

R-type :

4	3	3	3	1	2
op code	$R_c$	$R_a$	$R_b$		$CZ$

(i) ADD  $R_c R_a R_b$

pc $\rightarrow$ mem_addr	ir
mem_data $\rightarrow$ ir	nop
	MDR
fetch	none deco

MR=1

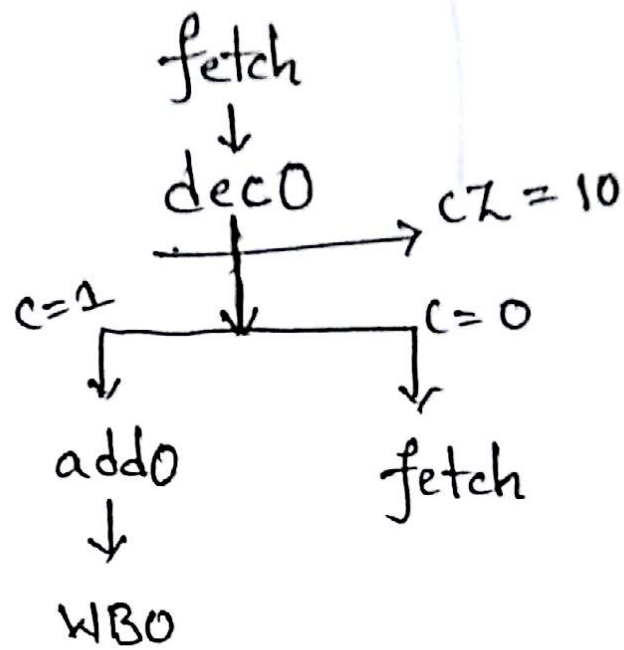
ir <sub>3-5</sub> $\rightarrow A_1$ -RF	none
ir <sub>6-8</sub> $\rightarrow A_2$ -RF	add
ir <sub>9-11</sub> $\rightarrow A_3$ -RF	
D <sub>1</sub> -AF $\rightarrow b$	
D <sub>2</sub> -AF $\rightarrow a$	
pc $\rightarrow$ alu	
+1 $\rightarrow$ alu	
alu $\rightarrow$ pc	
deco	none addo

CZ=00

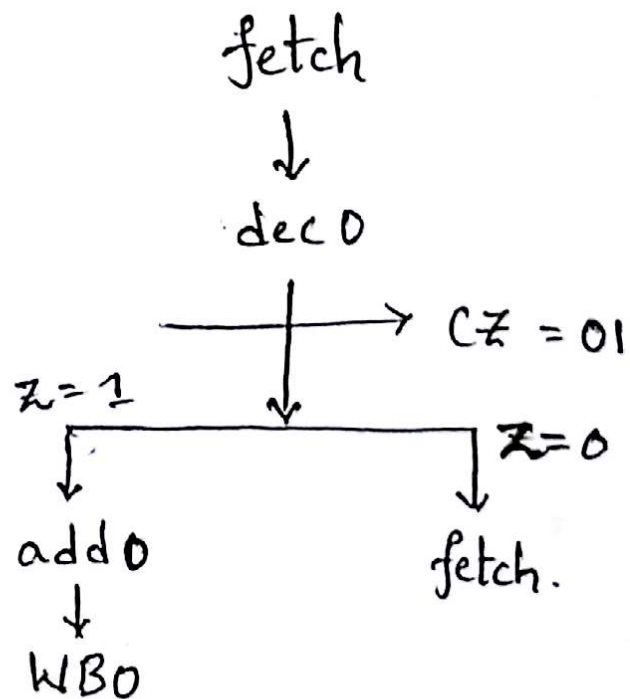
a $\rightarrow$ alu	none
b $\rightarrow$ alu	add
alu $\rightarrow$ c	
addo	none WBO

C $\rightarrow$ D <sub>3</sub> -RF	none
	nop
WBO	none fetch

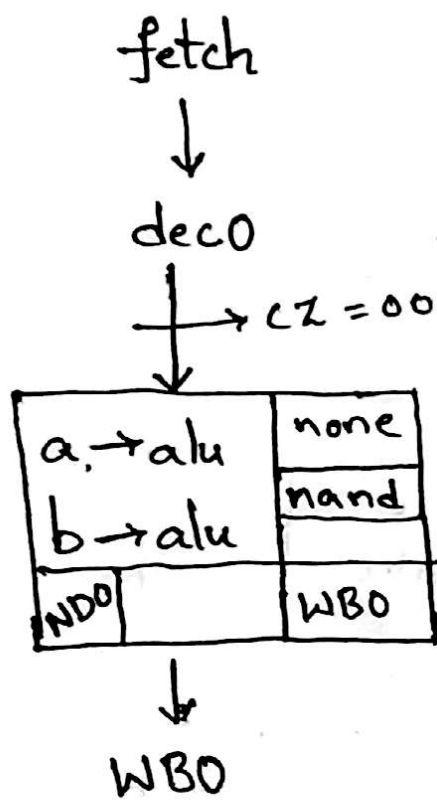
(ii) ADC  $R_c R_a R_b$



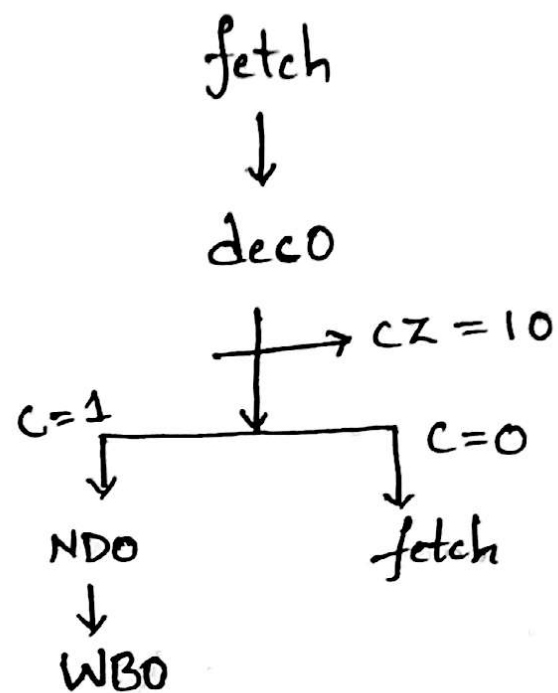
(iii) ADZ  $R_c R_a R_b$



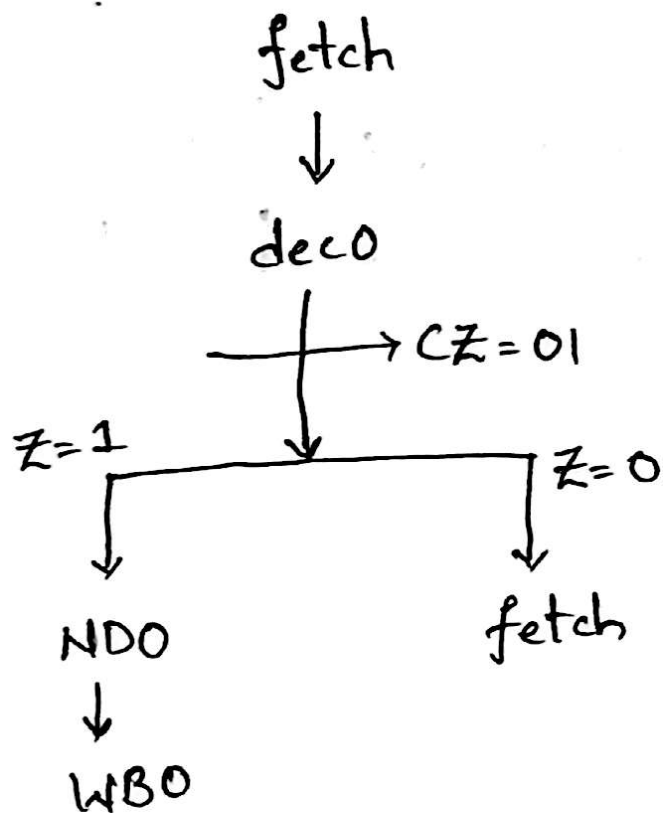
(iv) NDU  $R_c R_a R_b$



(v) NDC  $R_c R_a R_b$



(vi) NDZ  $R_c R_a R_b$



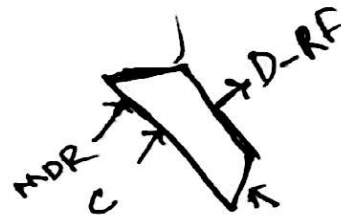
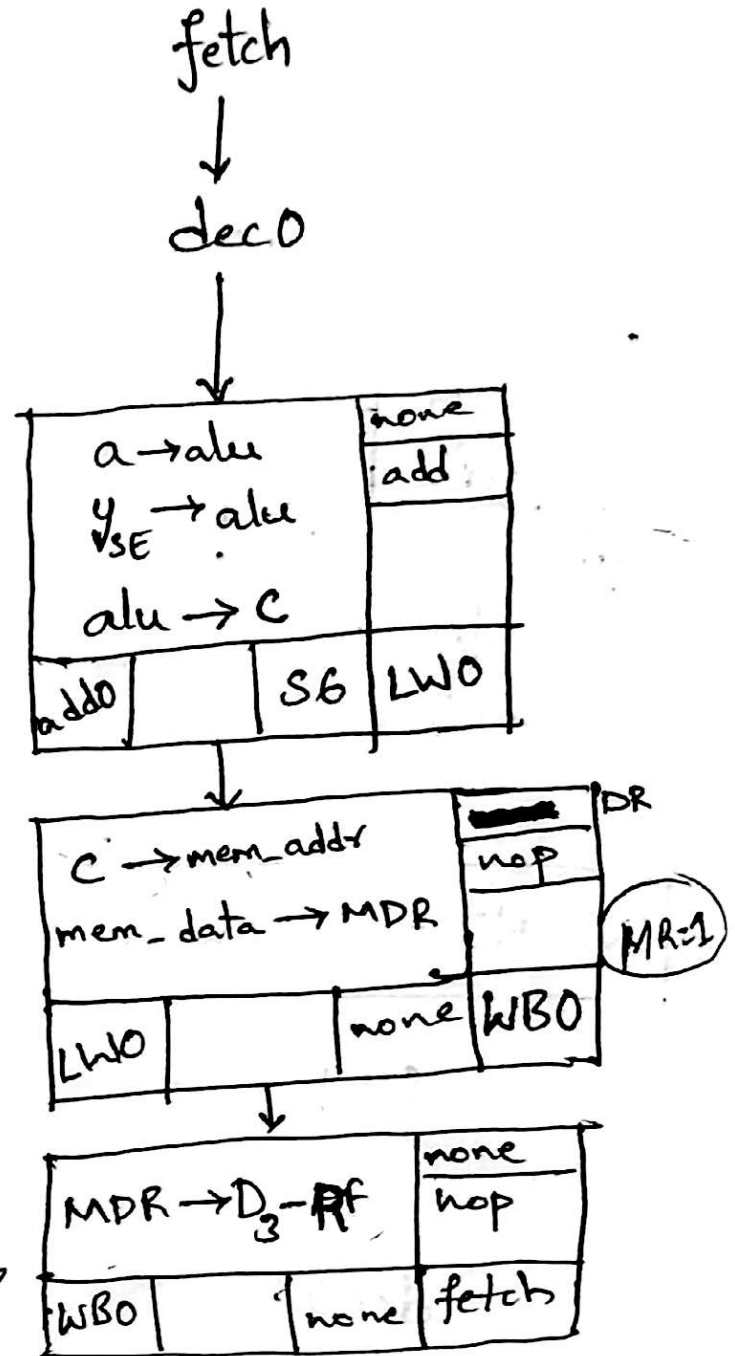
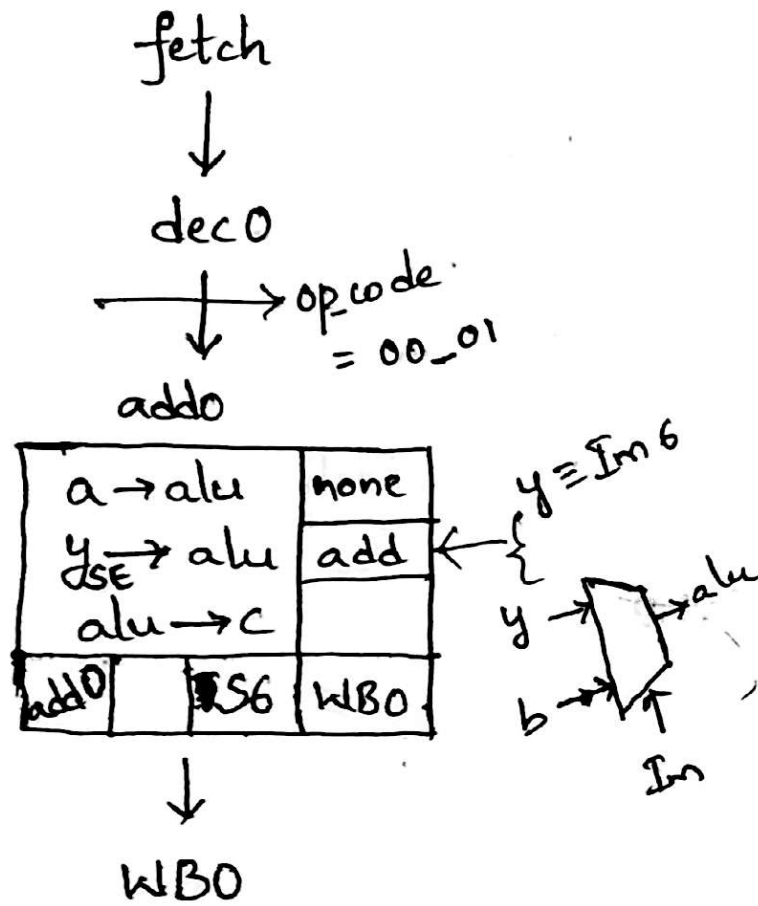
I-type:



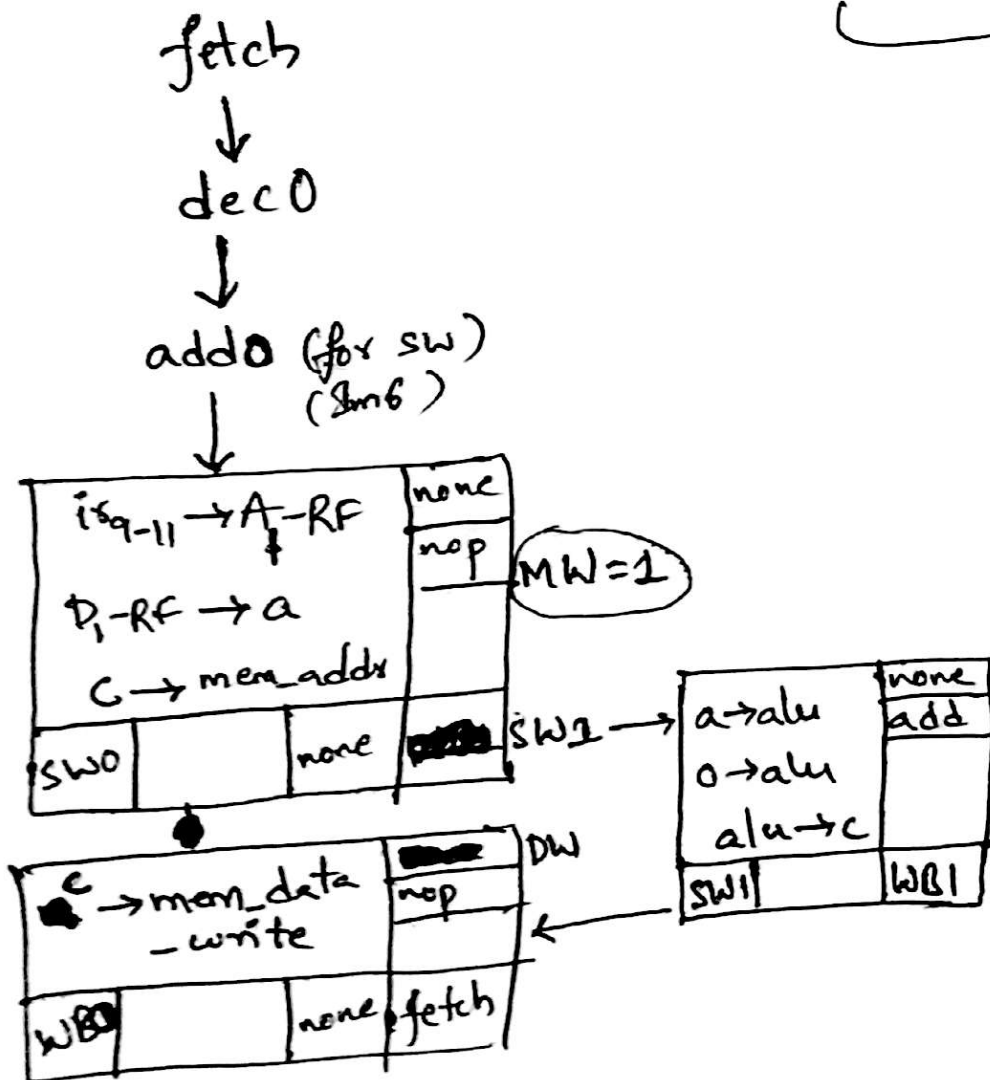
op-code

(vii) ADI R<sub>c</sub> R<sub>a</sub> Im6

(viii) LW R<sub>c</sub> R<sub>a</sub> Im6



(ix) SW R<sub>c</sub> R<sub>a</sub> Im6



(x) BEQ Ra, Rb Imm6

fetch



~~dec1~~

→ op-code 1xxx  
~~#00~~

ix <sub>9-11</sub> → A <sub>1</sub> -RF	none
A <sub>3</sub> -RF	none
ix <sub>6-8</sub> → A <sub>2</sub> -RF	
D <sub>1</sub> -RF → b	
D <sub>2</sub> -RF → a	none
dec1	none breq



a → alu	none
b → alu	equal
	none
breq	none bc

↓ e=1

pc → alu	none
SE → alu	add
alu → pc	
breq1	56

↓ e=0

pc → alu	none
H → alu	add
alu → pc	
IPC	none fetch

Partial of JAL (ix)

fetch



ix <sub>9-11</sub> → A <sub>1</sub> -RF	none
A <sub>3</sub> -RF	none
ix <sub>6-8</sub> → A <sub>2</sub> -RF	
D <sub>1</sub> -RF → b	
D <sub>2</sub> -RF → a	none
dec1	none breq



pc → alu	none
H → alu	add
alu → pc	
IPC	none fetch

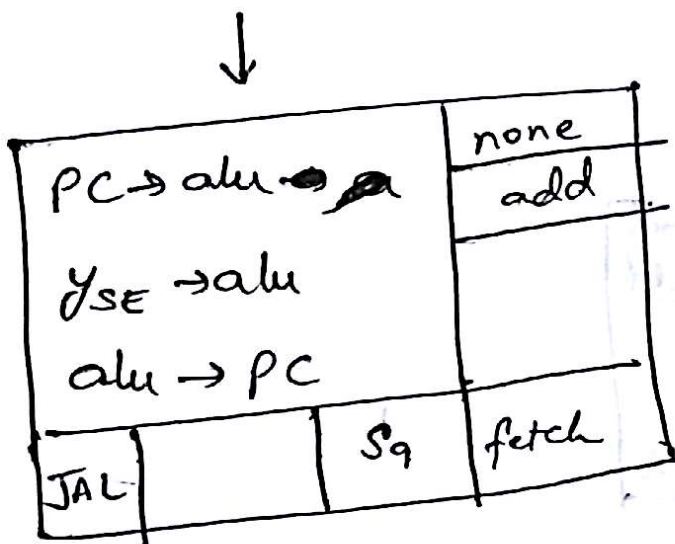
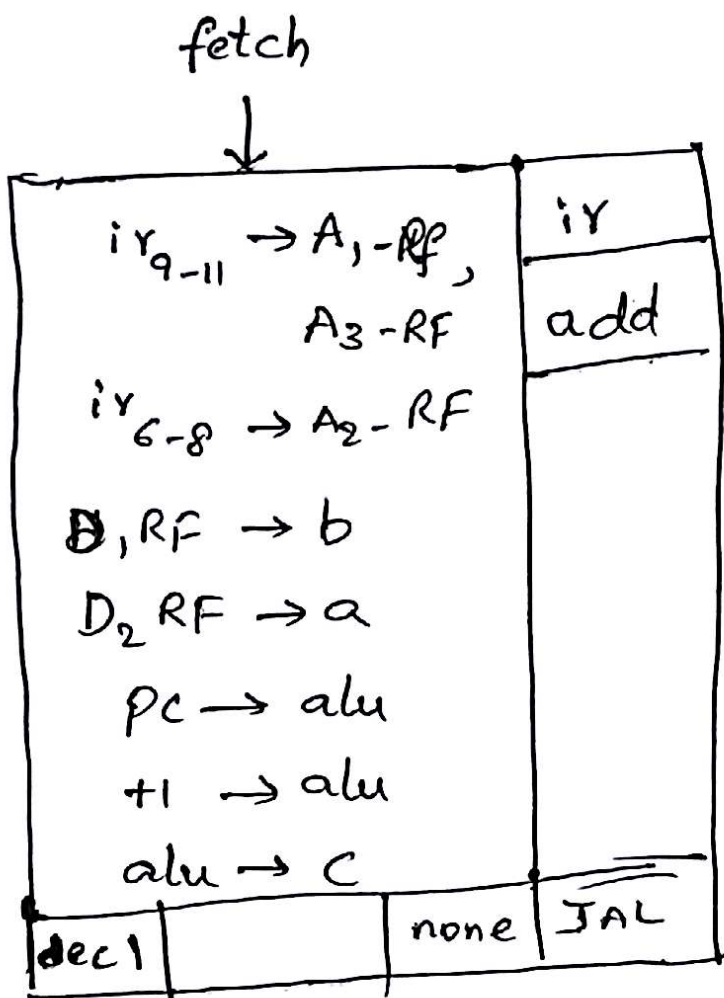


084



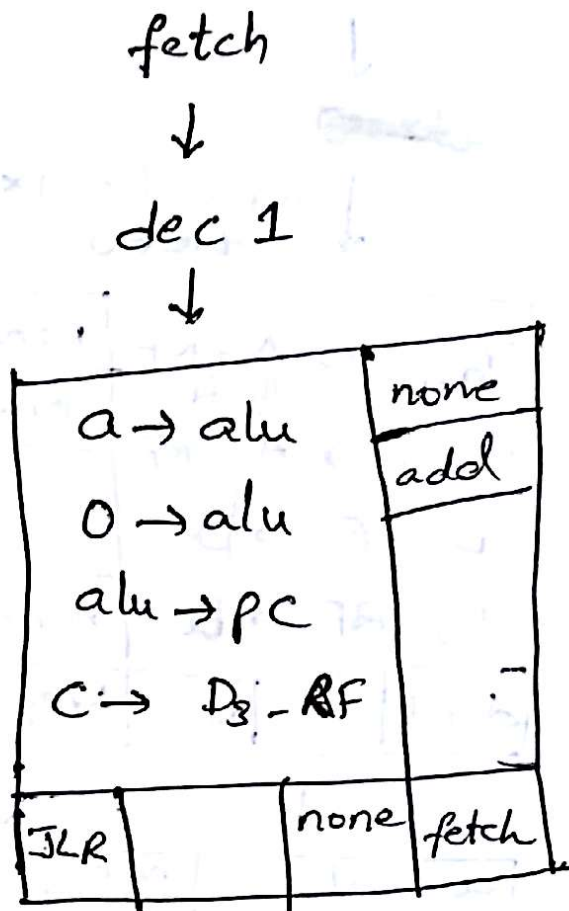
# J-type

(xi) JAL  $r_a$  Imm9



↓  
WBO

(xii) JLR  $r_a, r_b, 000000$



(xii) LHI    Ra    Imm?

fetch

↓

dec 1

↓

Y <sub>EE</sub> → D <sub>3</sub> -RF C → PC		none
		none
ΔH		Sq