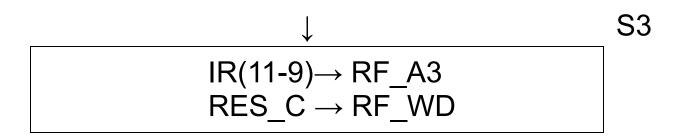
## **FLOWCHART**

RAUSHAN KUMAR MONU KUMAR YADAV Akshay Kaushal

#### R-Type instruction

Op_code	Rc	Rb	а	С	fn
15 – 12	11–9	8–6	5–3	2	1–0

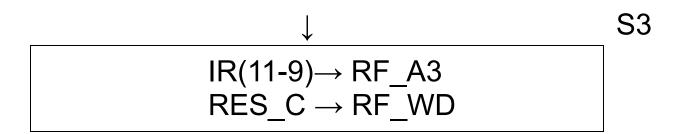
 $\begin{array}{c} PC \rightarrow MEM \rightarrow IR \\ PC \rightarrow PC+1 \end{array}$   $\downarrow \qquad \qquad S1$   $\begin{array}{c} IR(8\text{-}6) \rightarrow RF\_A1 \\ IR(5\text{-}3) \rightarrow RF\_A2 \\ RF\_D1 \rightarrow RES\_A \\ RF\_D2 \rightarrow RES\_B \end{array}$   $\downarrow \qquad \qquad S2$   $\begin{array}{c} RES\_A \rightarrow ALU\_A \\ RES\_B \rightarrow ALU\_B \\ ALU\_OUT \rightarrow RES\_C \end{array}$ 



#### I-Type instruction

ADI:-

Op_code	Rb	Ra	IMM-6BIT
15 – 12	11 – 9	8 – 6	5 — 0



LW:-

Op_code	Rb	Ra	IMM-6BIT
15 – 12	11 – 9	8 – 6	5 — 0

RES\_C 
$$\rightarrow$$
 ADDRM  
RD  $\rightarrow$  DR  $\rightarrow$  RF\_WD  
IR(11-9)  $\rightarrow$  RF\_A3

SW:-

Op_code	Rb	Ra	IMM-6BIT
15 – 12	11 – 9	8 – 6	5 — 0

PC  $\rightarrow$  MEM  $\rightarrow$  IR PC  $\rightarrow$  PC+1  $\downarrow$   $IR(8-6) \rightarrow RF\_A1$   $IR(5-0) \rightarrow SE-16 \rightarrow ALU\_B$   $RF\_D1 \rightarrow RES\_A$   $\downarrow$   $RES\_A \rightarrow ALU\_A$   $SE-16 \rightarrow ALU\_B$   $ALU\_OUT \rightarrow RES\_C$   $\downarrow$  S7

RES\_C 
$$\rightarrow$$
 ADDRM  
IR(11-9)  $\rightarrow$  RF\_A2  
RF\_D2  $\rightarrow$  RES\_B  
RES\_B  $\rightarrow$  WD

BEQ:-

Op_code	Rb	Ra	IMM-6BIT
15 – 12	11 – 9	8 – 6	5 — 0

PC 
$$\rightarrow$$
 MEM  $\rightarrow$  IR  
PC  $\rightarrow$  PC+1

$$\downarrow$$
S8

$$IR(11-9) \rightarrow RF\_A2$$

$$IR(8-6) \rightarrow RF\_A1$$

$$RF\_D1 \rightarrow RES\_A \rightarrow ALU\_A$$

$$RF\_D2 \rightarrow RES\_B \rightarrow ALU\_B$$

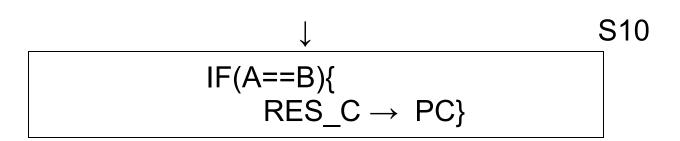
$$\downarrow$$

$$\downarrow$$

$$IR(5-0) \rightarrow SE-16 \rightarrow ALU\_B$$

$$PC \rightarrow ALU\_A$$

$$ALU\_OUT \rightarrow RES\_C$$



JLR:-

Op_code	Ra	Rb	IMM-6BIT
15 – 12	11 – 9	8 – 6	000000

### J-Type instruction:-

LHI:-

Op_code	Ra	IMM-9BIT
15 – 12	11 – 9	8 – 0

PC 
$$\rightarrow$$
 MEM  $\rightarrow$  IR  
PC  $\rightarrow$  PC+1
$$\downarrow$$
S13
$$IR(8-0) \rightarrow SE16 \rightarrow S7 \rightarrow RF\_WD$$

$$IR(11-9) \rightarrow RF\_A3$$

JRI:-

Op_code	Ra	IMM-9BIT	
15 – 12	11 – 9	8 – 0	

PC 
$$\rightarrow$$
 MEM  $\rightarrow$  IR  
PC  $\rightarrow$  PC+1

$$\downarrow$$
S14

IR(11-9)  $\rightarrow$  RF\_A2  
IR(8-0)  $\rightarrow$  SE16  $\rightarrow$  ALU\_B  
RF\_D2  $\rightarrow$  ALU\_B  
ALU\_OUT  $\rightarrow$  PC

LM:-

Op_code	Ra	IMM-9BIT
15 – 12	11 – 9	8 – 0

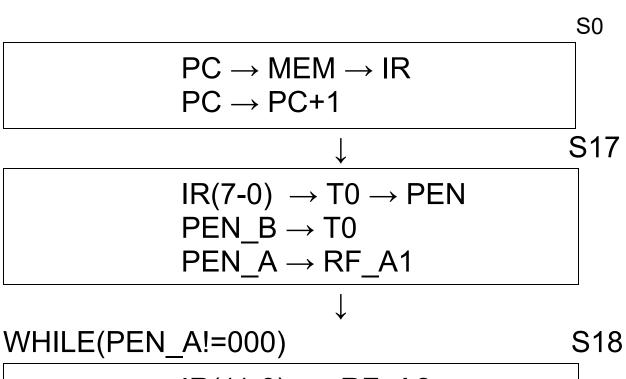
WHILE(PEN\_A!=000)

**S16** 

IR(11-9) 
$$\rightarrow$$
 RF\_A2  
RD  $\rightarrow$  DR  $\rightarrow$  RF\_WD  
RF\_D2  $\rightarrow$  ADDRM

SM:-

Op_code	Ra	IMM-9BIT
15 – 12	11 – 9	8 – 0



IR(11-9) 
$$\rightarrow$$
 RF\_A2  
RF\_D1  $\rightarrow$  WD  
RF\_D2  $\rightarrow$  ADDRM

JAL:-

Op_code	Ra	IMM-9BIT
15 – 12	11 – 9	8 – 0

 $\begin{array}{c} \text{PC} \rightarrow \text{MEM} \rightarrow \text{IR} \\ \text{PC} \rightarrow \text{PC+1} \\ & \downarrow \\ & \downarrow \\ \text{PC} \rightarrow \text{ALU}\_A \\ +1 \rightarrow \text{ALU}\_B \\ \text{IR}(11-9) \rightarrow \text{RF}\_A3 \\ \text{ALU}\_\text{OUT} \rightarrow \text{RF}\_\text{WD} \\ \downarrow \\ \end{array}$ 

**S19** 

PC  $\rightarrow$  ALU\_A IR(8-0)  $\rightarrow$  SE16  $\rightarrow$  ALU\_B ALU\_OUT  $\rightarrow$  RES\_C

# $\mathsf{RES\_C} \, \to \mathsf{PC}$