

Homework 8

4.14.1

Instruction	1	2	3	4	5	6	7	8	9	10	11	12	13	14
lw r2, 0(r1)	IF	ID	EX	MEM	WB									
label1: beq r4, r0, label2		IF	ID	EX	MEM	WB								
label2: sw r1, 0(r2)			IF	ID	EX	MEM	WB							
sw r3, 0(r2)				IF	ID	EX	MEM	WB						
beq r3, r0, label1					IF	ID	EX	MEM	WB					
label1: beq r2, r0, label2						IF	ID	EX	MEM	WB				
label2: sw r1, 0(r2)							IF	ID	EX	MEM	WB			

4.14.2

Instruction	1	2	3	4	5	6	7	8	9	10	11	12	13	14
lw r2, 0(r1)	IF	ID	EX	MEM	WB									
label1: beq r2, r0, label2		IF	ID	EX	MEM	WB								
lw r3, 0(r2)			IF	ID	EX	MEM	WB							
label2: sw r1, 0(r2)				IF	ID	EX	MEM	WB						
beq r3, r0, label1					IF	ID	EX	MEM	WB					
add r1, r3, r1						IF	ID	EX	MEM	WB				
label1: beq r2, r0, label2							IF	ID	EX	MEM	WB			
lw r3, 0(r2)								IF	ID	EX	MEM	WB		
label2: sw r1, 0(r2)									IF	ID	EX	MEM	WB	

4.14.3

Instructions

label1: lw \$t1, 40(\$6)

label2: beq \$8, \$2, \$3

label3: sw \$8, label2

label4: add \$t1, \$6, \$4

label5: sw \$8, \$t1

label6: beq \$t1, label1

label7: sw \$2, 20(\$4)

label8: add \$t1, \$6, \$4

3 Taken

1 Not taken

4.16.1

Always taken:

$$\frac{3}{5} = 60\%$$

Not always taken:

$$\frac{2}{5} = 40\%$$

4.16.2

Out cases	Predictor value	Correct/Incorrect	Accuracy
T, T, T, NT	0, 1, 2, 3	Incorrect Incorrect Correct Incorrect	25%

4.16.3

Out cases	Predictor values			Correct/Incorrect	Accuracy
	0	1	2		
T	0	1	1	correct	60%
T	1	2	2	correct	
T	2	3	3	correct	
NT	3	3	3	Incorrect	
NT	2	2	2	Incorrect	