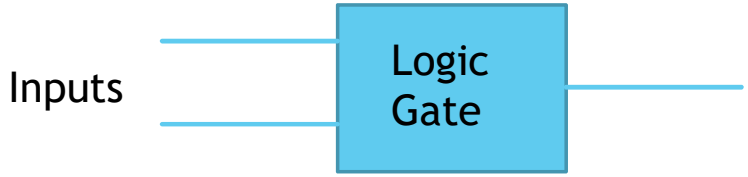
Logic Gates

Summary of Logic Gates

Logic Gates



- Only work with “Boolean values”.
  - Two distinct states
    - “On” / “Off”
    - “True” / “False”
    - “High”/ “Low”
    - “1” / “0”

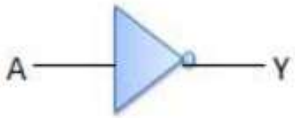
Behaviour

Inputs		Output
A	B	AB
0	0	0
0	1	0
1	0	0
1	1	1

Example of a Truth Table

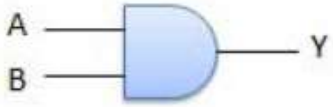
Logic Gates

NOT Gate



Inputs	Output
A	B
0	1
1	0

AND Gate

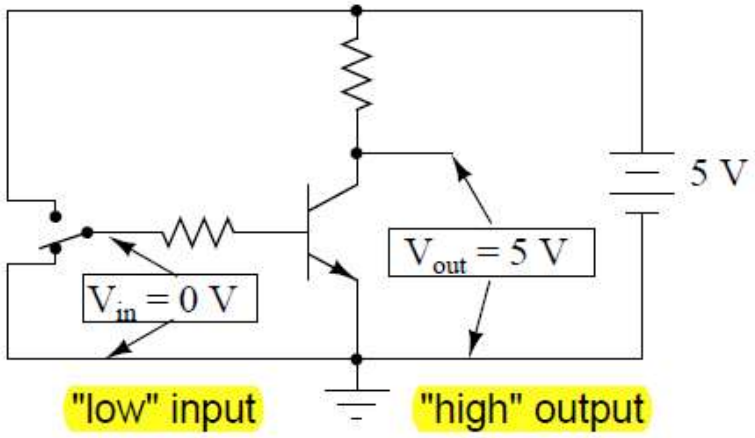


Inputs		Output
A	B	AB
0	0	0
0	1	0
1	0	0
1	1	1

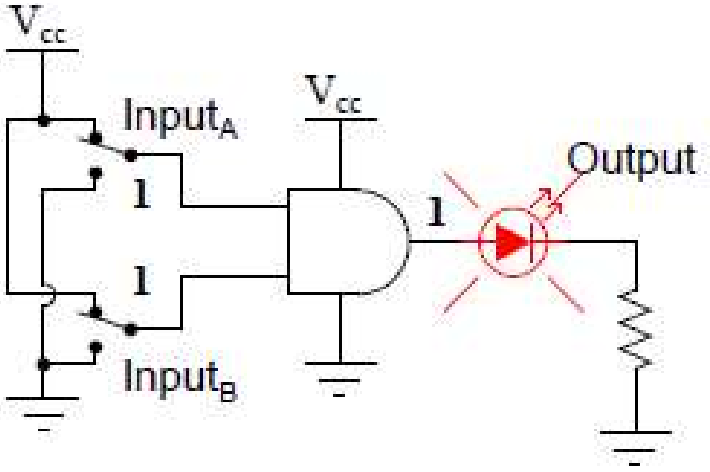
OR Gate

Inputs		Output
A	B	A + B
0	0	0
0	1	1
1	0	1
1	1	1

Logic Gates



Internal Transistors dictate behaviour (e.g. inverter behaviour above)



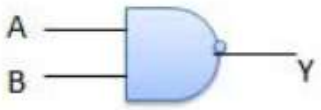
$Input_A = 1$

$Input_B = 1$

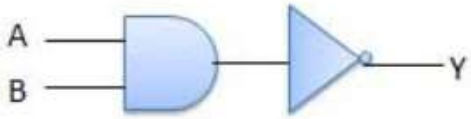
Output = 1 *(light!)*

Logic Gates

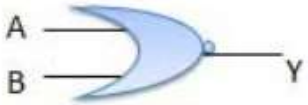
NAND Gate



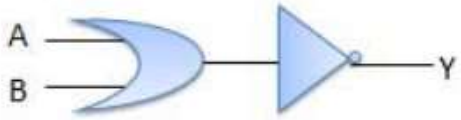
Inputs		Output
A	B	$\overline{AB}$
0	0	1
0	1	1
1	0	1
1	1	0



NOR Gate



Inputs		Output
A	B	$\overline{A+B}$
0	0	1
0	1	0
1	0	0
1	1	0

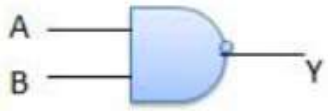


XOR Gate

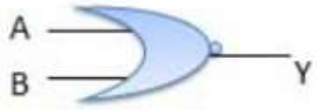
Inputs		Output
A	B	$A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

Universal Gates

NAND Gate



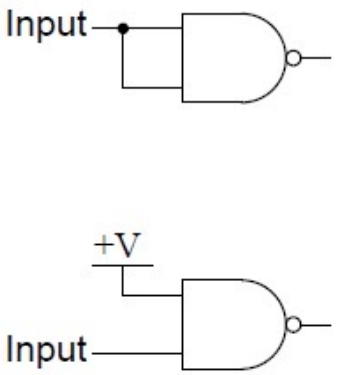
NOR Gate



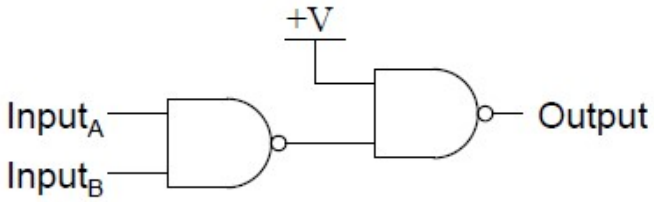
- All logic operations can be achieved using only NAND/NOR gates.

NAND

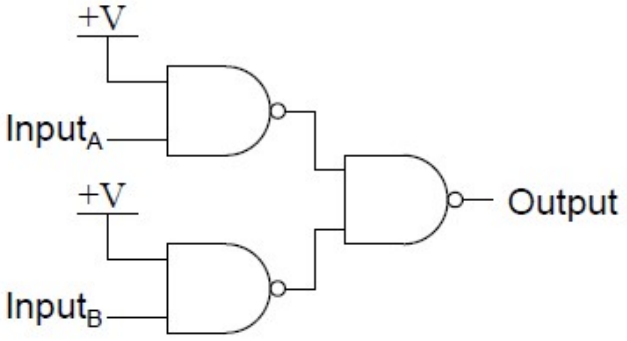
NOT Gate



AND Gate



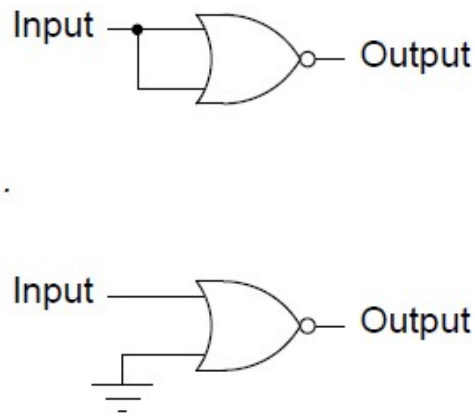
OR Gate



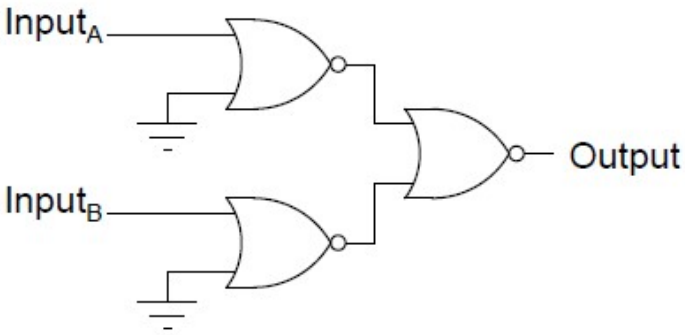
NOR?
NAND?

NOR

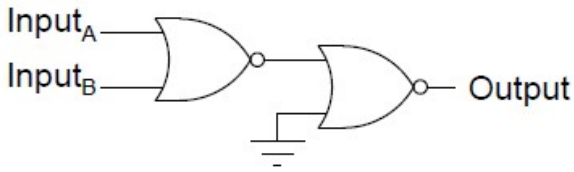
NOT Gate



AND Gate



OR Gate



NOR?
NAND?