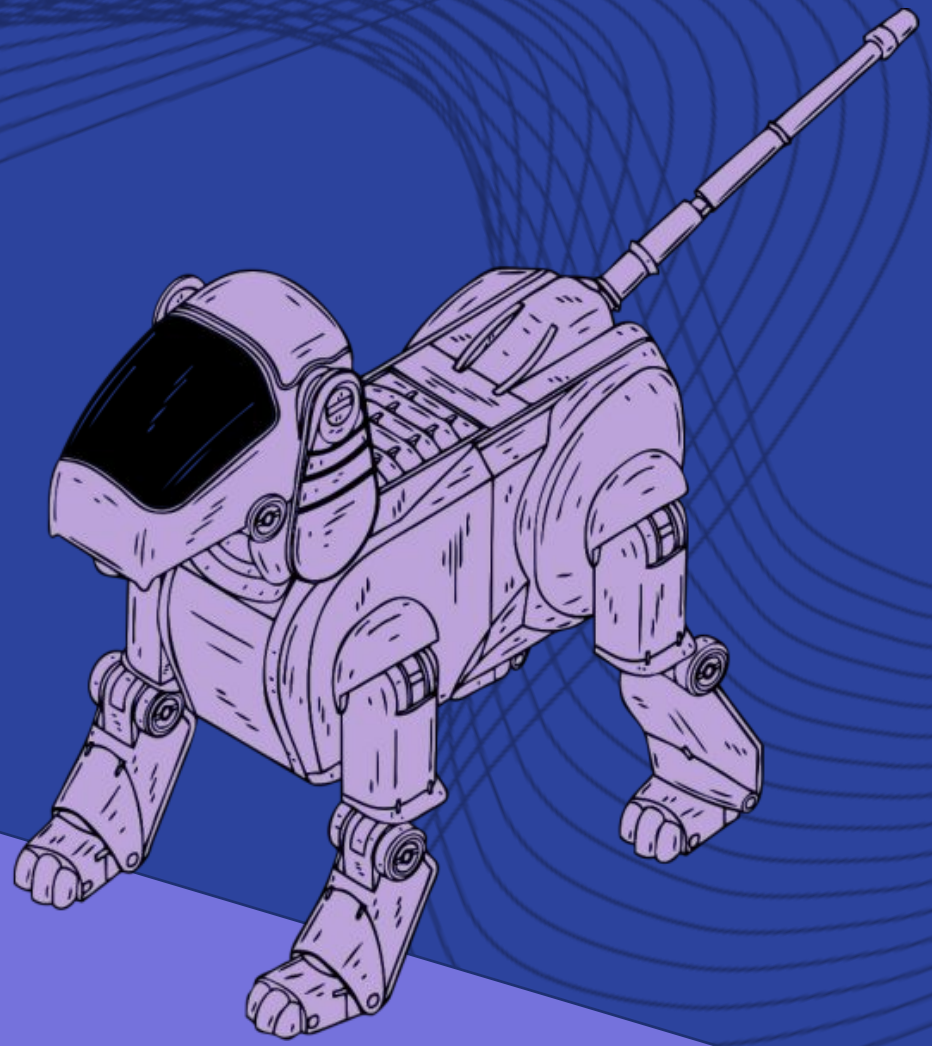
BBC Micro:Bit – Digital Dice

Level 2 – BBC MakeCode

Robotics



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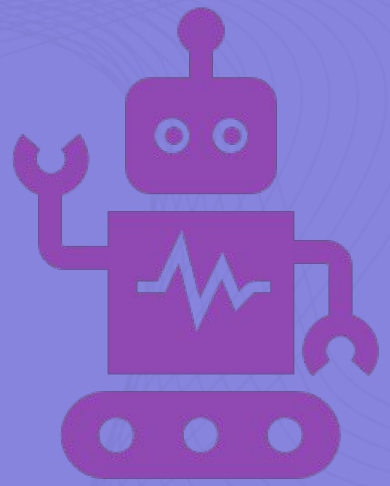
Introduction

Micro:Bits are pocket-sized computers with the potential to create whatever your imagination can code!

The Micro:Bit helps you to understand how computers work in this new tech-savvy world!



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Task

Lesson Objectives:

- To develop our understanding of programming using the ‘blocks’ language.
- To practice the art of decomposition and abstraction to help solve a problem.

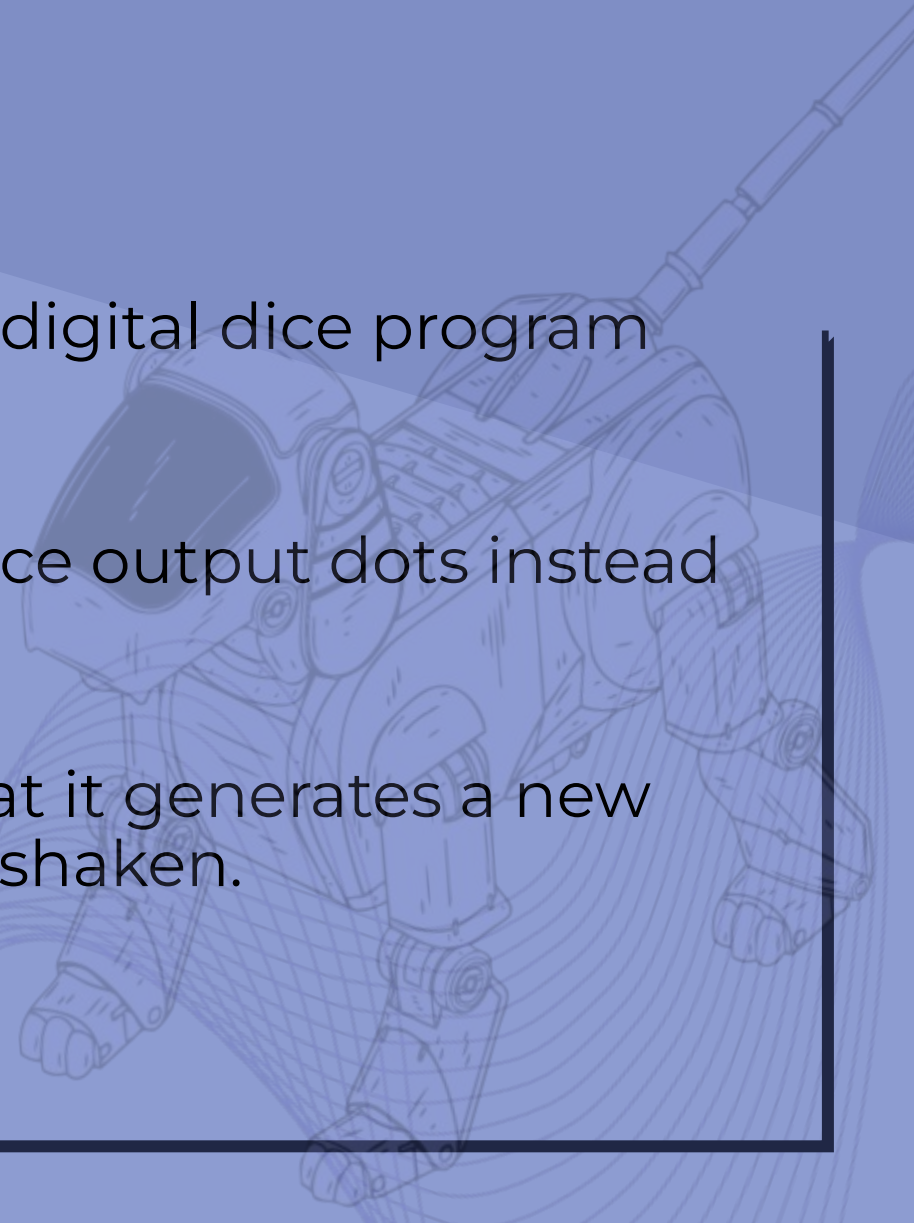
Challenge:

- To understand how to make use of the accelerometer.

Process

Success Criteria

- ✔ ALL: To code, compile and flash a simple digital dice program onto the Micro:Bit.
- ✔ MOST: To develop the code so that the dice output dots instead of the numerical value of the dice face.
- ✔ SOME: To further develop the code so that it generates a new random number each time the device is shaken.



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Key words:

Accelerometer –
A component of the Micro:Bit which can sense movement.

Compile –
The process of translating our programme code into machine code.

Flash –
The process of transferring machine code onto a computer chip.

Remembering the BBC Micro:Bit

We programme the Micro:Bit via the BBC website! There is a wide range of languages that can be used to programme the device.

We will be using 'Blocks' – which is a bit like Scratch – to begin with, then we may dabble with a bit of Python!

Code it

First we code our programme.
We can check it works by using the online Micro:Bit emulator.

Compile it

Then we compile the code. This is where our code is converted into binary – zeros and ones – so that the Micro:Bits CPU can process the programme.

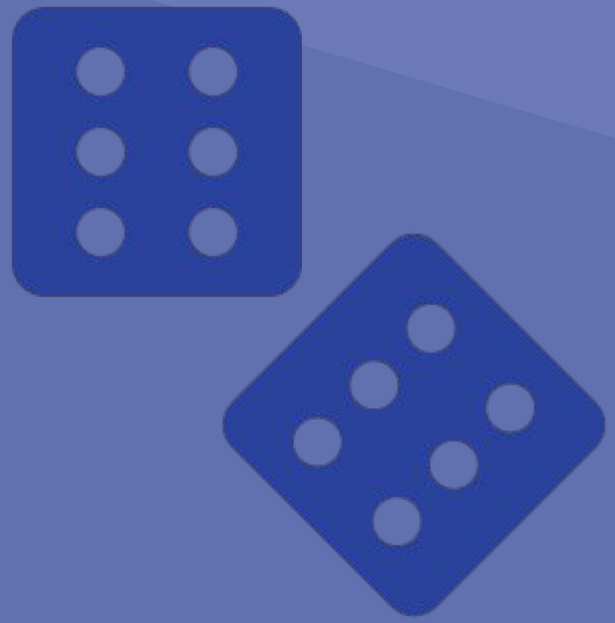
Flash it

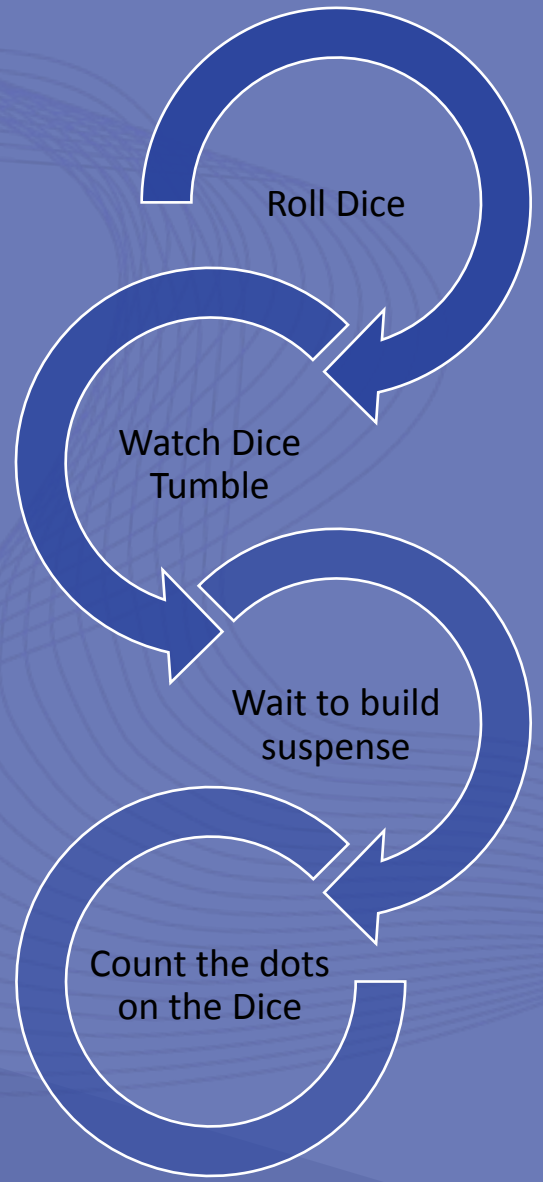
Finally, we transfer the compiled programme onto the device.
Flashing is where the code is stored on the Micro: Bit's memory chip, ready to be executed – run.

Creating a Digital Dice!

Decomposition – Breaking down the problem

How does a Dices work?

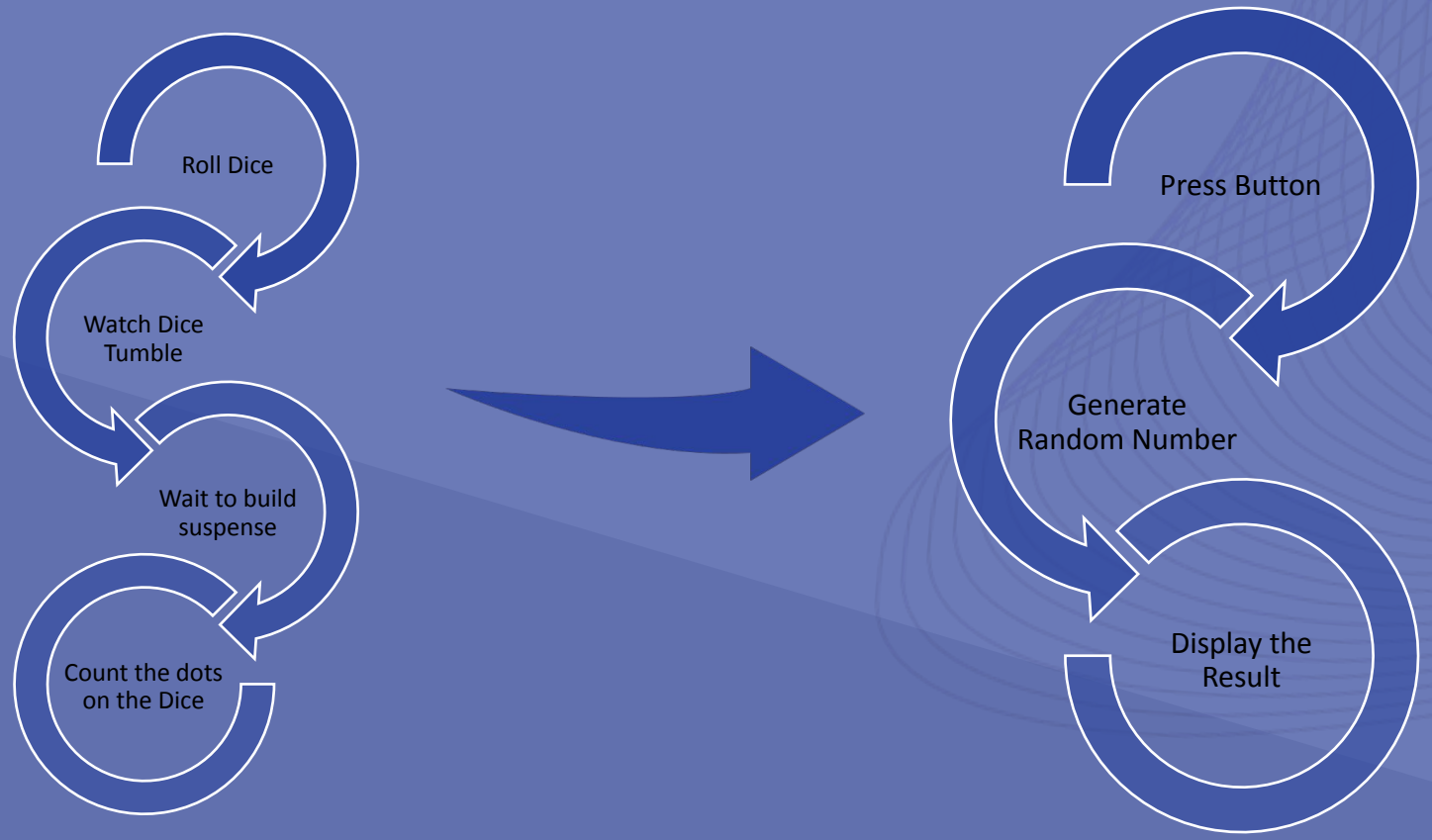




Creating a Digital Dice!

Abstraction – What's relevant?

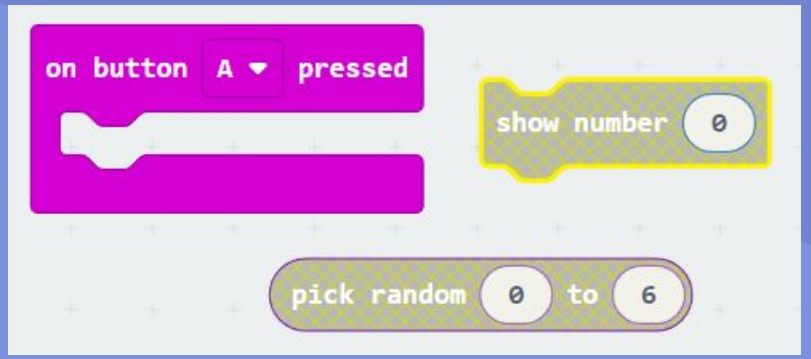
What are the important parts of the dice rolling process which are relevant to our dice programme?



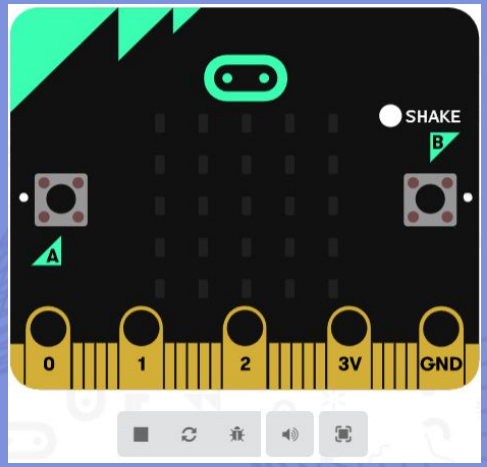
Step 1- Coding

Creating a new project

- Go to www.microbit.co.uk/create-code
- click on ‘New Project’.
- Use the following scripts to create your digital dice:



- Throughout your coding, click RUN and try out the code on the Micro:Bit emulator:

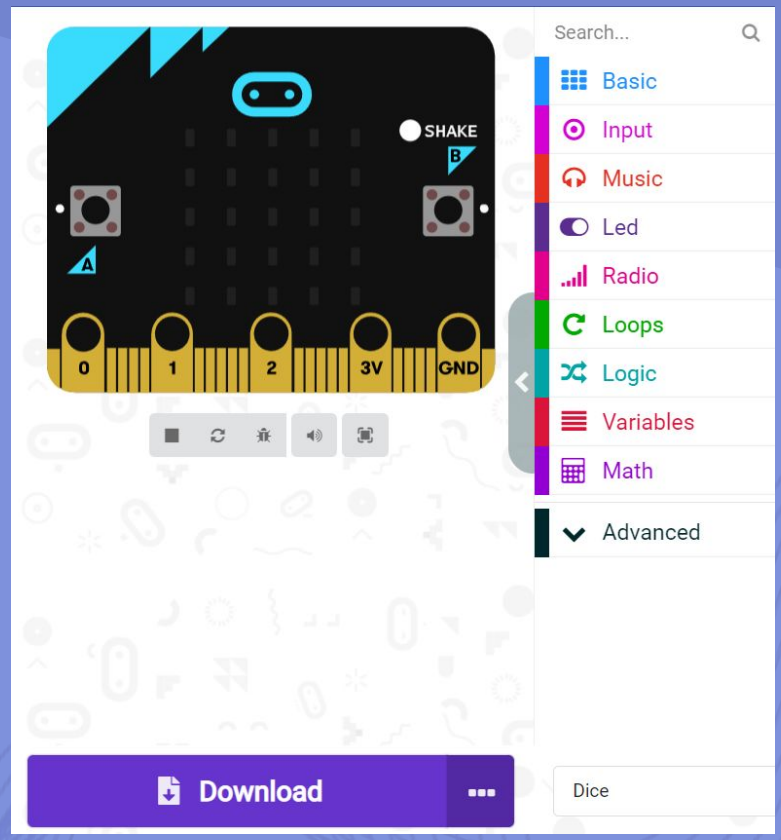


Step 2 – Compiling and Flashing

If your code is working it is time to COMPILE and FLASH

- Press the DOWNLOAD button.
- Once the HEX file has been downloaded, go into your documents and find it.
- Now plug in your device to an available USB port.

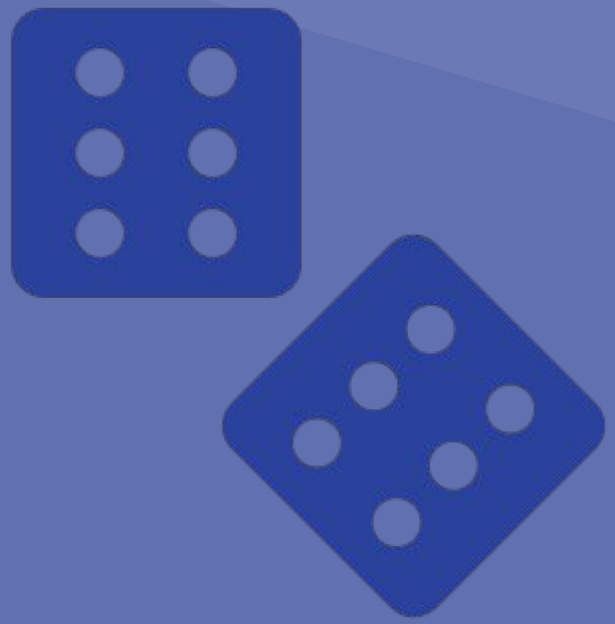
- Open the device up as if it were a USB memory stick.
- Now drag the HEX file into the opened device folder (as if you were transferring files to a memory stick).
- Now the FLASHING will be complete and you can try out your software on your Micro:Bit.



Class Tasks

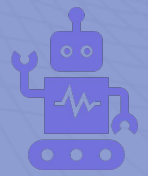
Challenges

Try to change the code so that it displays the appropriate number of dots of a dice face instead of a numerical digit.



Change the code so that it displays a new value each time the device is shaken.

Links to everyday life



Robotics

The coding of the Micro:Bit itself is classed as robotics since you are coding a device that interacts with its surroundings and even other people.

Creativity

This project makes you think deeply about just how much art can be incorporated into technology which we see all around us every single day.

Link 3

As a society in the 21st century, we are surrounded by technology everywhere, sometimes even to the point, that it can be intimidating. Starting with projects like this is a great way to start learning about technology.

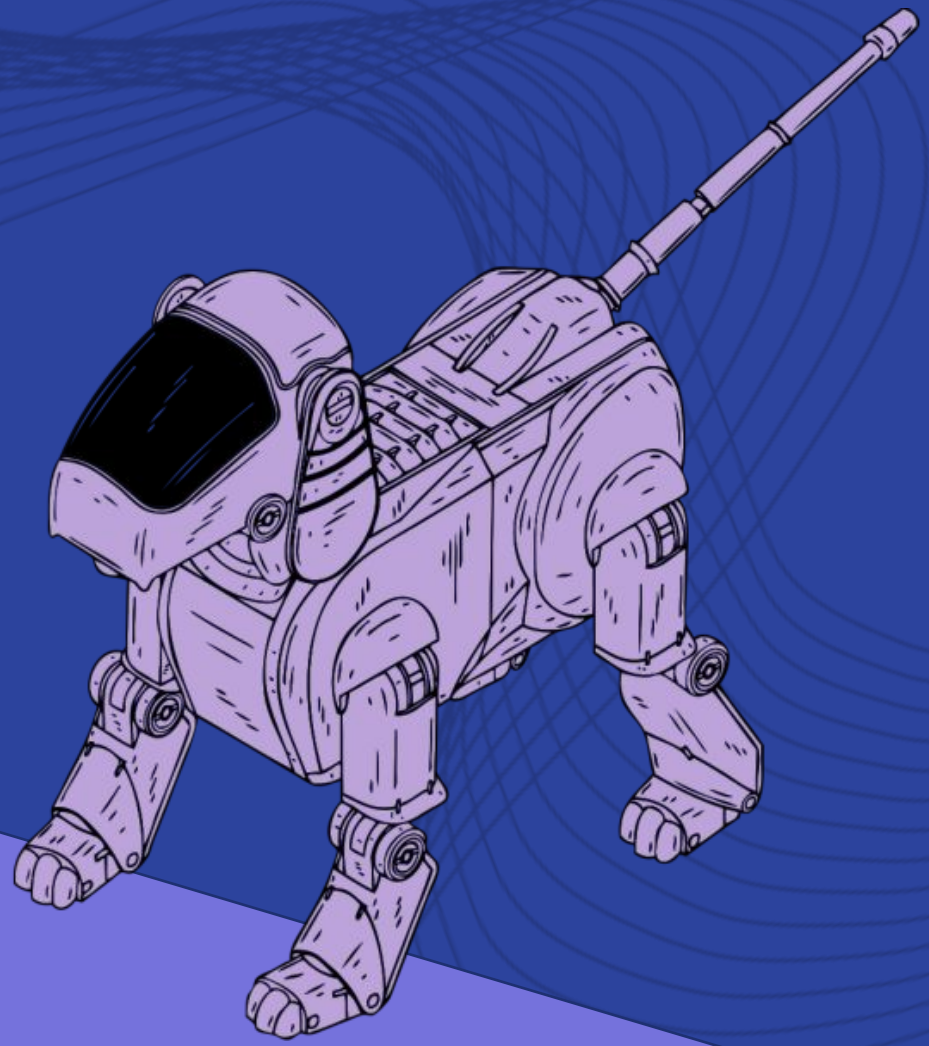
Conclusion

Learning outcomes

- ✔ I understand how to programme using the ‘blocks’ language,
- ✔ I can practice the art of decomposition and abstraction to help solve a problem,
- ✔ I understand how to use the accelerometer.

Congratulations!

You have completed the project



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