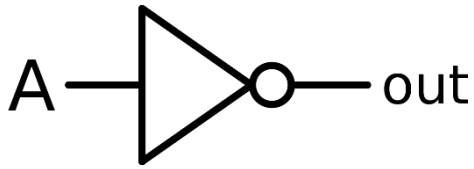
Knowledge Organiser

Year 9 Computer Science

Logic Gates

NOT

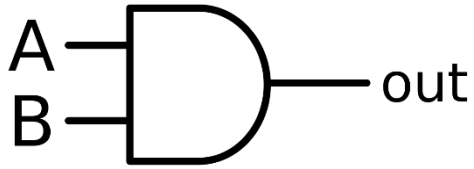
If A is True then the output is False, if the input A is False then the output is True.



A	Output
1	0
0	1

AND

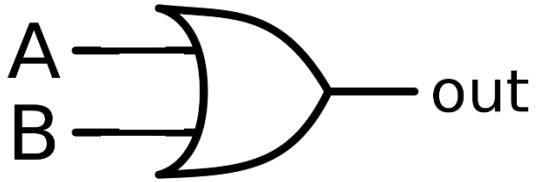
If both A and B are True then the output is also True, otherwise it is False.



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

OR

If either or both A, B are True then the output is also True.



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

Boolean Operators and Mathematical Symbols

- equal to (a == b)
- not equal to (a != b)
- less than (a < b)
- greater than (a > b)

- + (add)
- – (subtract)
- * (multiply)
- /(divide)

Converting Binary to Denary

1. Write the binary place values in their columns

Yes = 1

No = 0

	128's	64's	32's	16's	8's	4's	2's	1's
10	0	0	0	0	1	0	1	0

2. Is the denary value >=?

3. If Yes – subtract the binary place value from the value
10 – 8 = 2

Is the denary value >=?

Converting Binary to Decimal

Write the binary number under the place values and then add together all of the values that have a 1 underneath them.

128	64	32	16	8	4	2	1
0	0	0	1	1	1	0	1

16 + 8 + 4 + 1 = <u>29</u>

Adding Binary

Rules

0 + 0 = 0

0 + 1 = 1

1 + 0 = 0

1 + 1 = 10 (0 then carry the 1)

1 + 0 + 0 = 1

1 + 1 + 1 = 11 (1 then carry the 1)

Example:

$$\begin{array}{r} {\scriptstyle 1}\\ 1\,0\,1\,0 \\ 0\,0\,1\,0 \;+ \\ \hline 1\,1\,0\,0 \\ \hline \end{array}$$

Algorithms Starter

- Algorithms are sets of step-by-step instructions for the computer to follow. They are at the heart of all computer programs.

- To make a program, in your algorithm you must specify:
  - input
  - process
  - output

This is the success criteria.

Flow charts

Start or Stop		The beginning and end points in the sequence.	Input or output		An input is data received by a computer. An output is a signal or data sent from a computer.
Process		An instruction or a command.	Connector		A jump from one point in the sequence to another.
Decision		A decision, either yes or no. For example, a decision based on temperature that turns a central heating system on or off.	Direction of flow		Connects the symbols. The arrow indicates direction.

Flowchart Example

A selection is used to make choices based on information.

An algorithm can be made more intelligent by using IF, THEN and ELSE to repeat instructions or move to different parts of the program.

The algorithm about entering the room could be changed to account for different conditions. For instance, it could change to:

1. IF the door is locked, THEN unlock the door, ELSE do nothing (go to next instruction)
2. IF the door is closed, THEN open the door, ELSE do nothing
3. Enter the room
4. IF the room is dark, THEN switch on the light, ELSE do nothing
5. Close the door behind you