

a.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
lw	IF	ID	EX	M	WB																	
lw		IF	ID	ID	ID	EX	M	WB														
bne					IF	ID	ID	ID	EX	M	WB											
sw								IF	ID	EX												
...								IF	ID													
...										IF												
lw											IF	ID	EX	M	WB							
lw												IF	ID	ID	ID	EX	M	WB				
bne															IF	ID	ID	ID	EX	M	WB	
sw																		IF	ID	EX	M	WB



Stall by Data Hazard



Flush the IF, ID, EX stages due to wrong prediction

b.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
lw	IF	ID	EX	M	WB																	
lw		IF	ID	EX	EX	M	WB															
bne			IF	ID	ID	EX	EX	M	WB													
sw					IF	ID	ID	EX														
...							IF	ID														
...								IF														
lw									IF	ID	EX	M	WB									
lw										IF	ID	EX	EX	M	WB							
bne											IF	ID	ID	EX	EX	M	WB					
sw												IF	ID	ID	EX	M	WB					



Stall by Data Hazard



Flush the IF, ID, EX stages due to wrong prediction