CSE115 / CSE503
Introduction to Computer Science I

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Office hours:

Tuesday 10:00 AM – 12:00 PM (11-1 once a month)

Wednesday 4:00 PM – 5:00 PM

Friday 11:00 AM – 12:00 PM

OR request appointment via e-mail

PROFESSIONALISM

Until we do an interactive exercise or a poll, turn off and put away electronics:

- cell phones
- pagers
- laptops
- tablets
- etc.

ROADMAP

Class today

- Representations

Coming up

- Gates
- Memory
- Instruction decoding

Information encoding/decoding

Text (ASCII, EBCDIC, Unicode, Morse code…)

http://www.lookuptables.com

Images (GIF, JPG, …)

http://en.wikipedia.org/wiki/Image_file_formats

Music (mp3, …)

http://en.wikipedia.org/wiki/Comparison_of_audio_coding_formats

Video (MPG, …)

http://en.wikipedia.org/wiki/Comparison_of_container_formats

Quantity (decimal, binary,…)

http://en.wikipedia.org/wiki/Numeral_system

Two distinct color models

Subtractive **CMYK**

painting/printing

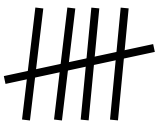
Additive **RGB**

televisions/monitors/stage lighting

See: www.designersinsights.com/designer-resources/understanding-color-models

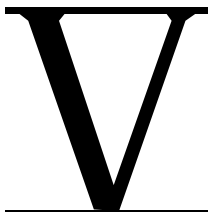
or: www.normankoren.com/light_color.html

Encoding quantity



5

five



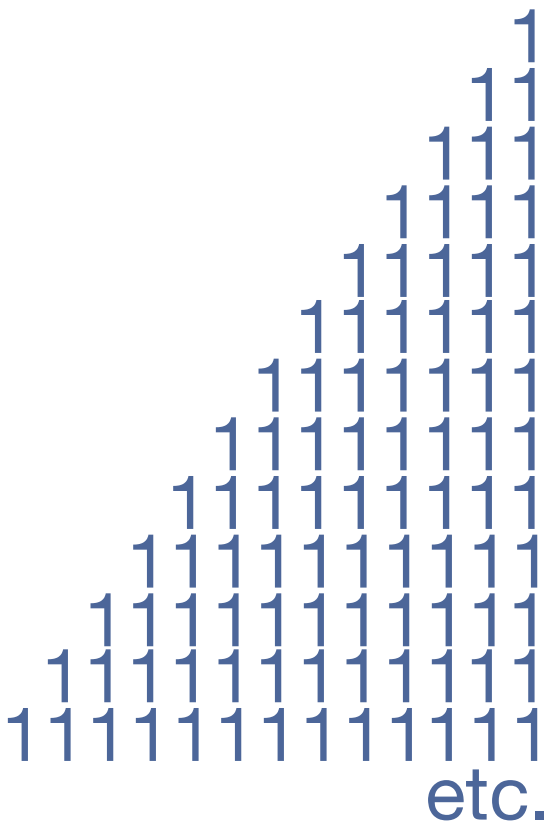
cinq

Counting

Decimal (base 10)

1
2
3
4
5
6
7
8
9
10
11
12
13
etc.

Unary (base 1)



Counting

Decimal (base 10)	Binary (base 2)
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001
10	1010
11	1011
12	1100
13	1101
etc.	etc.

Which base?

We use a subscript on a number to indicate in what base it should be interpreted:

11_{10} is a base 10 number
representing the quantity eleven

11_2 is a base 2 number
representing the quantity three

Decimal (base 10)

Each position is weighted by a power of 10.

E.g. 734 =

$7*100 + 3*10 + 4*1$

$7*10^2 + 3*10^1 + 4*10^0$

E.g. 1101 =

$1*1000 + 1*100 + 0*10 + 1*1$

$1*10^3 + 1*10^2 + 0*10^1 + 1*10^0$

Binary (base 2)

Each position is weighted by a power of 2.

E.g. 111 =

$1*4 + 1*2 + 1*1$ = "seven"

$1*2^2 + 1*2^1 + 1*2^0$

E.g. 1101 =

$1*8 + 1*4 + 0*2 + 1*1$ = "thirteen"

$1*2^3 + 1*2^2 + 0*2^1 + 1*2^0$

QUESTION:

What does 1101 represent?

QUESTION:

What does 1101 represent?

ANSWER:

Whatever we want it to represent!

GATES

physical vs. logical perspectives

Physical reality:

WIRE

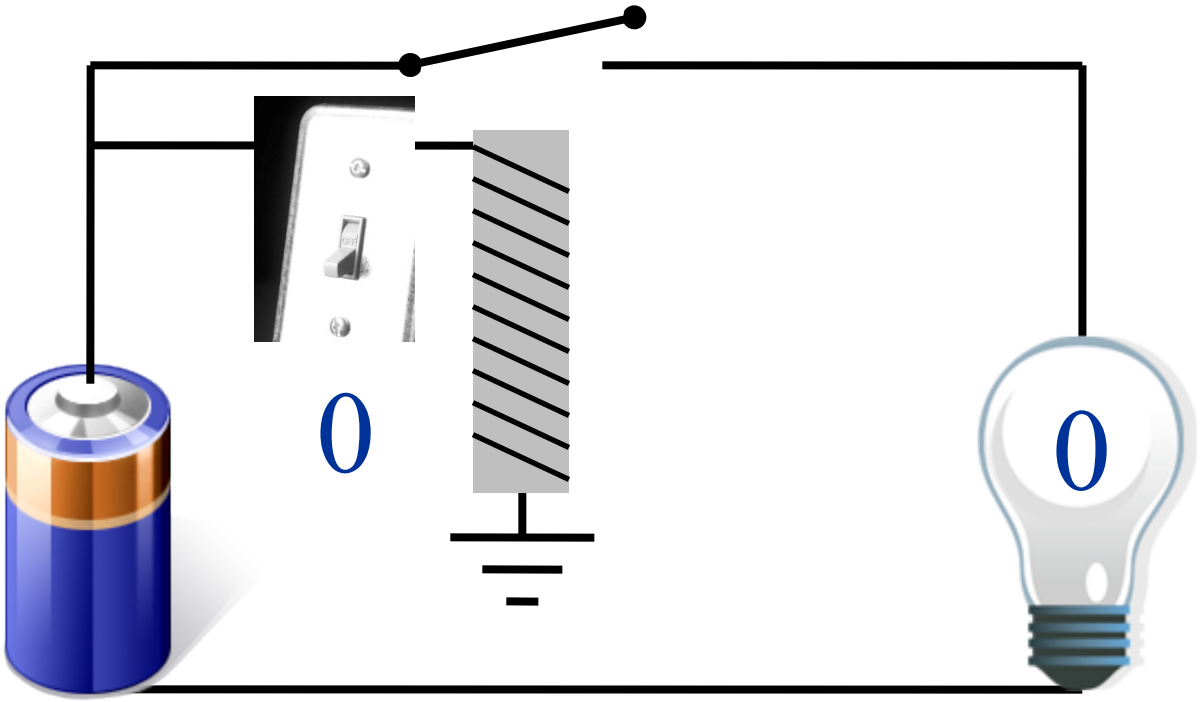
Carries a HIGH voltage or a LOW voltage

Logical view:

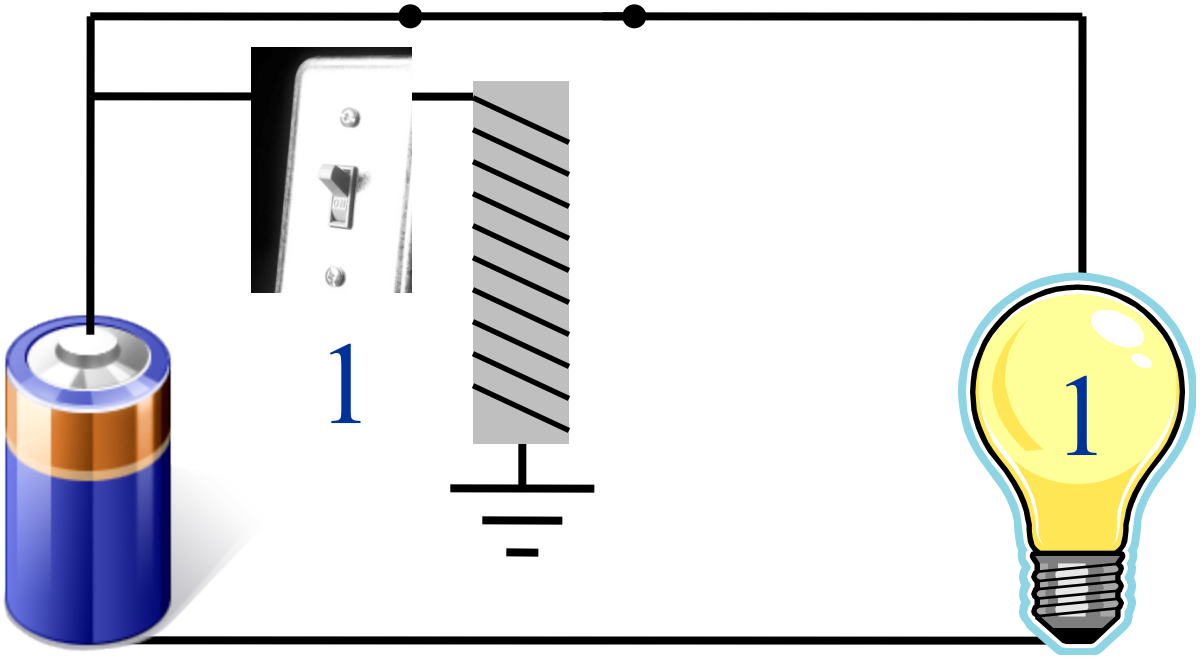
WIRE

Carries a 1 or a 0

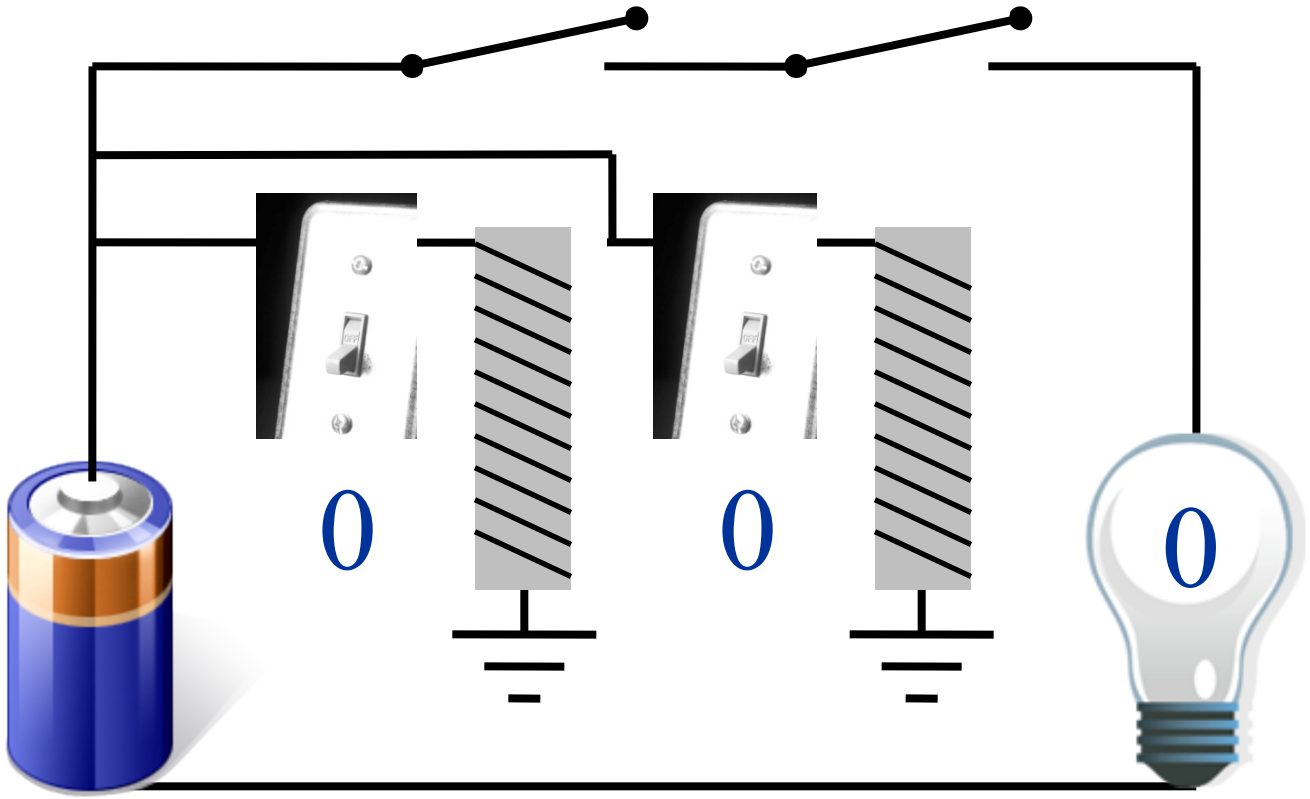
Controlling flow (normally open)



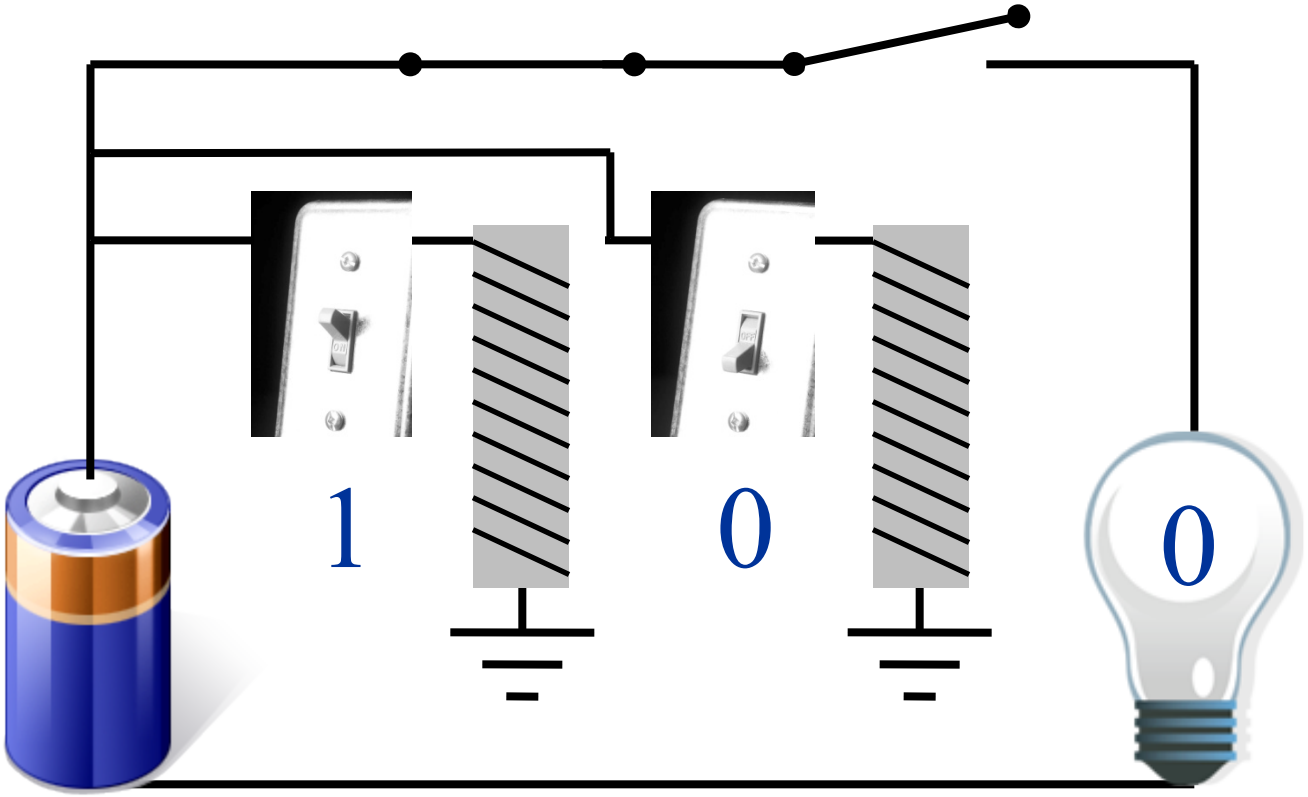
Controlling flow (normally open)



Two in a row (in series)?



Two in a row (in series)?



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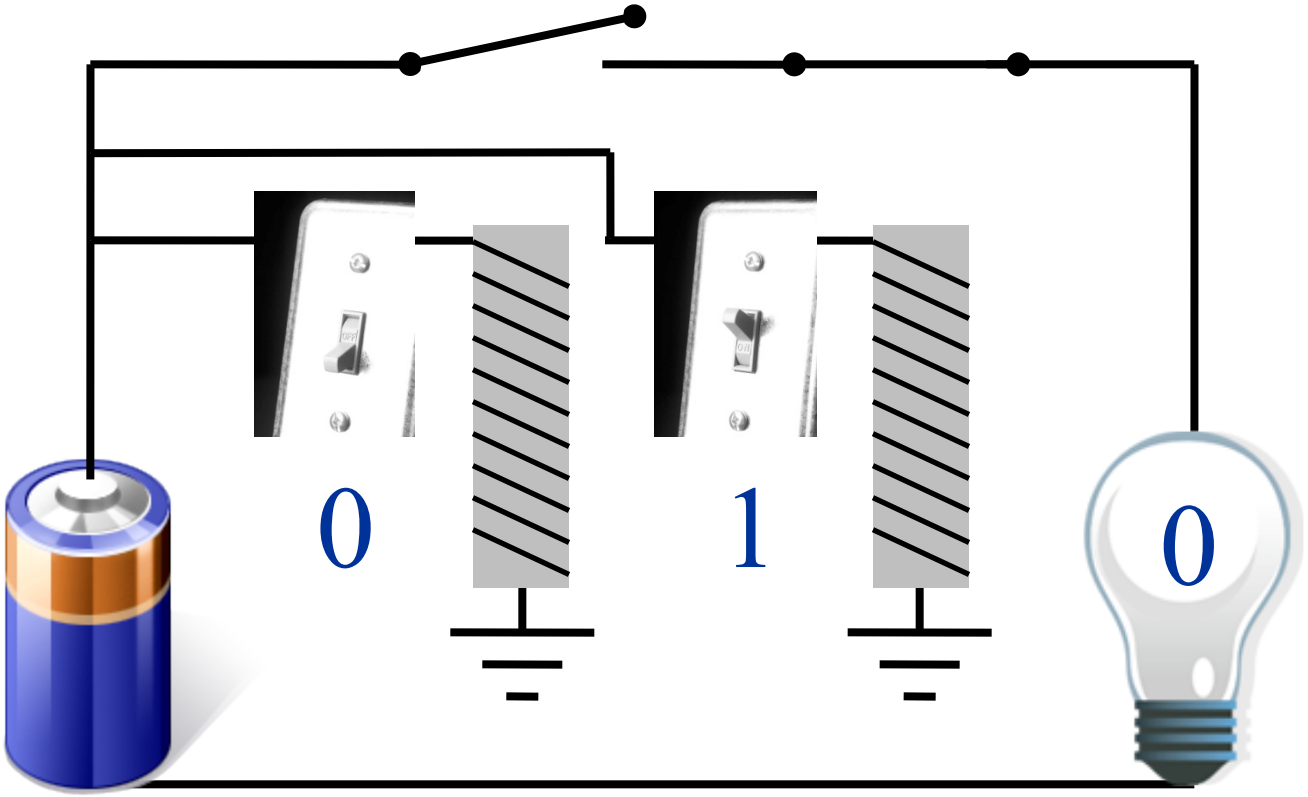

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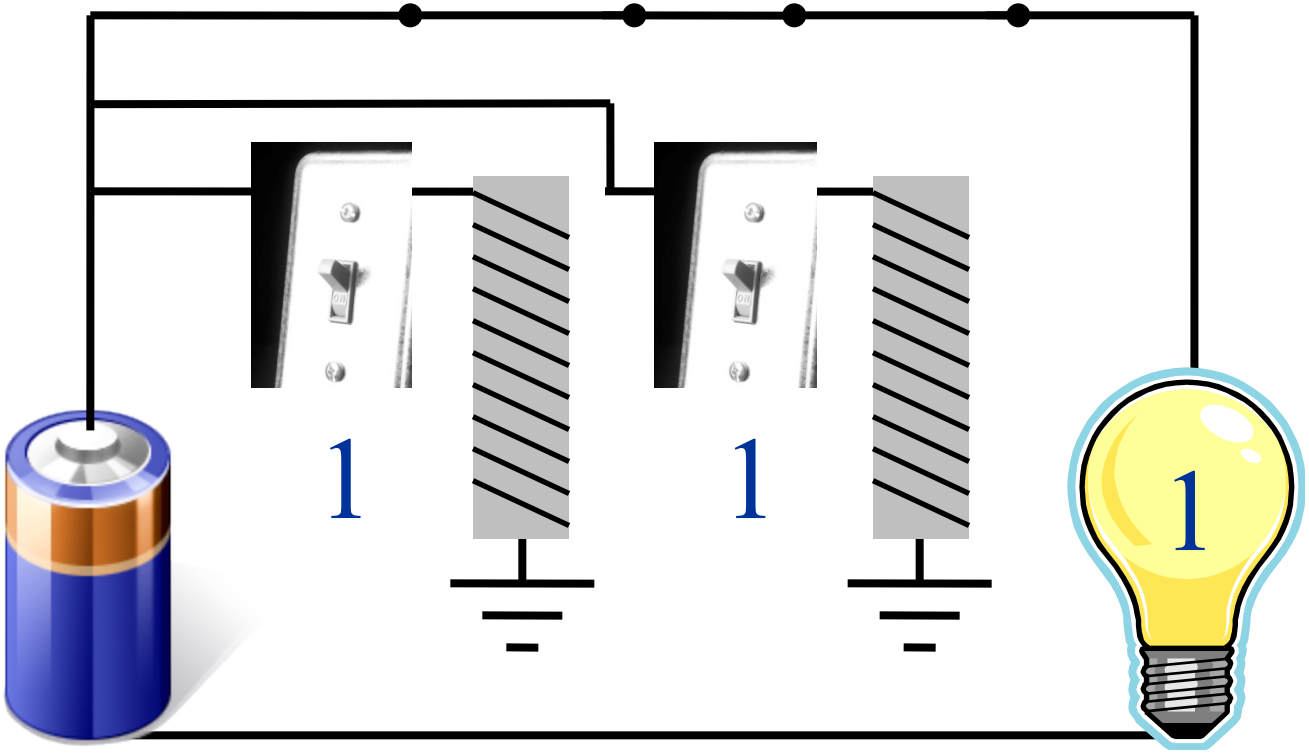
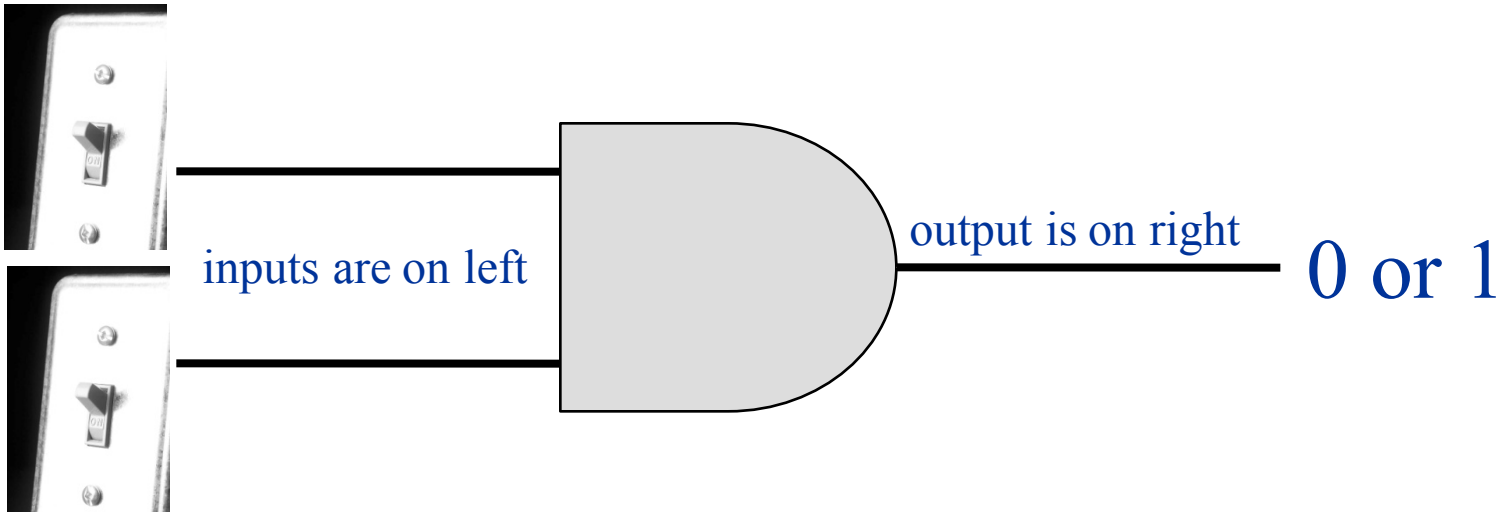


AND gate



For which input values is output 1?

For which input values is output 0?

Truth table for AND

Input 1	Input 2	Output
0	0	0
0	1	0
1	0	0
1	1	1