

a) $F(A, B, C) = \sum m(2, 4, 7)$, $d(A, B, C) = \sum m(0, 1, 5, 6)$

		B	
		0	1
		3	2
		0	1
A	0	0	1
	1	0	1
	4	1	0
	5	0	0
		C	

$A + \bar{C}$

b) $F(A, B, C, D) = \sum m(2, 5, 6, 13, 15)$, $d(A, B, C, D) = \sum m(0, 4, 8, 10, 11)$

??

		C	
		0	1
		3	2
		0	1
		5	4
		7	6
		0	1
		13	12
		15	14
		0	1
A	0	0	1
	1	0	1
	4	1	0
	5	0	0
		D	

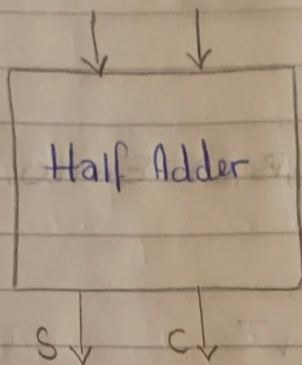
$B \cdot ADB + \bar{A}\bar{D} + D\bar{B}\bar{C}$

c) $F(w, x, y, z) = \sum m(1, 2, 4, 10, 13)$, $d(w, x, y, z) = \sum m(5, 7, 11, 14)$

		x	
		0	1
		3	2
		0	1
		5	4
		7	6
		0	1
		13	12
		15	14
		0	1
w	0	0	1
	1	0	1
	4	1	0
	5	0	0
		z	

$\bar{B}\bar{C}\bar{D} + B\bar{C}\bar{D} + B\bar{C}\bar{A}$
 $B + D\bar{C}\bar{A}$

Adders



A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Sum

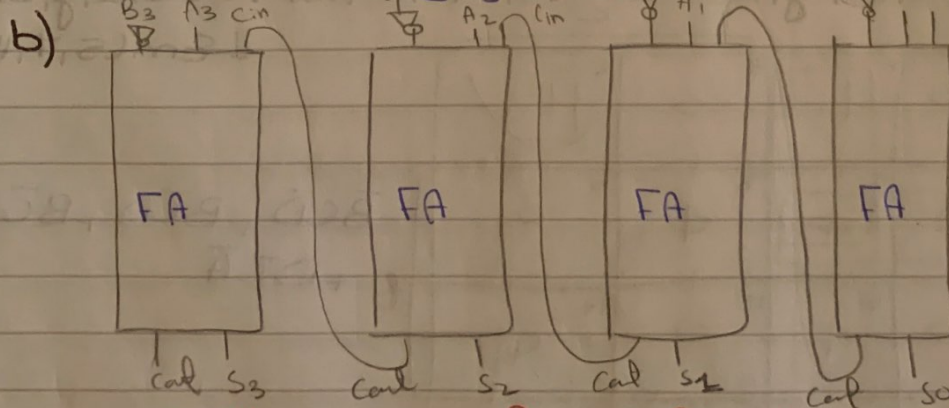
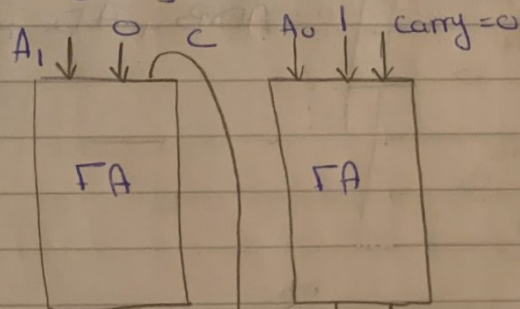
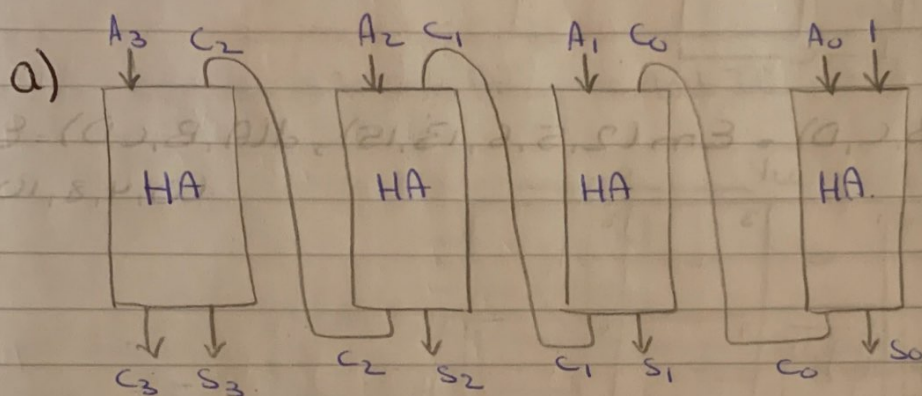
1	1
1	0

$$A \oplus B$$

Carry

0	0
0	1

AB



* Half Adder \rightarrow 2 inputs Full Adder \rightarrow 3 inputs

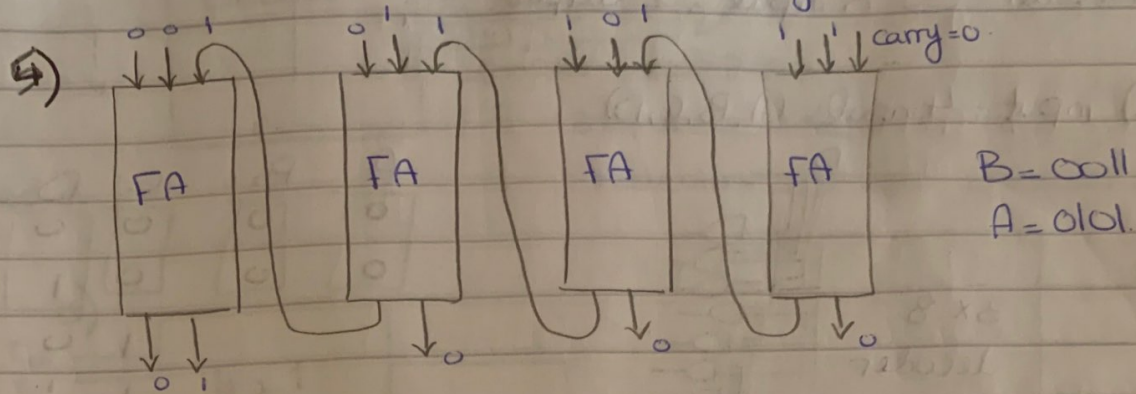
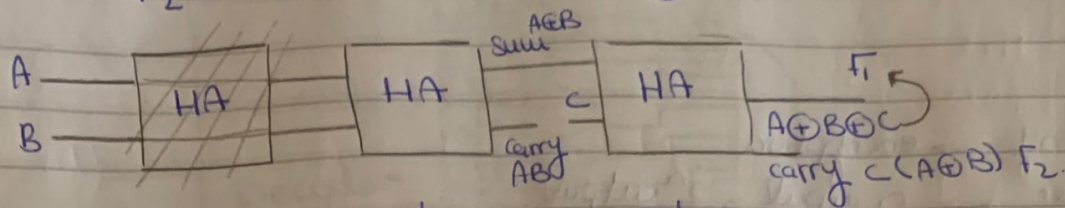
* Addition 0, subtraction 1

(\rightarrow + the complement of A (each of the A's)

* If 0 & A are complemented, subtraction is done using 1's complement

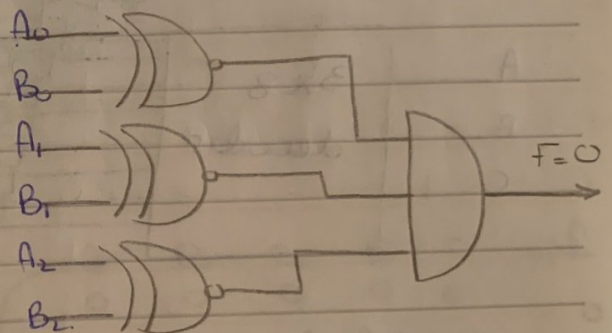
a) $F_1 = A \oplus B \oplus C \oplus$

$$b) \Gamma_2 = A\bar{B}C + \bar{A}BC = C(A \oplus B)$$



A	B	output
0	0	1
0	1	0
1	0	0
1	1	1

INOR



$$F(w, x, y, z) = Em(5, 6, 11, 12), d(w, x, y, z) = Em(0, 1, 2, 9, 10, 14, 15)$$

	ϕ	ϕ	0	ϕ
	0	1	0	1
	1	0	ϕ	ϕ
A	0	ϕ	1	ϕ

$$C\bar{D} + \bar{A}\bar{C}D + AC + AB\bar{D}$$