

CS315-02 Pipeline Stall and Flush

Data Hazards

Forwarding

sub t0, t1, t2
add t3, t0, t0

Load Stalling

~~sub~~
nop → ld t0, (t1)
add t2, t0, t0

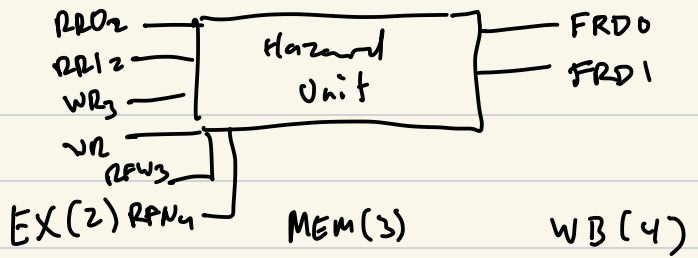
stalled [sub
addi

Control Hazards

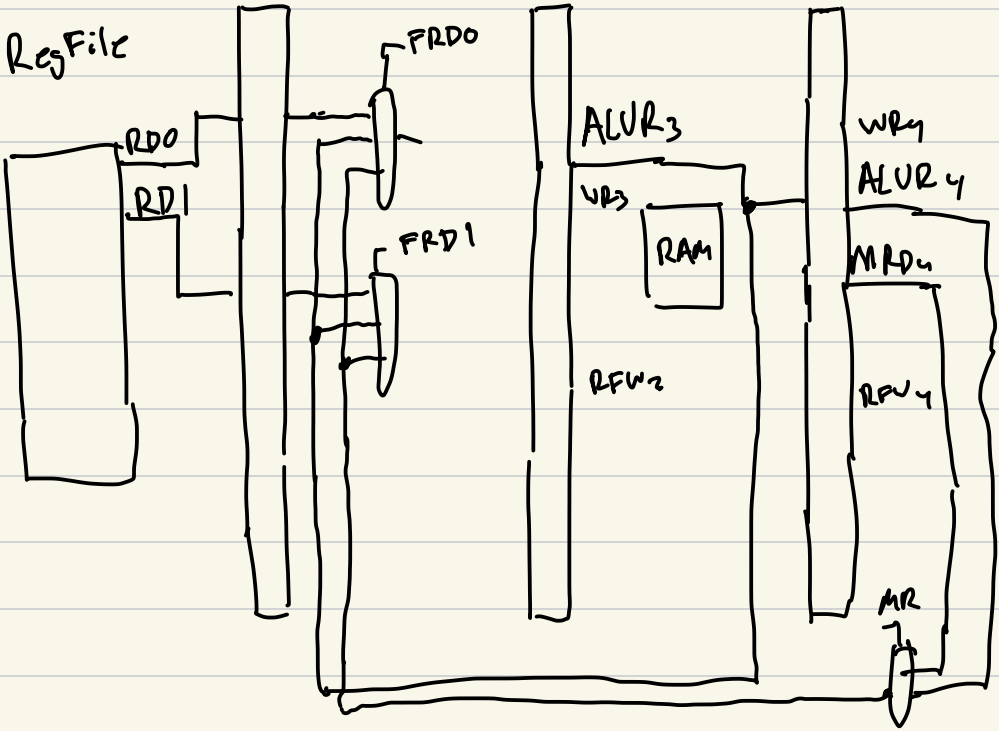
add
jal foo → foo: add:

[~~sub~~
~~add~~

Forwarding



RegFile



Load Stalling

- 1) nop/flush in EX/MEM
- 2) stall PC, IF/DR, DR/EX
- 3) Determination
 if $(MLD_3 == 1) \&\& (RPN_3 == 1) \&\&$
 $[(RRO_2 == WR_3) \parallel (RRI_2 == WR_3)]$

Control Hazards

- 1) Target address (ALUResult EX)
now goes to PCbr mux
- 2) PCbr selector comes from PCbr₂
- 3) IF PCbr₂ = 1 then Flush
IF/DR and DR/EX