T. GCD ComPUTATION (greatest Common
Drivion)

ASM CHART

8/ Data-input

ld-A   A   clk   ld-B   B   clk

A out   B out

A < B
B: A-A

sel A   mux   Cmp   mux   sel-B

eq Lt St   Y

X

Subtractor

Datapath

Sub-out   Mux   sel-in
                  0   1

Data-in   8 bit

ld A
ld B
sel-in
sel A
sel B
Lt
eq
GT

Datapath   Controller

Start

data-in

done

clk
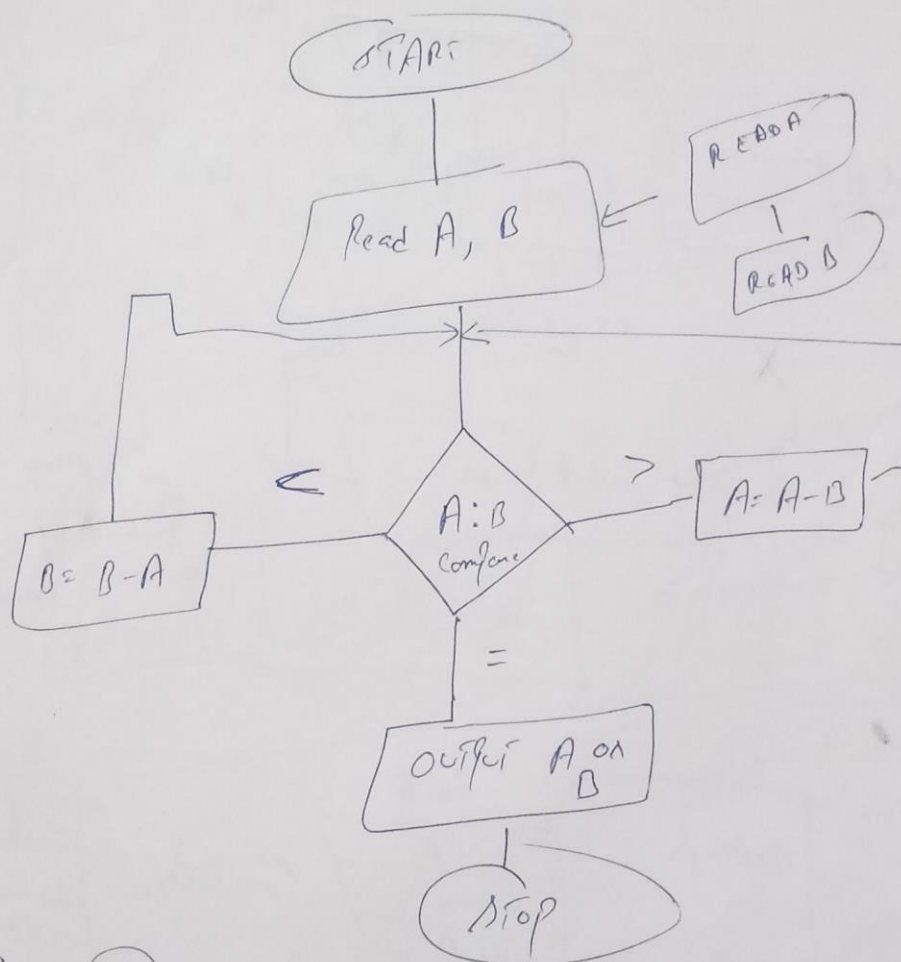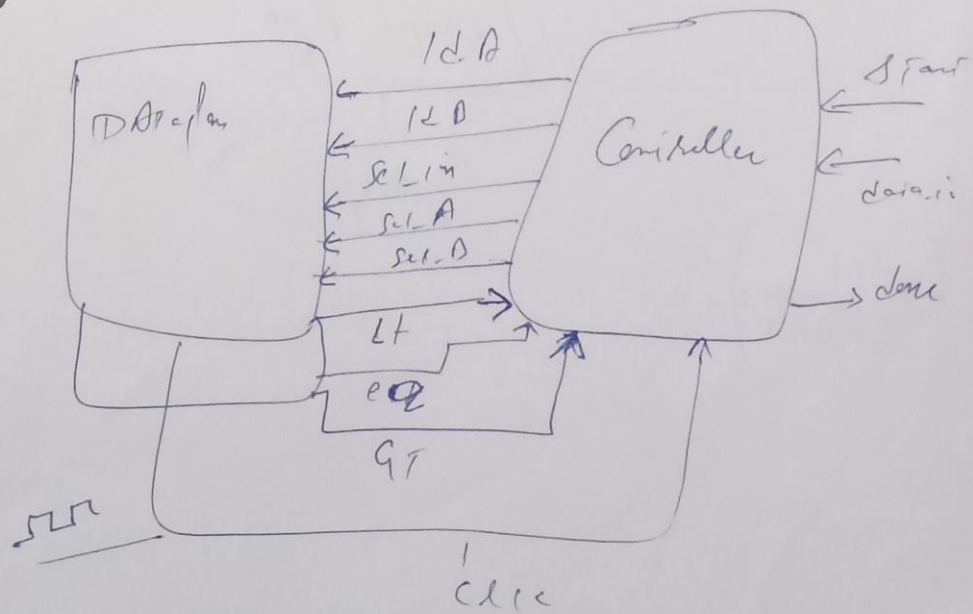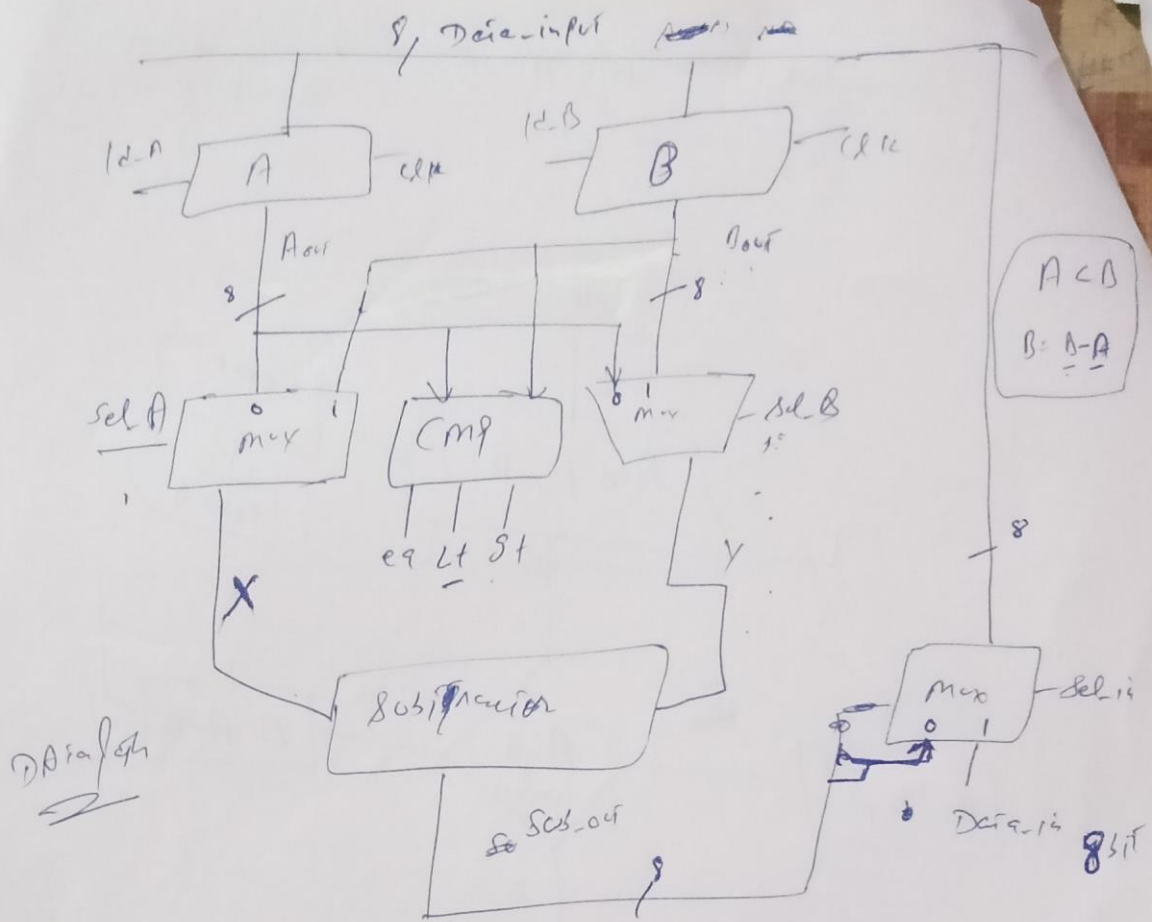
Control
path

eq = equal
lt → less than
gt → greater than

A < B

A > B

START   S0

S1

A = data_in

B = data_in   S2

if (eq)   >   A - B

A < B

B - A   gt (greater than)

lt (less than)   Aout : Bout

X = Aout
Y = Bout   S4
A = sub_out

S3

X = Bout
Y = Aout
B = sub_out   =   done = 1

S5

Aout - Bout

Bout - Aout

S0

S1

S2   e2   S5

LT   gt   eq

lt   e9   gt   S4   gt

lt   e9

	load_A	load_B	S_in1	S_in2	S_in3	Done
S0	1	0	0	0	1	0
S1	0	1	0	0	1	0
S2						
S3						
S4					0	1
S5	0	0	0	0		

S2 { if eq, CV= 000001, Lt, CV= 011000, Gt, CV= 100100 ;
else if, else if, else 010010 }

{ S2, S3, S4 have same FSM inputs }