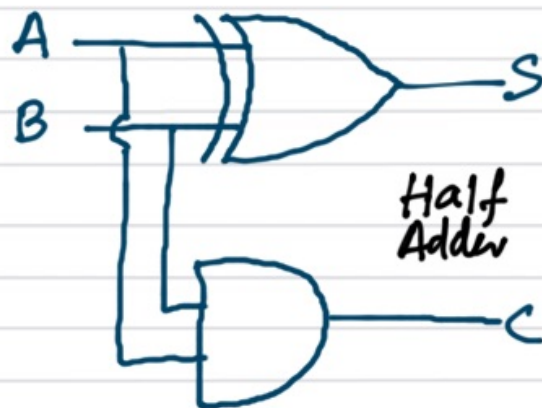


3.3.1

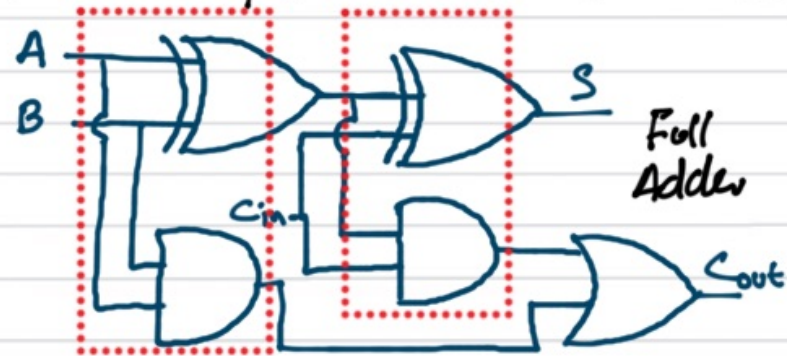
ADDERS

These circuits add bits and are found in ALU. They take two/three inputs and produce two outputs. Those which take two inputs are called "half adders" and those which take three inputs are called "full adders".



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

1/2 adder
Truth Table.

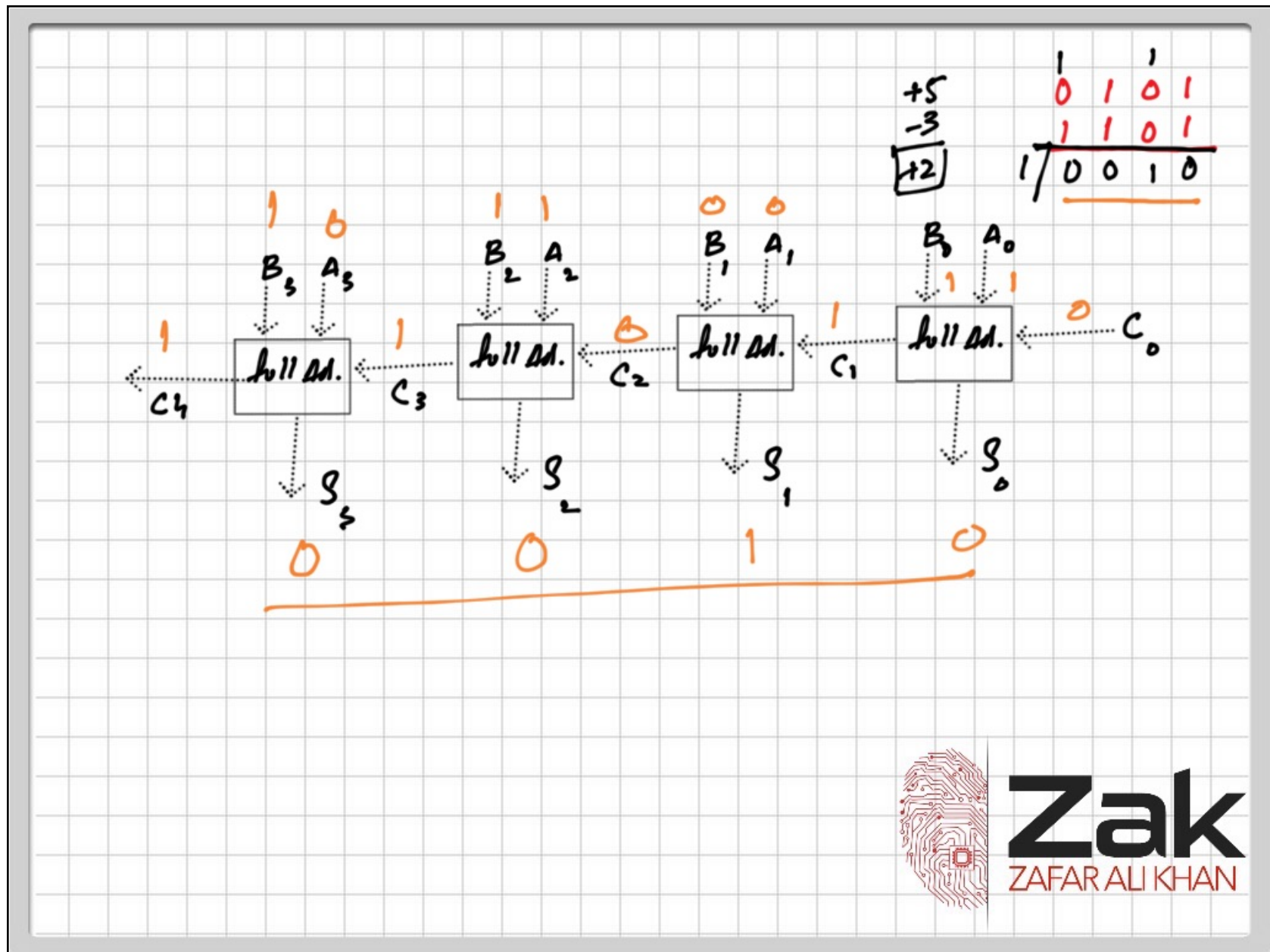


A	B	C _{in}	C _{out}	S
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

Full Adder
Truth Table.



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① Carry (c)

$$\begin{array}{r} 17 \\ + 9 \\ \hline \end{array}$$

② Sum (S)

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

dropped
msb.

Logic Diagrams:

Top Diagram: A logic circuit for a 2-bit adder. Inputs A and B are connected to two AND gates. The outputs of these AND gates are connected to an OR gate, which produces the carry-out (C). The carry-in (C_{in}) is connected to the same OR gate. The sum (S) is the output of the OR gate.

Bottom Diagram: A logic circuit for a 2-bit adder using two 1/2 Adder blocks. Inputs A and B are connected to the first 1/2 Adder. The carry-in (C_{in}) is connected to the second 1/2 Adder. The carry-out (C) is the output of the second 1/2 Adder. The sum (S) is the output of the first 1/2 Adder.



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