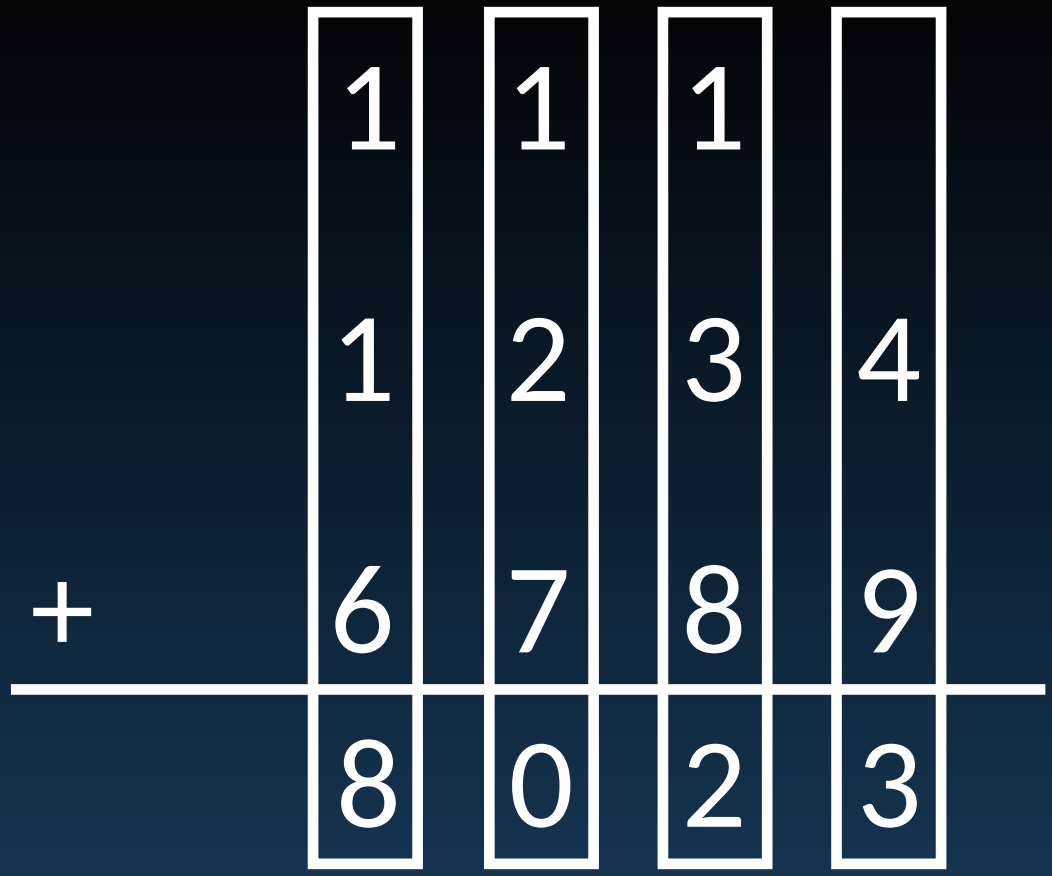
The Ripple Carry Adder


1 1 1
1 2 3 4
+ 6 7 8 9
8 0 2 3

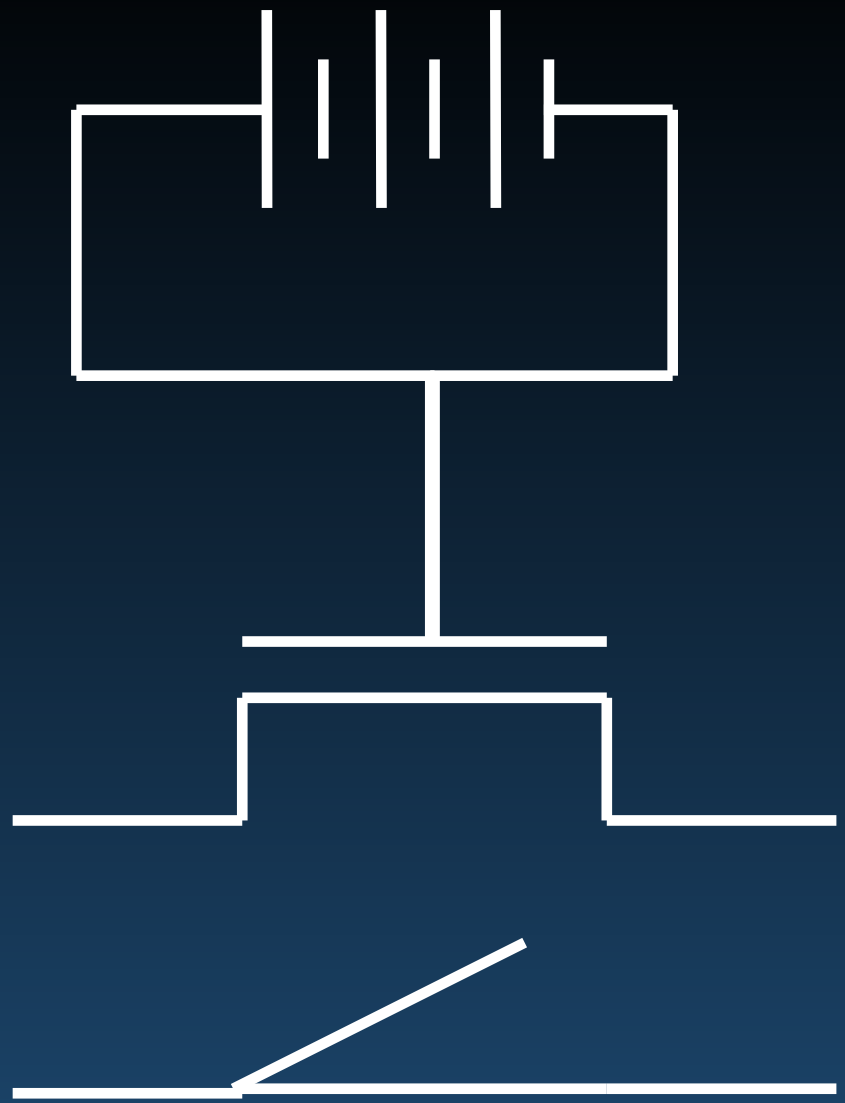

0 0 0 0 1 1 1 0 0
1 0 1 0 1 0 1 0
+ 0 1 0 0 0 1 1 1
1 1 1 1 0 0 0 1

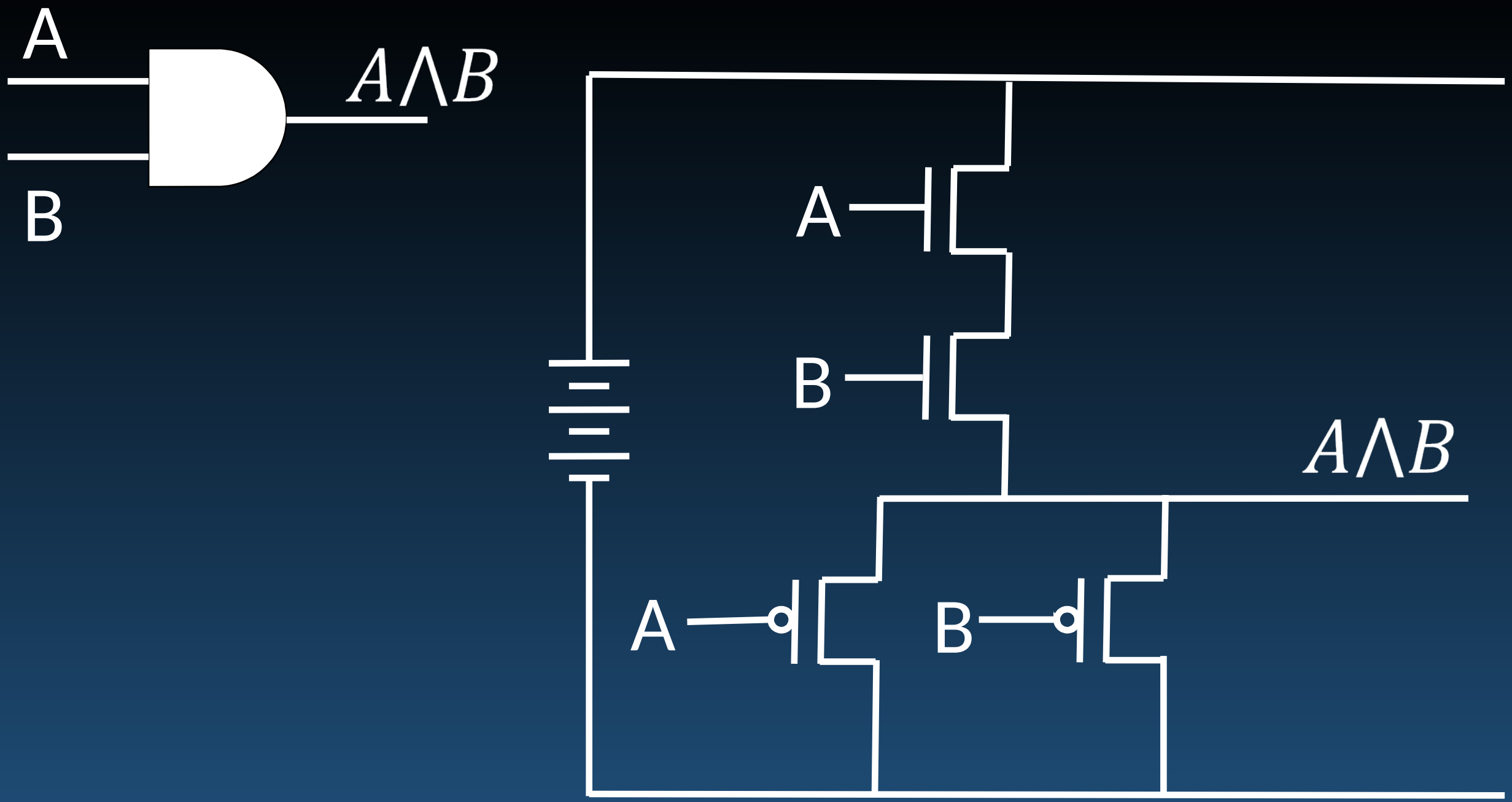
A	B	C_{in}	S	C_{out}
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

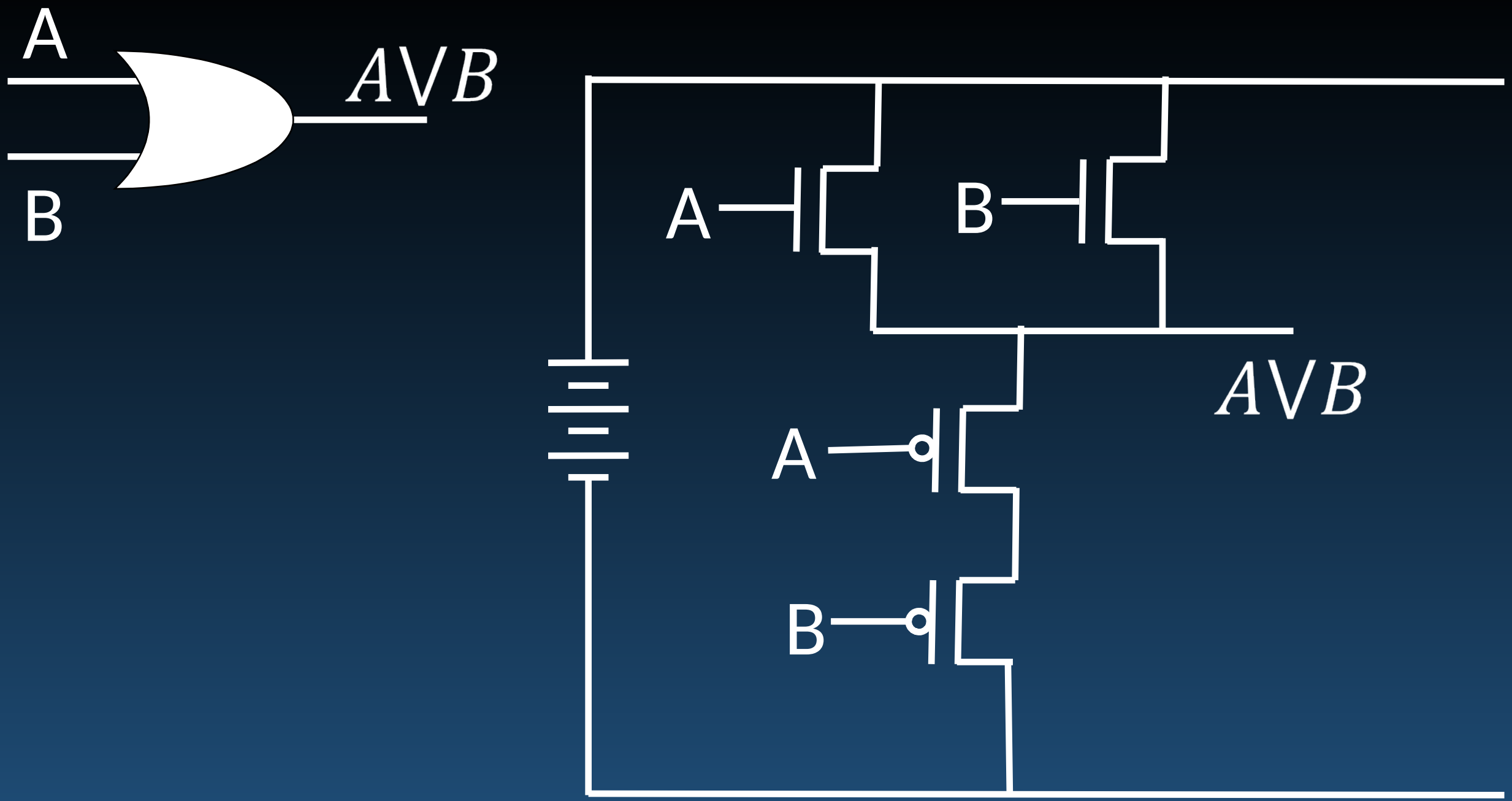
A	B	C_{in}	S	C_{out}
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

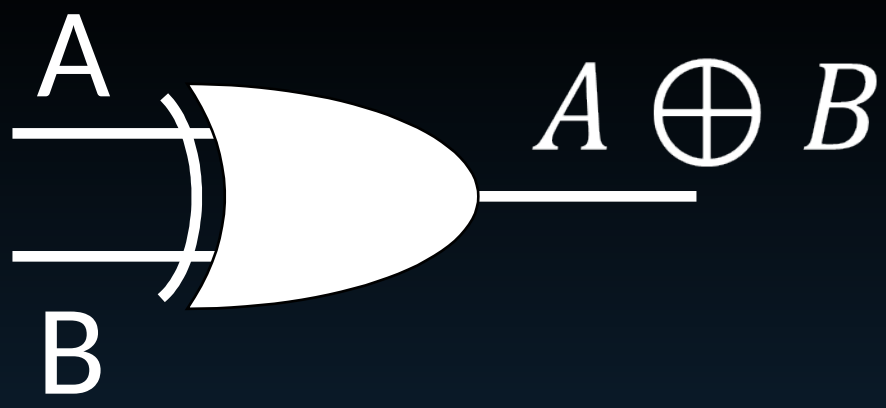
$$S = A \oplus B \oplus C_{in}$$

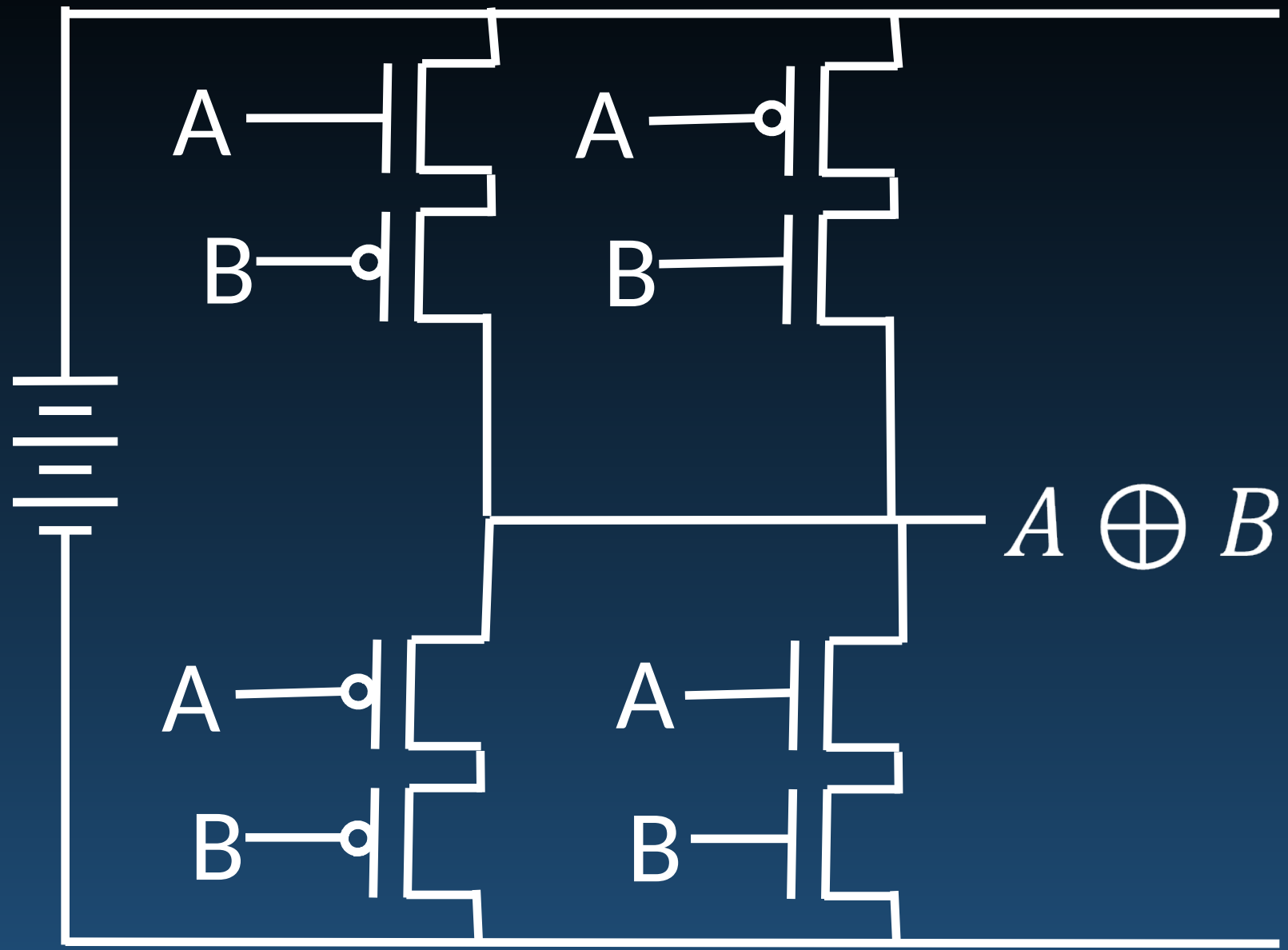
$$C_{out} = (A \wedge B) \vee \left(C_{in} \wedge (A \oplus B)\right)$$

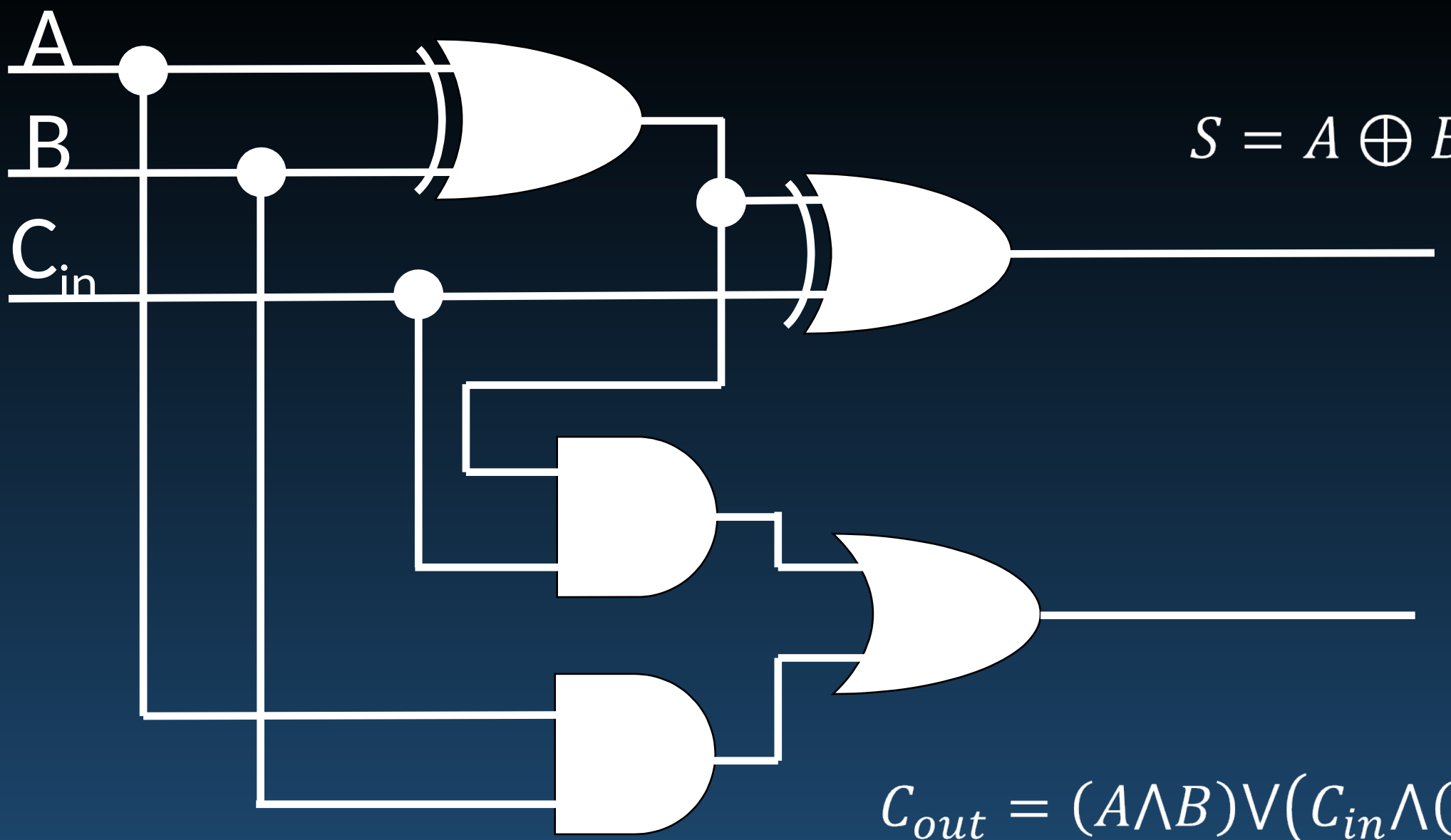



A
B
$A \wedge B$
A
B
$A \wedge B$
A
B


A
B
$A \vee B$
A
B
$A \vee B$
A
B

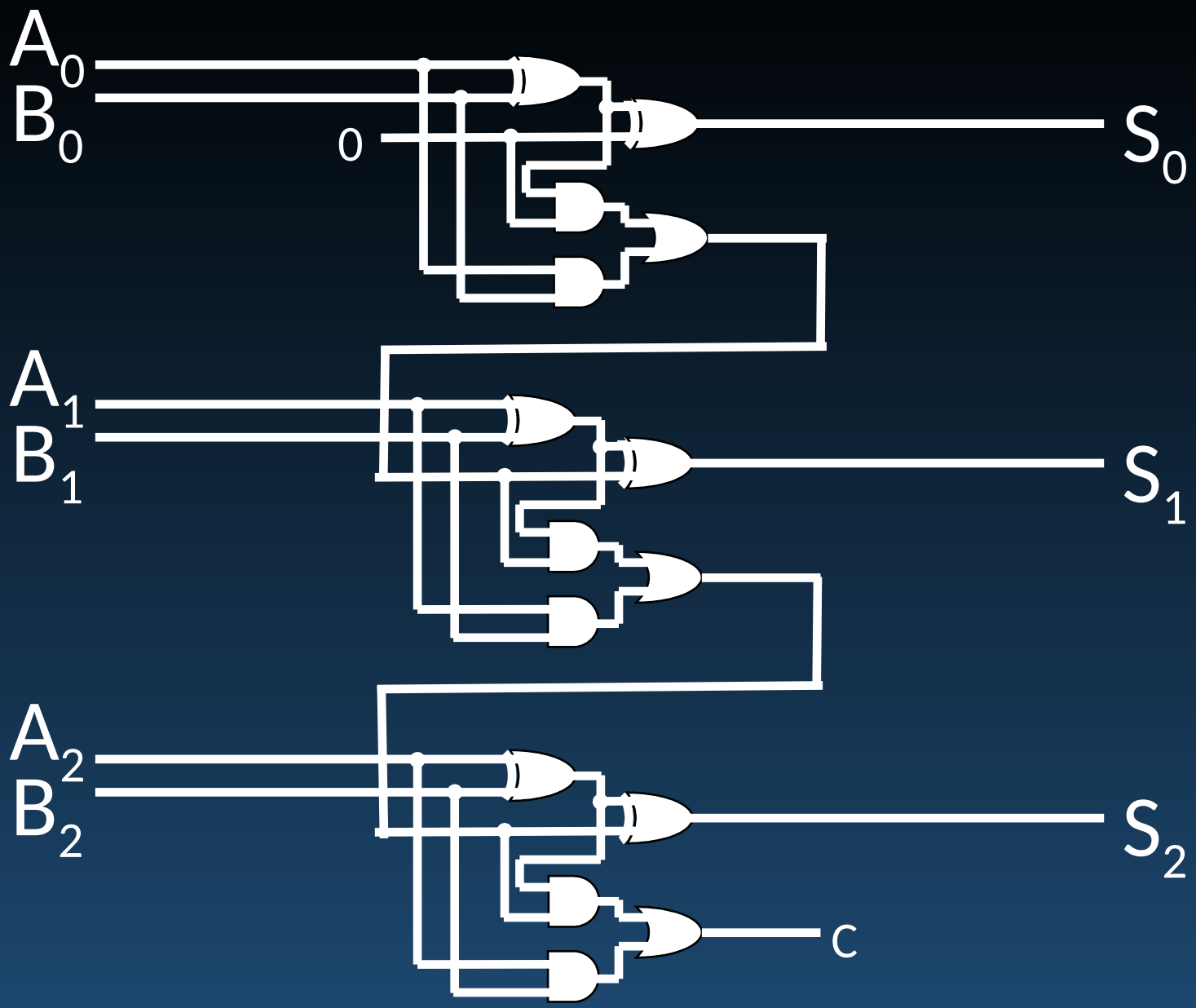

A
B
$A \oplus B$


A
A
B
B
$A \oplus B$
A
A
B
B



$$S = A \oplus B \oplus C_{in}$$

$$C_{out} = (A \wedge B) \vee \left(C_{in} \wedge (A \oplus B)\right)$$


A0
B0
0
S0
A1
B1
S1
A2
B2
S2
C