

Micro Project - I

(IITB RISC)

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FLOWCHARTS -

Level-2 Flowcharts

dec. → Decoder
F.C → Fetch Cycle

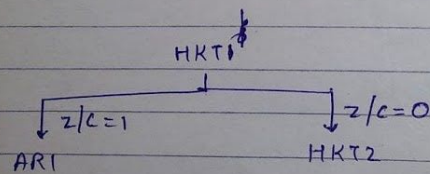
~~ADD~~ / ~~ADZ~~ / ~~ADC~~ / ~~NDU~~ / ~~NDC~~ / ~~NDS~~ / ADI

~~HKT1~~ HKT1

ir ₅₋₇ → rf-a1	X
rf-d1 → A	ADD
alu → rf-d3	X
rf → rf-a3	ARI
A → alu	ARZ
+1 → alu	
ir ₈₋₁₀ → rf-a2	
rf-d2 → B	
ir ₁₁₋₁₆ →	
sgnEt6 → B	

A → alu	X
B → alu	ARITHMETIC
alu → rf-d3	✓
ir ₁₁₋₁₃ → rf-a3	ARZ
ir ₈₋₁₀ → rf-a3	
flags → [Z, C]	F.C

③ ADZ / ADC / NDZ / NDC



② HKT

rf → rf-a1	✓
rf-d1 → A, mema	X
memout → IR	X
	HKT1
	Dec

A	X
+1 → alu	ADD
alu → rf-d3	X
rf → rf-a3	HKT2
	FC

④ LHI

HKT1

ir ₅₋₇ → rf-a3	X
ir ₈₋₁₆ → 7shifter → rf-d3	X
	X
	HKT1
	HKT2

HKT2

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SHOT ON MI A1
DUAL CAMERA

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HKTI

$r_{10} \rightarrow rf_a1$	$r_{5-7} \rightarrow rf_a1$	x
$rf_d1 \rightarrow A$		ADD
$r_{11-16} \rightarrow sgn$	$r_{16} \rightarrow B$	x
counter = "0000"		LS
$+1 \rightarrow alu$		Dec
$alu \rightarrow rf_d3$		oder
$r_7 \rightarrow rf_a3$		

$A \rightarrow alu$	✓
$B \rightarrow alu$	ADD
$alu \rightarrow mema$	Z
$memout \rightarrow rf_d3$	LWI
$nandout \rightarrow z$	
$r_{5-7} \rightarrow rf_a3$	F.G.

6 SW

HKTI

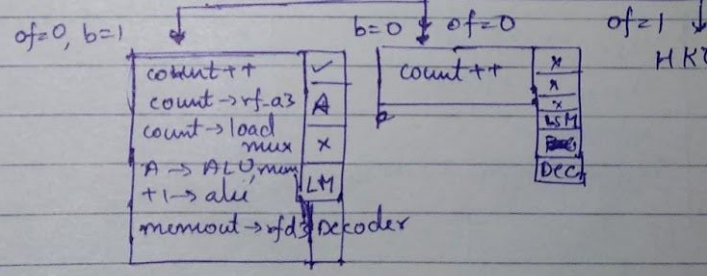
LS

$alu \rightarrow mema$	✓
$r_{5-7} \rightarrow rf_a1$	A
$rf_d1 \rightarrow memd$	x
$a \rightarrow alu$	SW
$b \rightarrow alu$	FC

7 LM

HKTI

LS



8 SM

HKTI

LS

of=1
r2
LSM

count++	✓
count → load mux, rf_a1	ADD
$a \rightarrow alu, mema$	x
$rf_d1 \rightarrow memd$	SW
$+1 \rightarrow alu$	Dec

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9 JAL / JLR
HKT1

$ir_{5-7} \rightarrow rf-a3$	x
$alu \rightarrow rf-d3$	ADD
	x
$ir_{8-16} \rightarrow sgnEt9 \rightarrow B$ $ir_{11-16} \rightarrow sgnEt6 \rightarrow B$	JL1
$+1 \rightarrow alu$ $A \rightarrow ALU$	JL2

$ALU \rightarrow ir-d3$	x
$r7 \rightarrow ir-a3$	ADD
$A \rightarrow ALU$	x
$B \rightarrow ALU$	JL2
	F.C.

10 BEQ

HKT1

$ir_{5-7} \rightarrow rf-a1$	x
$ir_{8-10} \rightarrow rf-a2$	x
$rf-d3$	x
$ir_{11-16} \rightarrow sgnEt6 \rightarrow B$	BEQ1
	BEQ2

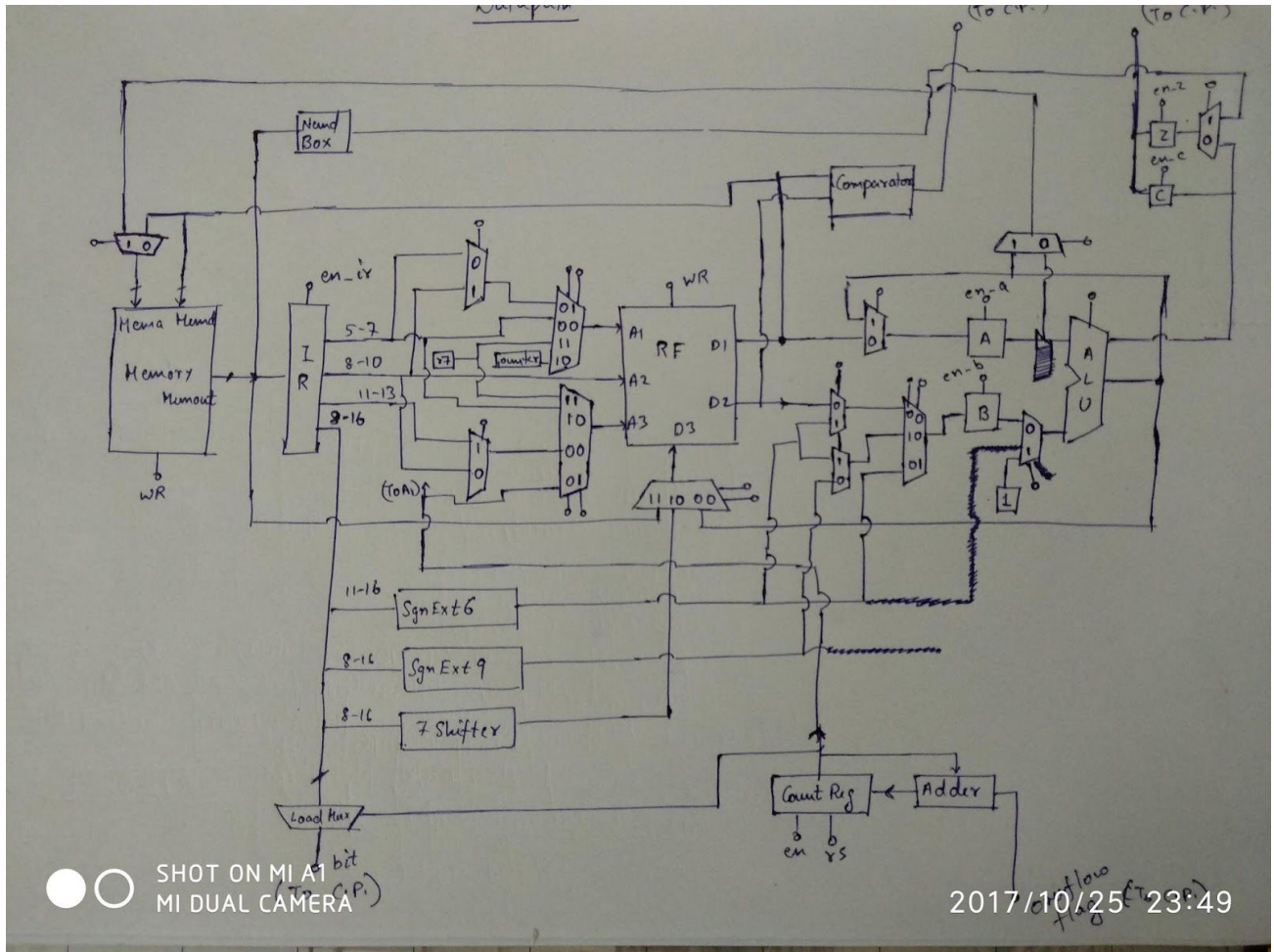
↓ comp = 1

$B \rightarrow ALU$	x
$A \rightarrow ALU$	ADD
$ALU \rightarrow rf-d3$	x
$r7 \rightarrow rf-a2$	JL1
	F.C.

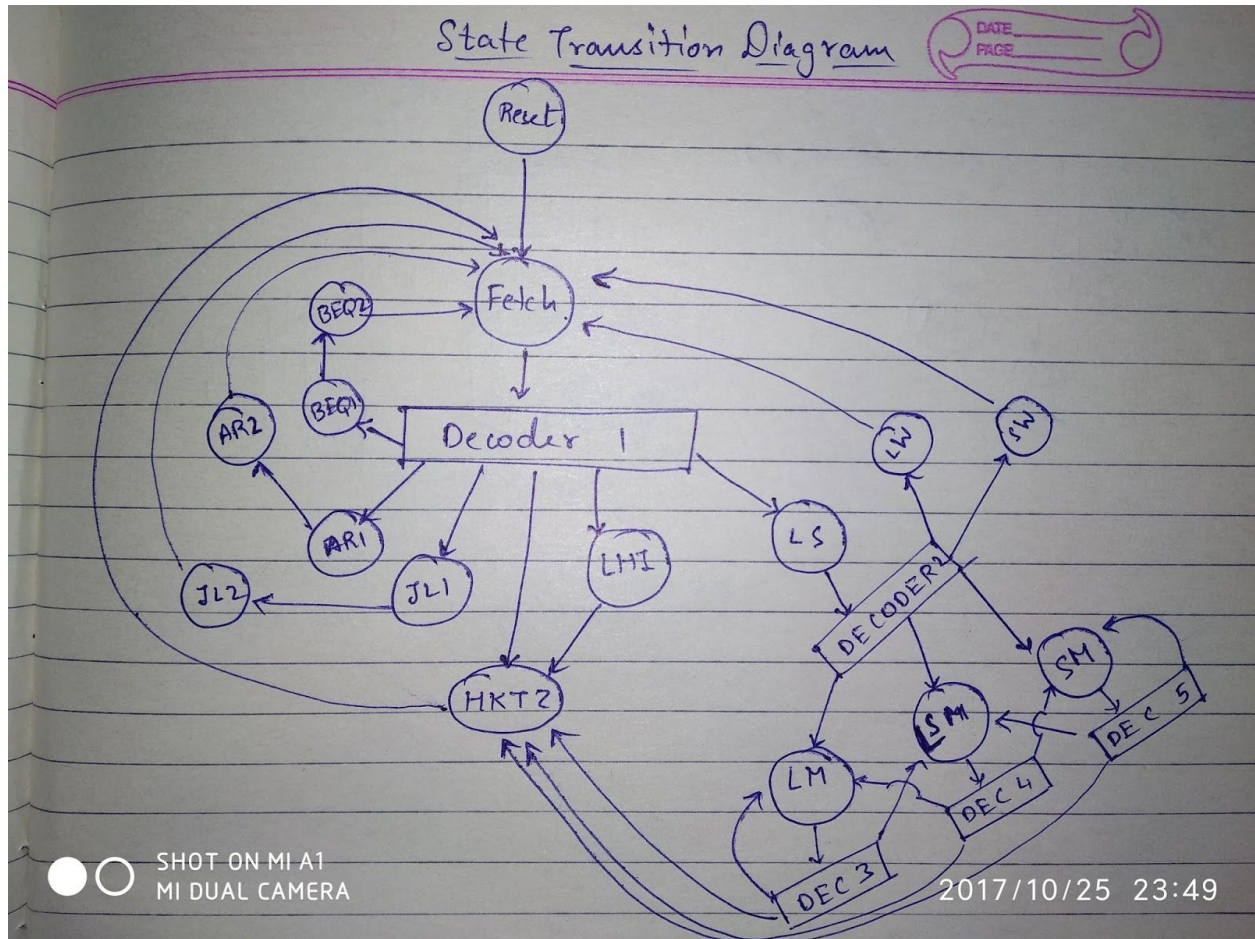
↓ Comp = 0
HKT2

(Same as
JL2)

DATAPATH -



STATE TRANSITION DIAGRAMS -



COMPONENTS - Files provided in Zip file

Counter

D_register

N_bit adder

N_left_shifter

Nand box

Memory

Register file

Mux

Sign_extender(6 and 9)