Boolean Logic Gates

Computers are made up of electronic circuits

These are made up of switches, transistors and **logic gates**. Each of these can be **ON** or **OFF**

On and off can be represented using **binary** - either a **1** or a **0**

Boolean Logic Gates

1 = True
0 = False

If electricity is flowing through a part of the circuit, the value is 1 - it is True that there is power

“Is this switch turned on?”

“Is electricity running through this cable?”

The answers to these questions can only ever be True or False

Boolean Logic Gates

1 = True
0 = False

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 only be **True** or **False** are called **Boolean variables**

When we ask a question which can be either True or False, this uses **Boolean Logic**

Boolean Logic is the foundation that all modern computers are 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

Unit 2 content:

There are five **data types** you need to know about. List them:

Boolean Logic Gates

1 = True
0 = False

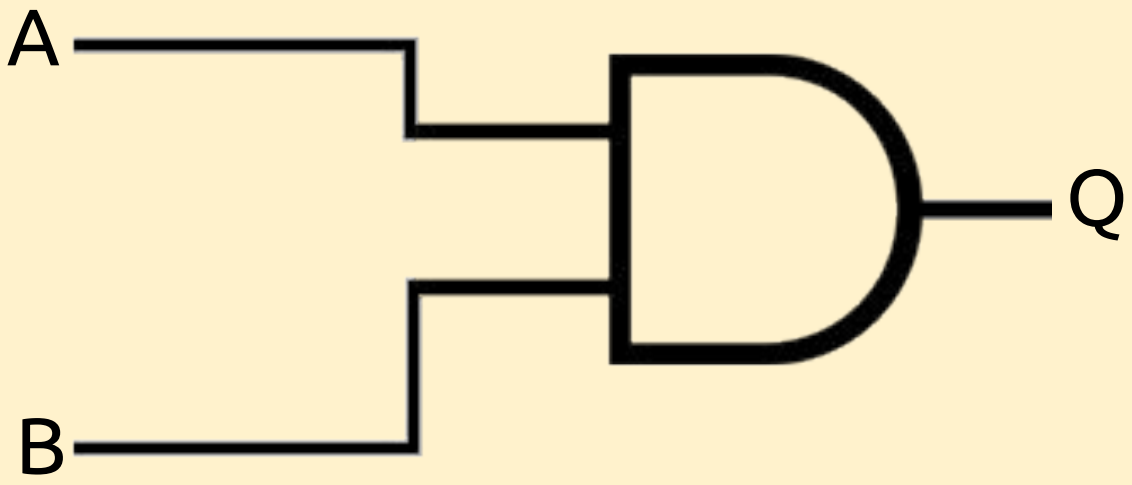
Logic gates are parts of the circuits that make up computers

They take inputs, apply a logical process to them and generate an output

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

The logic gate then generates a **single** Boolean value - 1 or 0 (True or False)

Boolean Logic Gates



Up to two inputs; always 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

Logic gates let us create automated systems that use processes such as:

- if it is dark and there is movement
- if there is movement or the button is pressed
- if temperature > 25 degrees and it is not raining
- if the sun is too bright and it isn’t too windy

Boolean Logic Gates

Logic gates are how computers make decisions

Computers **only** deal in **True** or **False**. There are **no** grey areas

- is it raining?

Boolean Logic Gates

```
num1 = int(input("Value 1: "))
num2 = int(input("Value 2: "))
while num1 != num2:
    if num1 > num2:
        num1 = num1 - num2
    else:
        num2 = num2 - num1
print(num1)
```

Boolean Logic Gates

```
theChar = input("A character: ")

while theChar != "XXX":

    if theChar >= "a" and theChar <= "z":
        print("LOWER")
    else:
        print("NOT LOWER")

    theChar = input("A character: ")
```