

Thursday, May 2, 2019

- Logic Gates
 - what are they?
 - NOT
 - AND
 - OR
 - Combinations
- Adding Binary
- Moore's Law

Journal

Define the
words
AND, OR
and **NOT**

Objectives

Content: I will complete and analyze **truth tables** and **logic gate** designs to accomplish **logic** tasks.

Social: I will participate in class activities.

Language: I will define in my journal **AND, OR** and **NOT** both in regular English and in applications of circuits.

Logic Gates

- Why logic gates? They are used to manipulate the signals in the processor.
- Logic gates are simple circuits which perform Boolean functions. In other words, a circuit which produces an output based on the input.
- Both the input and the output must be 1's and 0's and therefore these gates are the basis of all logic circuits.
- The 1's and 0's are actually where a small voltage is a 1 and a very small voltage is a 0

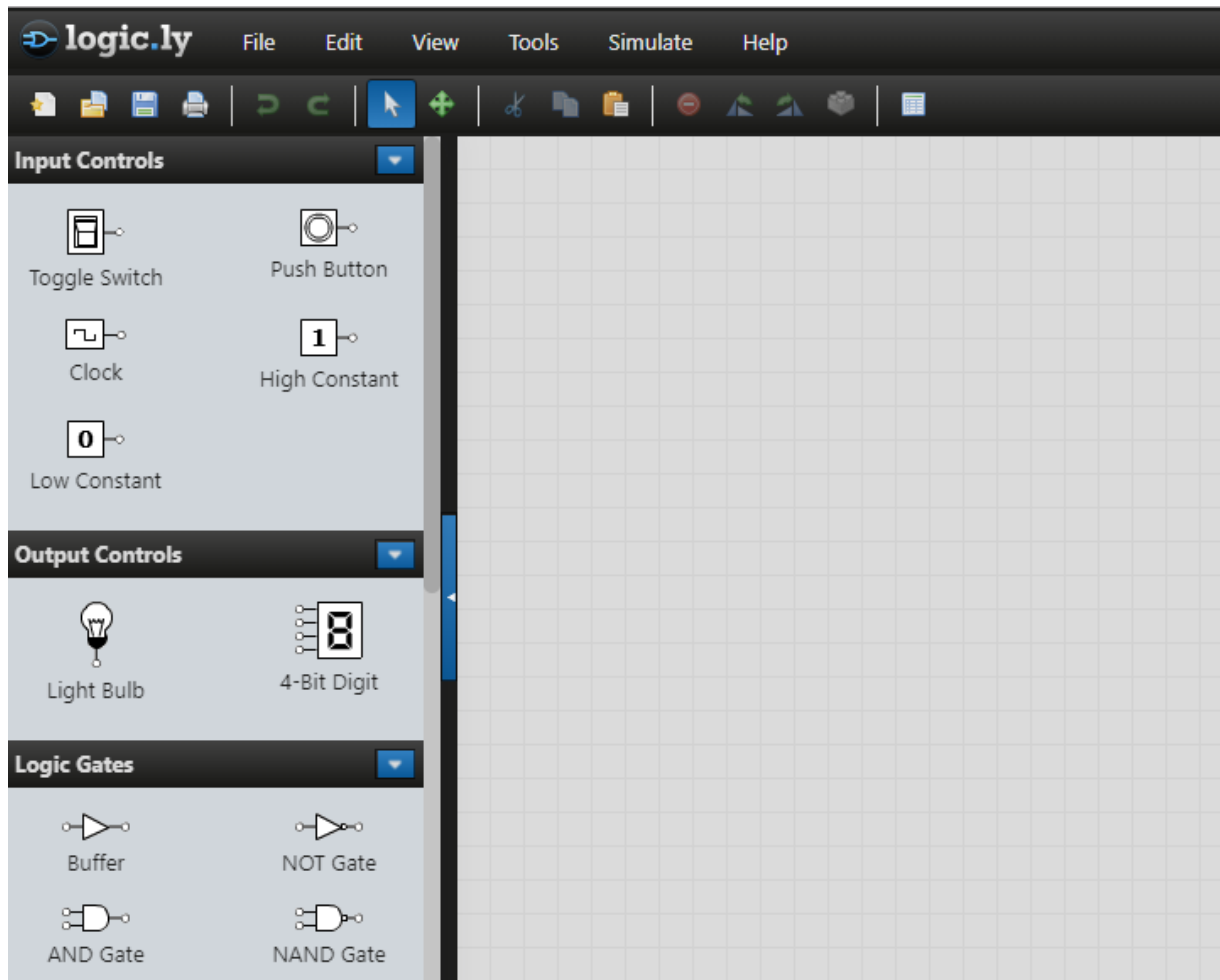
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<http://logic.ly/demo>



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Logic Gates - NOT

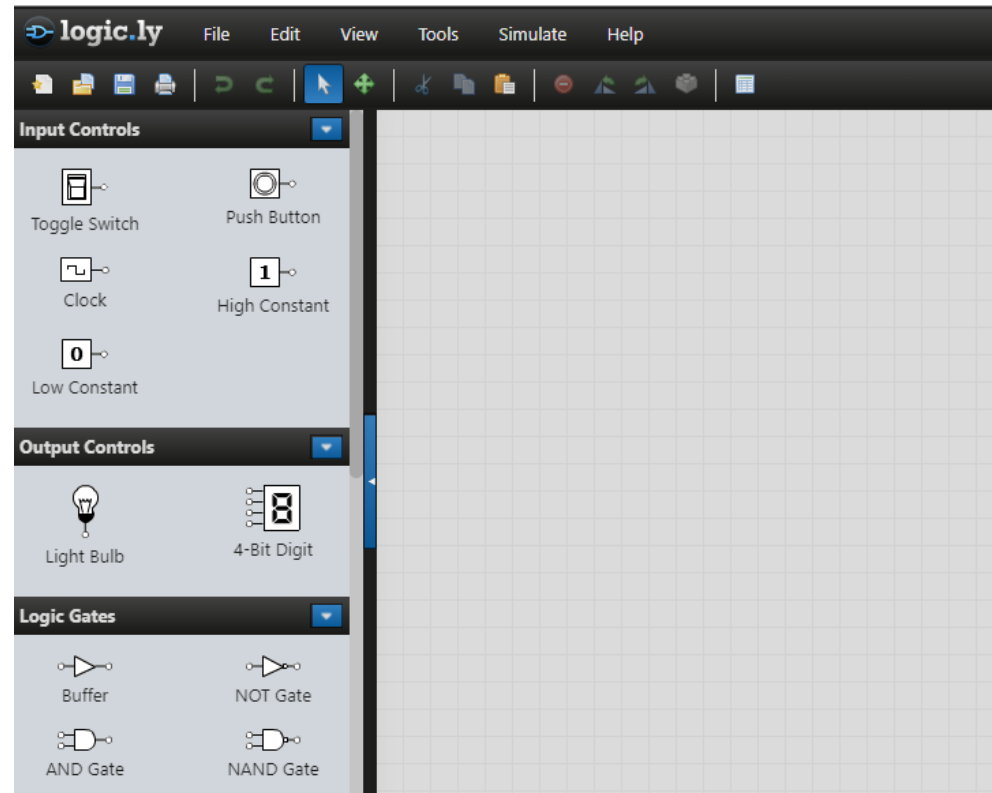


The **NOT** gate is sometimes known as an **INVERTER** as it will output the **opposite** or inverse of the input.

We can show this in a truth table.

And test it in logic.ly

Input	Output
0	1
1	0



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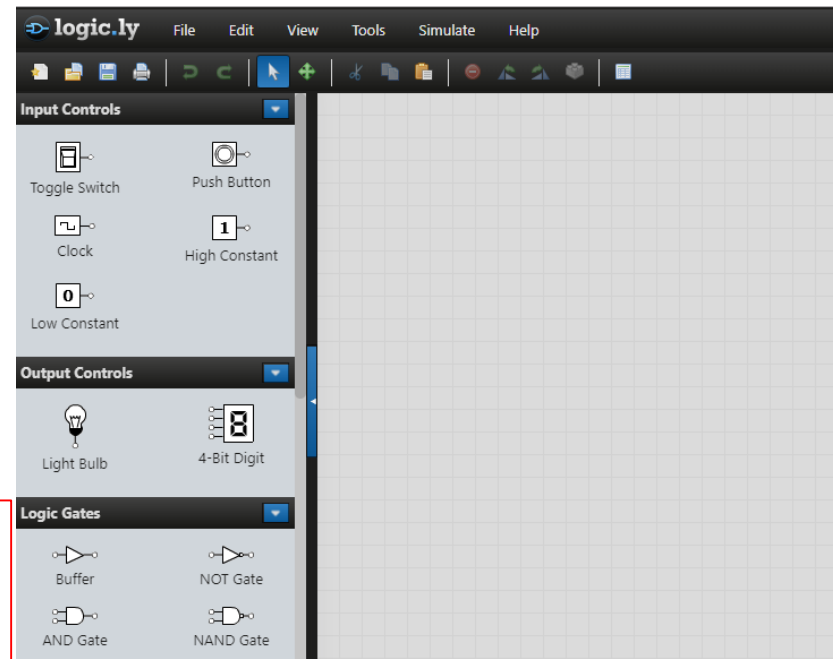
Logic Gates - AND



The **AND** gate takes two inputs and gives an output only if **both** inputs are true.

We can show this in a truth table. This time we have two inputs A and B.

Input A	Input B	Output
0	0	0
0	1	0
1	0	0
1	1	1



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Logic Gates - OR



The **OR** gate takes two inputs and gives an output if either one input **or** the other input **or** both inputs are true.

We can show this in a truth table. Again we have two inputs A and B.

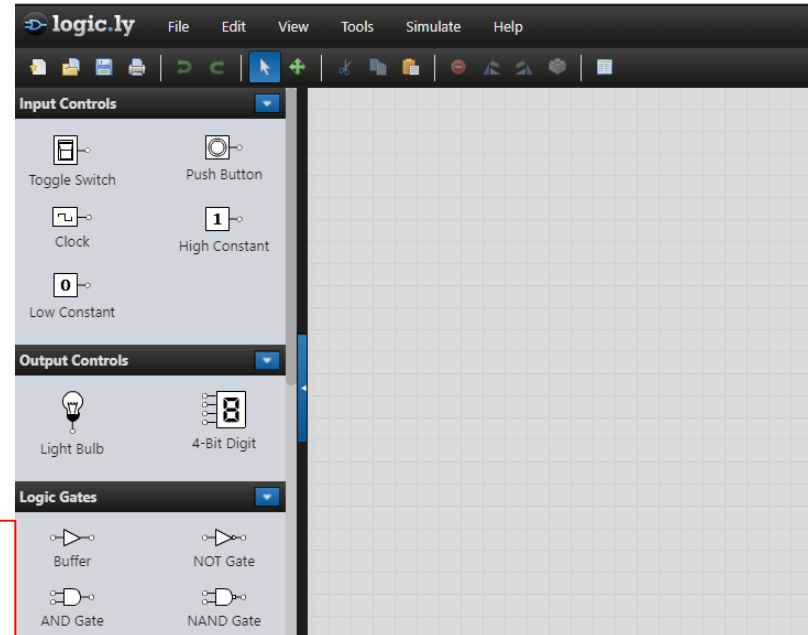
Input A	Input B	Output
0	0	0
0	1	1
1	0	1
1	1	1

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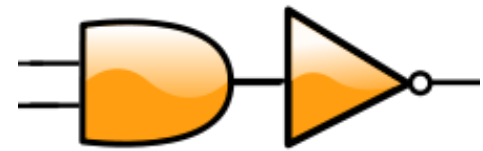
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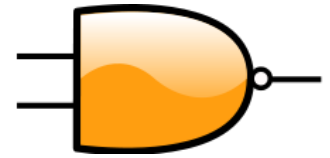


Combining Logic Gates

NOT & AND - NAND



We can also combine two or more gates and create a composite truth table.



Input A	Input B	A AND B	NOT (A AND B)
0	0		
0	1		
1	0		
1	1		

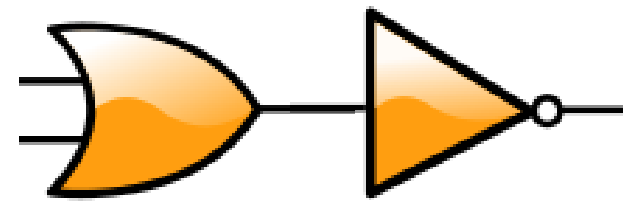
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Combining Logic Gates NOT & OR -NOR



in journal
AND

We can also combine two or more gates and create a composite truth table.



Input A	Input B	A OR B	NOT (A OR B)
0	0		
0	1		
1	0		
1	1		

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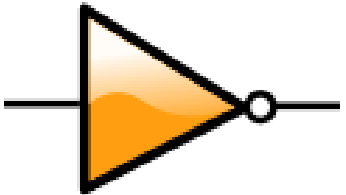
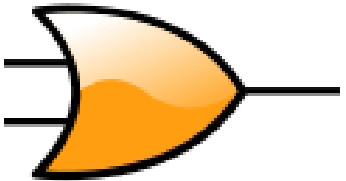
Complete the Worksheet

$\sim B$

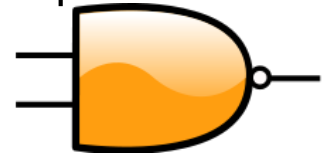
NOR \Rightarrow

NOT (A OR B)

~~NOT A OR NOT B~~



A	B	NOT A	NOT B
0	0	1	1
0	1	1	0



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Adding Binary

$$\begin{array}{r} 1000 \\ 0001 \\ \hline 1001 \end{array}$$

$$\begin{array}{r} \overset{1}{0} \overset{1}{0} \overset{1}{0} \\ + 0011 \\ \hline 1000 \\ \quad \quad \quad 2 \end{array}$$

"carry"
one

$$\begin{array}{r} 19 \\ + 6 \\ \hline 15 \end{array}$$

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Adding Binary – page 2

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QUT

MOORE'S LAW

with
A/Prof. Alexander Dreiling



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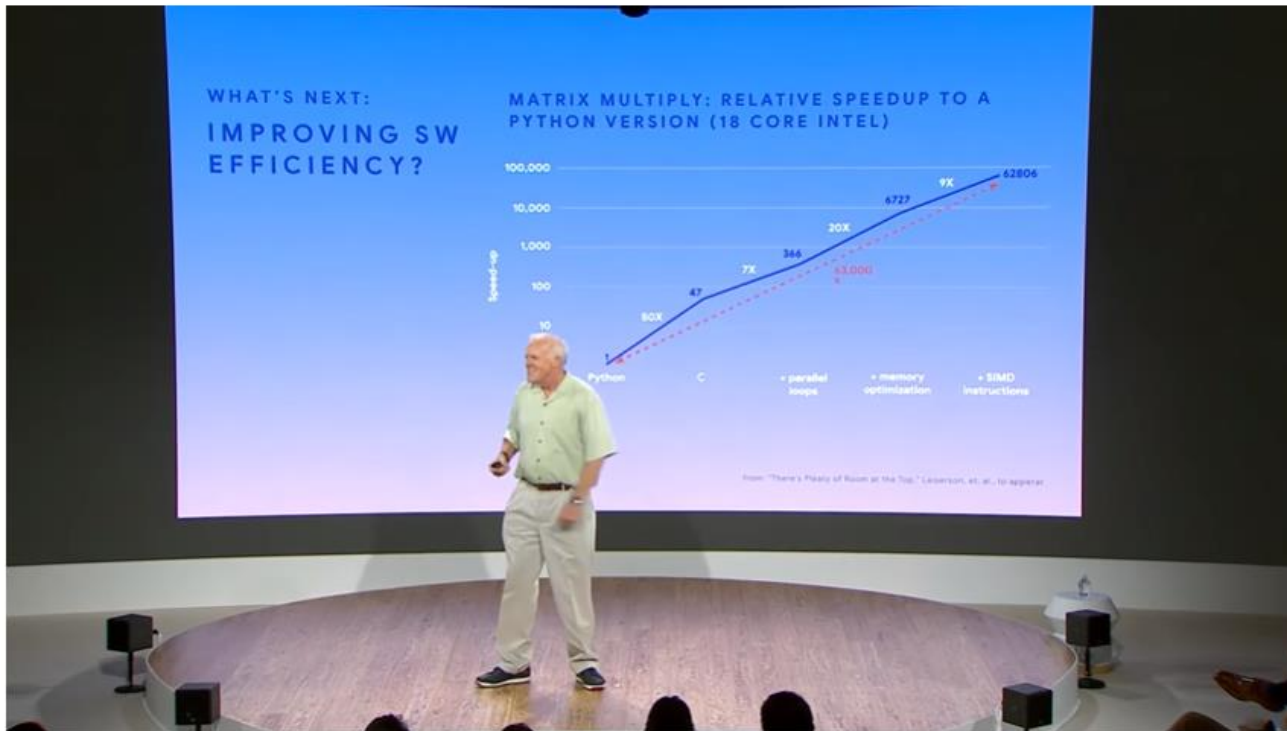
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Extra Credit...

← → ↻ 🔒 <https://www.youtube.com/watch?v=2ugsWUv-DVs>

☰  YouTube

Search



The End of Moore's Law & The Rise of AI

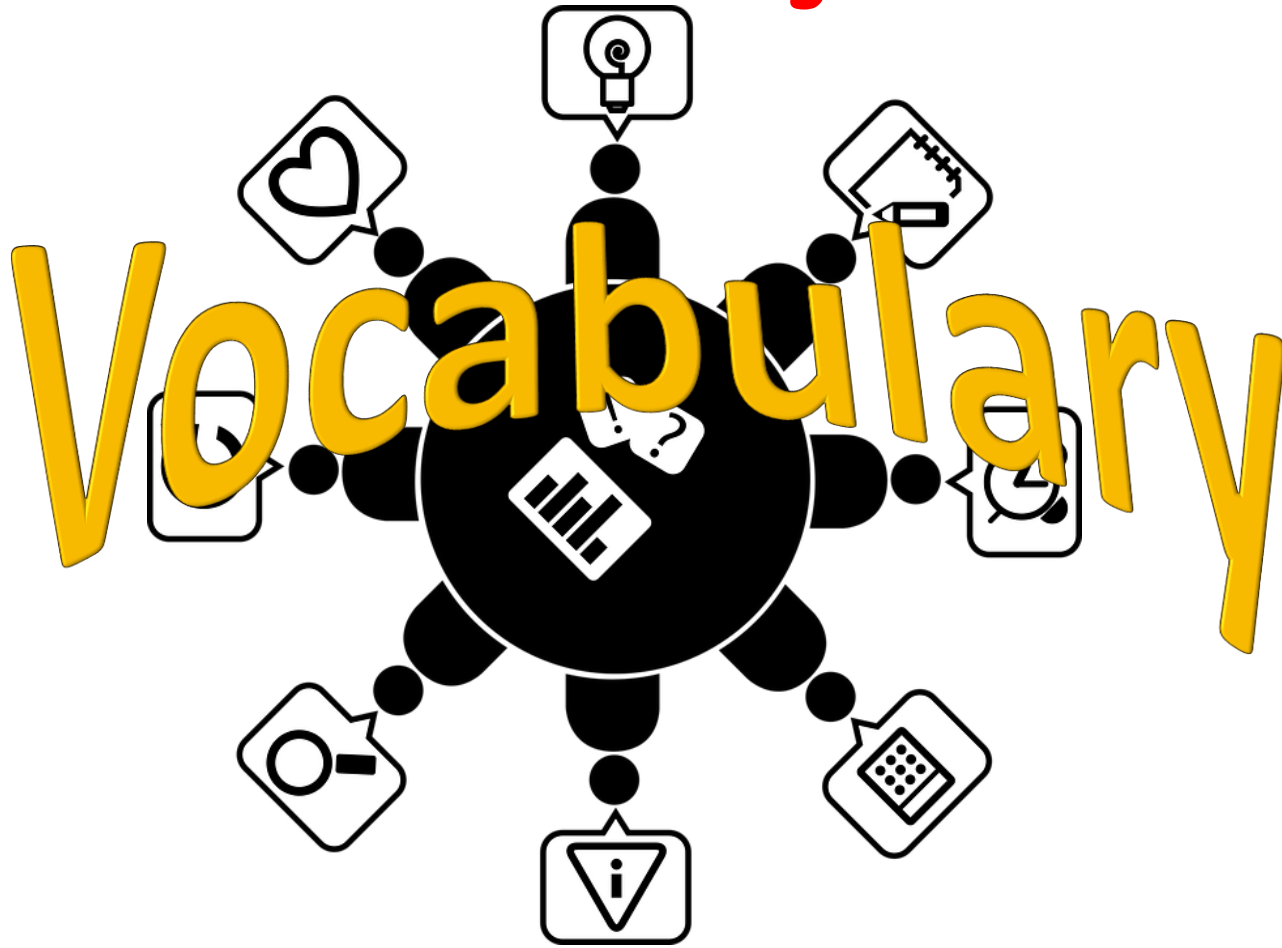
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Homework Due Friday



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