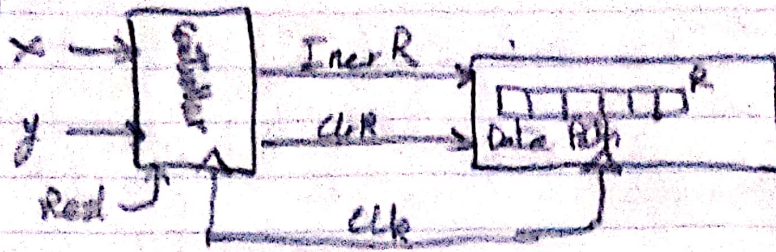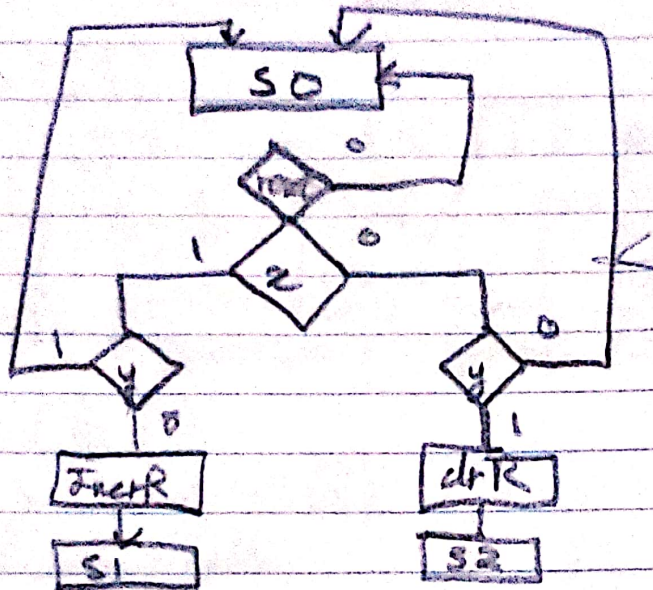Alan Palayil

ECE 218 Homework 12

8.2) a)
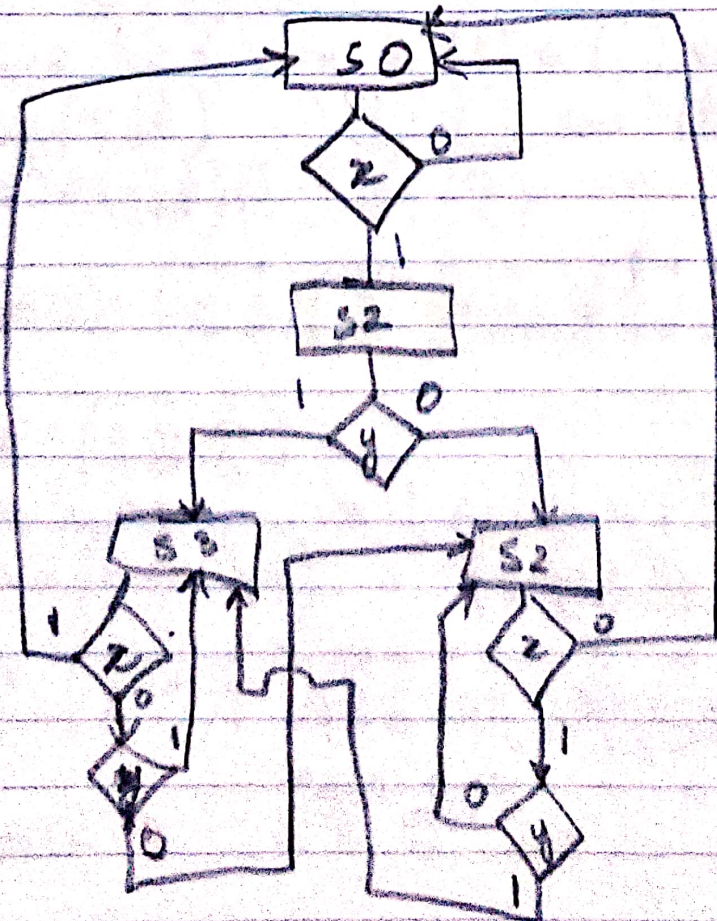

b)

S0 : 00
S1 : 01
S2 : 10
S3 : 11

8.10)

8.19) Multiplicand   Multiplier
      1101   10111

                                          C   A Q_0 P
Multiplier in Q   0   00000   101
$Q_0=1$ add B   0   11011   10111   100
First partial product
                                                 11011
Shift right CAQ
$Q_0=1$ add B   0   01101   10111   011
Second partial product   1   11011
                                                 01000
Shift right CAQ
$Q_0=1$ add B   0   10100   01101   010
Third partial product   1   11011
                                                 01111
Shift right CAQ
$Q_0=0$ shift right   0   10111   10110   001
$Q_0=1$ add B   0   01011   11011
Fifth partial product   1   11011
                                                 00110
Shift right CAQ
Final product in AQ   0   10011   01101   000
$AQ = 10011\ 01101_2$
     $= 26d_4$

SP11: S₀ :00
S₁ : 01
S₂ : 10
S₃ : 11

Inputs:
reset = b · x
Start = y
borrow = z

Outputs:
Load A-B = F₄
Subtract = F₃
Convert = F₂
done = F₁

PS		Inputs			N·S		Outputs			
	$q_1 q_0$	x	y	z	Q_1	Q_0	F_1	F_2	F_3	F_4
S₀	0 0	0	x	x	0	0	1	x	x	x
	0 0	1	0	x	0	0	1	x	x	0
	0 0	1	1	x	0	1	x	x	x	1
S₁	0 1	0	x	x	0	0	1	x	x	x
	0 1	1	x	x	1	0	x	x	1	x
S₂	1 0	0	x	x	0	0	1	x	x	x
	1 0	1	x	0	0	0	1	0	x	x
	1 0	1	x	1	0	0	1	1	x	x
S₃	1 1	0	x	x	x	x	x	x	x	x
	1 1	1	x	x	x	x	x	x	x	x

Design

$F_1 = q_1' q_0' x$

$F_2 = q_1' q_0' xz$

$F_3 = q_1 q_0' x$

$F_4 = q_1' q_0 y$