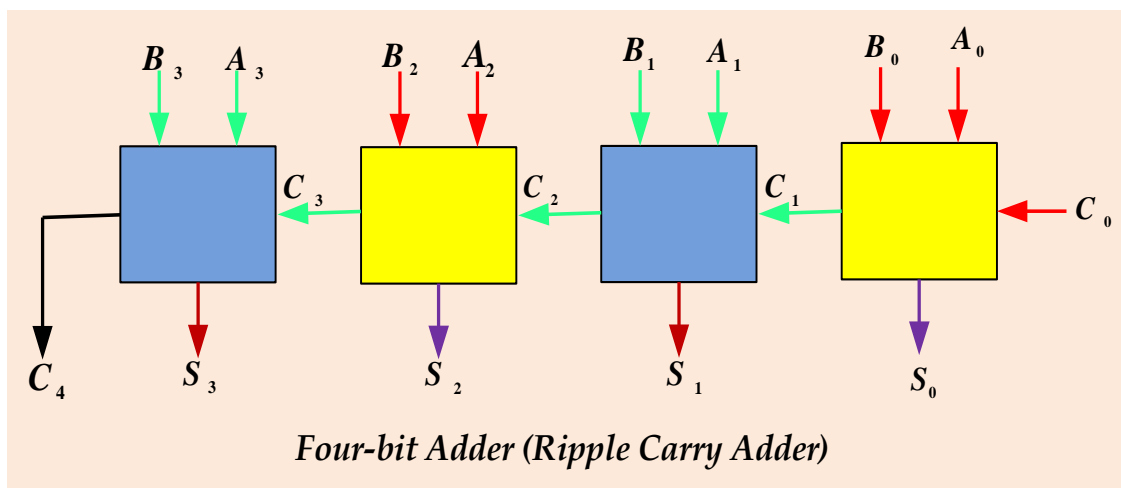


### 3. Binary Adder (Asynchronous Ripple-Carry Adder)

- A binary adder is a digital circuit that produces the *arithmetic sum of two binary numbers*.
- A binary adder can be constructed with *full adders connected in cascade* with the output carry from each full adder connected to the input carry of the next full adder in the chain.
- The *four-bit adder* is a typical example of a *standard component*. It can be used in many application involving arithmetic operations.



- The input carry to the adder is  $C_0$  and it ripples through the full adders to the output carry  $C_4$ .
- $n$ -bit binary adder requires  $n$  full adders.