Physical Computer Science

with the Raspberry Pi

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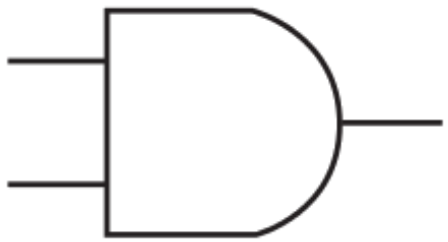
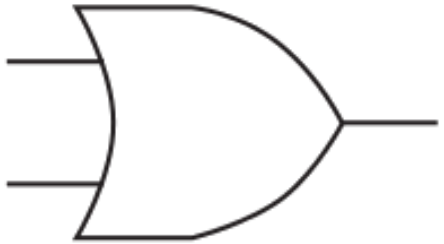
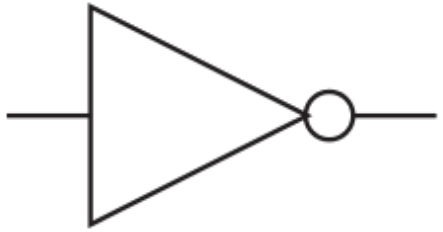
Logic

- Computers are built upon simple *logic*
  - AND
  - OR
  - NOT
- Logic allows for decisions making
- Decision making allows for algorithm development

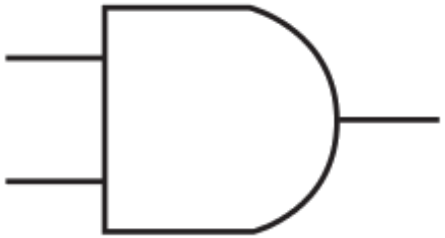






The AND gate

- 2 inputs (A and B), 1 output (Z)
- Outputs a 1 when **both** inputs are 1 (a 0 otherwise)



A	B	Z
0	0	0
0	1	0
1	0	0
1	1	**1**

Switch A	Switch B	Light
Open	Open	Off
Open	Closed	Off
Closed	Open	Off
Closed	Closed	**On**

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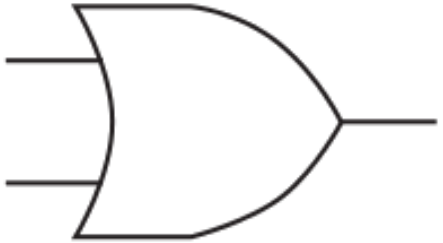
The OR gate

- 2 inputs (A and B), 1 output (Z)
- Outputs a 0 when **both** inputs are 0 (a 1 otherwise)



A	B	Z
0	0	0
0	1	**1**
1	0	**1**
1	1	**1**

Switch A	Switch B	Light
Open	Open	Off
Open	Closed	**On**
Closed	Open	**On**
Closed	Closed	**On**

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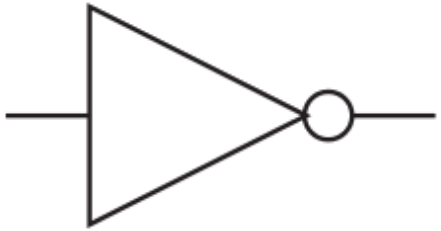
The NOT gate

- 1 input (A), 1 output (Z)
- Inverts the input



A	Z
0	1
1	0

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logic

Challenge

- LED is on when button 1 OR button 2 is pressed
- LED is on when button 1 AND button 2 are pressed

- LED is NOT on when button 1 is pressed
  - Inverted thinking!

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Search

- Max/Min – Lesson 4, Activity 1
- Max/Min – Lesson 4, Activity 2

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Sorting

- Bubble Sort - Lesson 4, Activity 3

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