

EE309 PROJECT – 1

RISC – IITB MULTICYCLE IMPLEMENTATION

BY –

HARSHWARDHAN WAGHCHOURE (20D070036)

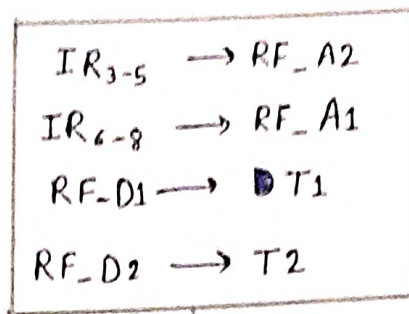
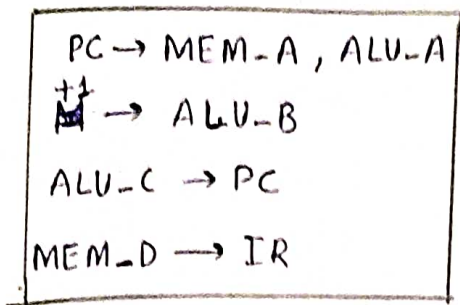
MOHIT (20D070052)

RITAM BARAI (20D070064)

SARTHAK ABHAY TONAPE (20D070084)

17. ADD

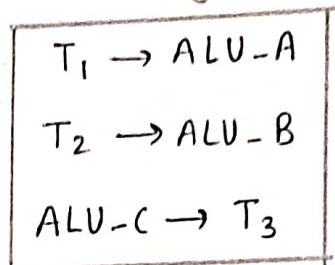
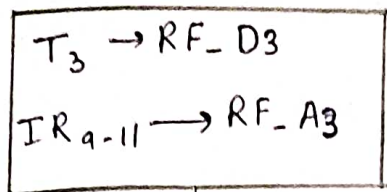
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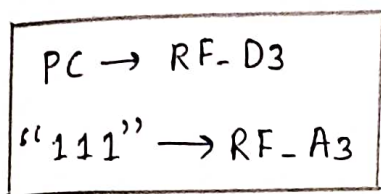
S2



S4



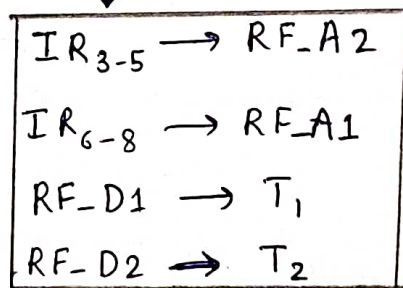
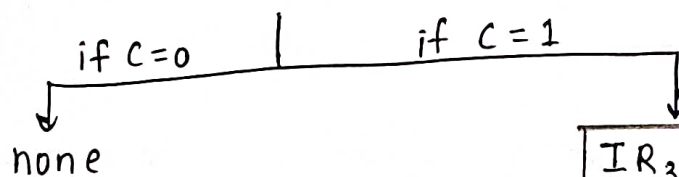
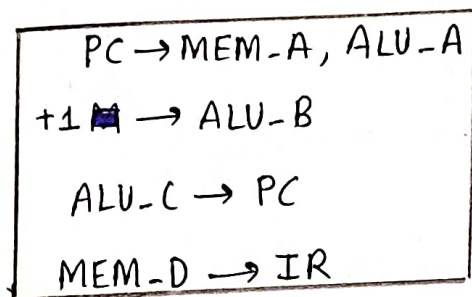
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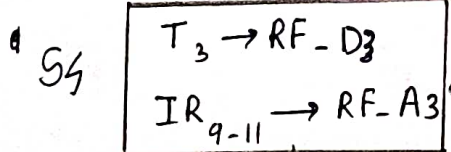
S5

27. ADC

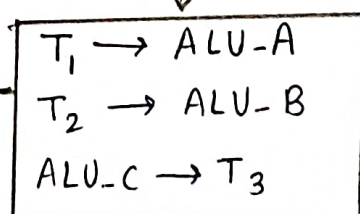
S1



S2

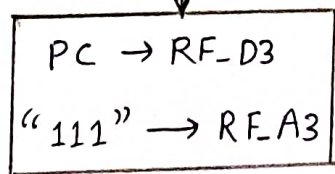


S4

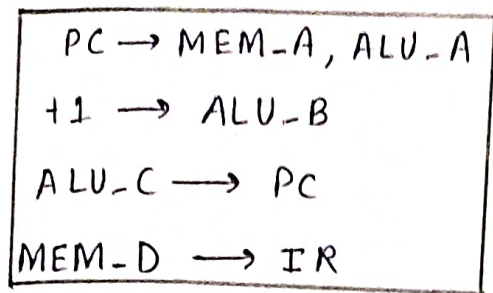


S3

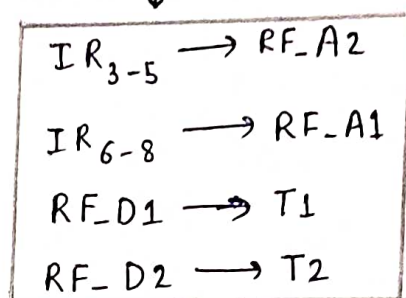
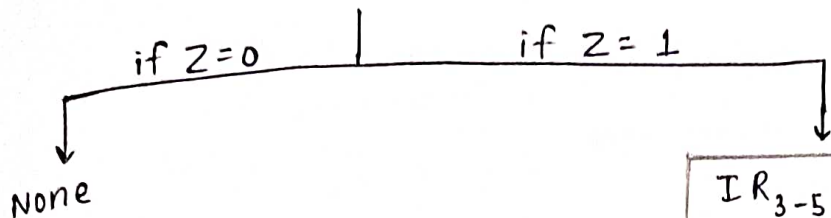
S5



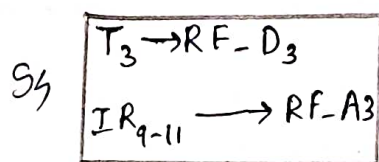
37. ADZ



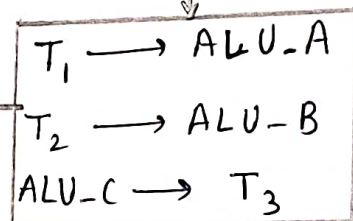
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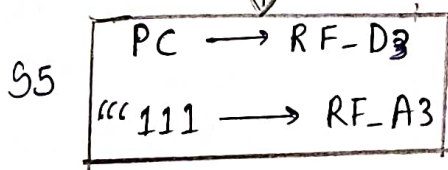
S2



S4

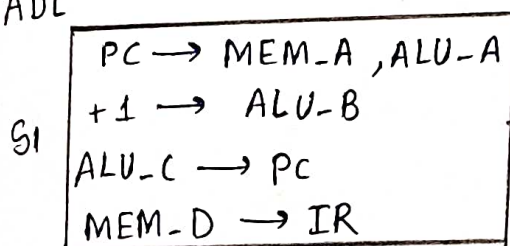


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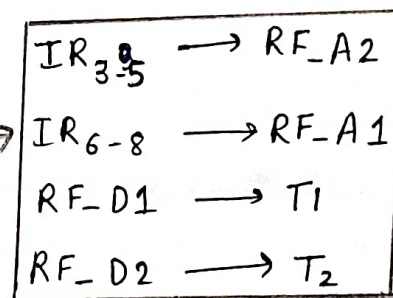


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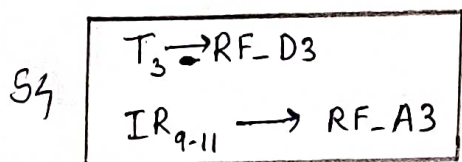
47. ADL



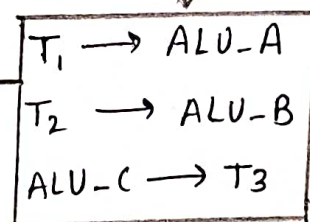
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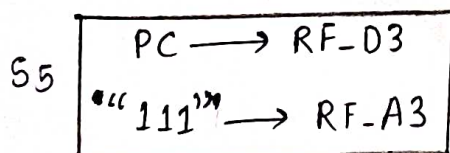
S2



S4

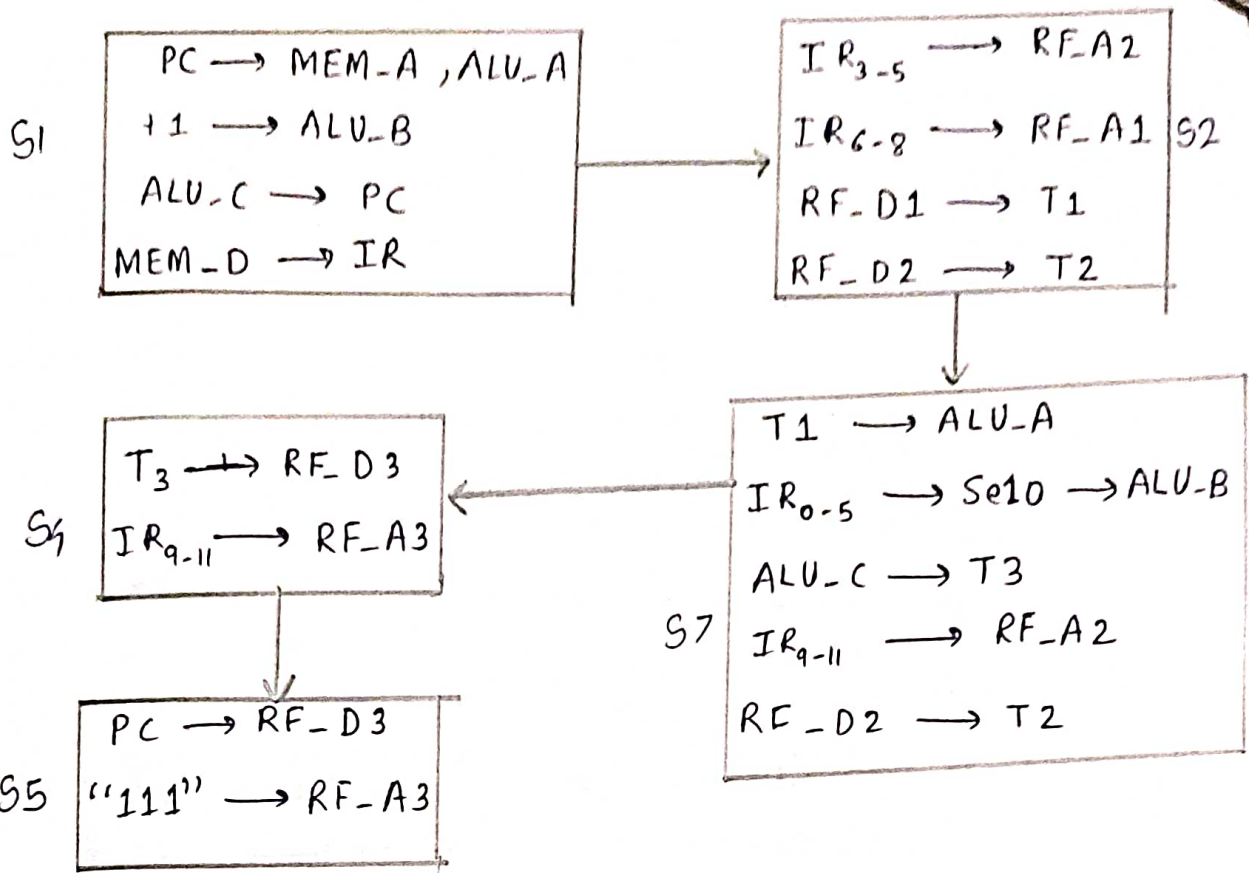


S3

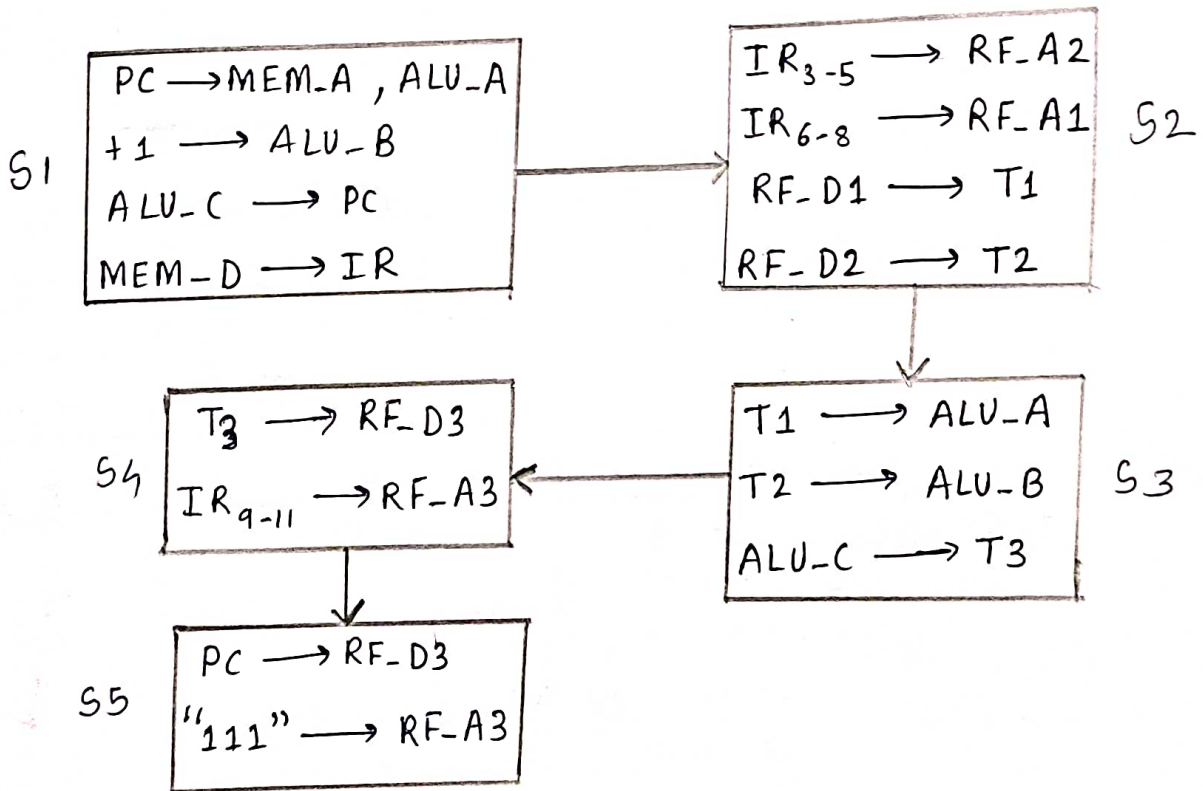


S5

57. ADI

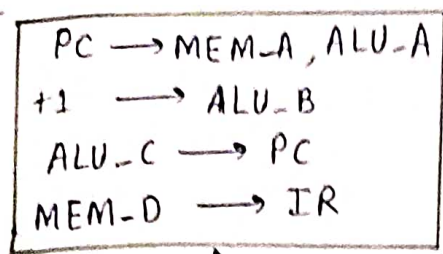


67. NDU



77 NDC

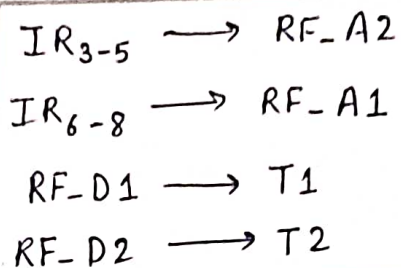
S1



C=0

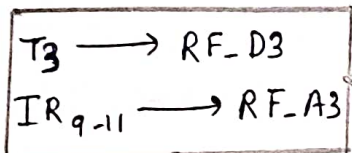
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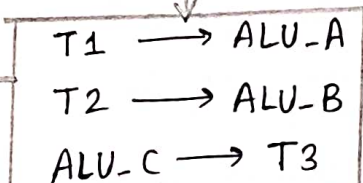
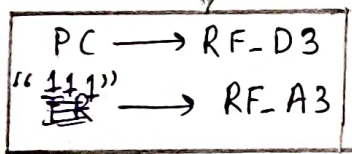


S2

S4



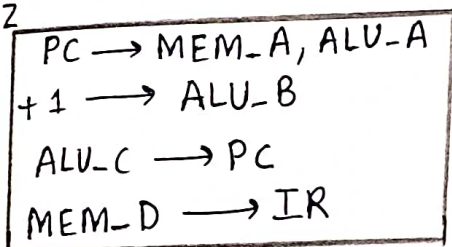
S5



S3

87 NDZ

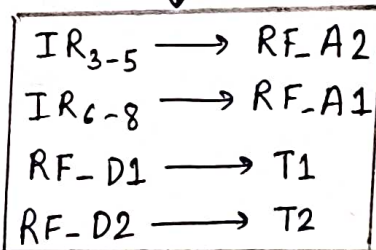
S1



Z=0

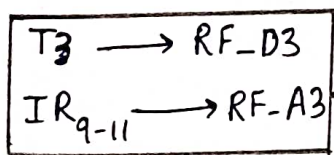
Z=1

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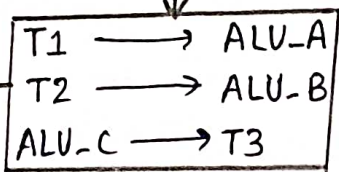
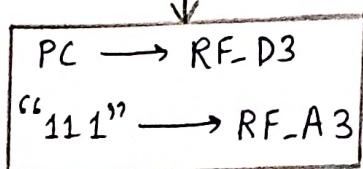


S2

S4



S5



S3

47 LHI

S1

PC \rightarrow MEM_A, ALU_A
 1 \rightarrow ALU_B
 ALU_C \rightarrow PC
 MEM_D \rightarrow IR

S8

IR₀₋₈ \rightarrow ~~27~~ \rightarrow RF_D3
 IR₉₋₁₁ \rightarrow RF_A3

PC \rightarrow RF_D3
 "111" \rightarrow RF_A3

S5

107 LW

S1

PC \rightarrow MEM_A, ALU_A
 1 \rightarrow ALU_B
 ALU_C \rightarrow PC
 MEM_D \rightarrow IR

IR₃₋₅ \rightarrow RF_A2
 IR₆₋₈ \rightarrow RF_A1
 RF_D1 \rightarrow T1
 RF_D2 \rightarrow T2

S2

S9

T3 \rightarrow MEM_A
 MEM_D \rightarrow T3

S4

T3 \rightarrow RF_D3
 IR₉₋₁₁ \rightarrow RF_A3

T1 \rightarrow ALU_A
 IR₀₋₅ \rightarrow S₁₀ \rightarrow ALU_B
 ALU_C \rightarrow T3
 IR₉₋₁₁ \rightarrow RF_A2
 RF_D2 \rightarrow T2

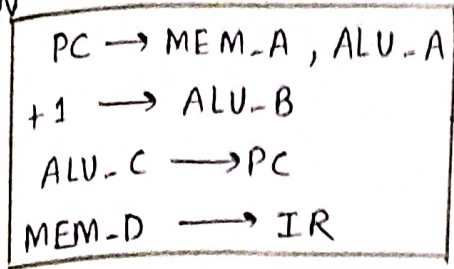
S7

S5

PC \rightarrow RF_D3
 "111" \rightarrow RF_A3

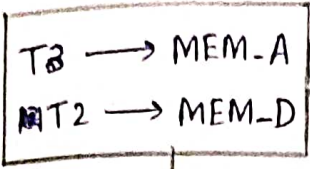
117 SW

S1

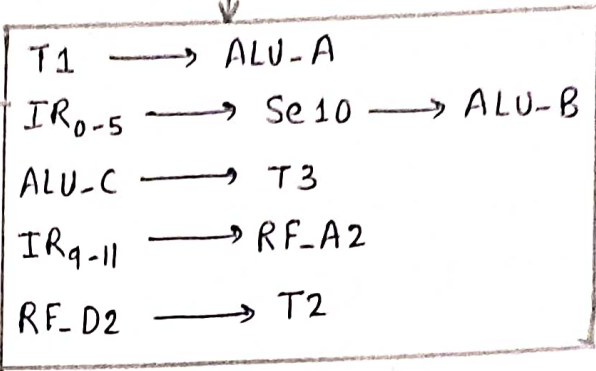
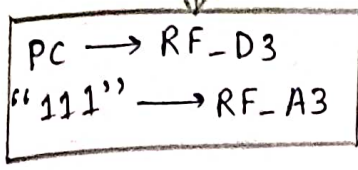


S2

S10



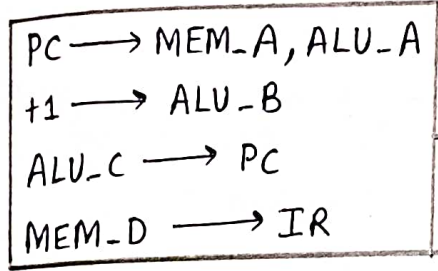
S5



S7

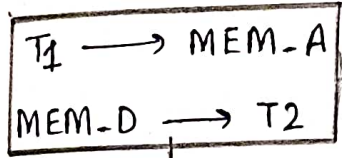
127 LM

S1

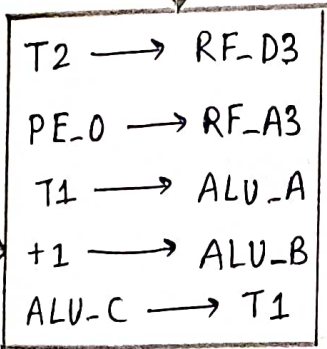


S6

S15



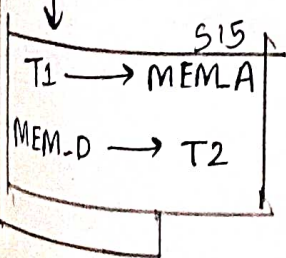
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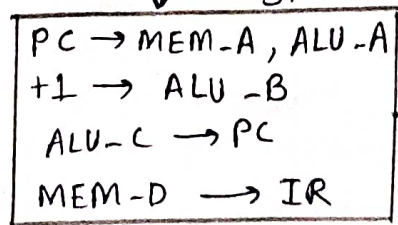
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x=1

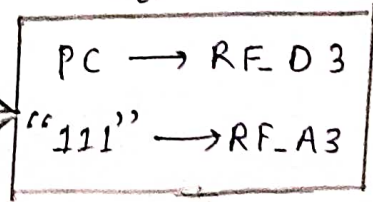
S15



S1



S5



137. SM

S1
if x=1

PC → MEM-A, ALU-A
+1 → ALU-B
ALU-C → PC
MEM-D → IR

↑ if x=1

S17

PE-0 → RF-A1
RF-D1 → T2

↓ if x=0

S18

T2 → MEM-D
T1 → MEM-A, ALU-A
+1 → ALU-B
ALU-C → T1

S6

IR₉₋₁₁ → RF-A1
IR₈₋₆ → RF-A2
RF-D1 → T1
RF-D2 → T2
PC → ALU-A
IR₀₋₅ → Se10 → ALU-B
ALU-C → T3
IR₀₋₇ → PEN

S5

PC → RF-D3
"111" → RF-A3

S6

IR₉₋₁₁ → RF-A1
IR₈₋₆ → RF-A2
RF-D1 → T1
RF-D2 → T2
PC → ALU-A
IR₀₋₅ → Se10 → ALU-B
ALU-C → T3
IR₀₋₇ → PEN

147. BEQ

S1

PC → MEM-A, ALU-A
+1 → ALU-B
ALU-C → PC
MEM-D → IR

S11

T1 → ALU-A
T2 → ALU-B

S5

PC → RF-D3
"111" → RF-A3

157. JAL

S1

PC → MEM-A, ALU-A
+1 → ALU-B
ALU-C → PC
MEM-D → IR

S12

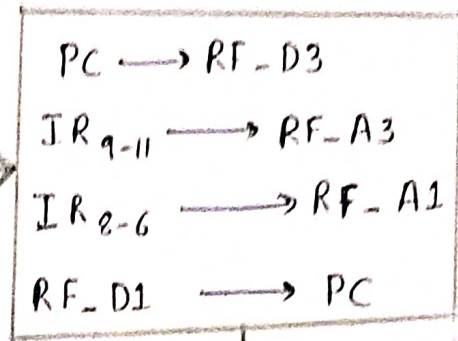
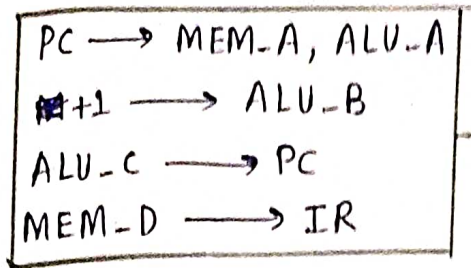
PC → RF-D3
IR₉₋₁₁ → RF-A3
IR₀₋₈ → Se7 → ALU-A
PC → ALU-B
ALU-C → PC

S5

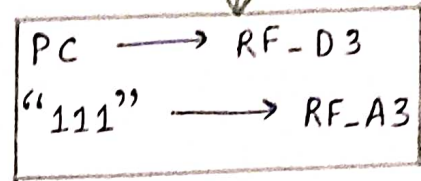
PC → RF-D3
"111" → RF-A3

167. JLR

S1



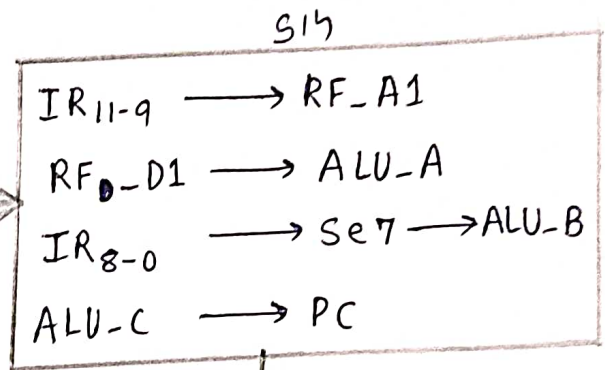
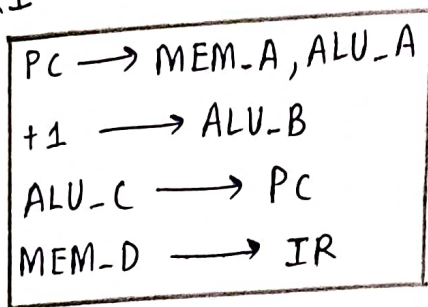
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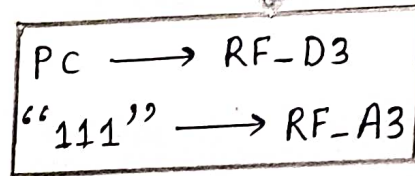
S5

177. JRI

S1



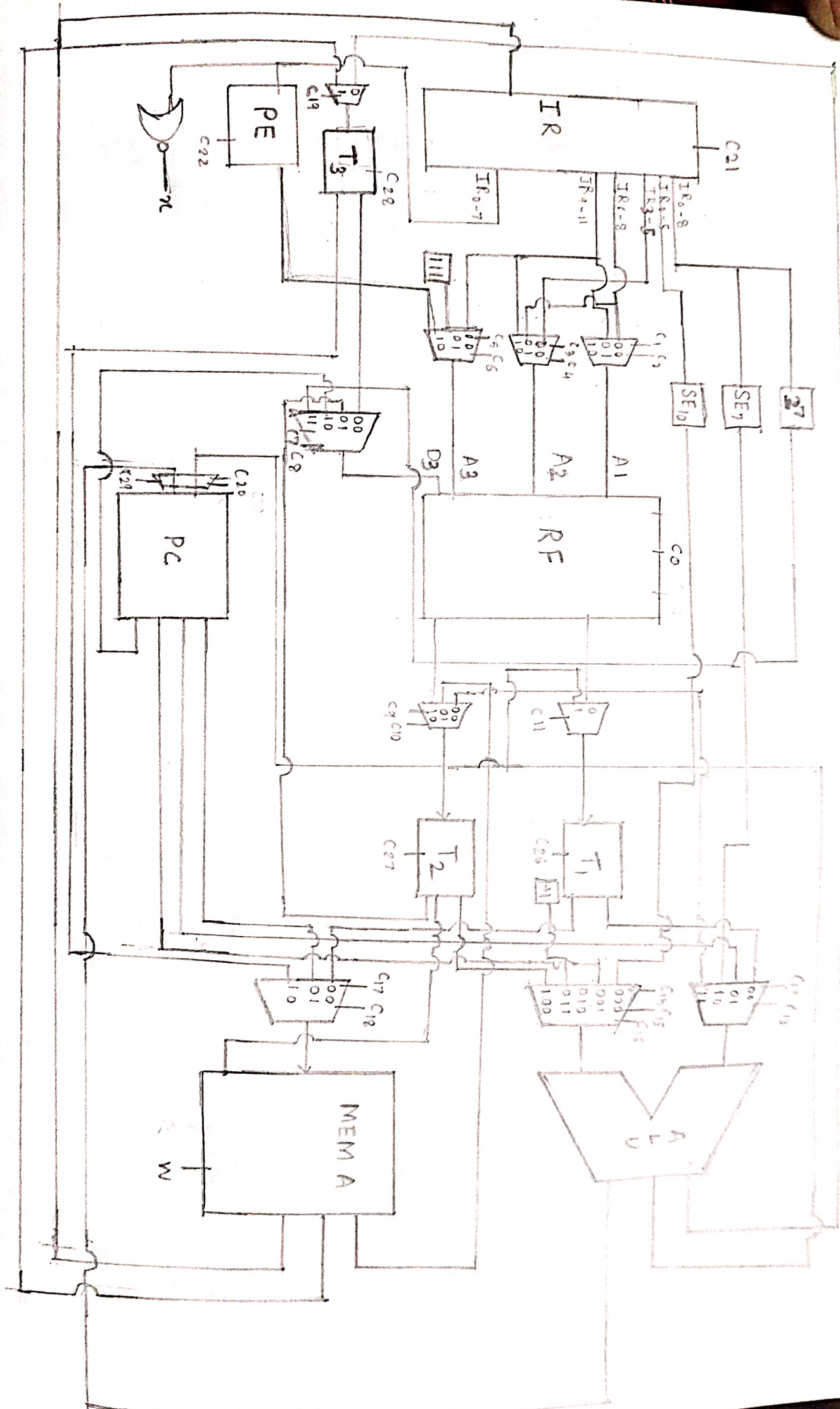
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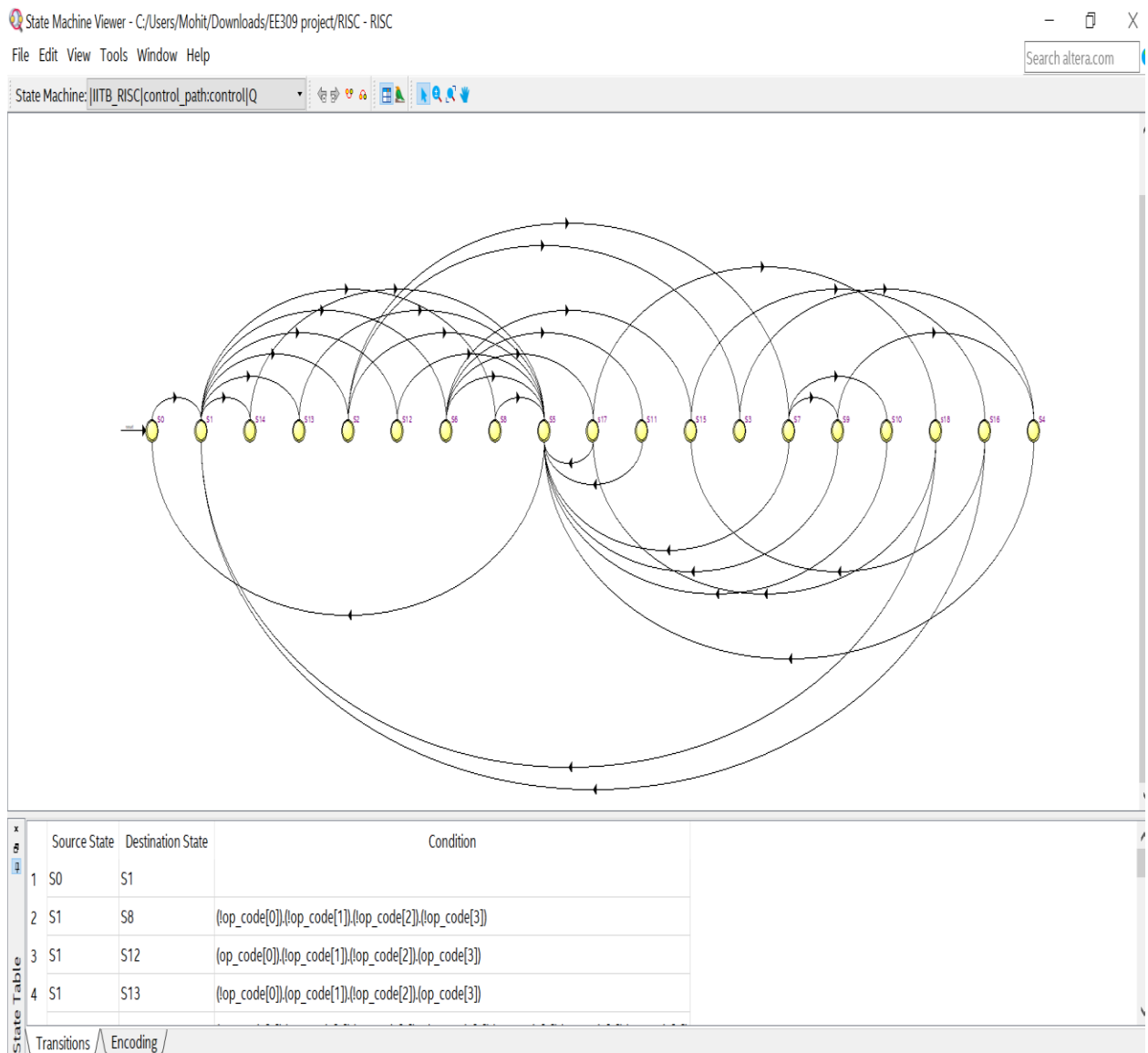
S5

No. of states:- 18

No. of control pins:- 28



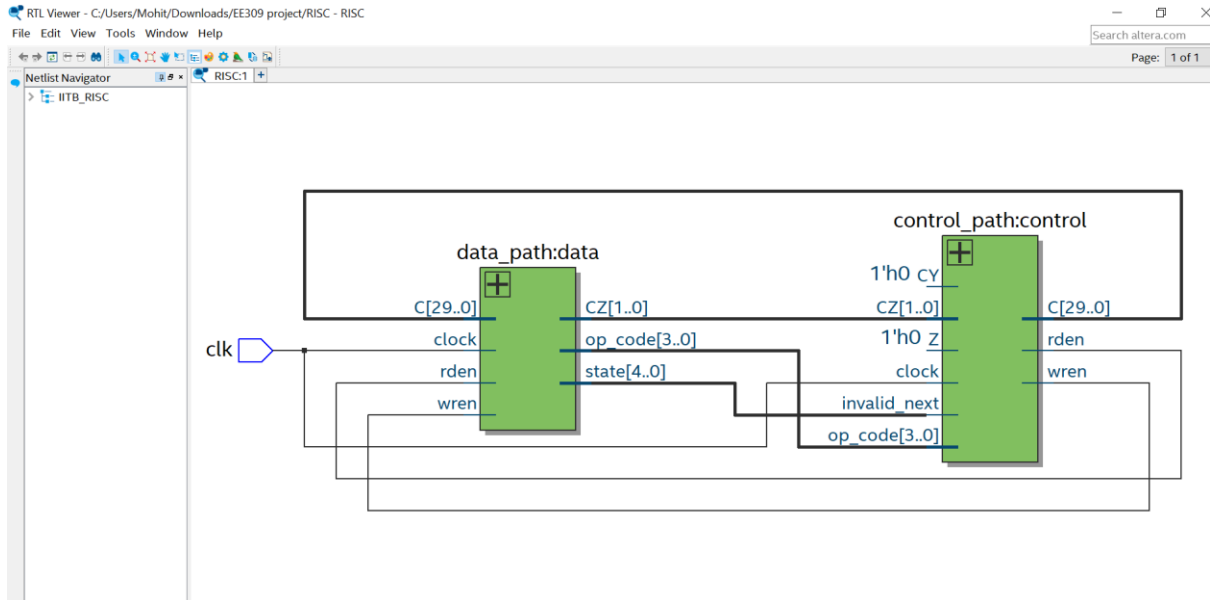
STATE TRANSITION MACHINE



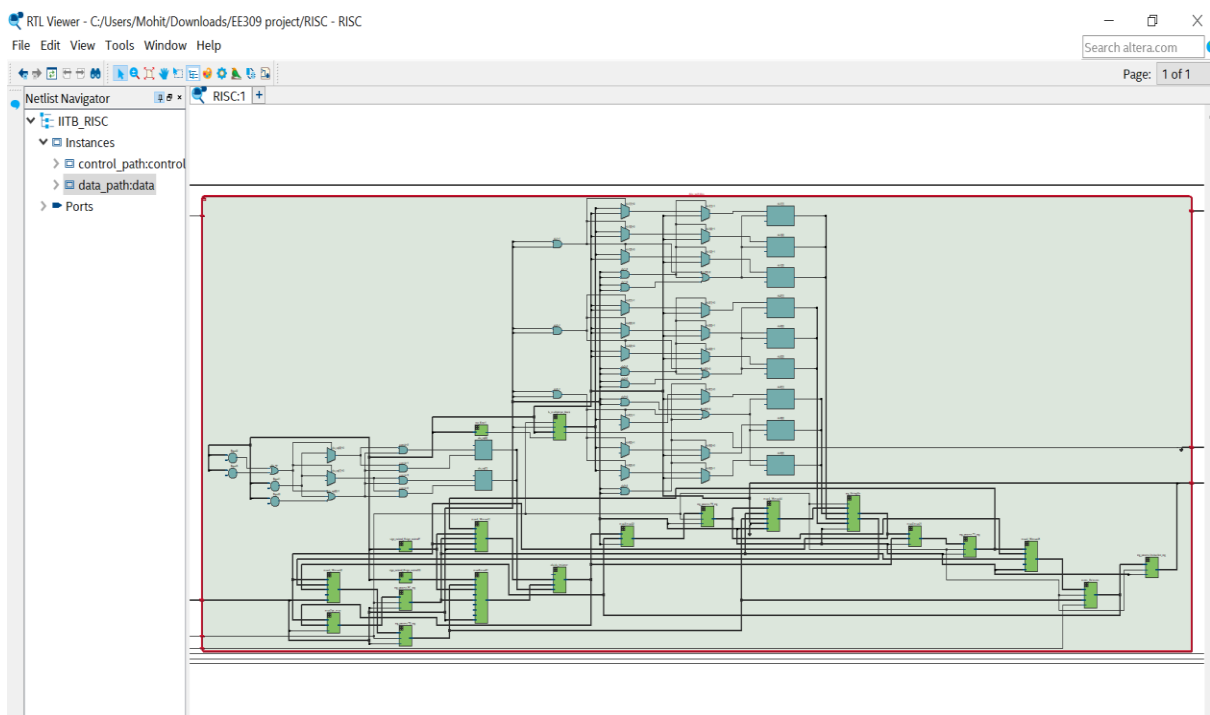
CONTROL FLOWCHART

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S1		0	0											1	0	1	0	1	1	0	1			1	0	0	0	0	1
S2			1	0	0	0	0					1	0	0										0	0	1	1	0	0
S3			0												0	0	1	0	0			0		0	0	0	0	1	0
S4			1					0	0	0	0													0	0	0	0	0	0
S5			1					0	1	1	0													0	0	0	0	0	0
S6			1	0	1	0	1					1	0	0	0	1	0	0	0			0		0	1	1	1	1	0
S7			1			1	0					1	0		0	0	0	0	0			0		0	0	0	1	1	0
S8			1					0	0	1	1													0	0	0	0	0	0
S9		0	0																	1	0	1		0	0	0	0	1	0
S10		1	0																	1	0			0	0	0	0	0	0
S11			0												0	0	1	0	0				1	0	0	0	0	0	0
S12			1					0	0	1	0				1	0	0	0	1					0	0	0	0	0	1
S13			1	0	0			0	0	1	0												0	0	0	0	0	0	1
S14			1	0	1										1	1	0	1	0				1	0	0	0	0	0	1
S15		0	0									0	1							0	0			0	0	0	1	0	0
S16			1					1	0	0	1			1	0	0	0	1	1					0	1	1	0	0	0
S17			1	1	0							0	0											0	1	0	1	0	0
S18		1	0											1	0	0	0	1	1	0				0	0	1	0	0	0

IITB_RISC



DATA PATH



CONTROL PATH

