

Dyanmic Branch Prediction

Consider the MIPS code

//R0 is always 0

DADDI R1, R0, R0

L1: DADDI R2, R0, R0

L2: DADDI R2, R2, #1

DSUBI R3, R2, #3

BNEQZ R3, L2 -- Branch 1

DADDI R1, R1, #1

DSUBI R4, R1, #4

BNEQZ R4, L1 -- Branch 2

Dynamic Branch Prediction

- Each table below refers to only one branch.
- For instance, branch 1 will be executed 12 times.
- Those 12 times should be recorded in the table for branch 1.
- Similarly, branch 2 is executed 4 times.

Dynamic Branch Prediction

- Assume that 1-bit branch predictors are used.
- When the processor starts to execute the above code, both predictors contain value N (Not taken).
- What is the number of correct predictions? Use the following tables to record the prediction and action of each branch. Several entries are filled in for you.

Branch 1

Step	Branch 1	Actual Branch 1 Action
1	N	T
2		T
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Branch 1

Step	Branch 1	Actual Branch 1 Action
1	N	T
2	T	T
3	T	
4	N	
5	T	
6	T	
7	N	
8	T	
9	T	
10	N	
11	T	
12	T	

Branch 1

Step	Branch 1	Actual Branch 1 Action
1	N	T
2	T	T
3	T	N
4	N	T
5	T	T
6	T	N
7	N	T
8	T	T
9	T	N
10	N	T
11	T	T
12	T	N

Branch 2

Step	Branch 2	Actual Branch 2 Action
1	N	T
2		
3		
4		

Branch 2

Step	Branch 2	Actual Branch 2 Action
1	N	T
2	T	
3	T	
4	T	

Branch 2

Step	Branch 2	Actual Branch 2 Action
1	N	T
2	T	T
3	T	T
4	T	N

Total of 6 correct predictions, 4 for Branch1, 2 for Branch 2