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A **Computer** is made up from lots of pieces of Hardware. As a minimum it needs an input device, and output device a processor and some storage

An input device is a piece of hardware that is used to enter data into a computer. There are many different kinds of input devices.

An output device is a piece of hardware that is used to display or output data which has been processed or has been stored on the compute

Memory is the area where the computer stores or remembers data. Memory provides the CPU with its instructions. There are different types of memory, and each one plays an important role in the running of a computer system.

A storage device is a piece of computer equipment which can be used to store data.
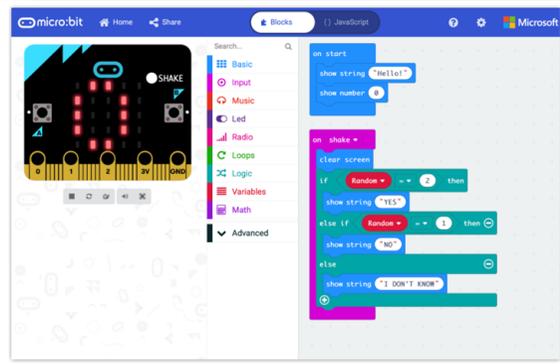Examples include:
hard disk drive, DVD drive, USB stick.
All of the Files such as Music, Photographs and Videos will be stored here.

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Microbits and MicroPython

A Microbit is a small computer that allows us to build various projects. It can be coded using block programming or a version of Python


BBC micro:bit **FRONT**

- 5x5 LED display
- Button A
- Button B
- I/O connection pins

- Micro USB connector
- Processor
- Compass
- Accelerometer
- Reset button
- Power connector
- Processor

BBC micro:bit **BACK**

MakeCode Editor

The MakeCode editor provid... makes it easy to program yo... blocks and JavaScript.

We have recently updated th... previous version is still availa... that needs it. If you have any... the editor, check that it isn't blocked in your school.
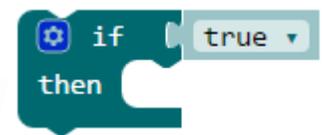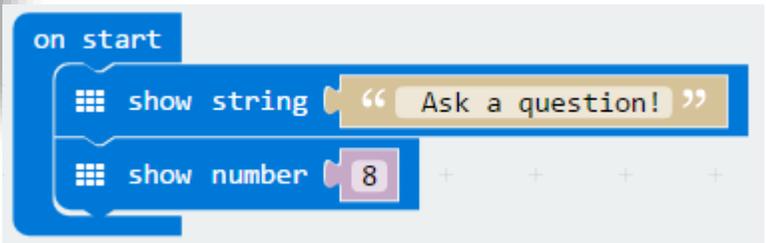
Let's Code

Reference

Lessons
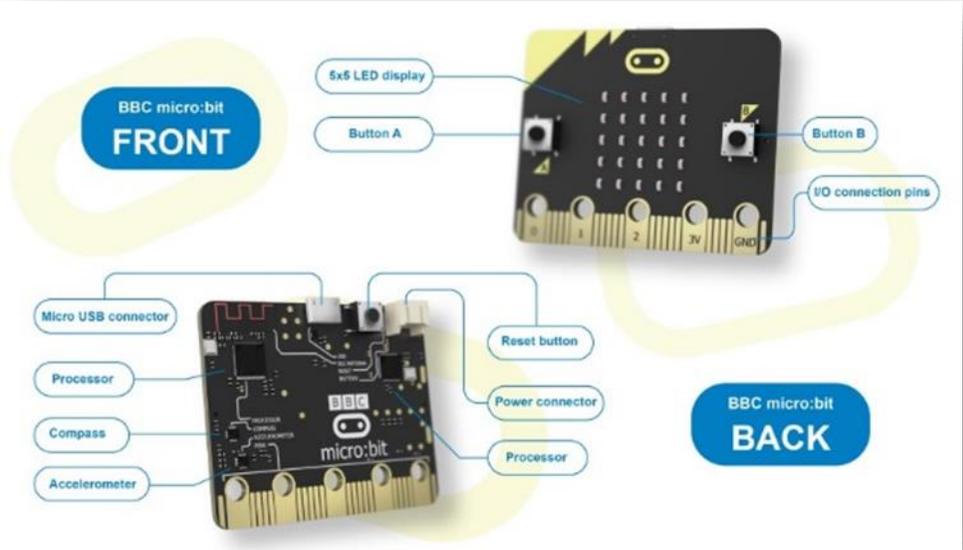
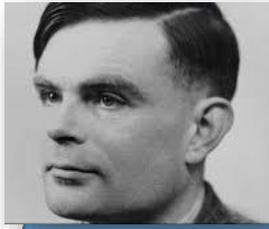```
from microbit import *

while True:
    display.scroll("Computer")
    display.scroll("Science")
    display.scroll("Rocks")
    sleep(1000)
```

on start
show string " Ask a question! "
show number 8

show string " Hello! "

if true then

Enjoyment – Achievement – Community

Be Respectful – Be Responsible – Be Ready

# Heroes of Computing

### Alan Turing

Turing was one of the people who worked on the first computers. He created the theoretical Turing machine in 1936. The machine was imaginary, but it included the idea of a computer program.

Turing was interested in artificial intelligence. He proposed the Turing test, to say when a machine could be called "intelligent". A computer could be said to "think" if a human talking with it could not tell it was a machine.[2]

During World War II, Turing worked with others to break German ciphers (secret messages). He worked for the Government Code and Cypher School (GC&CS) at Bletchley Park, Britain's codebreaking centre that produced Ultra intelligence. Using cryptanalysis, he helped to break the codes of the Enigma machine. After that, he worked on other German codes.

### Grace Hopper

She was one of the first people to work with modern digital computers and the first programmers of the Harvard Mark I calculator. She developed the first compiler for a computer programming language.
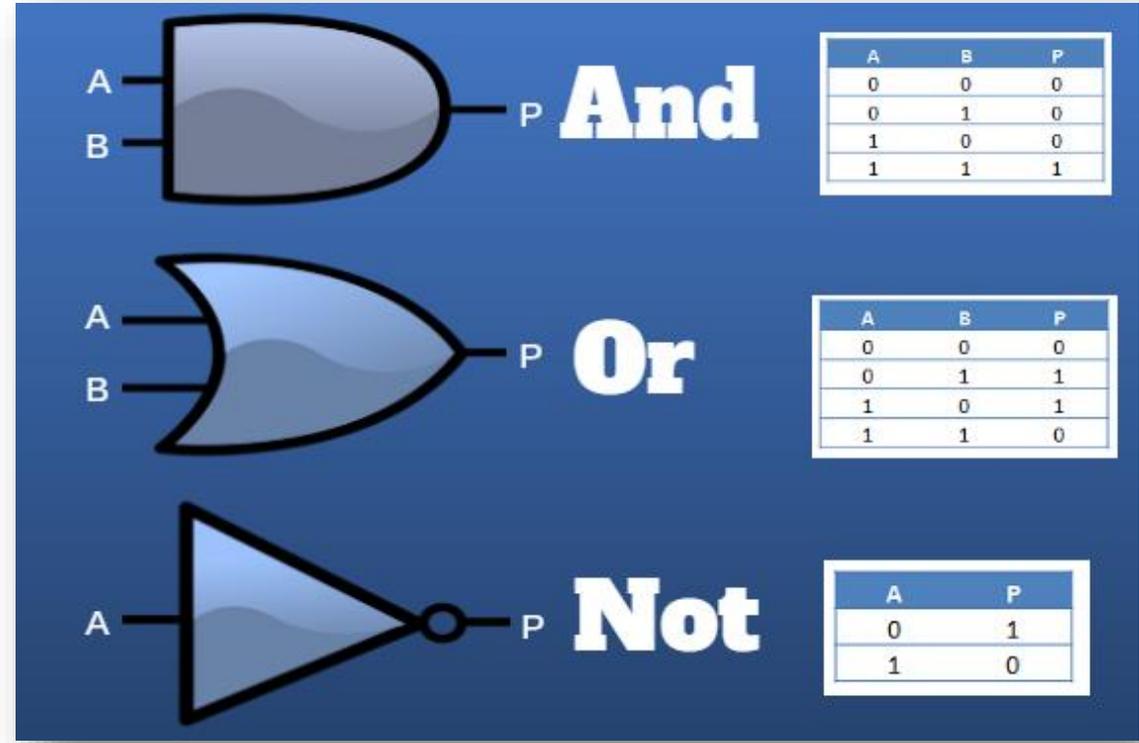
She had the idea that programs could be written in a language that was close to English rather than in machine code or languages (such as assembly language) close to machine code, which is how it was normally done at that time. She led the work of COBOL language, which was based very much on her philosophy. It was successful since it was not copyrighted, so many programmers could use it. The spread of COBOL led to it becoming the universal language for business coding. It became used in government, industry, and commerce.

Hopper, a mathematician, was on the faculty at Vassar College when World War II began. She joined the Navy. Hopper was assigned to the Bureau of Ordnance Computation Project to work on missile problems in 1943. The Navy began using one of the first electronic computers in 1944.

# CPU & Logic

A **Computer** carries out all its thinking in the processor, inside the computer only uses binary in the form of electrical signals.

The CPU or Central Processing Unit, is where processes such as calculating, sorting and searching take place. Whatever is done on our computers, such as checking emails, playing games and doing homework, the CPU has processed the data we use.

A CPU's speed is determined by its clock speed, the size of its cache or the number of Cores.



And

| A | B | P |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

Or

| A | B | P |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

Not

| A | P |
|---|---|
| 0 | 1 |
| 1 | 0 |

Logic in Computing is the fundamental way in which Computers work. Computers use Binary and are basically very simple machines that require Logic to provide us with the answers we need. Above are the three basic Logic Gates. Each gives a different out put depending on the function of the gate and the Input. We use Truth Tables to see the output.

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**What is a network?**

A network is two or more computers (or other electronic devices) that are connected together, usually by cables or Wi-Fi.

Some computer networks will have a server. A server is a powerful computer that often acts as a central hub for services in a network, eg emails, internet access and file storage. Each computer connected to a server is called a client.

A computer that is not connected to a network is called a standalone computer.

**What are the benefits of a network?**

Using a network allows you to share:

hardware, such as a printer

software, allowing multiple users to run the same programs on different computers

data, so that other people can access shared work and you can access your data from any computer on the network

Networking is critical if you want to use your computer to communicate. Without it you couldn't send an email, a text or an instant message.

We use a huge network on a daily basis and this is called the internet. Around three billion people use the internet to share data, news and resources, amongst many other things.

**E-Safety**

Trolling is the term given to people who visit other peoples' social media accounts and leave distasteful messages.

Cyberbullying is the bullying of another person using the internet, mobile phones and other digital devices. Cyberbullying can take the form of posts on forums or social media, text messages or emails, all with the aim of hurting the victim.

**Never agree to meet anyone in person that you've only known online.** If somebody does start sending you messages that offend or upset you, tell an adult that you trust.

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### Representing images

Images also need to be converted into **binary** in order for a computer to process them so that they can be seen on our screen. Digital images are made up of **pixels**. Each pixel in an image is made up of binary numbers.

If we say that 1 is black (or on) and 0 is white (or off), then a simple black and white picture can be created using binary.

To create the picture, a grid can be set out and the squares coloured (1 – black and 0 – white). But before the grid can be created, the size of the grid needs be known. This data is called **metadata** and computers need metadata to know the size of an image. If the metadata for the image to be created is 10x10, this means the picture will be 10 pixels across and 10 pixels down.
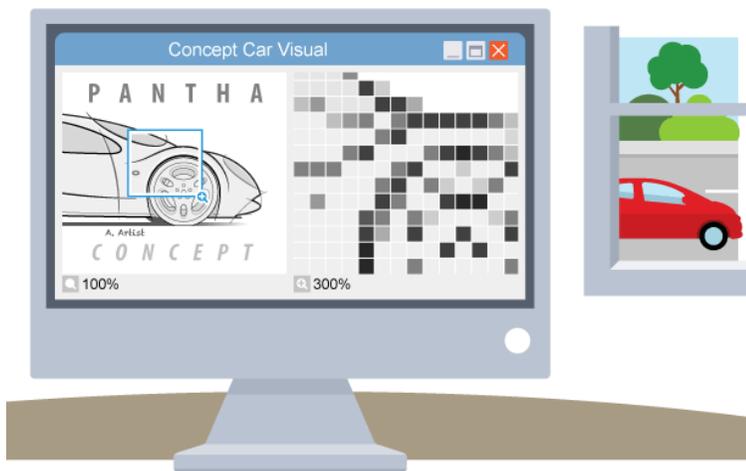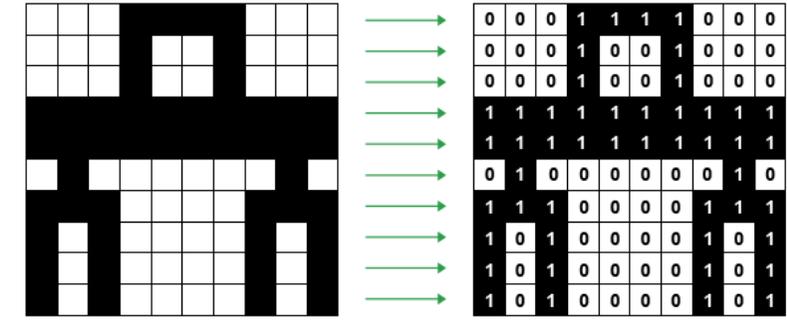


### Image quality

Image quality is affected by the **resolution** of the image. The resolution of an image is a way of describing how tightly packed the pixels are.

In a low-resolution image, the pixels are larger so fewer are needed to fill the space. This results in images that look blocky or **pixelated**. An image with a high resolution has more pixels, so it looks a lot better when you zoom in or stretch it. The downside of having more pixels is that the file size will be bigger.



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