CARLOS MARTIN

HW #4

CH6: 4, 7, 11, 15, 20, 21, 23, 29, 34, 45

4.) A=1, B=1, S_i=0, C_{out}=1

A=1, B=0, C_{in}=1, S_i=0, C_{out}=1

A=1, B=1, C_{out}=1, S_i=1, C_{out}=1

SUM IS $S_4 S_3 S_2 S_1$ = 1100

LONGHAND 111

+101

1100

7.) A= 1001, B = 1100, $\bar{B}$ = 0011 B XOR $\bar{B}$ = 1

A=1, B=1, C_{in}=1 S_i=1 C_{out}=1

A=0, B=1, C_{in}=1 S_i=0 C_{out}=1

A=0, B=0, C_{in}=1, S_i=1, C_{out}=0

A=1, B=0, C_{in}=0 S_i=1, C_{out}=0

SO WE GET 1101

11.) 6 TIMES C_{in} to C_{out}, C_{in} to S_i, A to S_i AND C_{out}

SO 40 ns + 6(25ns) + 35ns

= 40ns + 150ns + 35ns = 225ns

15.) A = 1100, B= 1001

SO THE OUTPUT IS

A>B = 1

A=B = 0

A<B = 0

A = 1000

B = 1011 SO

A>B= 0

A=B=0

A<B=1

A= 0100

B = 0100

A>B=0

A=B=1

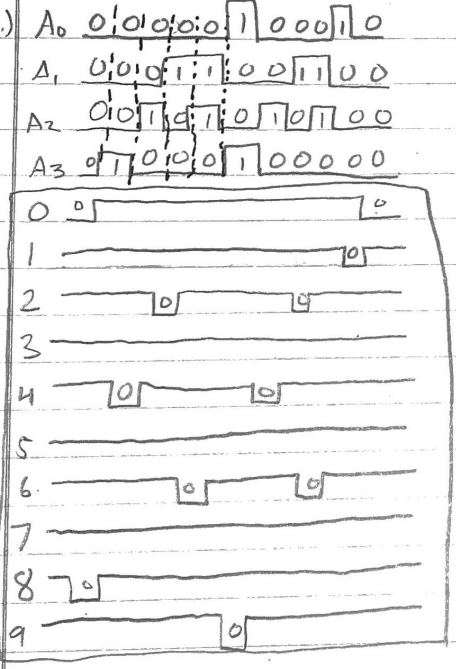
A<B=0

20.)

A_0	A_1	A_2	Y
0	0	0	0
1	0	1	1
0	0	1	0
0	1	1	1
0	1	0	1
1	0	0	0

$(\bar{A_0} A_1 A_2) + (A_0 \bar{A_1} A_2) + (\bar{A_0} A_1 \bar{A_2})$

21.)



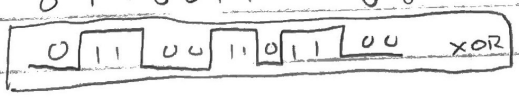
23.) THE OUTPUT IS $A_3 A_2 A_1 A_0 = 1011$, NOT VALID SINCE NOT INBETWEEN 0000, 1001

29.) $S_0 = 0\,0\,1\,1\,1\,1\,0\,0\,1\,0\,1\,0$

$S_1 = 0\,1\,0\,1\,1\,0\,1\,0\,0\,1\,1\,0$

OUT = $D_0\ D_2\ D_1\ D_3\ D_3\ D_1\ D_2\ D_0\ D_1\ D_2\ D_3\ D_0$

0 1 1 0 0 1 1 0 1 1 0 0



34.) BY OBSERVATION, THIS IS NOT WORKING PROPERLY SINCE AT THE BEGINNING A=0, B=0, Cin=0 PRODUCES A Σ=0 Cout=0 BUT Σ_1=1 SO NOT EQUAL, AT FAULT IS THE Cin.

45.)

A	B	Cin	Cout	Σ	
0	0	0	0	0	
0	0	1	0	1	→ 1
0	1	0	0	1	→ 2
0	1	1	1	0	
1	0	0	0	1	→ 4
1	0	1	1	0	
1	1	0	1	0	
1	1	1	1	1	→ 7

So Σ=1 so Σ 1,2,4,7

So $\boxed{\Sigma_1 = \bar{A}\bar{B}Cin + \bar{A}B\bar{Cin} + A\bar{B}\bar{Cin} + ABCin}$

NOW FOR Cout WE HAVE Cout = 1 SO

Σ = 3, 5, 6, 7.

$\boxed{\text{SO } Cout = \bar{A}BCin + A\bar{B}Cin + AB\bar{Cin} + ABCin}$

So SUM OF FULL ADDER

A \ Bcin	00	01	11	10
0	0	1	0	1
1	1	0	1	0

So WE CAN MINIMIZE

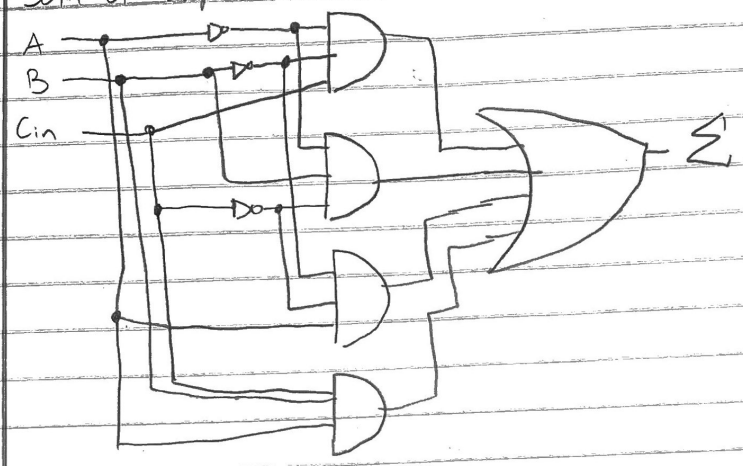
So $\boxed{\Sigma_1 = \bar{A}\bar{B}Cin + \bar{A}B\bar{Cin} + A\bar{B}\bar{Cin} + ABCin}$

So CARRY FULL ADDER

A \ BCin	00	01	11	10
0	0	0	1	0
1	1	1	1	1

So WE GET $\boxed{ACin + BCin + AB}$

SUM OF EXPRESSIONS



Cout