



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' (III Cycle) Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

23ECB201 – DIGITAL SYSTEMS DESIGN

II YEAR/ III SEMESTER

UNIT 2 – COMBINATIONAL CIRCUITS

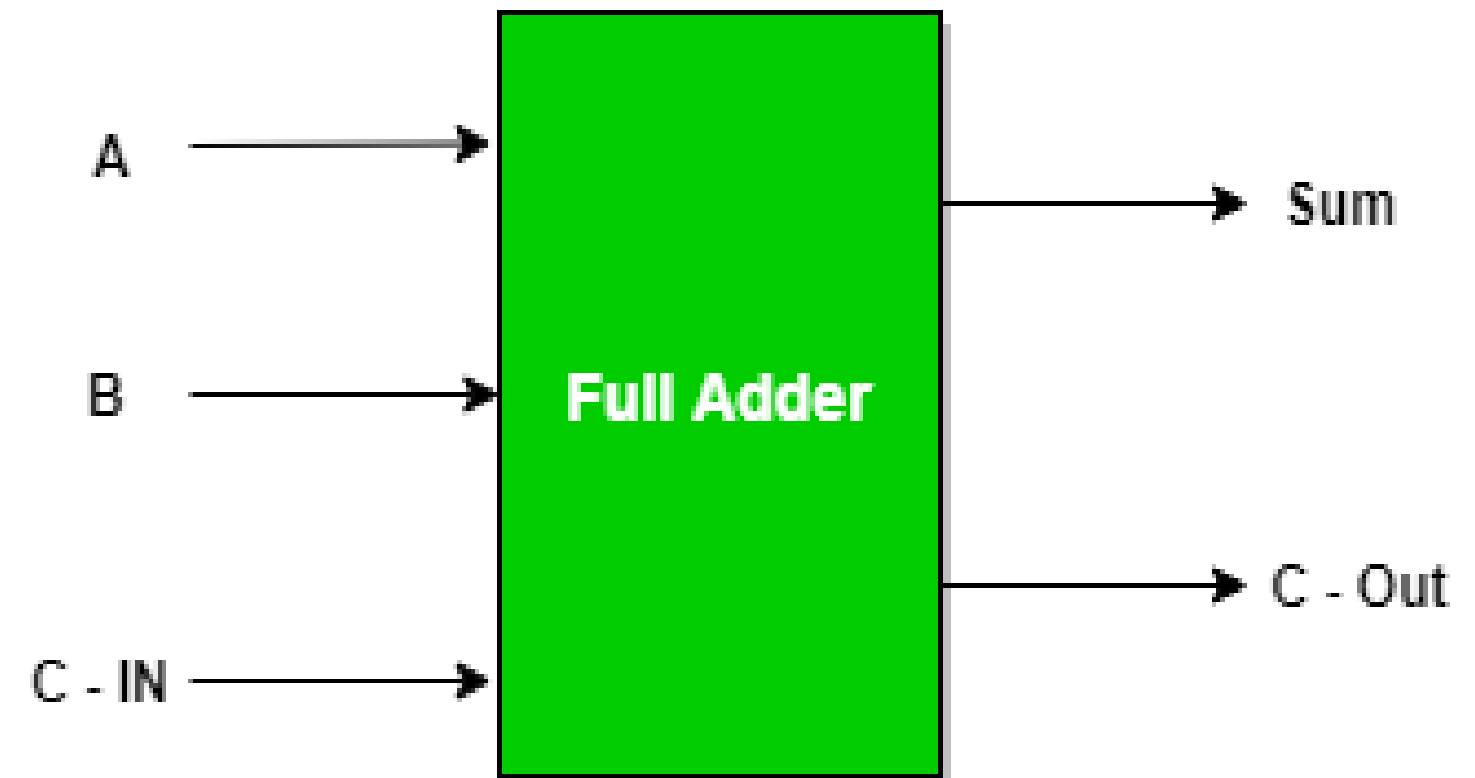
TOPIC- FULL ADDER



FULL ADDER



- Full Adder is the adder that adds three inputs and produces two outputs.
- The first two inputs are A and B and the third input is an input carry as C-IN.
- The input variables are augend and addend bits and output variables are sum & carry bits.





TRUTH TABLE



Inputs			Outputs	
A	B	C – IN	Sum	C – Out
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

Binary Addition

$$0 + 0 = 0$$

$$0 + 1 = 1$$

$$1 + 0 = 1$$

$$1 + 1 = 10$$

$$10 + 1 = 11$$



LOGICAL EXPRESSION



For Sum (S)

A \ BC _{in}	00	01	11	10
0	0	1	0	1
1	1	0	1	0

$$S = A'B'C_{in} + A'BC'_{in} + AB'C'_{in} + ABC_{in}$$

For Output Carry (C_{out})

A \ BC _{in}	00	01	11	10
0	0	0	1	0
1	0	1	1	1

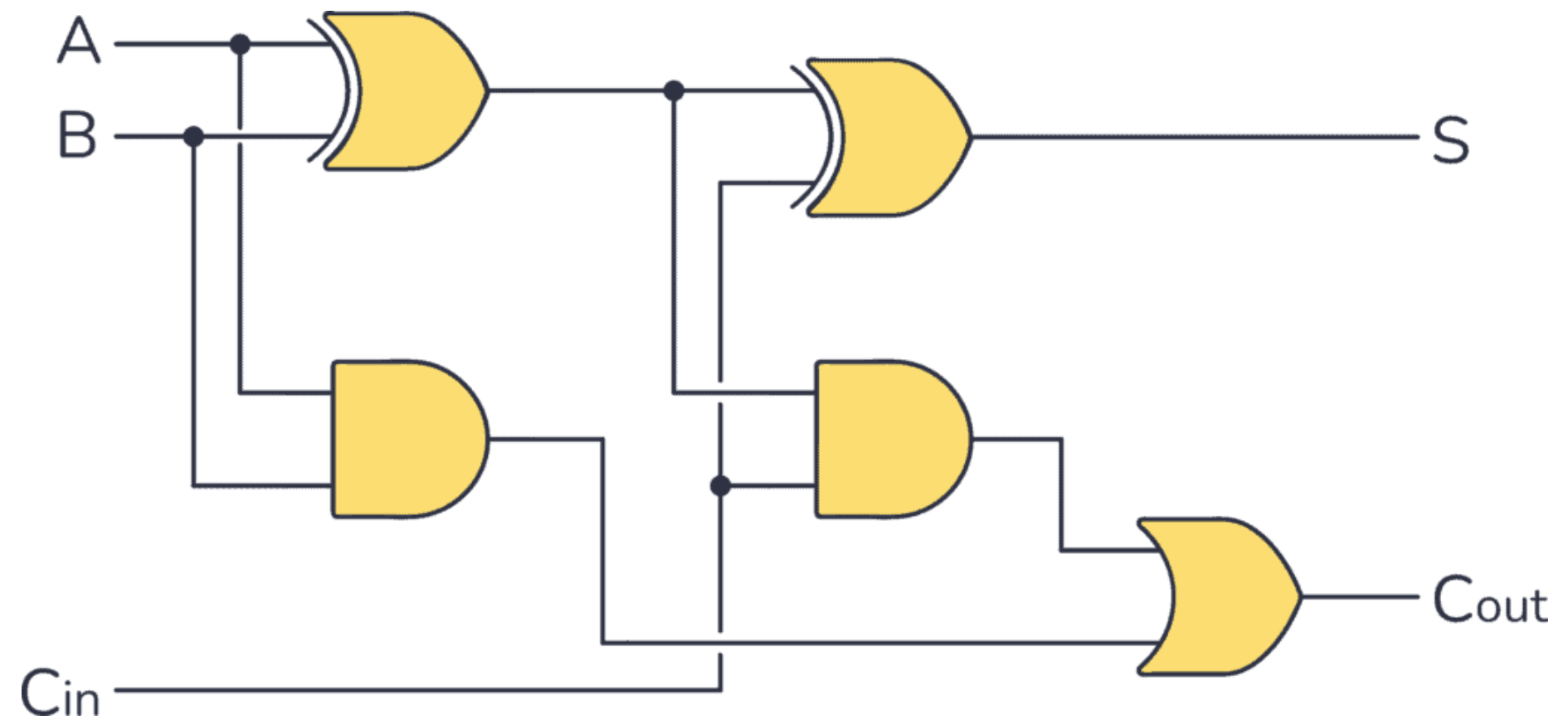
$$C_{out} = AB + AC_{in} + BC_{in}$$



IMPLEMENTATION

$$\text{Sum, } S = A \oplus B \oplus C_{in}$$

$$\text{Carry, } C = AB + AC_{in} + BC_{in}$$





APPLICATIONS OF FULL ADDER



1. Arithmetic circuits
2. Data handling
3. Counters
4. Multiplexers and demultiplexers
5. Memory tending to
6. ALUs





ADVANTAGES AND DISADVANTAGES



ADVANTAGES

- Flexibility
- Carry Info
- Speed

DISADVANTAGES

- Complexity
- Propagation Deferral





ASSESSMENT QUESTIONS



1. Total number of inputs in a Full adder is _____
 - a) 2
 - b) 3**
 - c) 4
 - d) 1

2. How many AND, OR and EXOR gates are required for the configuration
 - a) 1, 2, 2
 - b) 2, 1, 2**
 - c) 3, 1, 2
 - d) 4, 0, 1

3. The difference between half adder and full adder is _____
 - a) Half adder has two inputs while full adder has four inputs
 - b) Half adder has one output while full adder has two outputs
 - c) Half adder has two inputs while full adder has three inputs**
 - d) All of the Mentioned





THANK YOU