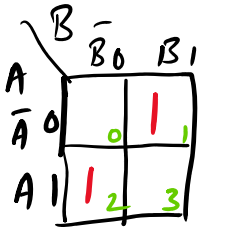
Adders

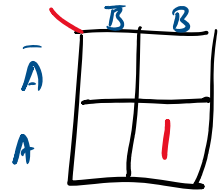
18 September 2023 11:19

Half adder

	A	B	S	C
0 →	0	0	0	0
1 →	0	1	1	0
2 →	1	0	1	0
3 →	1	1	0	1

Sum



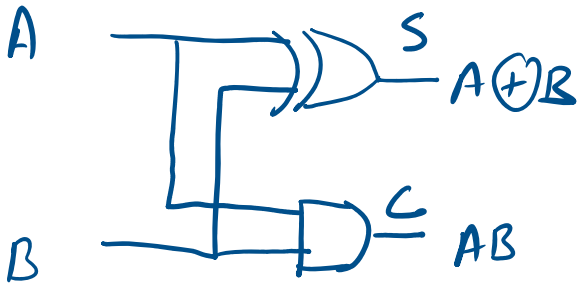


→ $A\bar{B}$

$\bar{A}B + A\bar{B}$ → Sum $= A \oplus B$

$A \oplus B$

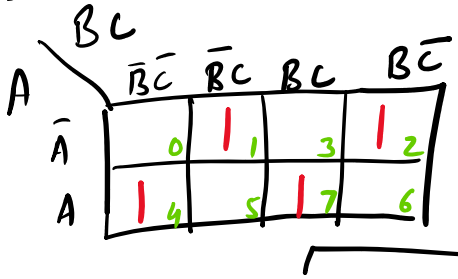
Carry → AB



Full Adder

	A	B	C	S	C
0	0	0	0	0	0
1	0	0	1	1	0
2	0	1	0	1	0
3	0	1	1	0	1
4	1	0	0	1	0
5	1	0	1	0	1
6	1	1	0	0	1
7	1	1	1	1	1

Sum



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

$C(\bar{A}\bar{B} + AB) + \bar{C}(\bar{A}B + A\bar{B})$

Consider → $\bar{A}B + A\bar{B} = X$

$C(\overline{A \oplus B}) + \bar{C}(A \oplus B)$

$C\bar{X} + \bar{C}X$

7 1 1 1 1 1

$C\bar{X} + \bar{C}X$

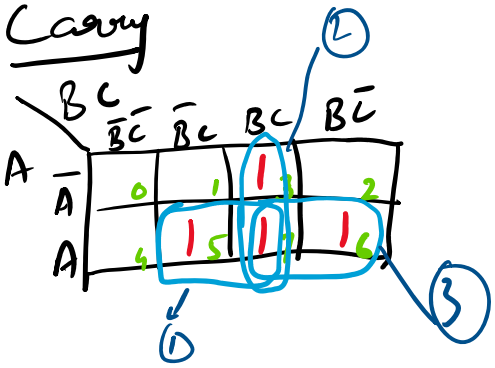
$C \oplus X$

put value of X in it

$C \oplus A \oplus B$

$Sum = A \oplus B \oplus C$

Carry



$AC + BC + AB$

$Carry = AB + BC + AC$