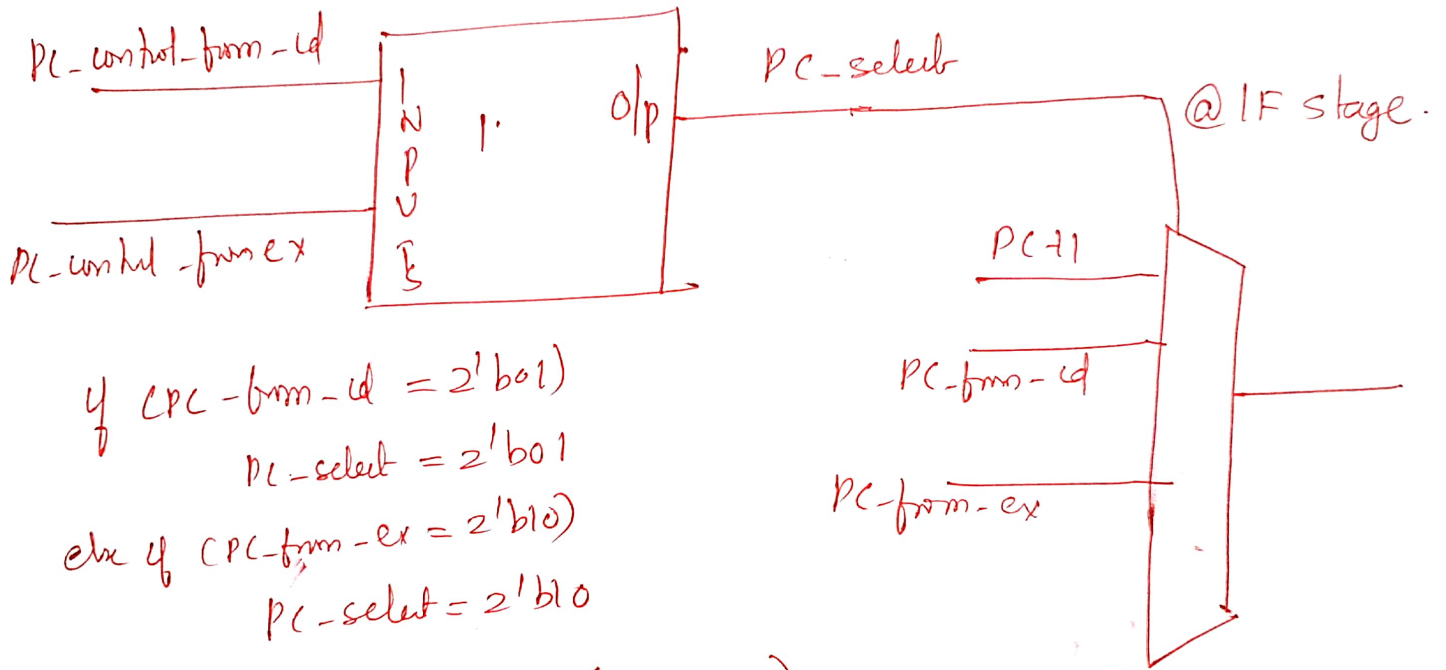
nop-select-for-uf-from-ex



nop-select-for-~~uf~~from-ex

\rightarrow directly to
 1 NOP MUX.

⑤ Branch Controller



if $PC\text{-}control\text{-}ld = 2'b01$
 $PC\text{-}select = 2'b01$
 else if $PC\text{-}control\text{-}ex = 2'b10$
 $PC\text{-}select = 2'b10$

else
 $PC\text{-}select = 2'b00(PC+1)$

Adding Prediction.

(6)

