

CS 230 Sem 4

# IITB-RISC

Project

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ADD	00_01	RA	RB	RC	0	00
ADC	00_01	RA	RB	RC	0	10
ADZ	00_01	RA	RB	RC	0	01
ADL	00_01	RA	RB	RC	0	11
ADI	00_00	RA	RB	6 bit intermediate		
NDU	00_10	RA	RB	RC	0	00
NDC	00_10	RA	RB	RC	0	10
NDZ	00_10	RA	RB	RC	0	01
LHI	00_00	RA	9 bit intermediate			
LW	01_01	RA	RB	6 bit intermediate		
SW	01_11	RA	RB	6 bit intermediate		
LM	11_01	RA	0 + 8 bits corresponding to Reg R0 to R7 (left to right)			
SM	11_00	RA	0 + 8 bits corresponding to Reg R0 to R7 (left to right)			
BEQ	10_00	RA	RB	6 bit Immediate		
JAL	10_01	RA	9 bit Immediate offset			
JLR	10_10	RA	RB	000_000		
JRI	10_11	RA	9 bit Immediate offset			

## STATE ELABORATION

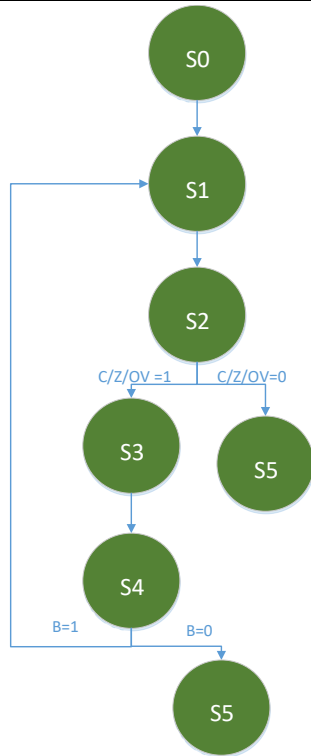
(Does not include the bootload states)

S0	"111" → RFA1 RFD1 → PC
S1	PC → MEM (A) MEM (D) → IR PC → ALU_a +1 → ALU_b ALU_c → PC
S2	I11-9 → RFA1 I8-6 → RFA2 RFD1 → T1 RFD2 → T2
S3	T1 → ALU_a T2 → ALU_b ALU_c → T3
S4	I5-3 / I8-6 → RFA3 T3 → RFD3
S5	PC → RFD3 "111" → RFA3 T2 → ALU 0 → ALU
S6	I8-0 → SE9-16 → LS7 → RFD3 I11-9 → RFA3
S7	T1 → ALU_a I5-0 → SE6-16 → ALU_b ALU_c → T1 → MEM(A)
S8	MEM (DO) → T2 → RFD3 I11-9 → RFA3
S9	RFD2 → MEM10(DI) PC → RFD3 "111" → RFA3
S10	do {MEMDAT (DO) → T2

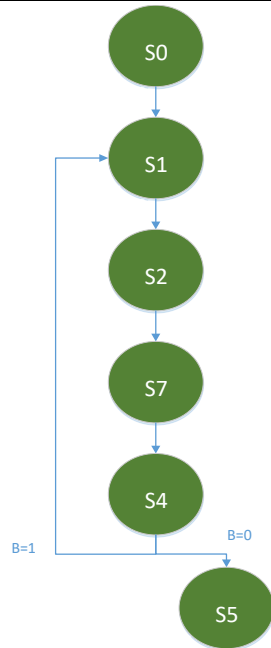
S11	T2 → RFD3 PEOUTPUT → RFA3 T1 → ALU_a +1 → ALU_b ALU_c → T1, MEM(DI)} while (! invalid_next);
S12	do {PEOUTPUT → RFA2 T1 → MEM(A)
S13	T1 → ALU_a +1 → ALU_b ALU → T1} while (! invalid_next);
S14	PC → ALU_a I5-0 → SE6-16 → ALU_b ALU_c → PC
S15	PC → RFD3 I11-9 → RFA3 PC → ALU_a I8-0 → SE9-16 → ALU_b ALU_c → PC
S16	PC → RFD3 I11-9 → RFA3 I8-6 → RFA1 RFD1 → PC
S17	T2 → ALU_a T2 → ALU_b ALU_c → T4
S18	T1 → ALU_a T4 → ALU_b ALU_c → T3
S19	I11-9 → RFA1 RFD1 → T1 T1 → ALU_a I8-0 → SE9-16 → ALU_b ALU_c → PC

# STATE FLOW DIAGRAM

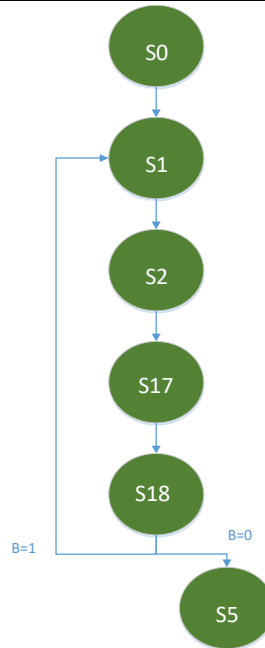
**ADD/ADC/ADZ/NDU/NDC /NDZ**



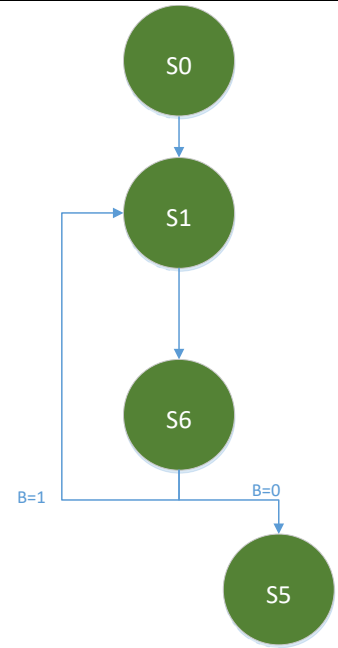
**ADI**



**ADL**



**LHI**



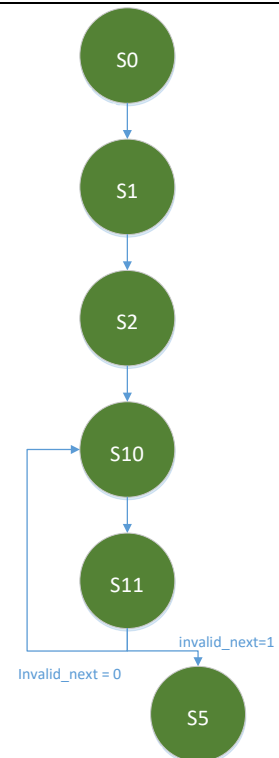
**LW**

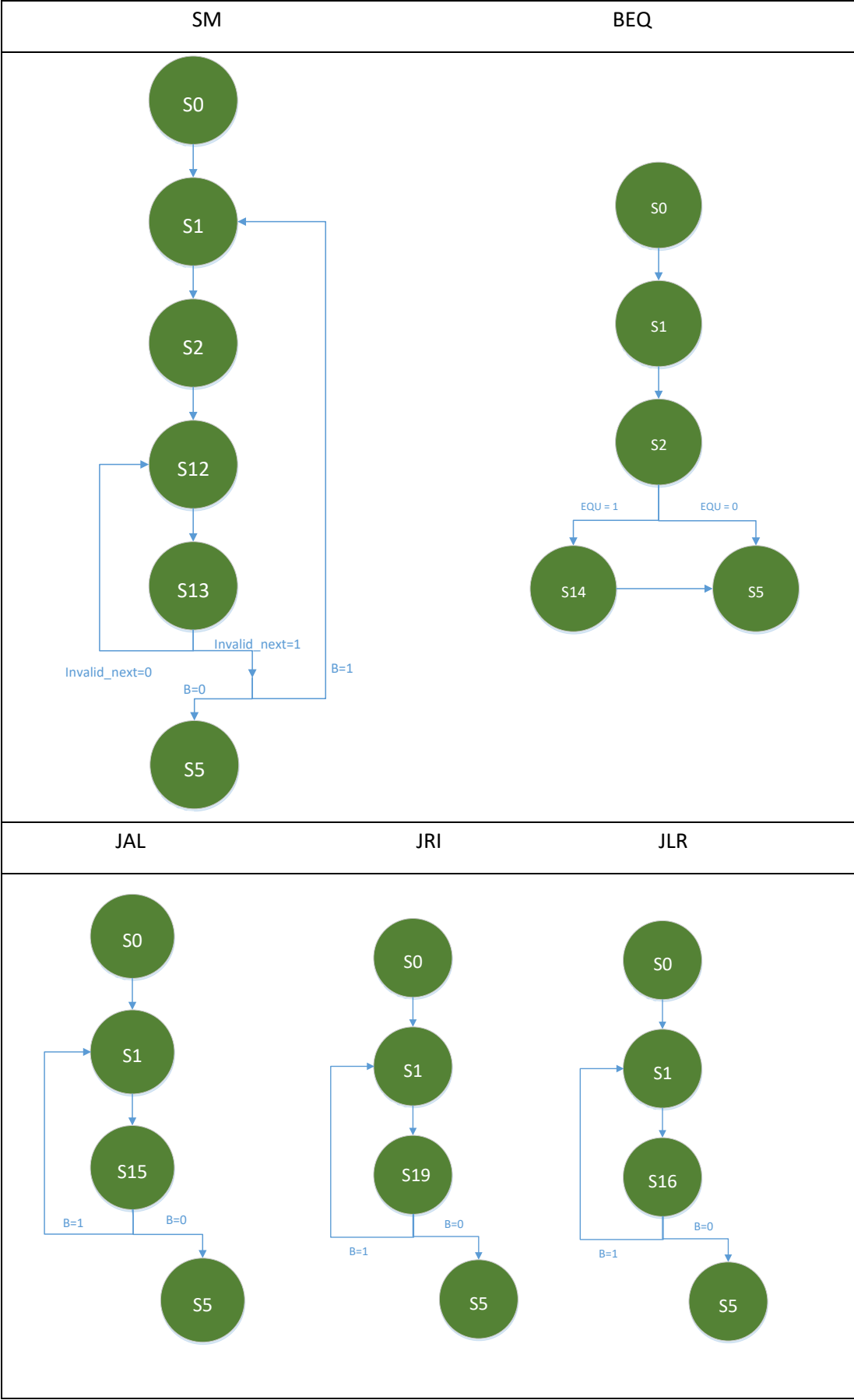


**SW**



**LM**





## INSTRUCTIONS THAT AFFECT FLAG SETTINGS

Instruction	Flags		Instruction	Flags	
	C	Z		C	Z
ADD	X	X	NDU		X
ADC	X	X	NDC		X
ADZ	X	X	NDZ		X
ADO	X	X	NDO		X
ADI	X	X	LW		X

