Full Adder

Last updated 10/31/24

Full Adder

- Binary Addition

Carry

```
  1
+ 0
---
```

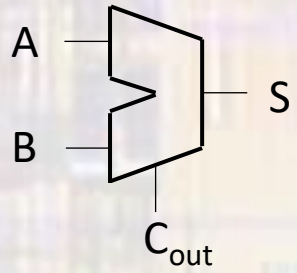
Sum

0	0	0	1
0	0	1	1
+ 0	+ 1	+ 0	+ 1
0	1	1	0

Full Adder

- A Half Adder is used to add two binary bits
  - 2 inputs
    - A, B
  - 2 outputs
    - Sum, Carryout (C_{out})

A	B	C_{out}	S
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	0

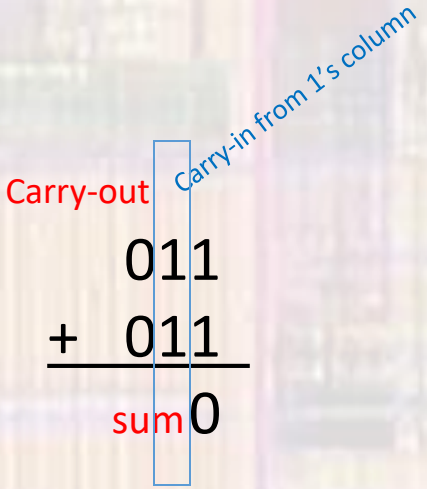


$S = A \otimes B$

$C_{out} = AB$

Full Adder

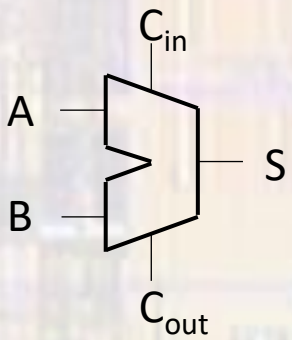
- Binary Addition
  - Looking at the 2's column



0 1	1 1	1 1	1 1
001	001	011	011
+ 001	+ 011	+ 001	+ 011
10	00	00	10

Full Adder

- A Full Adder is used to add two binary bits
  - 3 inputs
    - A, B, C_{in}
  - 2 outputs
    - Sum, Carryout (C_{out})



C_{in}	A	B	C_{out}	S
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

$$S = A \otimes B \otimes C_{in}$$
$$C_{out} = AB + AC_{in} + BC_{in}$$