Example 4:

- Assume that **forwarding HAS been implemented**
- We will stall if we encounter a branch instruction
- Branches or Jumps are resolved after the EX stage.
- Assume that register $2 has the value of 0 and $3 has the value of 0

Instruction	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
LW $1, 4($9)	**IF**	**ID**	**EX**	**M**	**W**												
Add $4, $1, $9		**IF**	**ID**	**ID**	**EX**	**M**	**W**							**Add gets data from lw forwarding**			
Sub $7, $4, $9			**IF**	**IF**	**ID**	**EX**	**M**	**WB**						**Sub gets data from add forwarding**			
BEQ $2, $3, X					**IF**	**ID**	**EX**							**BEQ must still wait to enter the pipeline**			
Add $9, $8, $7																	
And $4, $5, $5																	
X: Add $4, $5, $9								**IF**	**ID**	**EX**	**M**	**WB**		**Can't start Add until after BEQ finishes executing (comparing)**			

Example 5:

- Assume that **forwarding HAS been implemented**
- We will predict that any branch instruction is **NOT TAKEN**
- Branches or Jumps are resolved after the EX stage.
- Assume that register $2 has the value of 0 and $3 has the value of 0

Instruction	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
LW $1, 4($9)	**IF**	**ID**	**EX**	**M**	**W**												
Add $4, $1, $9		**IF**	**ID**	**ID**	**EX**	**M**	**W**										
Sub $7, $4, $9			**IF**	**IF**	**ID**	**EX**	**M**	**WB**									
BEQ $2, $3, X					**IF**	**ID**	**EX**										
Add $9, $8, $7						**IF**	**ID**					**Add and And start down pipeline; however, they would not change state until CC 10 and 11. They never get this far so there is no harm done. We can kill them and restart the next add instruction.**					
And $4, $5, $5							**IF**										
X: Add $4, $5, $9								**IF**	**ID**	**EX**	**M**	**W**					

Example 6:

- Assume that **forwarding HAS been implemented**
- We will predict that any branch instruction is **TAKEN**
- Branches or jumps are resolved after the EX stage.
- Assume that register $2 has the value of 0 and $3 has the value of 0

Instruction	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
LW $1, 4($9)	**IF**	**ID**	**EX**	**M**	**W**												
Add $4, $1, $9		**IF**	**ID**	**ID**	**EX**	**M**	**W**										
Sub $7, $4, $9			**IF**	**IF**	**ID**	**EX**	**M**	**WB**									
BEQ $2, $3, X					**IF**	**ID**	**EX**										
Add $9, $8, $7																	
And $4, $5, $5																	
X: Add $4, $5, $9						**IF**	**ID**	**EX**	**M**	**W**							

This is the best situation – the last add instruction finishes 2 CC's earlier.