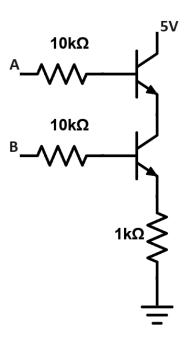
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Introduction to Logic Gates

In lecture, we've discussed how it can be used in the linear mode at length and we saw how to use an integrated circuit (the op-amp) that incorporated the Class A amplifier that we discussed. Let's discuss a few different applications for the transistor.

In this part of our discussion, we talked about the fact that we could only put 0V or 5V at A and B. Draw a table to remind yourself of when you'll see a 5V drop across the $1k\Omega$ resistor. What kind of logic gate is this?



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Introduction to Logic Gates

We looked at one integrated circuit (the AND gate) that made use of the transistor as a switch. Now, we're going to take a look at a few more ICs like the AND gate, and we'll see how to use them to do some interesting things.

Logic Gates

Name NOT Alg. Expr. Symbol A		AND AB			NAND			OR A+B			$\overline{A+B}$			XOR			XNOR			
					ĀB □□□□□		$A \oplus B$							$\overline{A \oplus B}$						
		<u>A</u> <u>x</u>																		
A	X	В	A	X	В	A	X	В	A	X	В	A	X	В	A	X	В	A	X	
1	0	0	1	0	0	1	1	0	1	1	0	1	0	0	1	1	0	1	0	
		1	0	0	1	0	1	1	0	1	1	0	0	1	0	1 0	1	0	0	
	A 0	A X 0 1	$ \begin{array}{c cccc} \hline A & X & B \\ \hline 0 & 1 & 0 \\ 1 & 0 & 0 \end{array} $	A AB A B A B A B B A 0 1 0 0 1 0 0 1	A AB A B X B A X 0 1 0 0 0 1 0 0 1 0	A AB A B X B A X B B A A X B B A X B B B C C C C C C D </td <td>A AB AB A B X B X B A 0 1 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0</td> <td>A AB AB A B X B X B A A X B A X 0 1 0 0 0 1 1 0 0 1 0 0 1 1 0 0 1 0 1</td> <td>A AB AB A B X B A X B A X B B B A X B A X B 0 1 0 0 0 0 1 0 0 0 1 0 1 0 0 1 0 0 1 0 1 1 0</td> <td>A AB AB AB A B X B A X B A X B A A X B A X B A X B A 0 1 0 0 0 0 0 1 0 0 0 1 0 0 1 0 0 1 0 1 0 1 1 0 0 1 0 1 0 1 0 1</td> <td>A AB AB AB A+B A B X AB AB A+B A B A X BA X BA</td> <td>A AB AB AB A+B A B A X A+B A X B A X B A X</td> <td>A AB AB AB A+B A+B A B X D AB AB</td> <td>A AB AB AB A+B A+B A B X B A X B A X</td> <td>A AB AB AB A+B A+B A B X B A X B A X B A X B A X B A X B B A X B B B B B B B B B B B B B B B B B B B</td> <td>A AB AB AB A+B A+B</td> <td>$\begin{array}{c ccccccccccccccccccccccccccccccccccc$</td> <td>$\begin{array}{c ccccccccccccccccccccccccccccccccccc$</td> <td>A AB AB AB A+B A+B</td>	A AB AB A B X B X B A 0 1 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0	A AB AB A B X B X B A A X B A X 0 1 0 0 0 1 1 0 0 1 0 0 1 1 0 0 1 0 1	A AB AB A B X B A X B A X B B B A X B A X B 0 1 0 0 0 0 1 0 0 0 1 0 1 0 0 1 0 0 1 0 1 1 0	A AB AB AB A B X B A X B A X B A A X B A X B A X B A 0 1 0 0 0 0 0 1 0 0 0 1 0 0 1 0 0 1 0 1 0 1 1 0 0 1 0 1 0 1 0 1	A AB AB AB A+B A B X AB AB A+B A B A X BA X BA	A AB AB AB A+B A B A X A+B A X B A X B A X	A AB AB AB A+B A+B A B X D AB AB	A AB AB AB A+B A+B A B X B A X B A X	A AB AB AB A+B A+B A B X B A X B A X B A X B A X B A X B B A X B B B B B B B B B B B B B B B B B B B	A AB AB AB A+B A+B	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	A AB AB AB A+B A+B	

In the table above, what do the 0s and 1s indicate?

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Introduction to Logic Gates

Let us try building a table and filling it out for the following logic circuit.

