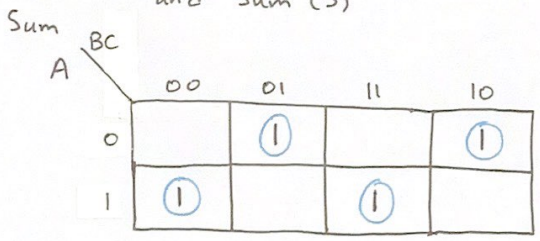
1. Design a Single cell - 1 bit Carry Propagate (Ripple Carry Adder) full adder.

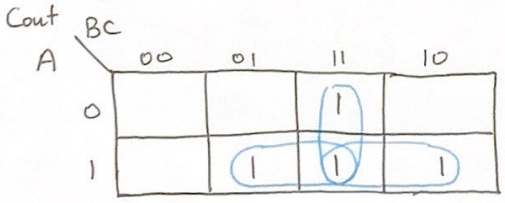
a. Generate the truth table

A	B	Cin	Sum	Cout
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

b. Using K-map, determine the logical expression for Carry out (C-out) and Sum (S)

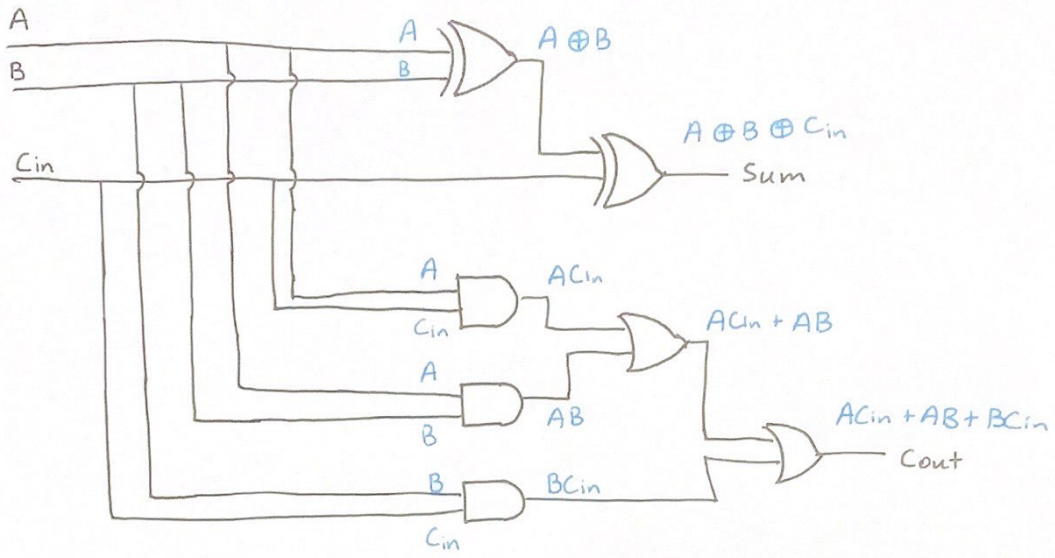


$$Sum = A\bar{B}\bar{C} + \bar{A}\bar{B}C + ABC + \bar{A}B\bar{C}$$
$$= A(\bar{B}\bar{C} + BC) + \bar{A}(\bar{B}C + B\bar{C})$$
$$= A(\overline{B \oplus C}) + \bar{A}(B \oplus C)$$
$$Sum = A \oplus B \oplus Cin$$



$$Cout = ACin + AB + BCin$$

C. Based on the logical expression, create the schematic diagram for full adder.

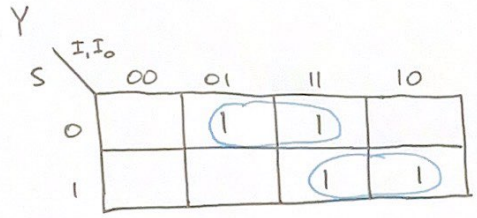


2. Design a 1 bit, 2 to 1 multiplexer (Mux). Outputs Y when S=0; X when S= 1.

a. Generate the truth table.

S	I_1	I_0	Y
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

b. Using K-map, determine the logical expression for output.



$$Y = \bar{S}I_0 + SI_1$$

C. Based on the logical expression, create the schematic diagram for Mux.