

# Mcs 260 - Week 1 Lec 1

## Logic Gates and Memory

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UIC:  
Department of Mathematics, Statistics and Computer Science

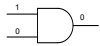
Fall 2010

# Logic Gates

AND, OR

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## AND gate

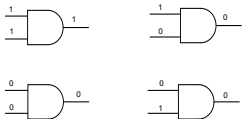


## AND gate



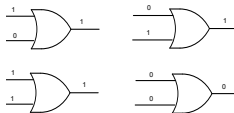
<b>a</b>	<b>b</b>	<b>a and b</b>
<b>0</b>	<b>0</b>	<b>0</b>
<b>0</b>	<b>1</b>	<b>0</b>
<b>1</b>	<b>0</b>	<b>0</b>
<b>1</b>	<b>1</b>	<b>1</b>

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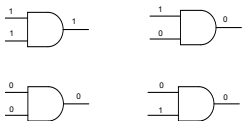


<b>a</b>	<b>b</b>	<b>a and b</b>
<b>0</b>	<b>0</b>	<b>0</b>
<b>0</b>	<b>1</b>	<b>0</b>
<b>1</b>	<b>0</b>	<b>0</b>
<b>1</b>	<b>1</b>	<b>1</b>

## OR gate

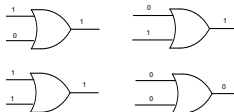


## AND gate



<b>a</b>	<b>b</b>	<b>a and b</b>
0	0	0
0	1	0
1	0	0
1	1	1

## OR gate



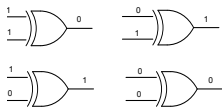
<b>a</b>	<b>b</b>	<b>a or b</b>
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0	1	1
1	0	1
1	1	1

XOR exclusive OR, either but not both.

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XOR gate

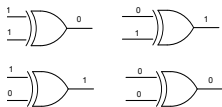




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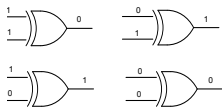
XOR gate



<b>a</b>	<b>b</b>	<b>a xor b</b>
<b>0</b>	<b>0</b>	<b>0</b>
<b>0</b>	<b>1</b>	<b>1</b>
<b>1</b>	<b>0</b>	<b>1</b>
<b>1</b>	<b>1</b>	<b>0</b>

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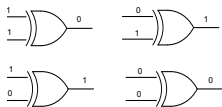
<b>a</b>	<b>b</b>	<b>a xor b</b>
<b>0</b>	<b>0</b>	<b>0</b>
<b>0</b>	<b>1</b>	<b>1</b>
<b>1</b>	<b>0</b>	<b>1</b>
<b>1</b>	<b>1</b>	<b>0</b>

inverter



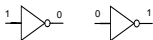
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XOR gate



<b>a</b>	<b>b</b>	<b>a xor b</b>
<b>0</b>	<b>0</b>	<b>0</b>
<b>0</b>	<b>1</b>	<b>1</b>
<b>1</b>	<b>0</b>	<b>1</b>
<b>1</b>	<b>1</b>	<b>0</b>

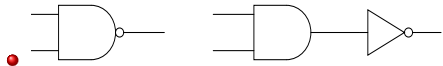
inverter



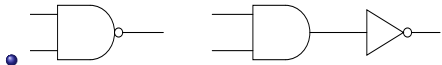
<b>a</b>	<b>¬a</b>
<b>0</b>	<b>1</b>
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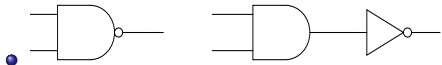


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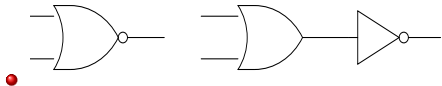


- NOR gate is the same as NOT OR

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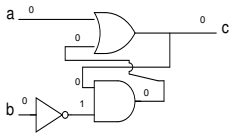


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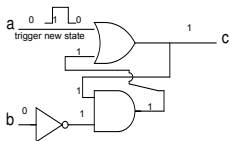
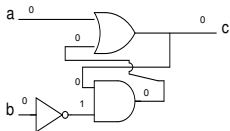
## Flip-Flops





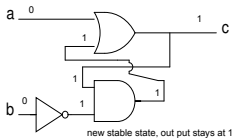
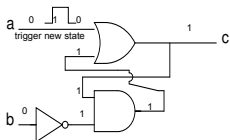
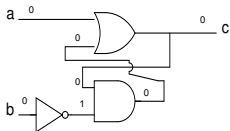
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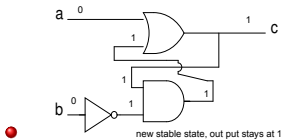
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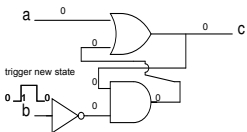
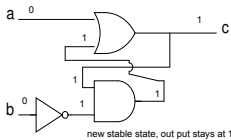
# Logic Gates

Flip-Flops cont.



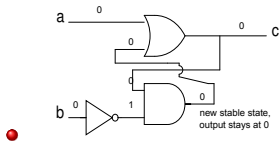
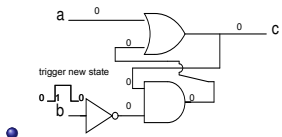
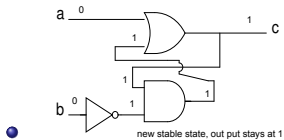
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  - **SDRAM**

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  - RAM
  - DRAM
  - SDRAM
  - hard drive, cd, dvd, flash drive etc.