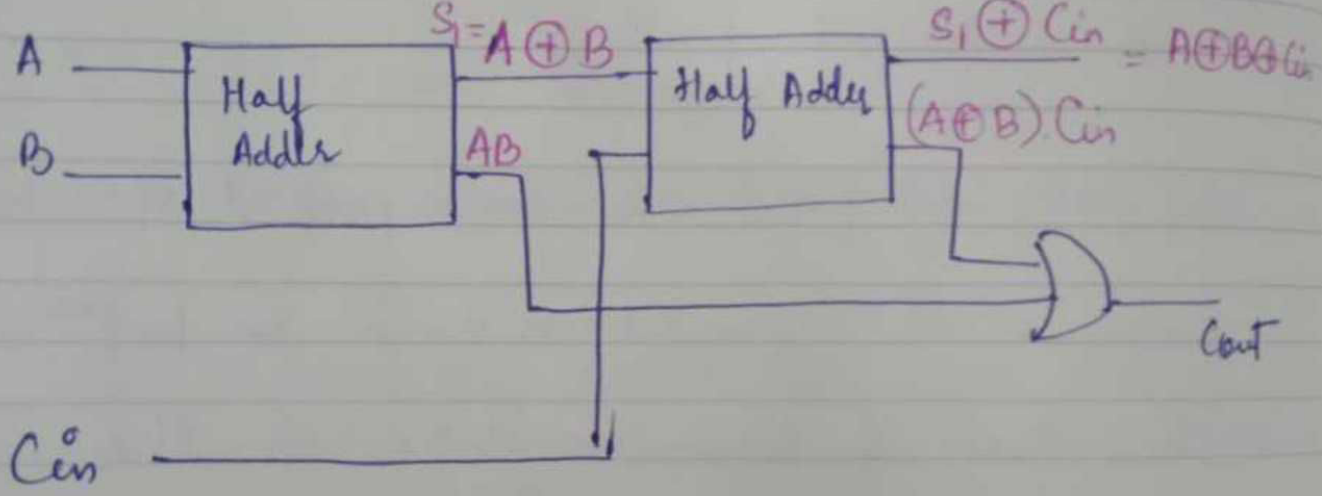
31 SATURDAY • AUGUST

COMBINATIONAL CIRCUITS:

Full Adder using Half Adder:-

* If full Adder not available & we have only half adders. we can design full Adder using two half Adders.



Half Adder

$S_1 = A \oplus B$

$Carry_1 = A.B.$

$Cout = (A \oplus B)Cin + AB$

$A + \bar{A}B = A + B$

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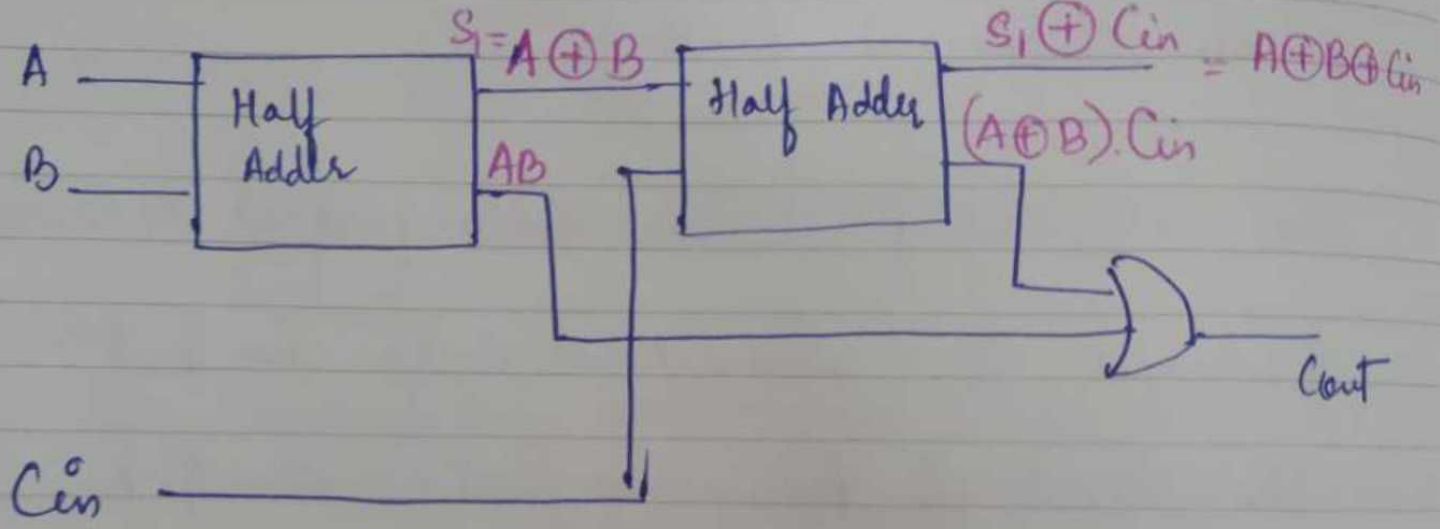


Half Adder

$S_1 = A \oplus B$

$Carry_1 = A.B.$

$A + \bar{A}B = A + B$

$C_{out} = (A \oplus B)C_{in} + AB$

$= (\bar{A}B + A\bar{B})C_{in} + AB$

$= \bar{A}BC_{in} + A\bar{B}C_{in} + AB$

$= B(\bar{A}C_{in} + A) + A\bar{B}C_{in}$

$= B(A + C_{in}) + \bar{B}AC_{in}$

(244-121) WK 35

01 SUNDAY • SEPTEMBER

$= AB + BC_{in} + \bar{B}AC_{in}$.

$= AB + (B + \bar{B}A)C_{in}$

$= AB + (A+B)C_{in}$

$= AB + BC_{in} + C_{in}A$.

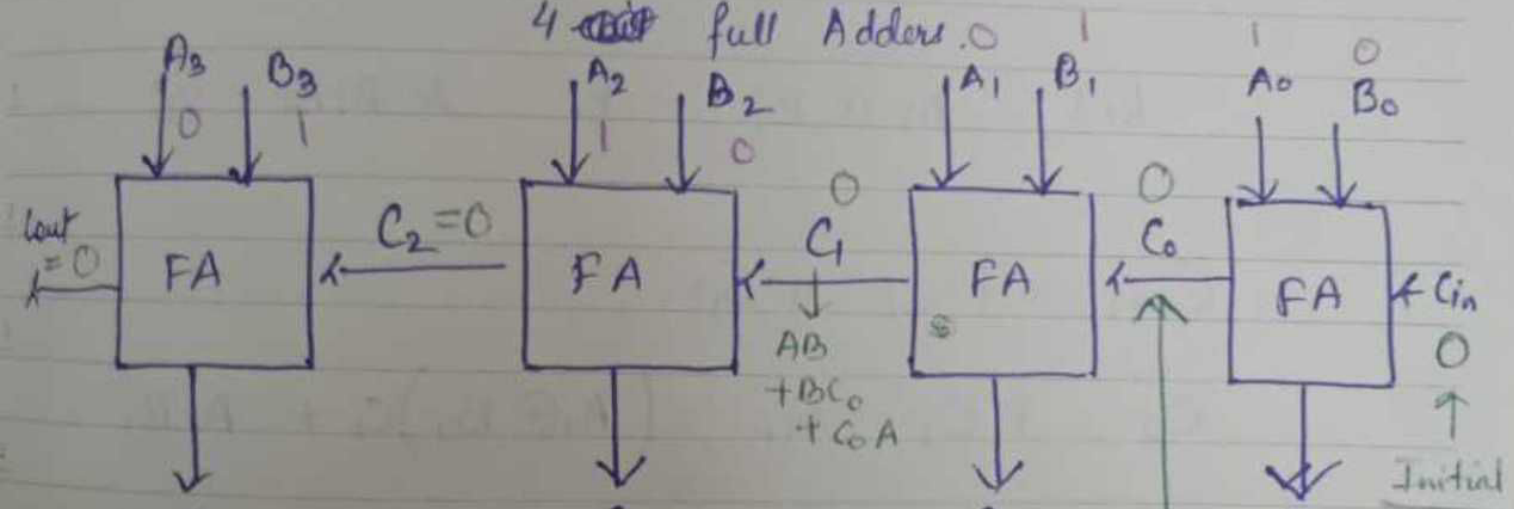
Self study

Subtractors

N Bit parallel Adder :—

- cascade of Full Adder
- device for adding multi bit nos.

4-bit Parallel Adder :—



MSB LSB

A = 0 1 0 1 (A_3 A_2 A_1 A_0)

B = 1 0 1 0 (B_3 B_2 B_1 B_0)

S = 1 1 1 1 (15)

Full Adder :- Sum = $A \oplus B \oplus C$

Carry = $AB + BC + CA$