Boolean Logic Gates

Computers are made up of electronic systems. They include lots of switches. Each switch can be **ON** or **OFF**.

The position of each switch can be represented using **binary** - either a **1** or a **0**.
Boolean Logic Gates

So, we can ask questions such as:

“Is this switch turned on?”

“Is electricity running through this cable?”

The answer to these questions can only ever be True or False.
Boolean Logic Gates

Variables which can be **True** or **False** are called **Boolean variables**.

So, when we ask a question which can be either True or False, this is **Boolean Logic**.

**Boolean Logic** is the foundation that any modern computer is based on.

Boolean logic is named after George Boole, an English mathematician who worked on it at Queens College, Cork in the mid-19th century.
Boolean Logic Gates

Logic gates are switches - usually made from diodes or transistors.

They allow **up to two** inputs to be processed.

The logic gate then generates a **single** Boolean value - True or False.
Boolean Logic Gates

- is it Friday?
- are you aged 16?
Boolean Logic Gates

Up to two inputs; one output
Boolean Logic Gates

There are four logic gates you need to know:

- AND
- OR
- XOR
- NOT

Key ideas:
- each logic gate can have up to two inputs
- each logic gate has one output - True or False
Boolean Logic Gates

Truth Tables are used to work out the range of possible outputs from a logic gate.

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<tr>
<th>Input A</th>
<th>Input B</th>
<th>Output Q</th>
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You need to be able to create Truth Tables for the four basic logic gates.