Carry Lookahead Adder (CLA)

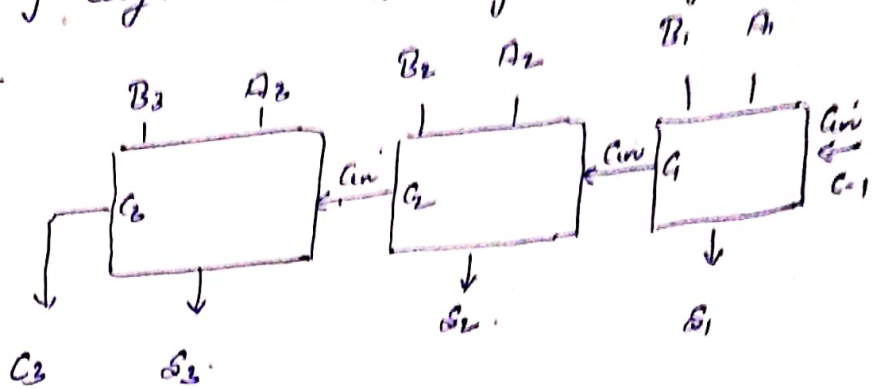
→ Superior than Full Adder.

→ Propogation Delay of Carry. → Predicting the Carry Output

A	B	Cin	Co
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

A⊕B·Cin

A·B



Carry Output

$$C_o = \underbrace{A \cdot B}_{\text{Carry Generator (G)}} + \underbrace{(A \oplus B)}_{\text{Carry Propogator P}} \cdot C_{in}$$

$$C_o = G + P\,C_{in}, \quad C_{in} = C_{i-1}$$

$$\boxed{C_i = G_i + P_i \cdot C_{i-1}}$$

$i = 0$

$$C_0 = G_0 + P_0 C_{-1} \quad - (1)$$

$i = 1$

$$C_1 = G_1 + P_1 C_0 \quad \ldots (2)$$

$$C_1 = G_1 + P_1 (G_0 + P_0 C_{-1})$$

$$G_1 + P_1 G_0 + P_1 P_0 C_{-1}$$

$i = 2$

$$C_2 = G_2 + P_2 C_1$$

$$C_2 = G_2 + P_2 (G_1 + P_1 G_0 + P_1 P_0 C_{-1})$$

$$= G_2 + P_2 G_1 + P_2 P_1 G_0 + P_2 P_1 P_0 C_{-1}$$

$i = 3$

$G_3 = A_3 \cdot B_3$

$P_3 = A_3 \oplus B_3$.

$P_2 = A_2 \oplus B_2$

$P_1 = A_1 \oplus B_1$

$P_0 = A_0 \oplus B_0$

$A = A_3\ A_2\ A_1\ A_0$

$B = B_3\ B_2\ B_1\ B_0$

$S_3 = A_3 \oplus B_3 \oplus C_2$.