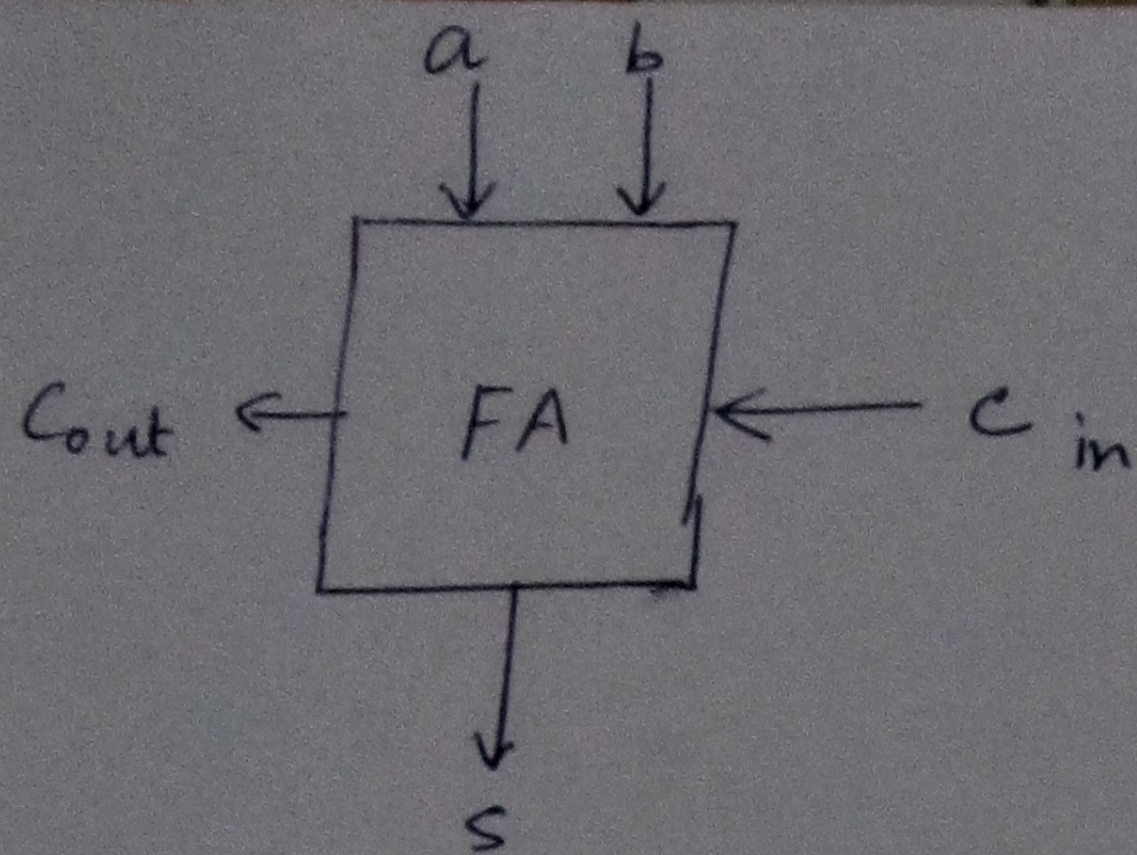


Slide-5

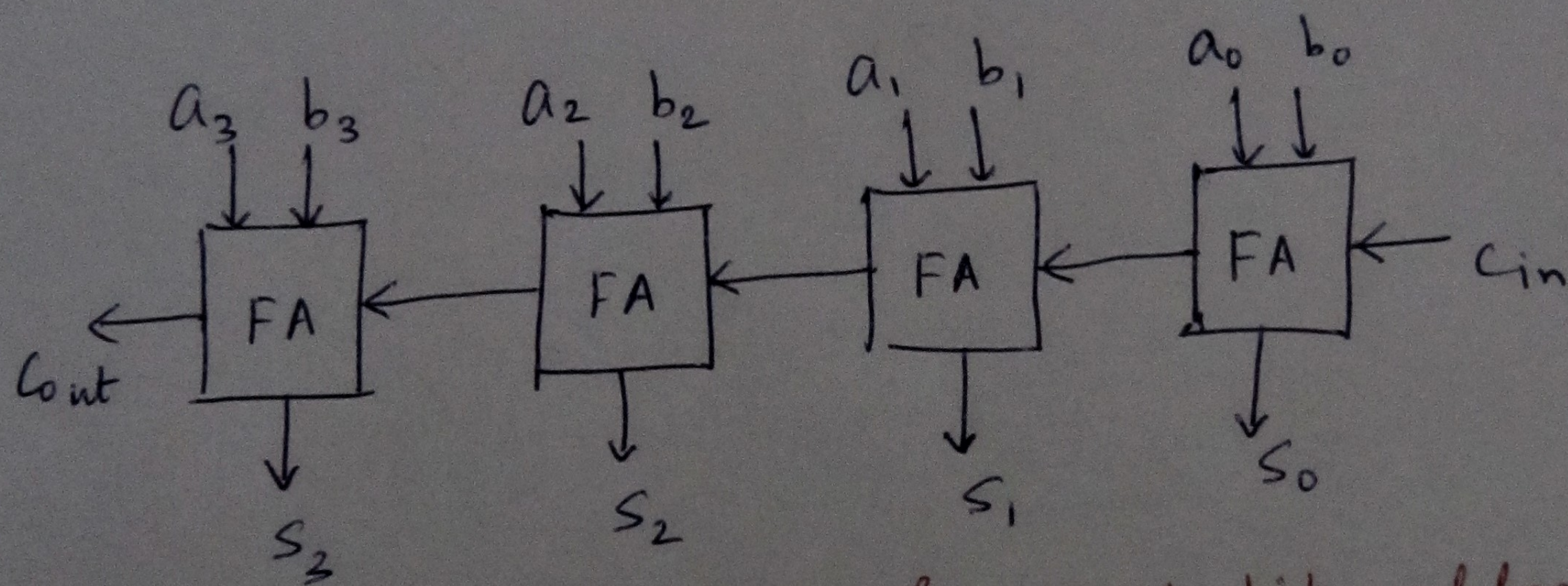


| a | b | C <sub>in</sub> | S | C <sub>out</sub> |
|---|---|-----------------|---|------------------|
| 0 | 0 | 0               | 0 | 0                |
| 0 | 0 | 1               | 1 | 0                |
| 0 | 1 | 0               | 1 | 0                |
| 0 | 1 | 1               | 0 | 1                |
| 1 | 0 | 0               | 1 | 0                |
| 1 | 0 | 1               | 0 | 1                |
| 1 | 1 | 0               | 0 | 1                |
| 1 | 1 | 1               | 1 | 1                |

$$S = \bar{a}\bar{b}C_{in} + \bar{a}b\bar{C}_{in} + a\bar{b}\bar{C}_{in} + abc_{in}$$

$$= a \oplus b \oplus C_{in}$$

$$C_{out} = \bar{a}bC_{in} + a\bar{b}C_{in} + ab\bar{C}_{in} + abc_{in}$$



Microarchitecture of a 4-bit adder (ripple-carry)  
 (An algorithm to add two 4-bit numbers)  
 [Input: two 4-bit numbers  
 Output: sum and carry-out]