

Computer Architecture: Gates and Wires

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Truth Tables to Boolean Algebra

INPUTS		OUT
A	B	R
0	0	0
0	1	1
1	0	1
1	1	0

Truth Tables to Boolean Algebra

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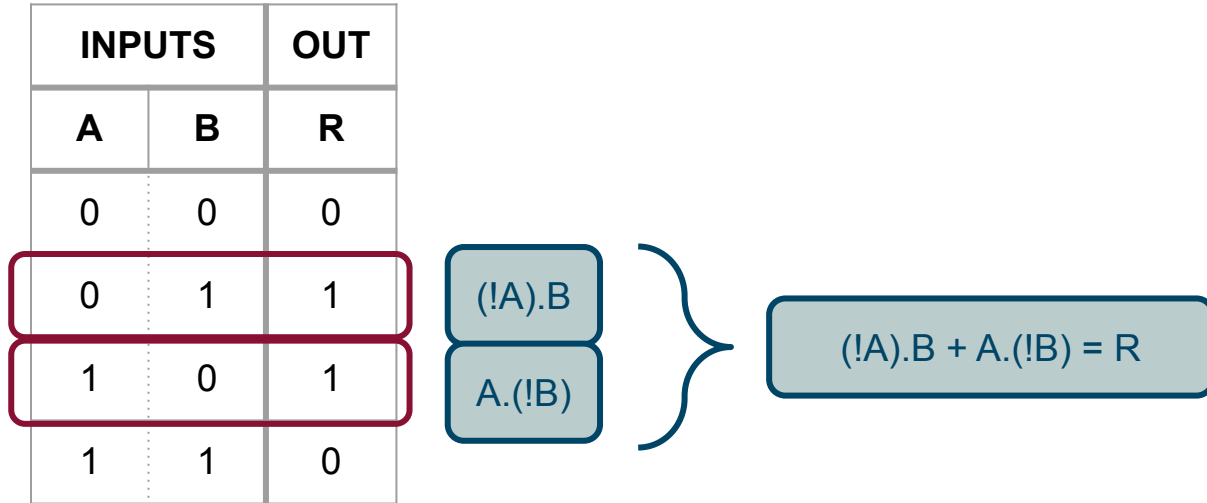
Truth Tables to Boolean Algebra

INPUTS		OUT
A	B	R
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0	1	1
1	0	1
1	1	0

$(!A).B$

$A.(!B)$

Truth Tables to Boolean Algebra



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1	0	1
1	1	0

$$A = 0, B = 0: (!0).0 + 0.(!0) = 1.0 + 0.1 = 0 + 0 = 0$$

$$A = 0, B = 1: (!0).1 + 0.(!1) = 1.1 + 0.0 = 1 + 0 = 1$$

$$A = 1, B = 0: (!1).0 + 1.(!0) = 0.0 + 1.1 = 0 + 1 = 1$$

$$A = 1, B = 1: (!1).1 + 1.(!1) = 0.1 + 1.0 = 0 + 0 = 0$$

$(!A).B$

$A.(!B)$

$$(!A).B + A.(!B) = R$$

Truth Tables to Boolean Algebra

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$(!A).B$

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$$(!A).B + A.(!B) = R$$

Every truth table can be converted to a sum of products!

Boolean Algebra to Circuit

$$(!A).B + A.(!B) = R$$



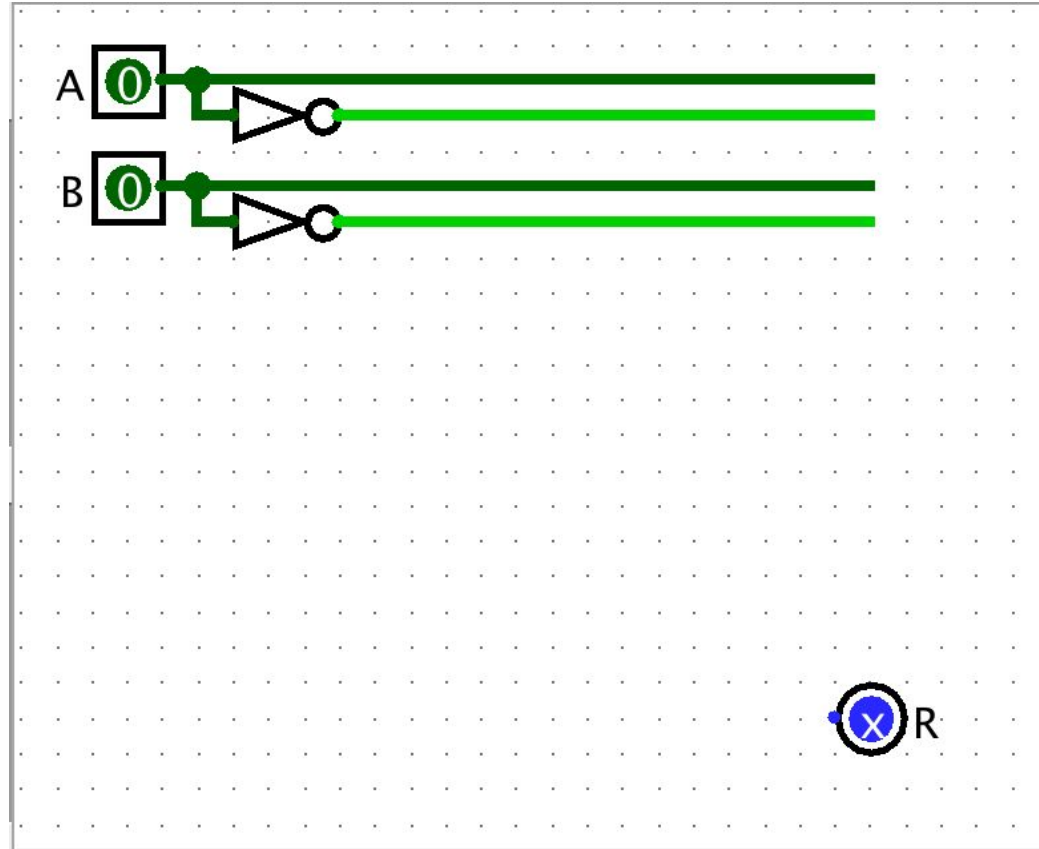
Boolean Algebra to Circuit

$$(\neg A).B + A.(\neg B) = R$$



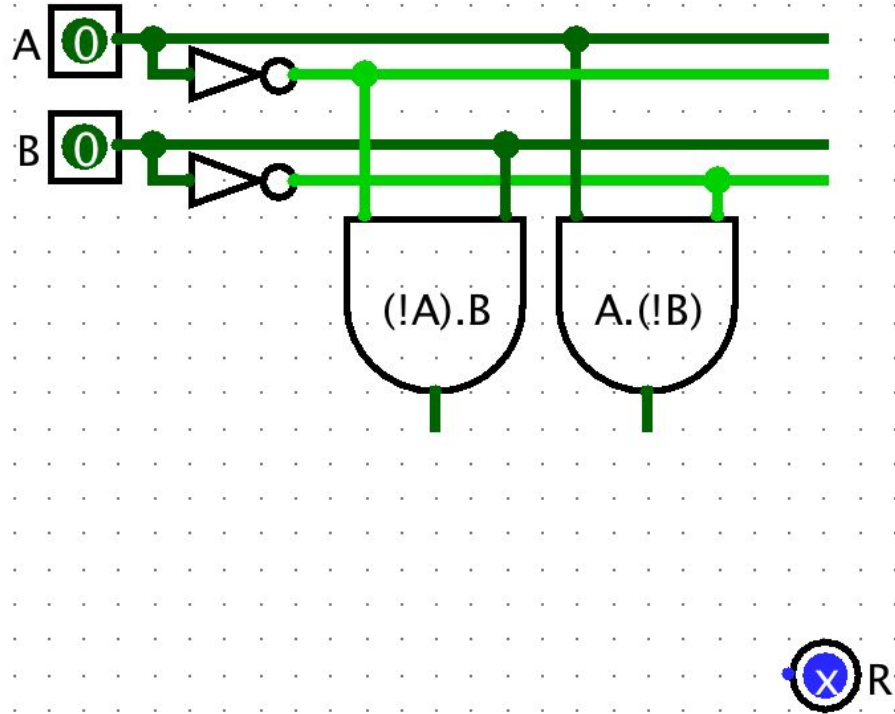
Boolean Algebra to Circuit

$$(!A).B + A.(!B) = R$$



Boolean Algebra to Circuit

$$(\neg A) \cdot B + A \cdot (\neg B) = R$$



Boolean Algebra to Circuit

$$(\neg A) \cdot B + A \cdot (\neg B) = R$$

