Data Forwarding Unit:

Forwarding unit

Rs(1st src from ID/EX)

Rt(2nd src from ID/EX)

Forward A

Rd3(dst from EX/MEM)

Rd2(dst from ID/EX)

Forward B

Rd4(dst from MEM/WB)

EX. RegWrite

MEM.RegWrite

WB.RegWrite

|  |  |
| --- | --- |
| ALU operand A | ALU operand B |
| If ( (Rs == Rd2) and (EX. RegWrite))  ForwardA=01  Else if ( (Rs == Rd3) and (MEM.RegWrite))  ForwardA = 10  Else if ((Rs == Rd4) and (WB.RegWrite))  Forward A =11  Else ForwardA=00 | If ((Rt == Rd2) and (EX.RegWrite))  Forward B =01  Else if ( (Rt == Rd3) and (MEM.RegWrite))  Forward B= 10  Else if ((Rt == Rd4) and (WB.RegWrite))  Forward B=11  Else Forward B =00 |

Forward(A,B)= 00 ->First ALU operand comes from register file = Value of (Rs)

Forward(A,B)= 01 ->Forward result of previous instruction to A (from ALU stage)

Forward(A,B) = 10 ->Forward result of 2nd previous instruction to A (from MEM stage)

Forward(A,B)= 11 ->Forward result of 3rd previous instruction to A (from WB stage)

Special unit "inside DF unit ":

R\_Dst(to PC\_Predictor)

Dst from Reg\_file

Dst from IF

Dst from EX/MEM

Dst from MEM/WB

If(Dst(from IF)== Dst(from EX/MEM))

{

R\_Dst(to PC\_Predictor)= Dst(from EX/MEM)

}

Else If(Dst(from IF== Dst(from MEM/WB))

{

R\_Dst(to PC\_Predictor)= Dst(from MEM/WB)

}

Else R\_Dst(to PC\_Predictor) = Dst(from reg\_file)