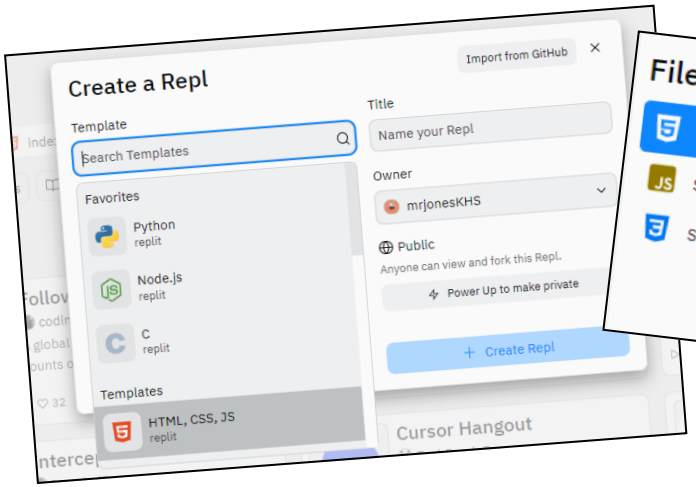
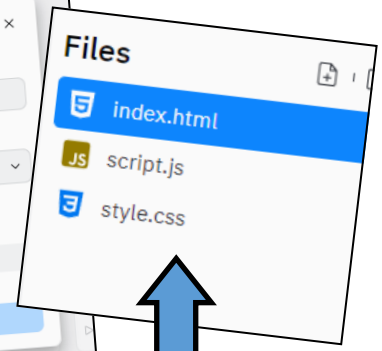


Replit.com is the website used to develop our website.



The website will be automatically divided into **three** files.

Each file will be used to contain HTML code, JavaScript code and CSS code.

Using HTML to create websites

All **web** pages on the **internet** are created using a language called **Hypertext Markup Language** (**HTML**). **HTML** describes:

- what information appears on a webpage
- how it appears on the page (formatting)
- any links to other pages or sites

HTML can be written in specialist software, or in a simple text editor like Notepad++. As long as the document is saved with the file extension '**.html**' it can be opened and viewed as a **webpage** from a **browser**. This example **HTML** code displays a message on a webpage:

```
<html>
    <body>
        <h1>Hello world</h1>
        <p>This is my first webpage</p>
    </body>
</html>
```

The code uses **tags** to describe the appearance of the information:

<html> states that the document is a HTML document
<body> states that the information appears in the body of the page
<h1> states that the following text appears as a prominent heading
<p> states that this is the beginning of a new paragraph

Keyword
Elements
Tags
Hyperlinks
Format
Interactive
Statements
Variables
Function
Design
Properties

```
<!DOCTYPE html>
<html>
<body>

<h1>My First Heading</h1>

<p>My first paragraph.</p>

</body>
</html>
```

To set up any additional pages, you need to at least include the <!DOCTYPE> <html> and <body> tags to open the page.
Include the page contents within the <body> tags and close both body and html tags at the end.

Tag	Description
<html> ... </html>	Declares the Web page to be written in HTML
<head> ... </head>	Delimits the page's head
<title> ... </title>	Defines the title (not displayed on the page)
<body> ... </body>	Delimits the page's body
<h *n*> ... </h*n*>	Delimits a level *n* heading
...	Set ... in boldface
...	Set ... in italics
...	Center ... on the page horizontally
...	Brackets an unordered (bulleted) list
...	Brackets a numbered list
...	Brackets an item in an ordered or numbered list
 	Forces a line break here
<p>	Starts a paragraph
<hr>	Inserts a horizontal rule
<img src="...">	Displays an image here
 ... 	Defines a hyperlink

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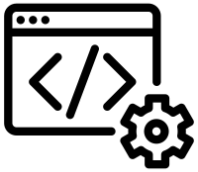
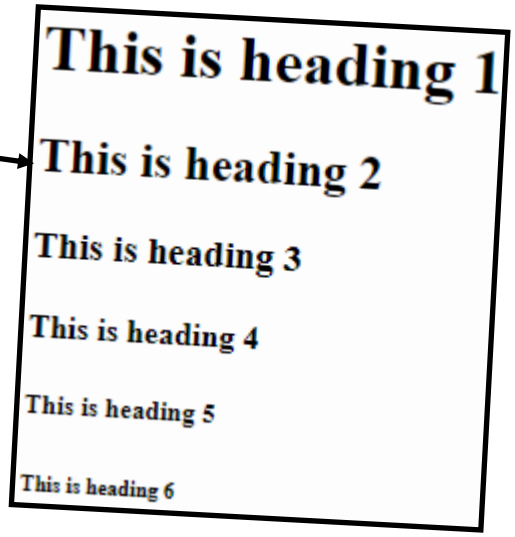
Websites tend to contain many of the same structures. However, they are used differently on different websites.

```
<h1>This is heading 1</h1>
<h2>This is heading 2</h2>
<h3>This is heading 3</h3>
<h4>This is heading 4</h4>
<h5>This is heading 5</h5>
<h6>This is heading 6</h6>
```





Within CSS scripts, we have attributes, which look like this:

```
input {
width: 10px;
background-color: #284d28;
color: white;
text-align: center;
border: 5px solid black;
  border-radius: 1px;
  padding: 26px;
  margin: 4px;
  font-size: 12px;
```

CSS (Cascading Style Sheets)

HTML defines the structure and content of your **web page**

CSS defines the style and layout of **web pages**

CSS can be used to change the style of a whole **website**, one **web page** or a single occurrence of an element, e.g.

<h1 style="text-align:center">

CSS Syntax

When adding **CSS** to a **web page** it is defined at the top of the page between the **<style>** tags.

Structures that are normally used include:

- Headings
- Paragraphs
- Links
- Images
- Videos
- Forms
- Tables
- Lists.

Useful websites:
www.replit.com
www.w3schools.com
www.code.org/educate/weblab

JavaScript Calculator

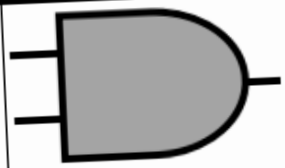
```
function myCalc()
  {
const operator = prompt('USER INSTRUCTION');

const number1 = parseFloat(prompt ('INSTRUCTION'));
const number2 = parseFloat(prompt ('INSTRUCTION'));

let result;

if (operator == '+') {
    result = number1 + number2;
}
else if (operator == '-') {
    result = number1 - number2;
}
else if (operator == '*') {
    result = number1 * number2;
}
else {
    result = number1 / number2;
}

window.alert(" Result is" + result);
  }
```

To make a form, you require the following tags and attributes:

```
<form action="/action_page.php">
  <label for="fname">First name:</label><br>
  <input type="text" id="fname" name="fname" value="John"><br>
  <label for="lname">Last name:</label><br>
  <input type="text" id="lname" name="lname" value="Doe"><br><br>
  <input type="submit" value="Submit">
</form>
```

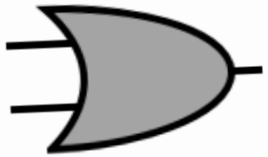
Binary Logic Gate Diagrams

AND



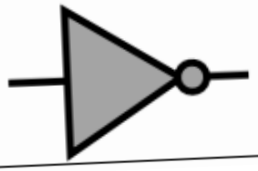
Input A	Input B	Output Q
0	0	0
0	1	0
1	0	0
1	1	1

OR



Input A	Input B	Output Q
0	0	0
0	1	1
1	0	1
1	1	1

NOT



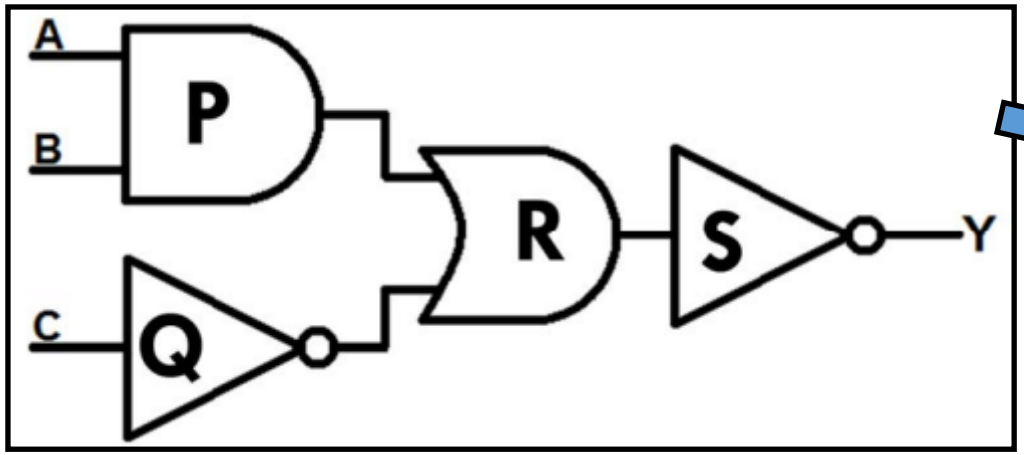
Input A	Output Q
0	1
1	0

Key vocabulary

Logic Gate	A logic gate is an building block of a digital circuit. Most logic gates have two inputs and one output. At any given moment, every terminal is in one of the two binary conditions 0 or 1.
And	A logic gate which returns a 1 when both inputs are 1's. Else a 0 is returned.
Or	A logic gate which returns 1 when either or both of the inputs are 1.
Not	A logic gate which inverts its input.
Truth table	A table which shows outputs from a logic gate or circuit given certain inputs.

Operator	Meaning
and	both sides of the test must be true to return true
or	either side of the test must be true to return true
not	inverts

A logic circuit comprises of multiple gates in a sequence



To follow through a logic circuit, you create a truth table that will progress through each input and show its output.

A	B	C	P	Q	R	S / Y
0	0	0	0	1	1	0
0	0	1	0	0	0	1
0	1	0	0	1	1	0
0	1	1	0	0	0	1
1	0	0	0	1	1	0
1	0	1	0	0	0	1
1	1	0	1	1	1	0
1	1	1	1	0	1	0

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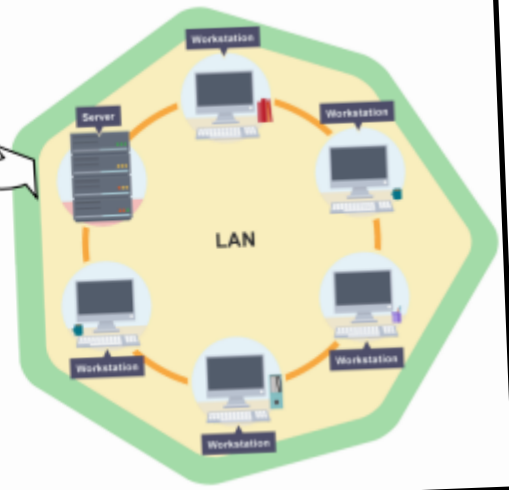
Year 9| GCSE Topics

Local area network (LAN)

A **local area network** is when computers or devices are connected together over a **small geographical area**, such as within a home, a building or one site. A LAN can be created to share data or hardware such as a printer, or to share an internet connection.

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

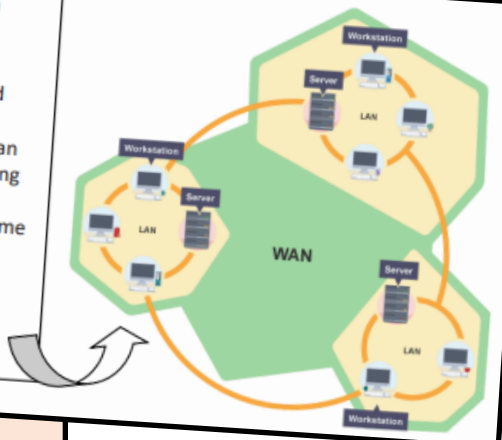


What is a network?

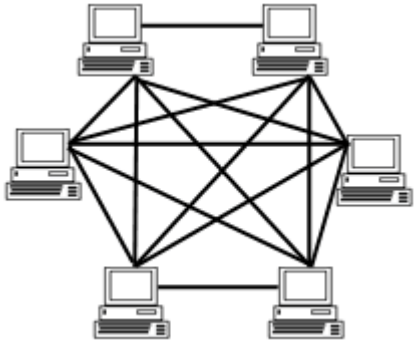
A network is two or more computers (or other electronic devices) that are connected together, usually by cables or Wi-Fi.

Wide area network (WAN)

A **wide area network** is when computers or devices are connected together over a **large geographical area**. For example, a company with an office in London and another in Beijing would use a WAN to allow the employees to share one network. Some companies will connect a number of LANs in different areas together to create a WAN. The biggest WAN we know is the internet.

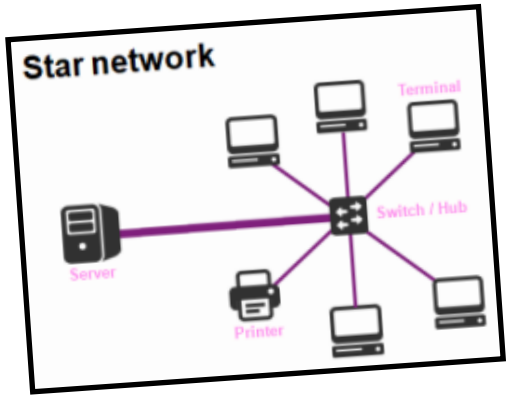


MESH Network



What is a server?

Some networks have a server—some do not. A server is a powerful computer that is capable to providing services to other computers, such as Internet connections, emails



Keyword	Definition
Network	Two or more computers that are connected together.
LAN	Local Area Network—connected computers in a small geographical area
WAN	Wide Area Network—connected computers in a larger geographical area.
Client	A computer on a network that requests services from a server.
Peer	A computer with equal permissions as every other computer on a network
Server	More powerful computer that provides services to other computers.
NIC	Network Interface Card—used to connect a computer to a network.
WAP	Wireless Access Point—converts wired network access into radiowaves.
Traffic	Term used to describe data flowing around a network.
IP Address	Internet Protocol address—used to give each computer a unique address

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Computer Science

Year 9| GCSE Topics

These three protocols are involved in email communication.
POP3 is the protocol used to download emails directly from a mail server to a computer.
SMTP is the protocol used to send an email from one computer to another.
IMAP is the protocol used when you wish to access emails from an online inbox, such as Hotmail or Gmail accounts.

How can different computers communicate with each other?

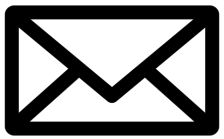
Computers use PROTOCOLS that enable them to communicate and share data/resources.
Protocols are a series of rules that computers must follow in order to send/receive data.

Protocol	Description
POP3	Post Office Protocol 3
SMTP	Simple Mail Transfer Protocol
IMAP	Internet Message Access Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
HTTP/S	Hyper Text Transfer Protocol / Secure
FTP	File Transfer Protocol

TCP/IP is the protocol suite responsible for the transport of data from one computer to another.

TCP is responsible for deciding how the data is sent from one computer to another.

IP is responsible for locating the computer receiving the data using addressing such as IPv4 and IPv6.



HTTP/S is the protocol used to send web-site data to and from a web server.

FTP is the protocol used to transfer (download/upload) files on a network.

Wired	Wireless
• Uses cables such as coaxial, twisted pair and fibre optic to communicate between computers. • Computers are more difficult to add to the network, wire access must be available. • Static—cannot move around. • Much larger range (if connected.)	• Uses radio waves to communicate between computers. • Computers are easily added to the network. • Allows for portability (moving around.) • Have a limited range.

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Computer Science
Year 9| GCSE Topics

Environmental Issues

Energy Consumption	Replacement Cycle
How much energy is being used to power the digital devices AND to create those devices. This leads to more pollution given off because of the constant energy requirements.	People constantly updating their digital devices even though their current devices are in good working order. This leads to the wastage of many different devices including phones, tablets and laptops etc.
Manufacture	**Disposal**
How many resources are used to create these devices. Usually finite raw materials such as gold, copper, lithium and cobalt. Resources are often found in microchips and circuits, but are being increasingly used for	E-Waste is the term given to all disposed electronic devices. Devices do not degrade over time and can often lead to the materials in the devices leaking into the ground and causing further damage to the environment.

Legislation

Computer Misuse Act 1990	The Computer Misuse Act 1990 is a law in the UK that makes it a crime to access computer systems without permission.
Copyright, Designs and Patents Act 1988	The Copyright, Designs and Patents Act 1988 exists to protect personal or organisational creations.
Data Protection Act 2018	The Data Protection Act 2018 is a law in the UK that focuses on how personal data is handled and protected. It ensures that people's personal information is used responsibly and kept secure.

Ethical Issues

Data Protection	AI & Machine Learning
How is personal data being protected? Do people understand how their data is being used? Do people know if their data is being used?	AI refers to computers being able to act intelligently. Coupled with machine learning, computers can have the ability to learn from large datasets and use that data to answer intelligently.
Smart Speakers/Personal Digital Assistants	**Robotics**
Extremely popular—use machine learning to better predict results for us based on data collected from us and others 'similar' to us.	Self-driving vehicles and their safety algorithm bias. Difficult situations such as which 'object' to hit in the road or legal accountability if something goes wrong are major issues.

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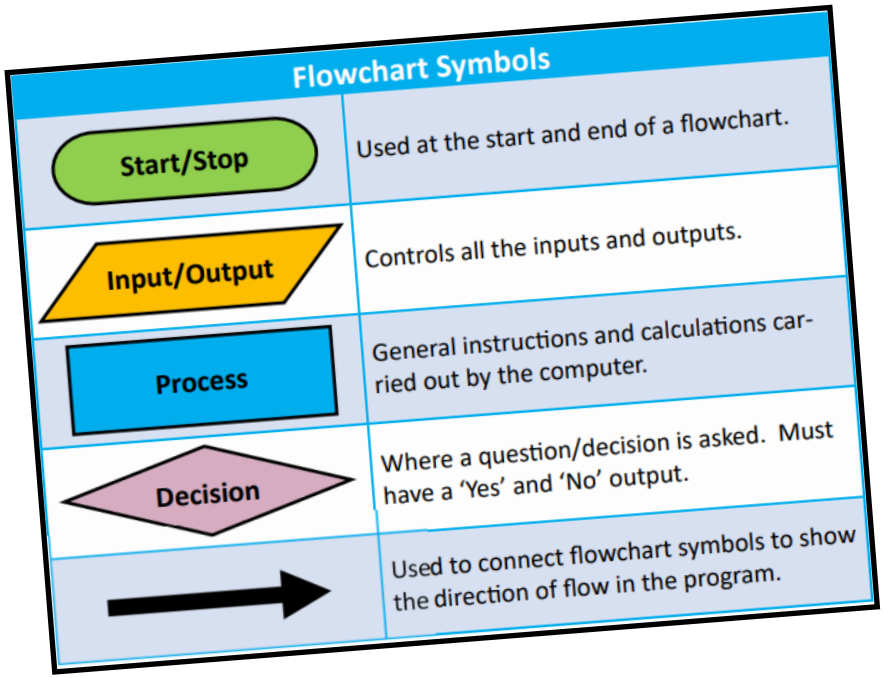
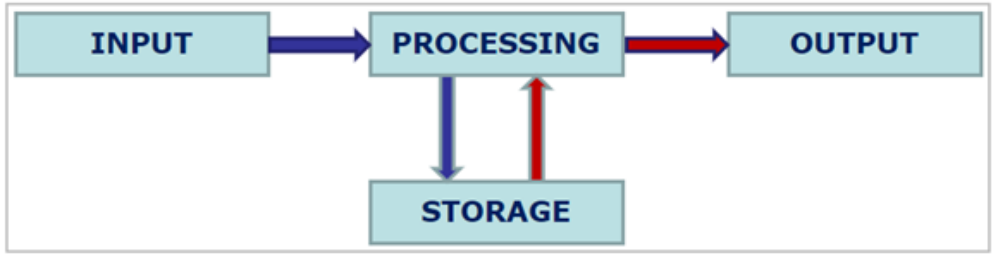
Computer Science

Year 9| Ethics/Legislation

Control Systems

Instructions are inputted, the processors processes the instructions and there are resulting actions that are outputted.

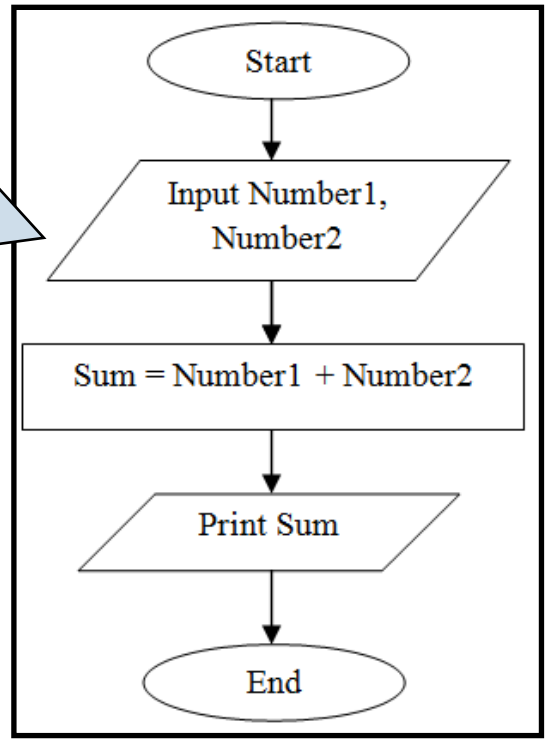




Sensors

A sensor is more often than not, responsible for giving processors instructions/data. For example, an automatic door will open when the **motion sensor** detects motion in front, telling the processor, which will then decide to open the doors.

What is happening within this flowchart?



Subroutines

Subroutines are 'mini' programs within a larger program. These follow the same principle as a function in Python Programming. These can be used to make a program much more **efficient**.

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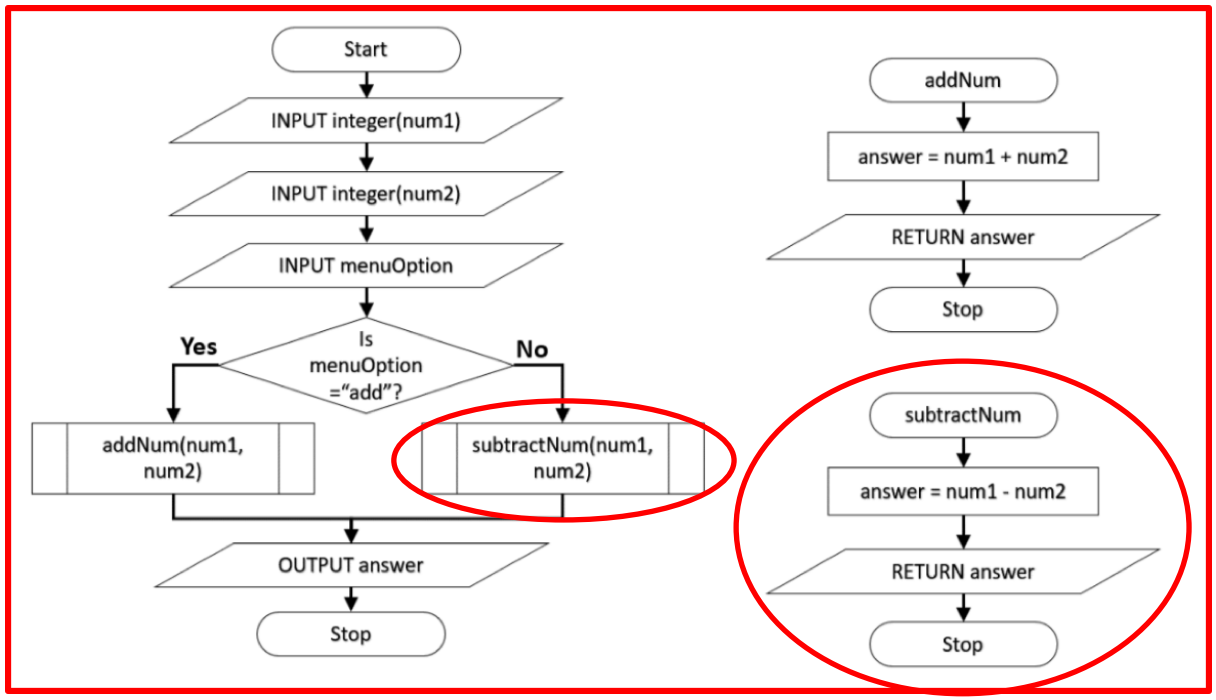
Computer Science

Year 9| Control Systems

Subroutines

Efficiency is a hugely important concept in computer science. The more efficient a program is, the less memory it takes up and therefore the faster and more responsive it will run.



Subroutines

In this example, we have combined **four** blocks into a single subroutine block, saving 3 blocks. If this subroutine was used 100 times in a program, then we've saved 300 blocks!

Control Systems in Agriculture	Control systems are present in agriculture to help grow, maintain and perfect the environment for crops. For example, if a farm is looking to enhance its yield (amount it produces) then it can use monitored data to see which conditions the crops grow best in.
Control Systems in Competitive Sport	Control systems are responsible for monitoring data in various ways. Within competitive sports they can also monitor performance data. For example, on a racing car, airflow is a significant piece of data that can affect performance. If they monitor airflow, they can adjust the aerodynamics of the car.

Three main programming constructs are:

Sequence

Selection

Iteration

Sequence

Sequence is the **order** a program must follow to perform what it is programmed to do.

Selection

An if statement can be used to implement selection in Python. It can be followed by an elif and/or and else statement.

```
# Example 1
if age >= 18:
    print("You can watch the film")
else:
    print("You can't watch the film")
```

Comments

Anything on a line after the character # is considered a comment.

Iteration

Iteration is the process of repeated a section of code multiple times. There are **two** main types of iteration:

Count-controlled

Condition-controlled

Variables

A place in memory in which data may be stored.

- Different types e.g. string, decimal, etc.
- Allows the program to store data such as an input for later use

Constants

A fixed value used by the program such as pi

Allows easy use of fixed values without having to store them in the program.

Data Type	Description	Example
String	A combination of characters, numbers or letters.	"Password123!!"
Integer	A whole number.	34
Float	A decimal number.	3.14159
Boolean	True or False values	True
Character	A single character.	M

Arithmetic operations are used when needing **calculate** something.

Arithmetic operator	Meaning
/	division
*	multiplication
**	exponentiation
+	addition
-	subtraction
//	integer division
%	modulus

Logical operations are used when needing to **compare** something.

Logical operator	Meaning
==	equal to
!=	not equal to
>	greater than
>=	greater than or equal to
<	less than
<=	less than or equal to

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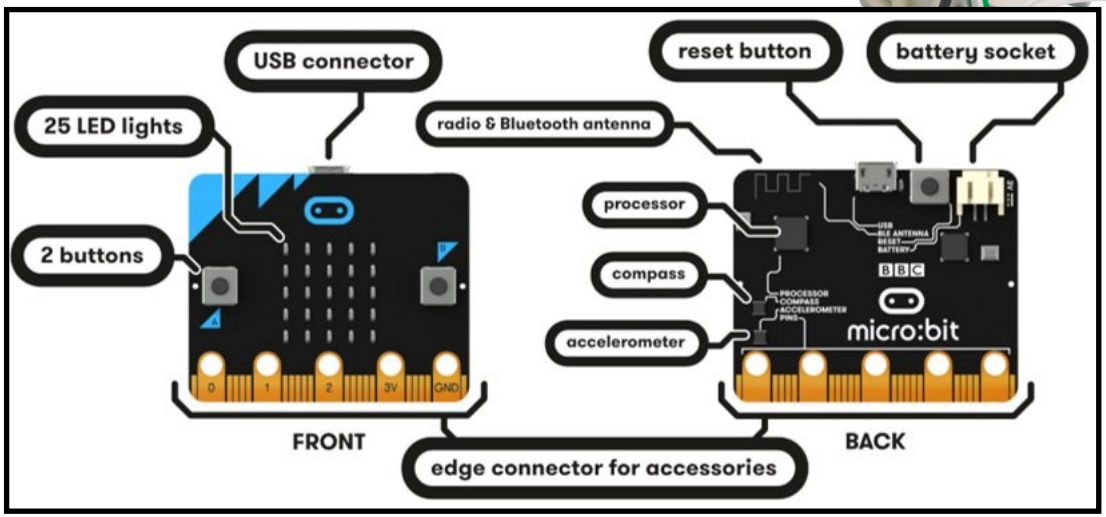
Computer Science

Year 9| Python Programming

Robotics is the discipline that combines engineering and computer science.



Robotics in Society

Healthcare
Used to diagnose conditions and prescribe treatments using AI.

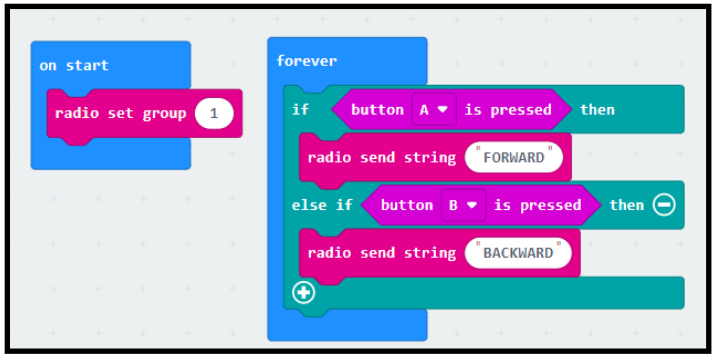
Agriculture
Increasing farmers yield and optimises the use of natural resources.

Transport
Can help drive independently, calculating best routes depending on position.

Extreme Environments
Nuclear inspection and decommissioning, space exploration and deep mining.

Infrastructure
Structural health monitoring using sensors to monitor and assess the condition of buildings.

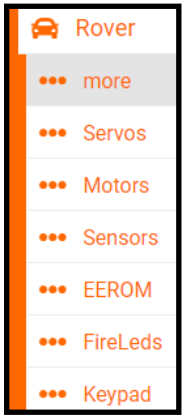
Use the following code to create a radio link between two Microbits (to control the robotics.) When button A or B is pressed, they will send a string via group 1.



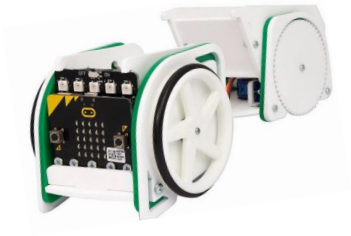
Soft Robotics

These robotics are inspired by creatures such as starfish & worms.

They are usually constructed using materials such as elastic, rubber & electroactive polymers to fit or work in spaces that are difficult for traditional robotics to reach.

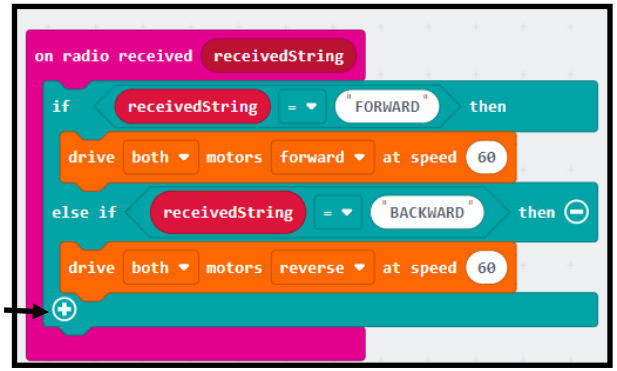


Use the link on your notebook to download the Rover extension on MakeCode.



Use the following code to receive the strings sent and perform a task. In this example, if the Microbit receives FORWARD it drives both motors forward at a speed of 60.

If you wish to add more conditions, then just click on the + symbol at the bottom of the logic block.



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Computer Science

Year 9| Robotics