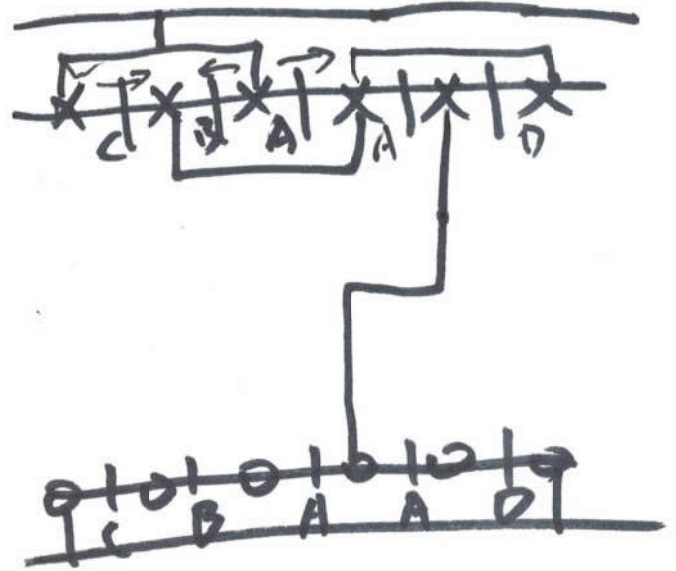
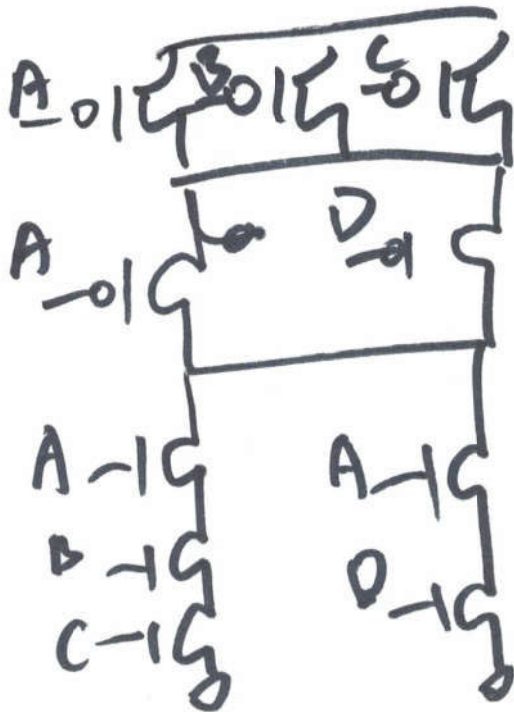


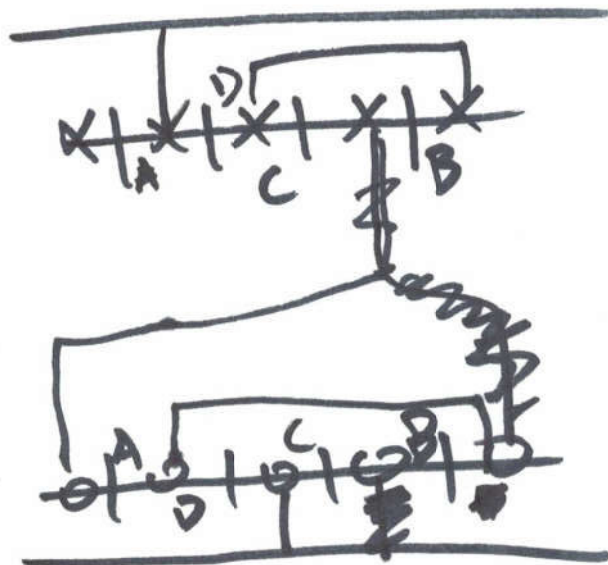
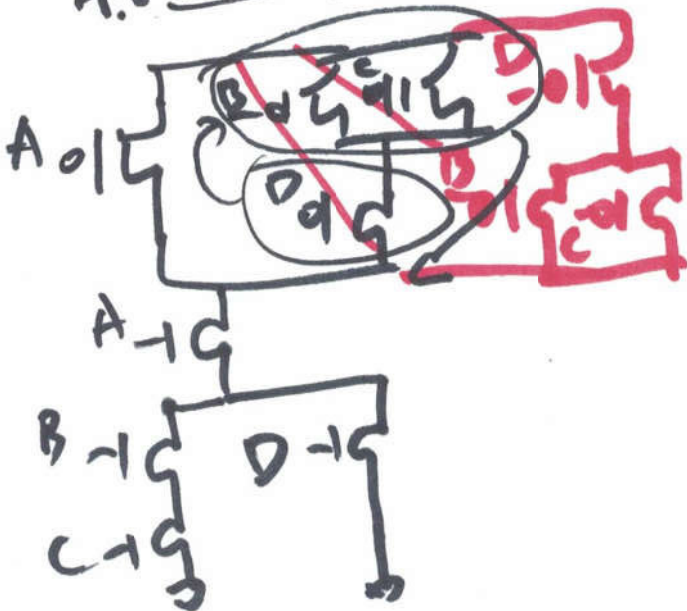
CE338 Quiz 8

1. Draw the CMOS AOI schematics and the stick diagrams of the following logic expressions. (50 points)

$ABC + AD$



$A:(BC+D)$



①

$$Y = \overline{A \cdot B} = \overline{A} + \overline{B}$$

Full Adders (FAs)

Static Hazard

$$\begin{cases} S = A \oplus B \oplus C_i \\ C_o = (A+B)C_i + AB \end{cases}$$

$(A+B)C_i + AB$

A	B	C _i	C _o
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

C_o:
A B C_i

	00	01	11	10
0	0	0	1	0
1	0	1	1	1

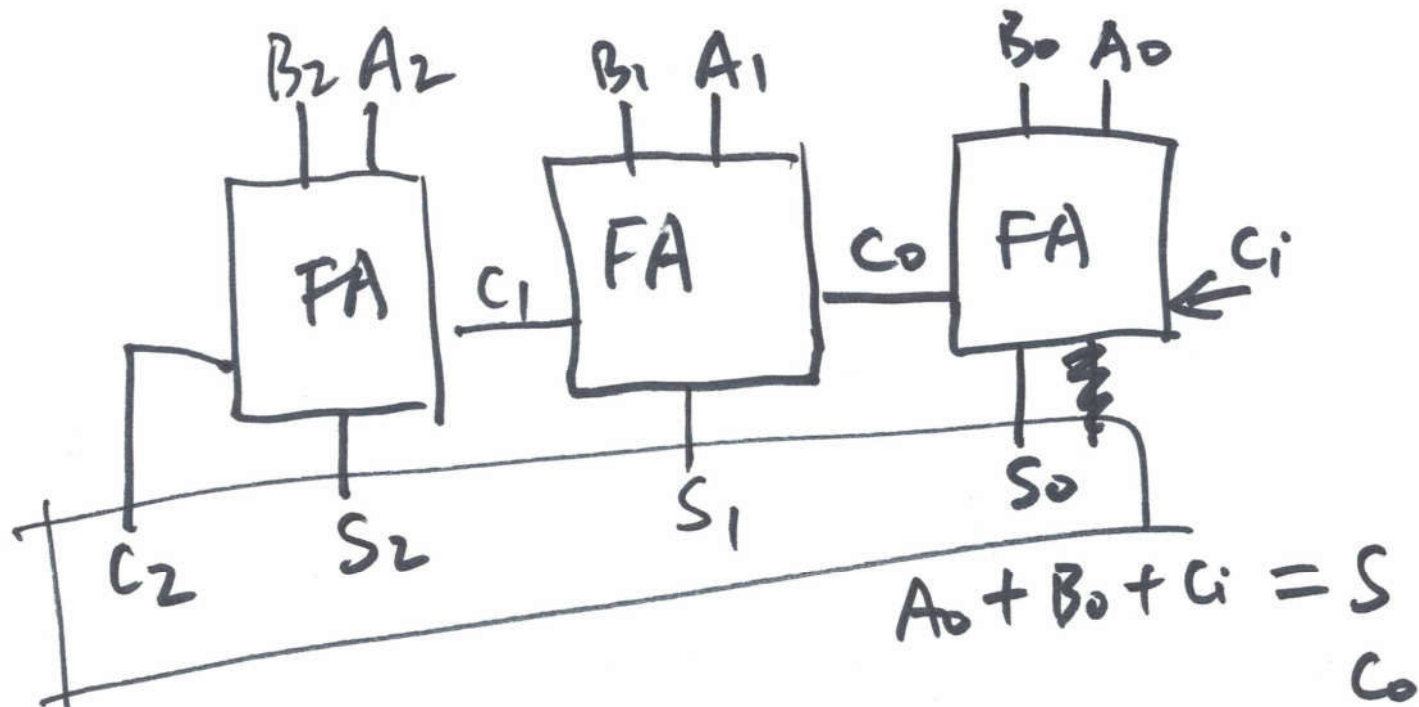
$$\begin{aligned} C_o &= \overline{A} B C_i + A C_i + AB \\ &= (\overline{A} B + A) C_i + AB \\ &= (A+B) C_i + AB \end{aligned}$$

A+B

$$\begin{aligned} &= A+B(\overline{A} + A) \\ &= A+B\overline{A} + AB \\ &= A(\overline{A} + B) + B\overline{A} = A + \overline{A}B \\ &= \overline{A}B + B\overline{A} = B(\overline{A} + A) \end{aligned}$$

(2) ~~$\overline{A}B + B\overline{A} = B(\overline{A} + A)$~~

$$\begin{aligned} A + \overline{A}B &= A + B \\ &= A(B + \overline{B}) + \overline{A}B \\ &= AB + A\overline{B} + \overline{A}B \end{aligned}$$



~~To = 0x FF~~

To = 0x FF

||||

||||
+ ||||

$$B_2 B_1 B_0 + A_2 A_1 A_0 = \underline{\underline{C_2 S_2 S_1 S_0}}$$

$$\begin{array}{l} B_2 B_1 B_0 \\ + A_2 A_1 A_0 \\ \hline \end{array}$$

(3)

2's Complement (signed)

100

⊖10

$$\begin{array}{r} 011 + 3 \\ 100 \\ \hline 101 \end{array} \leftarrow 3$$

MSB (-real value)

~~100~~

$$\begin{array}{r} 011 \quad 3 \\ 100 \quad -3 \\ + \quad 1 \\ \hline 101 \end{array}$$

flip
+1

$$-4 \begin{array}{r} 101 \\ \hline 1010 \end{array} = -3$$

$$\begin{array}{r} 10101 \\ \hline -16 + 4 + 1 = -11 \end{array}$$

$$-8 \begin{array}{r} 1011 \\ \hline 1011 \end{array} = -5$$

$$\begin{aligned} & \underline{B_2 B_1 B_0} \oplus \overline{A_2 A_1 A_0} \\ & = \underline{B_2 B_1 B_0} + \underline{(-A_2 A_1 A_0)} \end{aligned}$$

$D = B \cdot B_0' (-A_2, A_1, A_0) :$

