1.

a. bruh,

Initial:

Tag	ВНТ	Target
0x00	11	0x34
0x20	10	0x34
0x00	00	0x00
0x00	10	0x24

After JAL x2, 36: will always go to target so no change but PC = 0x24 or 36

Tag	ВНТ	Target
0x00	11	0x34
0x20	10	0x34
0x00	00	0x00
0x00	10	0x24

After BEQ x0, x3, END: will not be equal so no change, PC = 0x28

Tag	ВНТ	Target
0x00	11	0x34
0x20	10	0x34
0x00	00	0x00
0x00	10	0x24

After JAL $\times 0$, -12: unconditional jump back to BEGIN at 0x1c, save tag as PC (which is 0x28). Change BHT to 11

Tag	ВНТ	Target
0x00	11	0x34
0x20	10	0x34

0x00	00	0x00
0x28	11	0x1c

After BEQ $\times 0$, $\times 3$, END: we predict not taken when in reality it's taken since $\times 3$ is 0. Replace 00 with 10 for BHT 3rd row

Tag	ВНТ	Target
0x00	11	0x34
0x20	10	0x34
0x1c	10	0x28
0x28	11	0x1c

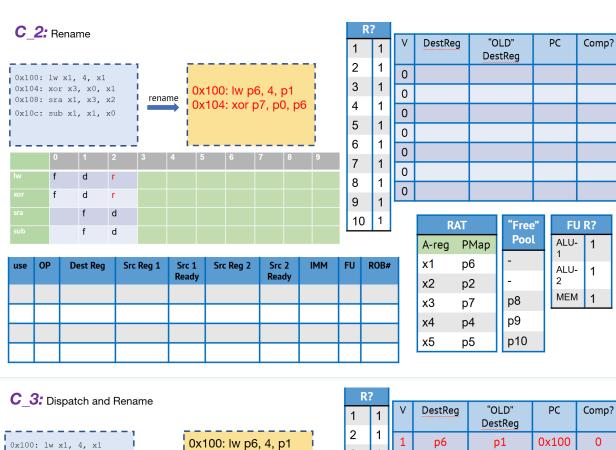
b.

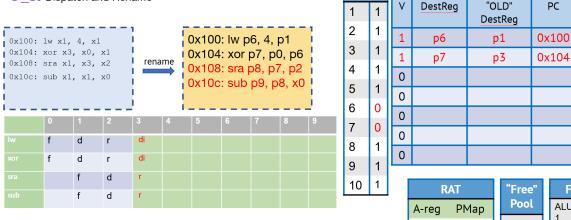
PC	0x0c	0x24	0x28	0x1c
Prediction	Taken	Not Taken	Taken	Not Taken
Actual Outcome	Taken	Not Taken	Taken	Taken

c.

	1	2	3	4	5	6
addi	f	d	е	m	W	
addi		f	d	е	m	W

2.

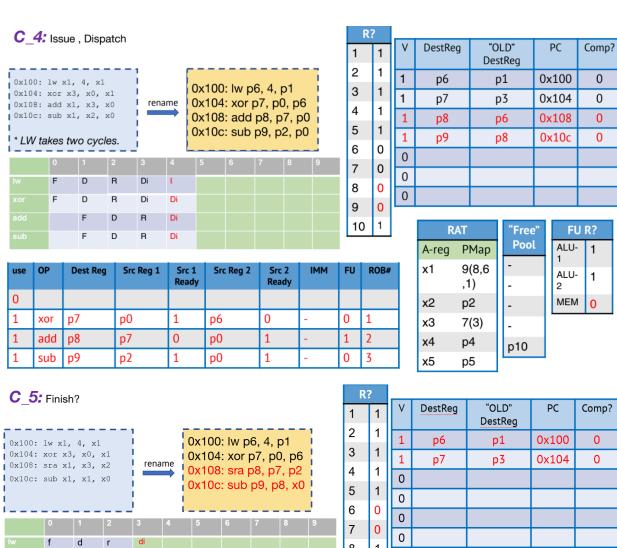




use	OP	Dest Reg	Src Reg 1	Src 1 Ready	Src Reg 2	Src 2 Ready	IMM	FU	ROB#
1	lw	р6	p1	1	-	-	4	2	0
1	xor	p7	р0	1	р6	0	-	0	1

RAT		
РМар	Pool	
9(8,1)	-	
p2	-	
р7	p8	
p4	p9	
p5	p10	
	PMap 9(8,1) p2 p7 p4	

FU R?				
ALU- 1	1			
ALU- 2	1			
MEM	1			



8 1

9 1

10 1

use	OP	Dest Reg	Src Reg 1	Src 1 Ready	Src Reg 2	Src 2 Ready	IMM	FU	ROB#
1	lw	р6	p1	1	-	-	4	2	0
1	xor	p7	p0	1	р6	0	-	0	1

d

f

d

d

di

	٧	DestReg	"OLD" DestReg	PC	Comp?
ı	1	р6	p1	0x100	0
١	1	р7	р3	0x104	0
	0				
	0				
	0				
	0				
ı	0				
ı					

RAT		"Free
A-reg	РМар	Poo
x1	9(8,1)	-
x2	p2	-
x3	p7	p8
x4	p4	р9
х5	p5	p10

"Free"	FU R?		
Pool	ALU- 1	1	
	ALU- 2	1	
8c	MEM	1	
o9			