

1. add r_c, r_a, r_b

$PC \rightarrow MEMA, aluA$
 $+4 \rightarrow aluB$
 $aluC \rightarrow PC$
 $MEND \rightarrow IR$

$IR_{11-9} \rightarrow RF-A1$
 $IR_{8-6} \rightarrow RF-A2$
 $RF-D1 \rightarrow T1$
 $RF-D2 \rightarrow T2$

$T1 \rightarrow aluA$
 $T2 \rightarrow aluB$
 $aluC \rightarrow T3$

$IR_{5-3} \rightarrow RF-A3$
 $T3 \rightarrow RF-D3$

2. adc rc,ra,rb.

PC \rightarrow memA, aluA
+4 \rightarrow aluB
aluC \rightarrow PC.
memD \rightarrow IR



IR₁₁₋₉ \rightarrow RF-A1
IR₈₋₆ \rightarrow RF-A2
RF-D1 \rightarrow T1
RF-D2 \rightarrow T2



T1 \rightarrow aluA
T2 \rightarrow aluB
aluC \rightarrow T3



if (C == 1), then
IR₅₋₃ \rightarrow RF-A3
T3 \rightarrow RF-D3

③ ROZ RA RB RC

PC \rightarrow memA, aluA
+4 \rightarrow aluB
aluC \rightarrow PC
memD \rightarrow IR



IR₉₋₁₁ \rightarrow RF-A1
IR₆₋₈ \rightarrow RF-A2
RF.D1 \rightarrow T1
RF.D2 \rightarrow T2



T1 \rightarrow aluA
T2 \rightarrow aluB
aluC \rightarrow T3



if (z == 1).
IR₅₋₃ \rightarrow RF-A3
T3 \rightarrow RF-D3

4. add r_c, r_a, r_b .

PC \rightarrow aluA, memA
+4 \rightarrow aluB
aluC \rightarrow PC
memD \rightarrow IR



IR₁₁₋₉ \rightarrow RF-A1
IR₈₋₆ \rightarrow RF-A2
RF-D1 \rightarrow T1
RF-D2 \rightarrow T2



T1 \rightarrow aluA
T2 \rightarrow is \rightarrow aluB
aluC \rightarrow T3



IR₅₋₃ \rightarrow RF-A3
T3 \rightarrow RF-D3

⑤ ADD RA, RB, 6-bit Immediate

PC \rightarrow mem A, alw A
+4 \rightarrow alw B
Mem D \rightarrow IR
alw C \rightarrow PC

IR₀₋₅ \rightarrow SE8 \rightarrow T2
IR₉₋₁₁ \rightarrow RF.A1
RF.D1 \rightarrow T1

T1 \rightarrow alw A
T2 \rightarrow alw B
alw C \rightarrow T3

T3 \rightarrow RF.D3
IR₆₋₈ \rightarrow RF.A3

6. ndu π_c, π_a, π_b

$PC \rightarrow memA, aluA$
 $+4 \rightarrow aluB$
 $aluC \rightarrow PC$
 $memD \rightarrow IR$



$IR_{11-9} \rightarrow RF-A1$
 $IR_{8-6} \rightarrow RF-A2$
 $RF-D1 \rightarrow T1$
 $RF-D2 \rightarrow T2$



$T1 \rightarrow aluA$
 $T2 \rightarrow aluB$
 $aluC \rightarrow T3$



$IR_{5-3} \rightarrow RF-A3$
 $T3 \rightarrow RF-D3$

⑦ NDC RA, RB, RC

PC \rightarrow memA, alwA
+4 \rightarrow alwB
alwC \rightarrow PC
memD \rightarrow IR



IR₉₋₁₁ \rightarrow RF.A1
IR₆₋₈ \rightarrow RF.A2
RF.D1 \rightarrow T1
RF.D2 \rightarrow T2



T1 \rightarrow alwA
T2 \rightarrow alwB
alwC \rightarrow T3



if (c == 1)
IR₃₋₅ \rightarrow RF.A3
T3 \rightarrow RF.D3

8. ndz zc, za, zb

PC \rightarrow memA, aluA
+ 4 \rightarrow aluB
aluC \rightarrow PC
memD \rightarrow IR

IR₁₁₋₉ \rightarrow RF-A1
IR₈₋₆ \rightarrow RF-A2
RF-D1 \rightarrow T1
RF-D2 \rightarrow T2

T1 \rightarrow aluA
T2 \rightarrow aluB
aluC \rightarrow T3

if (Z == 1) then,
IR₅₋₃ \rightarrow RF-A3
T3 \rightarrow RF-D3

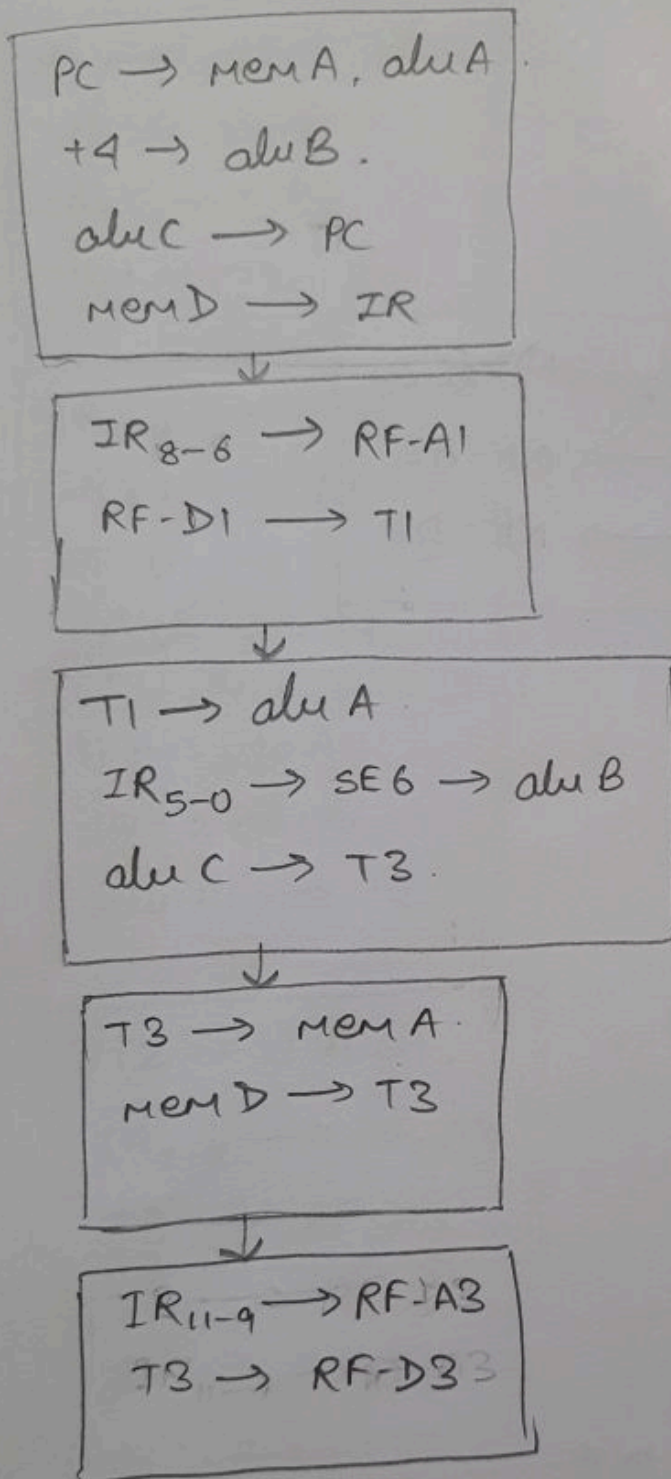
⑨ LHI

PC \rightarrow mem A, alw A
+4 \rightarrow alw B
alw C \rightarrow PC
mem D \rightarrow IR
↓

IR₀₋₈ \rightarrow SE9 \rightarrow T2 \rightarrow 7S \rightarrow RF-D3

IR₁₁₋₉ \rightarrow RF-A3

10. $lw\ ra, rb, imm$



⑪ SW RA, RB, 6bit sum

PC \rightarrow memA, aluA
memD \rightarrow IR
+4 \rightarrow aluB
aluC \rightarrow PC

IR₆₋₈ \rightarrow RF.A1
RF.D1 \rightarrow T1

T1 \rightarrow aluA
IR₀₋₅ \rightarrow SE 6 \rightarrow aluB
aluC \rightarrow T3

IR₉₋₁₁ \rightarrow RF.A1
RF.D1 \rightarrow mem-d
T3 \rightarrow mem-A

IR. Im 910, imm

PC \rightarrow memA, aluA
+4 \rightarrow aluB
aluC \rightarrow PC
memD \rightarrow IR

IR₁₁₋₉ \rightarrow RF-A1
RF-D1 \rightarrow T1

T1 \rightarrow memA
memD \rightarrow T3

if (IR₀ == 1), then
000 \rightarrow RF-A3
T3 \rightarrow RF-D3
T1 \rightarrow aluA
+4 \rightarrow aluB
aluC \rightarrow T1

T1 \rightarrow memA
memD \rightarrow T3

if (IR₁ == 1), then
001 \rightarrow RF-A3
T3 \rightarrow RF-D3
T1 \rightarrow aluA
+4 \rightarrow aluB
aluC \rightarrow T1

T1 \rightarrow memA
memD \rightarrow T3

if (IR₇ == 1), then
111 \rightarrow RF-A3
T3 \rightarrow RF-D3

for 0 to 6

(13)

SM RA, Imm

PC \rightarrow memA, aluA
 +4 \rightarrow aluB
 aluC \rightarrow PC
 memD \rightarrow IR

↓

IR₁₁₋₉ \rightarrow RF-A1
 RF-D1 \rightarrow T1

↓

if (IR₀ == 1), then
 000 \rightarrow RF-A2
 RF-D2 \rightarrow T2
 T1 \rightarrow aluA
 +4 \rightarrow aluB
 aluC \rightarrow T1

↓

T1 \rightarrow memA
 T2 \rightarrow memD

↓

if (IR₁ == 1), then
 001 \rightarrow RF-A2
 RF-D2 \rightarrow T2
 T1 \rightarrow aluA
 +4 \rightarrow aluB
 aluC \rightarrow T1

↓

T1 \rightarrow memA
 T2 \rightarrow memD

if (IR₂ == 1), then

111 \rightarrow RF-A2

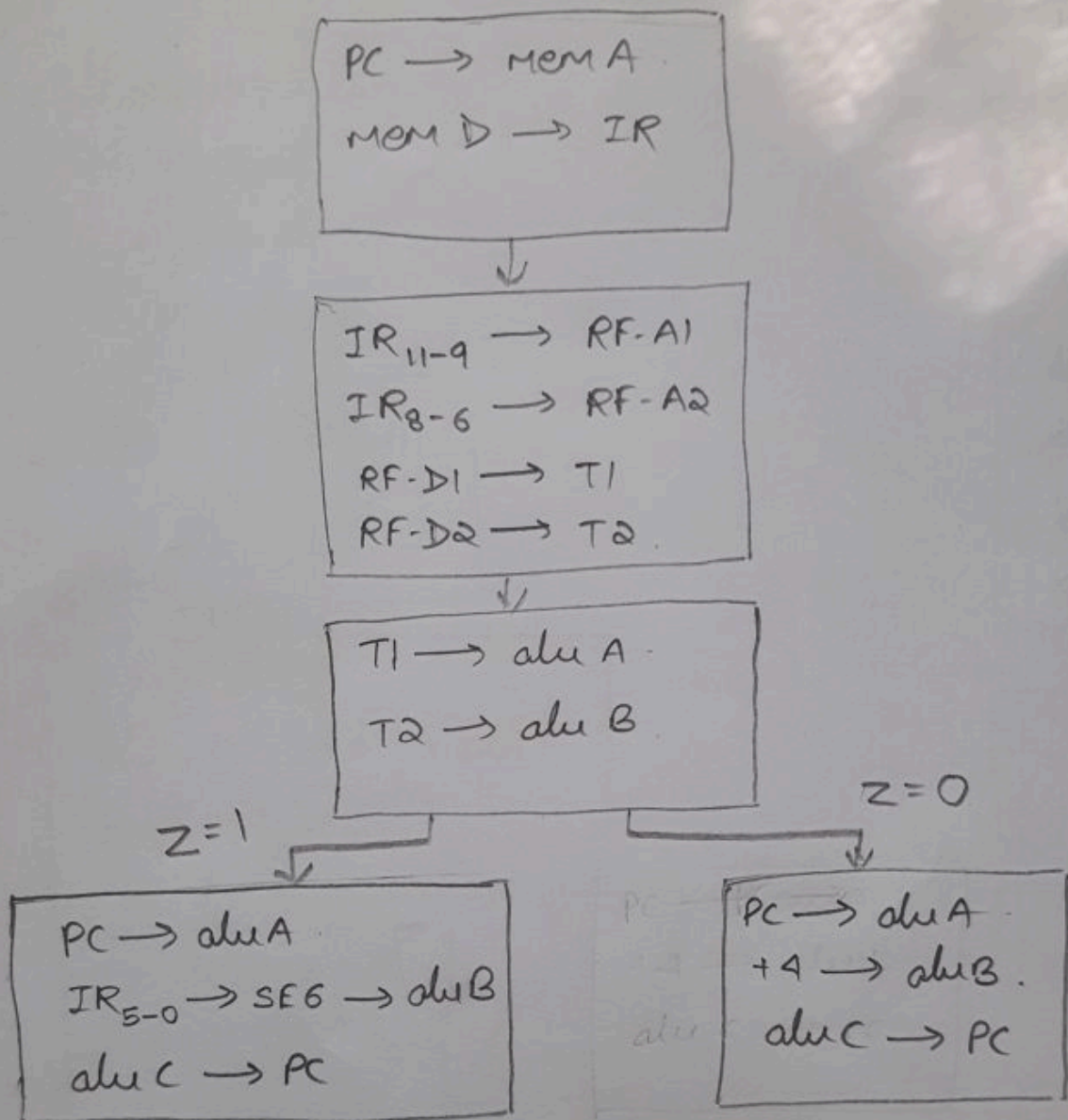
RF-D2 \rightarrow T2

↓

T1 \rightarrow memA
 T2 \rightarrow memD

till 6.

14. beg ra, rb, imm



15 JAL Ra, Imm

PC \rightarrow memA, alwA
+4 \rightarrow alwB
mem.0 \rightarrow IR
alwC \rightarrow PC

PC \rightarrow alwA
+1 \rightarrow alwB
alwC \rightarrow PC, RF.D3
IR₉₋₁₁ \rightarrow RF.A3

IR₀₋₈ \rightarrow SEG \rightarrow alwB
PC \rightarrow alwA
alwC \rightarrow PC

16. jlt ra,rb

PC \rightarrow memA, aluA
+4 \rightarrow aluB.
aluC \rightarrow PC.
memD \rightarrow IR.



IR₁₁₋₉ \rightarrow RF-A3
IR₈₋₆ \rightarrow RF-A2
PC \rightarrow RF-D3
RF-D2 \rightarrow T2



T2 \rightarrow PC

⑦ JRI Ha, Imm

PC \rightarrow mem A, alw A
+4 \rightarrow alw B
mem D \rightarrow IR
alw C \rightarrow PC

IR₀₋₈ \rightarrow SEG \rightarrow T2
IR₉₋₁₁ \rightarrow RF, A1
RF 01 \rightarrow T1

T1 \rightarrow alw A
T2 \rightarrow alw B
alw C \rightarrow PC

