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 – DIGIT AL SYSTEMS DESIGN

II YEAR/ III SEMESTER

UNIT 2 – COMBINATIONAL CIRCUITS

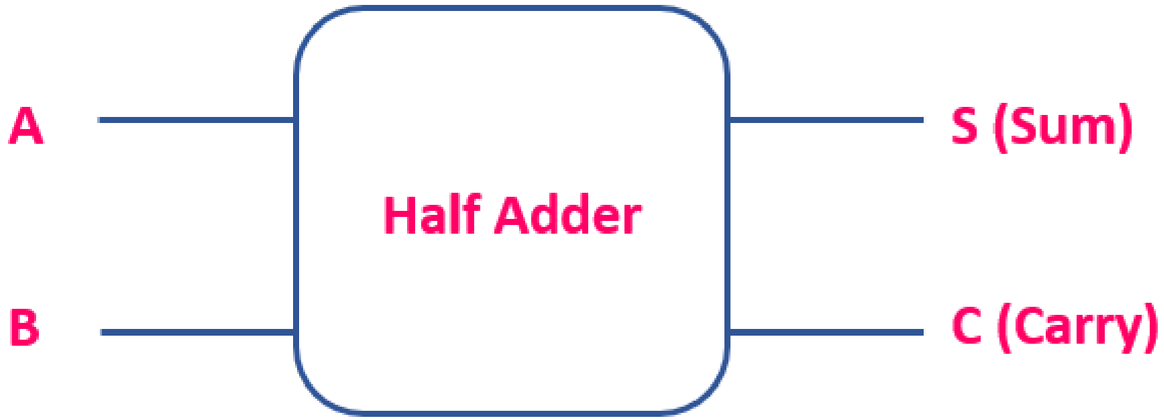
TOPIC- HALF ADDER

HALF ADDER

- A half adder is a digital logic circuit that performs binary addition of two single-bit binary numbers.

- Half adder is a combinational arithmetic circuit that adds two numbers and produces a sum bit (s) and carry bit (c) both as output.

- The input variables are augend and addend bits and output variables are sum & carry bits.



TRUTH TABLE

A	B	Sum	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Binary Addition

0 + 0 = 0

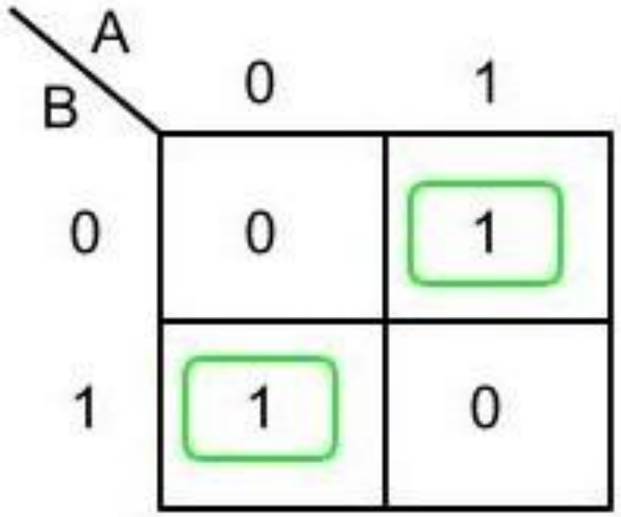
0 + 1 = 1

1 + 0 = 1

1 + 1 = 10

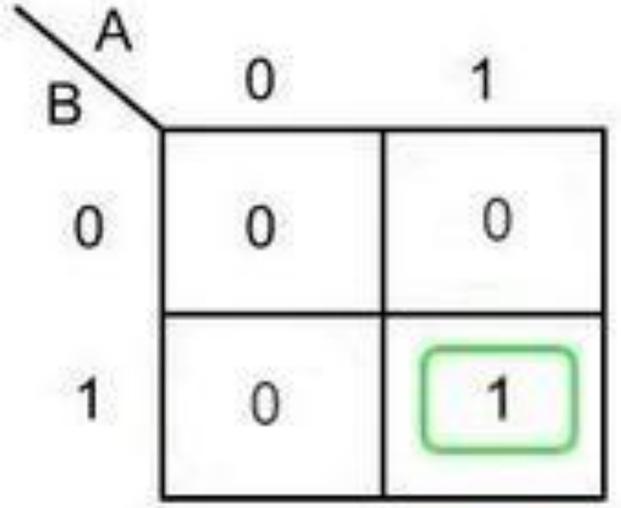
LOGICAL EXPRESSION

FOR SUM



Sum,$S=A \oplus B=AB'+A'B$

FOR CARRY

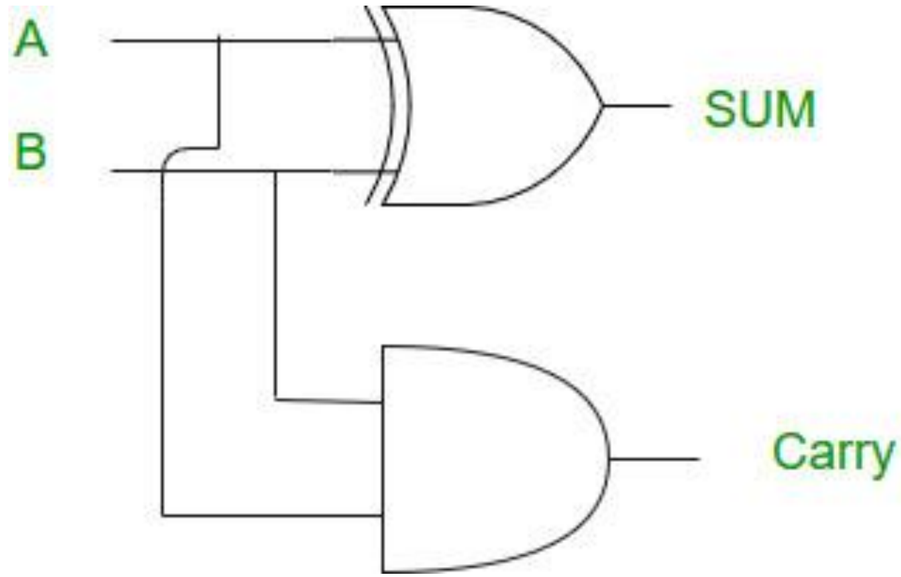


Carry,$C=A \cdot B$

IMPLEMENTATION

Sum = A XOR B

Carry = A AND B



APPLICATIONS OF HALF ADDER

1.Arithmetic circuits

2.Data handling

3.Address unraveling

4.Encoder and decoder circuits

5.Multiplexers and demultiplexers

6.Counters

ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- Simplicity
- Speed

DISADVANTAGES

- Limited Usefulness
- Lack of Convey Info
- Propagation Deferral

ASSESSMENT QUESTIONS

1. Total number of inputs in a half adder is _____

a) 2
b) 3
c) 4
d) 1

2. In which operation carry is obtained?

a) Subtraction
b) Addition
c) Multiplication
d) Both addition and subtraction

3. If A and B are the inputs of a half adder, the sum is given by _____

a) A AND B
b) A OR B
c) A XOR B
d) A EX-NOR B

THANK YOU