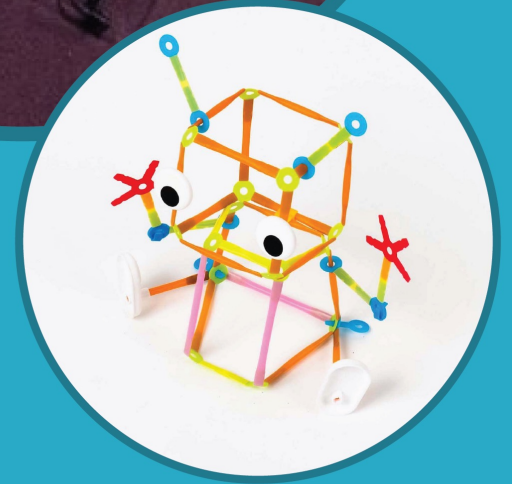
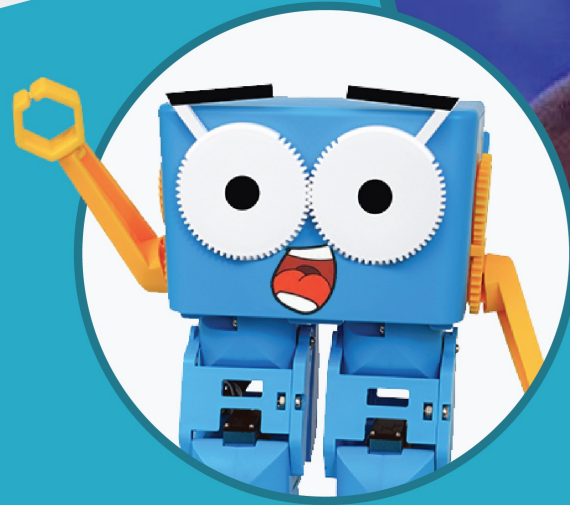
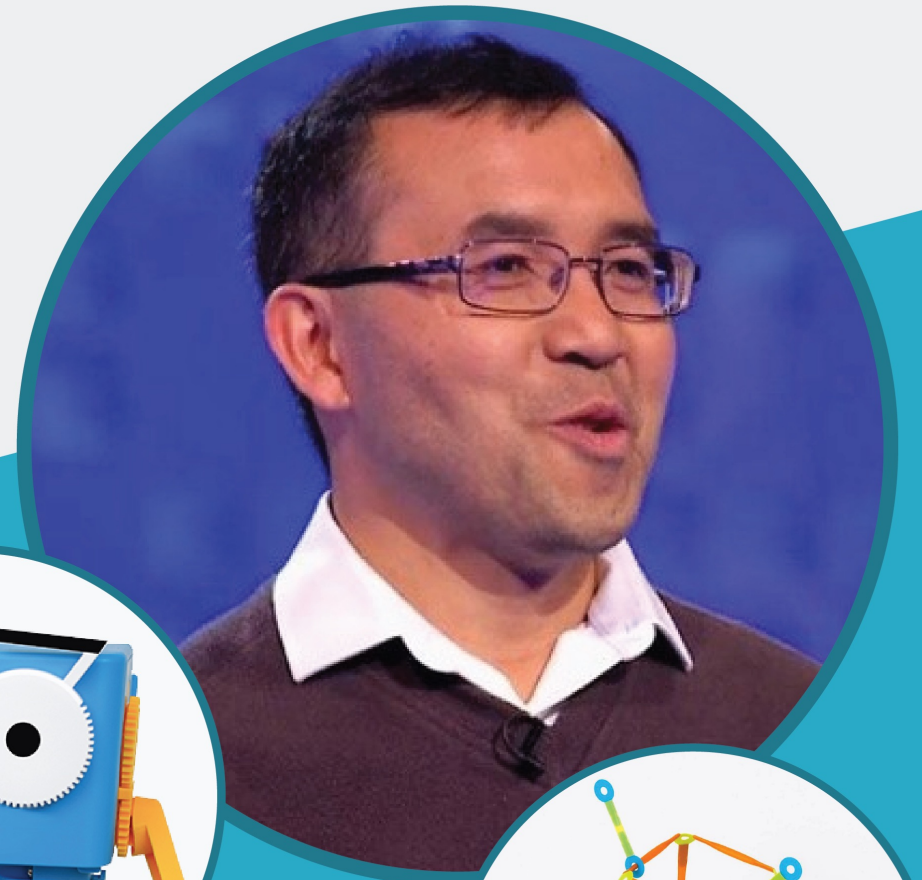




and **Strawbees**.<sup>®</sup>

# BUILDING THE FUTURE

with Allen Tsui



**AN HOUR OF CODE™ EVENT**



Wed, December 6th



3.30pm GMT

# Introductions



**Natalya Ratner**  
Marketing Director,  
Robotical



**Allen Tsui**  
Subject Lead for  
Primary Computing,  
Willow Brook  
Primary school



**Sarah Walker**  
UK Partnership  
Manager, Strawbees

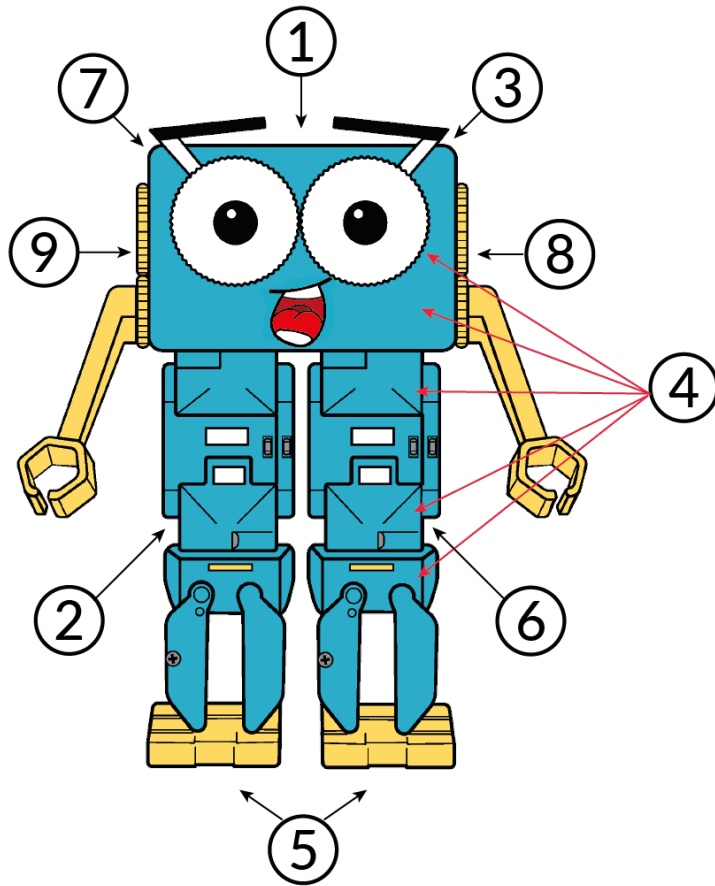
# Housekeeping and Agenda

- This session is **approx. 60 minutes** long - if we have time, we'll do Q&A at the end
- Let us know where you're joining from in the chat 😊
- If you want to ask a question at any time (and please do!), type it into the Q&A (box with '?' in it), we'll try to answer as many as possible
- Stay till the end for the giveaway!

## **(Rough) Agenda:**

- Who is Marty the Robot (5 mins)
- What is Strawbees (5 mins)
- Coding Club fun with Allen and Willow Brook Primary School (40-45 mins)

# Who is Marty the Robot?



## 1 - Humanoid Form

Marty has a personality and is full of character!

## 2 - Unique Walking Mechanism

Walk, turn, dance, sidestep, kick a ball, wiggle

## 3 - Range of Expressions

Marty's eyebrows move to express emotions

## 4 - Motors with Position Sensors

Nine metal-g geared smart servo motors (in legs, arms & eyes)

## 5 - Foot Sensors

Infrared (IR) Sensor & Color Sensor for screenless coding

## 6 - Quality Moulded Plastic Parts

Classroom-ready, robust and built to last

## 7 - Acceleration & Tilt Sensor

Found in the control board in Marty's head

## 8 - Rechargeable Battery

With run time of 2-3 hours when fully charged

## 9 - Speaker

Marty speaks and plays sounds

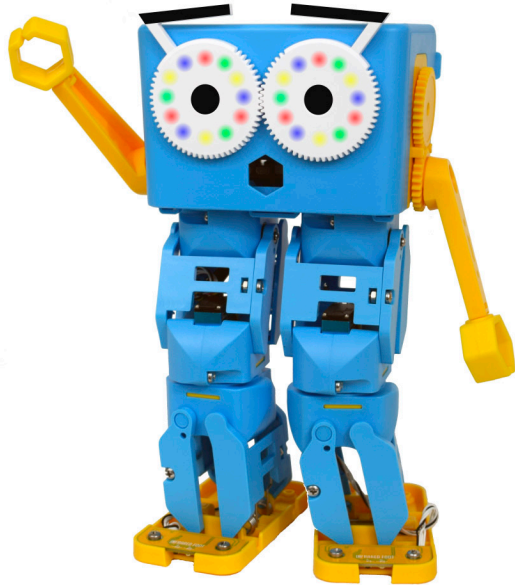
## Programming Languages

Marty supports progression from screen-free programming and block-based coding, to text-based programming language Python and more.

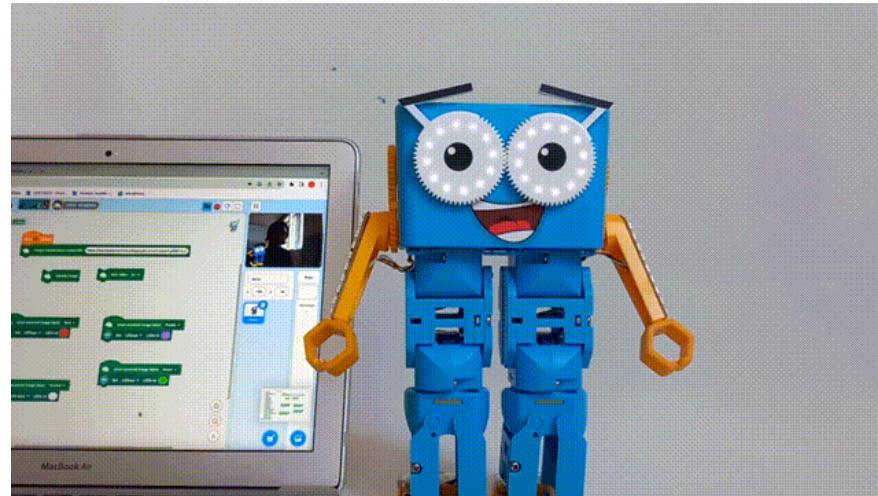
## Connectivity & Compatibility

Program Marty from PC, or any Android and iOS devices, using our app. Connect using Bluetooth, WiFi, USB, or I2C for custom add-ons.

# Marty's Newest Features



All Martys now  
come with Disco  
eyes



Teach AI and  
machine learning  
in primary



Improved sound  
and speech  
functionality –  
over +40  
languages!

# Value for the Whole School

## LEARNING PROGRESSION *with* MARTY THE ROBOT

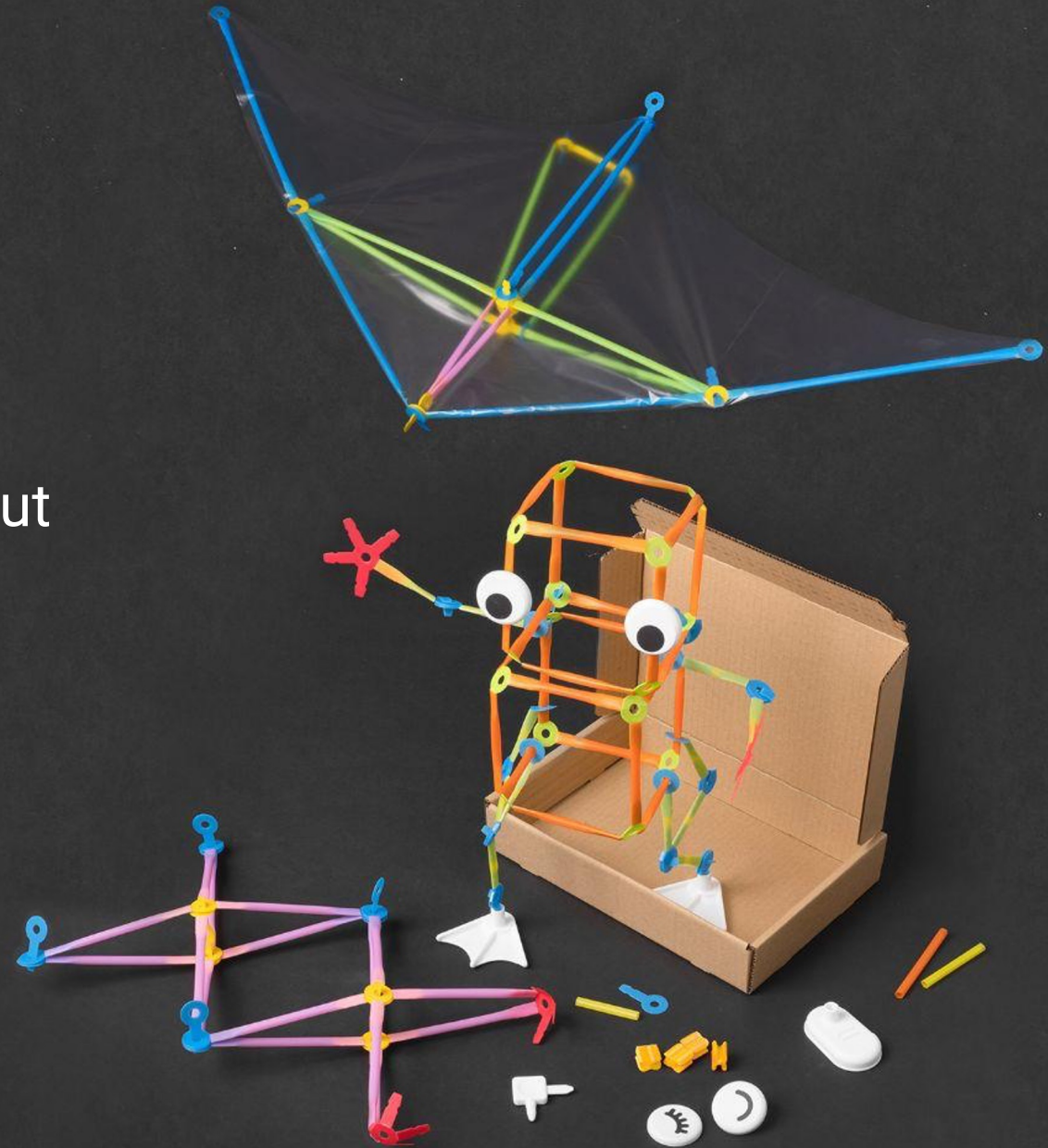
CODING ENVIRONMENT	RECEPTION /YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7-9
Unplugged	✓	✓					
Remote Control		✓	✓				
MartyBlocks Jr			✓	✓			
MartyBlocks					✓	✓	✓
Python							✓



# WHAT IS STRAWBEES?

*Strawbees is a creative way of learning STEM using hands-on pedagogy.*

A hands-on tool which educates learners about building and coding whilst having fun.



# STEM CLASSROOM

Building Solution

Kit for 30 Learners

Pocketful of Ideas

Strawbees Classroom

Storage Solution





# STEM CLASSROOM ROBOTICS WITH MICRO:BIT

Building and Robotics Solution

Kit for 30 Learners

Ages 8 +

Pocketful of Ideas

Strawbees Classroom

Storage Solution



The screenshot shows the Code.org website homepage. At the top, there is a navigation bar with links for Learn, Teach, Projects, Stats, Help Us, Incubator, and About. On the right side of the navigation bar, there are buttons for 'Create' (with a dropdown arrow), 'Sign in', and a help icon. The main content area features a large banner for a Strawbees event. The banner includes the Strawbees logo, the 'ROBOTICAL' logo, and the 'HOUR OF CODE' logo. Below these logos is the 'micro:bit' logo. The main text of the banner reads 'BUILDING THE FUTURE with Allen Tsui 6th December, 3.30pm GMT'. A circular portrait of Allen Tsui is positioned to the right of the text. The background of the banner shows colorful Strawbees structures and a blue robot character. On the left side of the banner, there is a white robot character with 'A.I.' written on its chest. On the right side, there is a blue cat character wearing sunglasses and a peace sign t-shirt. The browser's address bar shows 'https://code.org'.

Every student in every school should have the opportunity to learn computer science

# Micro:bit the next gen

## Reminder from the BBC Claim your Micro:bit by 18 December 2023

Register for your free BBC micro:bits now!

The BBC micro:bit is a pocket-sized computer which helps you teach children how to get creative with coding and tech. At BBC Education, we've just launched our exciting new campaign **BBC micro:bit – the next gen** in partnership with the Micro:bit Educational Foundation and Nominet.

We are donating a FREE classroom set of 30 BBC micro:bits to every UK primary school that registers. Not only that, but we're supporting teachers with training webinars, virtual courses and a host of free classroom resources in all 4 nations. You can find all the info here:

<https://microbit.org>

Please [register](#) for your school's FREE micro:bits now, because time is running out – registration closes on 18<sup>th</sup> December 2023.



**BBC**  
micro:bit  
the next gen

Last chance: free  
micro:bits for UK  
primary schools


Last chance: Register by 18 Dec

Register now

# Programming targets from the Primary National Curriculum for schools in England since 2014

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Give instructions to my friend and follow their instructions to move around.	Give instructions to my friend using forward, backward and turn and physically follow instructions.	Break an open ended problem up into smaller parts.	Use logical thinking to solve an open ended problem by breaking it up into smaller parts.	Decompose a problem into smaller parts to design an algorithm for a specific outcome and use this to write a program.	Deconstruct a problem into smaller parts, recognising similarities to solutions used before.
Describe what happens when I press buttons on a robot.	Tell the order I need to do things to make something happen and talk about this as an algorithm.	Put programming commands into a sequence to achieve a specific outcome.	Use an efficient procedure to simplify a program.	Refine a procedure using repeat commands to improve a program.	Explain and program each of the steps in my algorithm.
Press buttons in the correct order to make a robot do what I want.	Program a robot or software to do a particular task.	Keep testing my program and recognise when I need to be debug it.	Know to keep testing a program while putting it together.	Use variables to increase programming possibilities.	Evaluate the effectiveness and efficiency of my algorithm while continually testing the programming of the algorithm.
Describe what actions I will need to do to make something happen and begin to use the word algorithm.	Look at my friend's program and say what will happen.	Use repeat commands.	Recognise that an algorithm will help sequence more complex programs.	Change an input to a program to achieve a different output.	Recognise when using a variable is needed to achieve a required output.
Begin to predict what will happen for a short sequence of instructions.	Use programming software to make objects move.	Describe the algorithm needed for a simple task.	Use a variety of tools to create a program.	Use 'if' and 'then' commands to select an action.	Use a variable and operators to stop a program.
Begin to use software or apps to create movement and patterns on a screen.	Watch a program execute and spot where it goes wrong so that I can debug it.	Detect a problem in an algorithm which could result in unsuccessful programming.	Recognise that algorithms will help in other learning such as Maths, Science as well as Design & Technology.	Use logical reasoning to detect and debug mistakes in a program.	Use different inputs (including sensors) to control a device or onscreen action and predict what will happen.
Use the word debug when I correct mistakes when I program.			Use a sensor to detect a change which can select an action within my program.	Use logical thinking, imagination and creativity to extend a program.	Use logical reasoning to detect and correct errors in algorithms and programs.
				Talk about how a computer model can provide information about a physical system.	

  ARE targets achievable with @RoboticalLtd

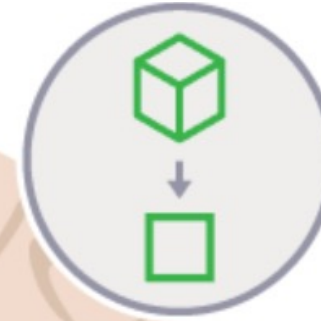
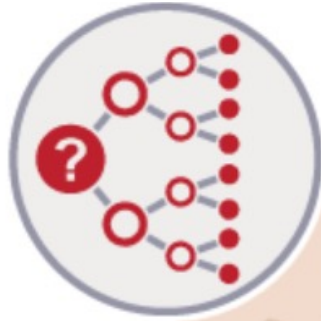
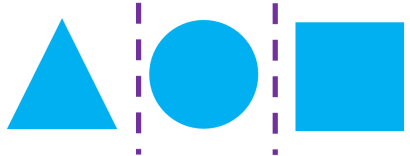
 Other resources

# Computational Thinking

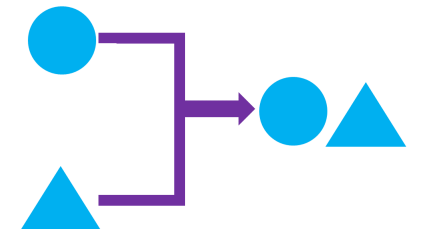
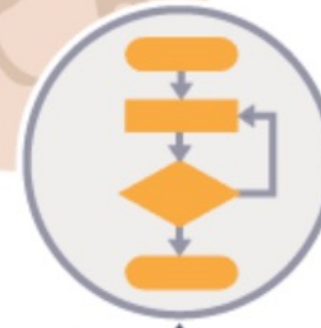
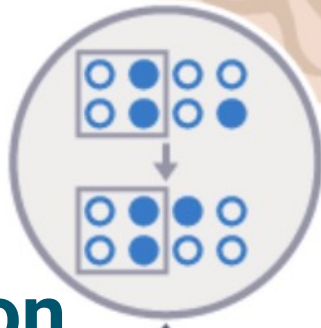
1 Break the idea down into smaller parts.

3 Focus on the important or key parts of the idea.

## decomposition



## abstraction



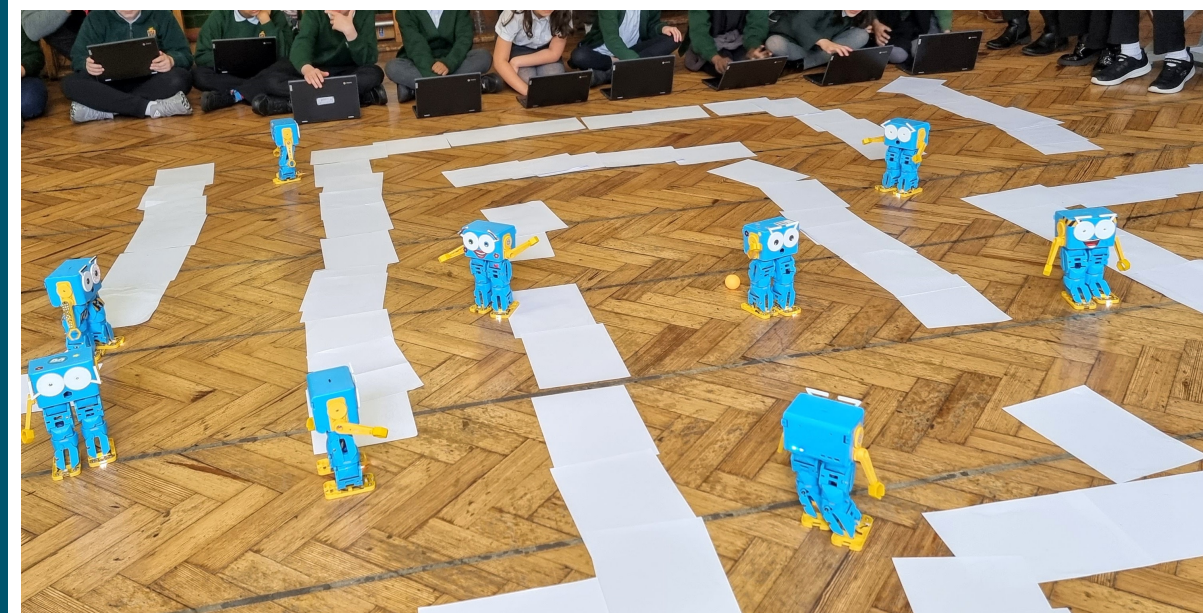
## algorithm

2 Spotting similarities which could help.

4 Write instructions for the technology to work.

## pattern recognition

# Marty from @RoboticalLtd @WillowBrookGST



Home Tools PS 176 Tsui FINAL.... x ? Sign In

21 (1 of 3) 110%

LEARNING FROM LOCKDOWN

# Raising the limits on learning with technological tangibles



**Allen Tsui**  
showcases how  
children as young as  
4 can learn to code

Search 'Watermark'

Export PDF

Adobe Export PDF

Convert PDF Files to Word  
or Excel Online

Select PDF File

PS 176 Tsui FINAL.pdf



# Marty from Robotical @ISTEofficial, 2023


Miss Jami Shields on x

https://twitter.com/MissJShields1/status/1673440604548677633

Post

Miss Jami Shields @MissJShields1

@TsuiAllen it was amazing to hear your poster session!! I loved helping to talk to people about @RoboticalLtd and Marty at the @ISTEofficial #ISTELive #ShieldsScribbles



10:18 PM · Jun 26, 2023 · 587 Views



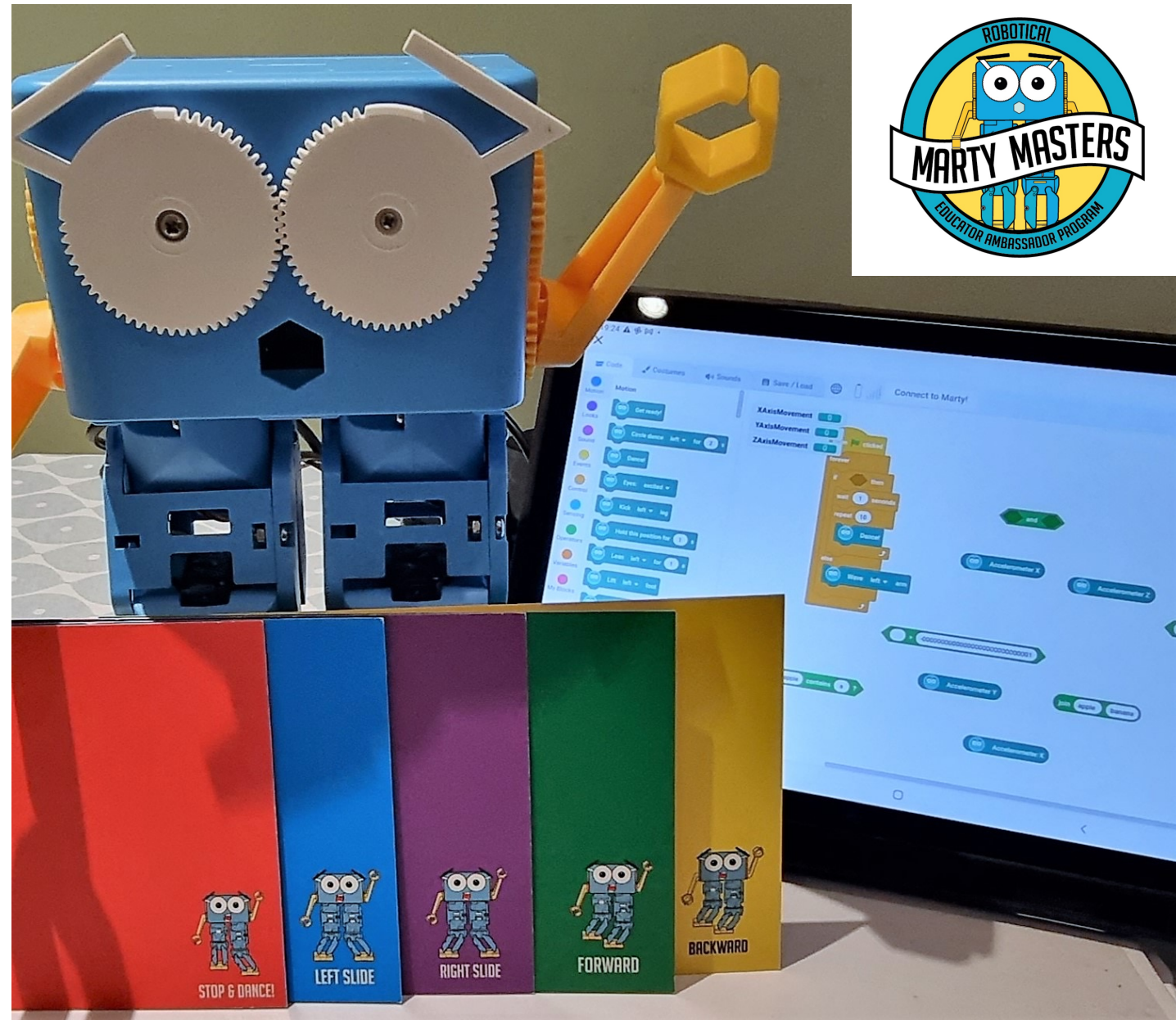


# Humanoid

Type of robot design which has a body shaped like a person with a head, chest and two arms. This type of robot design also has legs and able to move with a walking style motion.

Marty the robot from Twitter: @RoboticalLtd has two ways of being programmed. Marty has a sensor in its foot which allows it to read or recognise colours. Using the coloured cards it can move forward, backward, go left or right as well as stop and dance.

Marty can also be connected to an Android or Apple device which can be used as a controller. The Android or Apple app also includes “Marty Blocks” with versions which work in the same or similar way to Scratch Jr and Scratch.

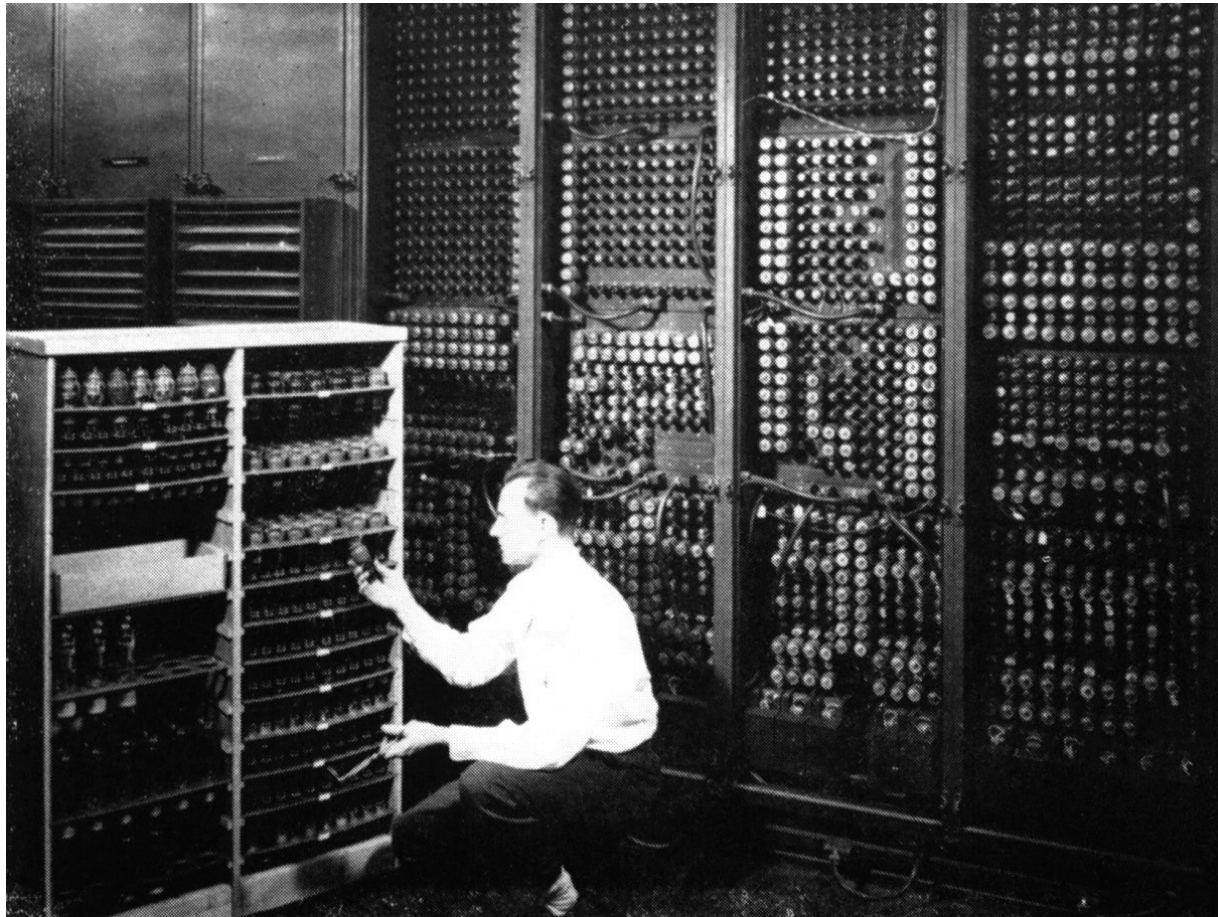


Where are the robots? Are they already here?

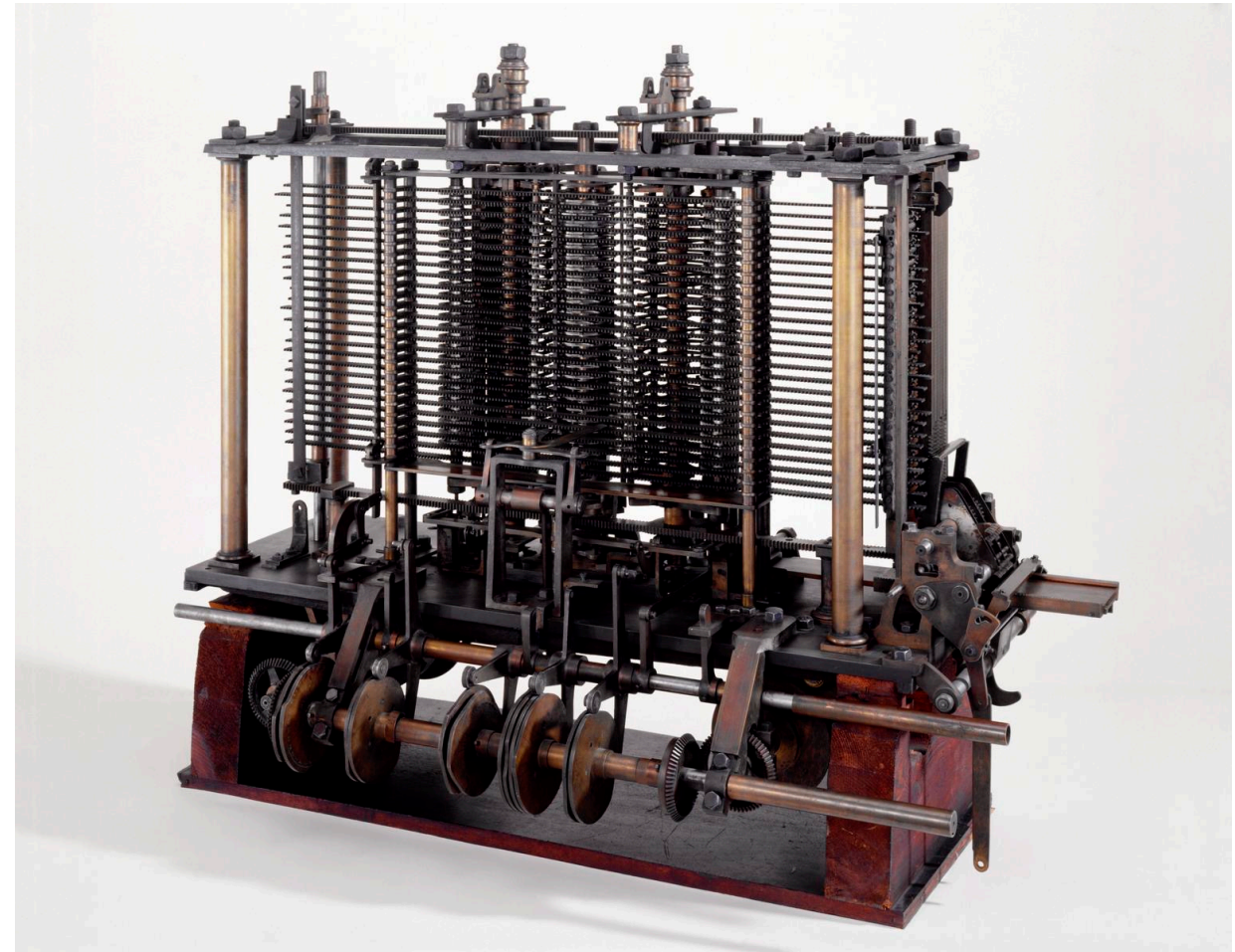


Marty version 1 (2017) and version 2 (2022)

# How long has the idea of robots been around?



US Government ENIAC (Electronic Numerical Integrator and Computer) 1945



Babbage's Analytical Engine, 1834-1871. (Trial model)

# How long has the idea of robots been around?

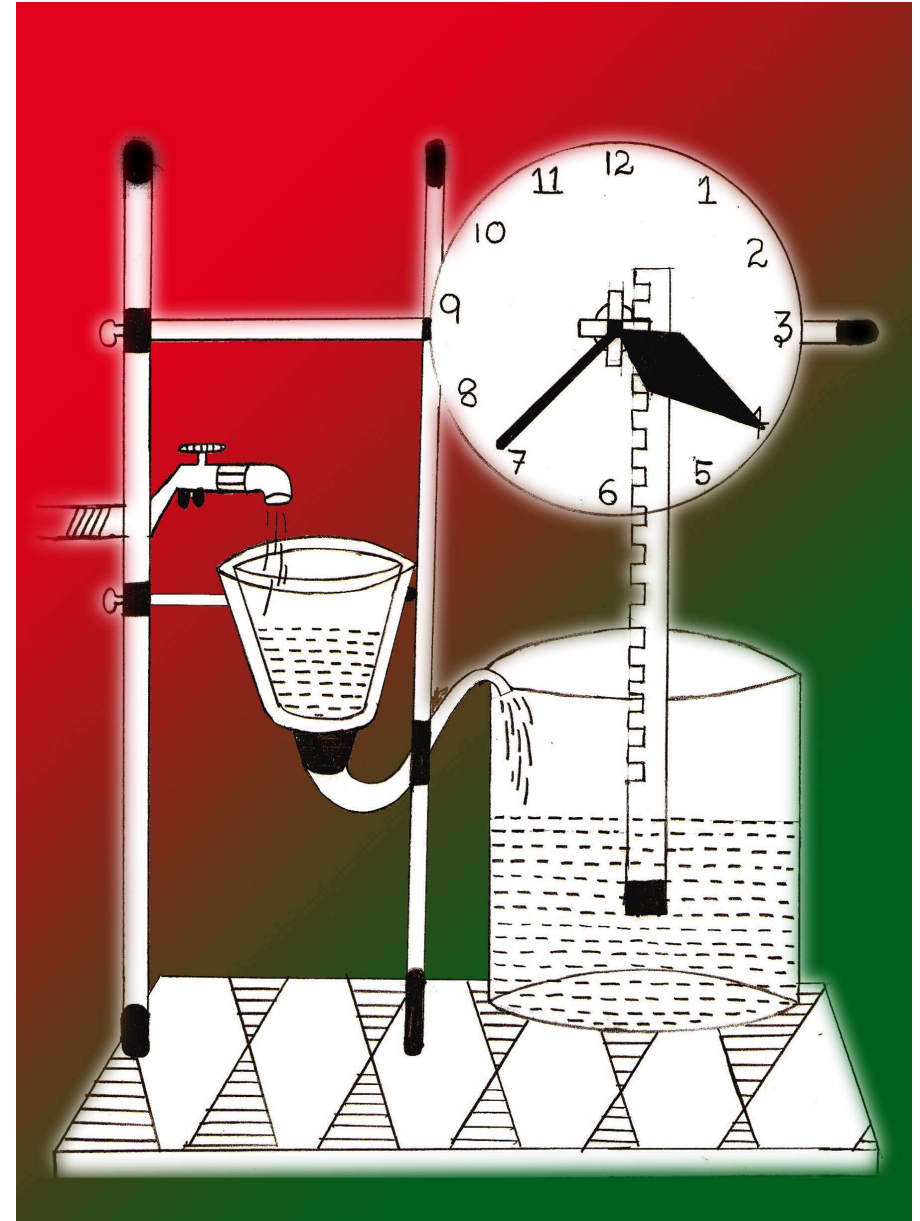


Archytas wooden mechanical pigeon (around 400 BCE)

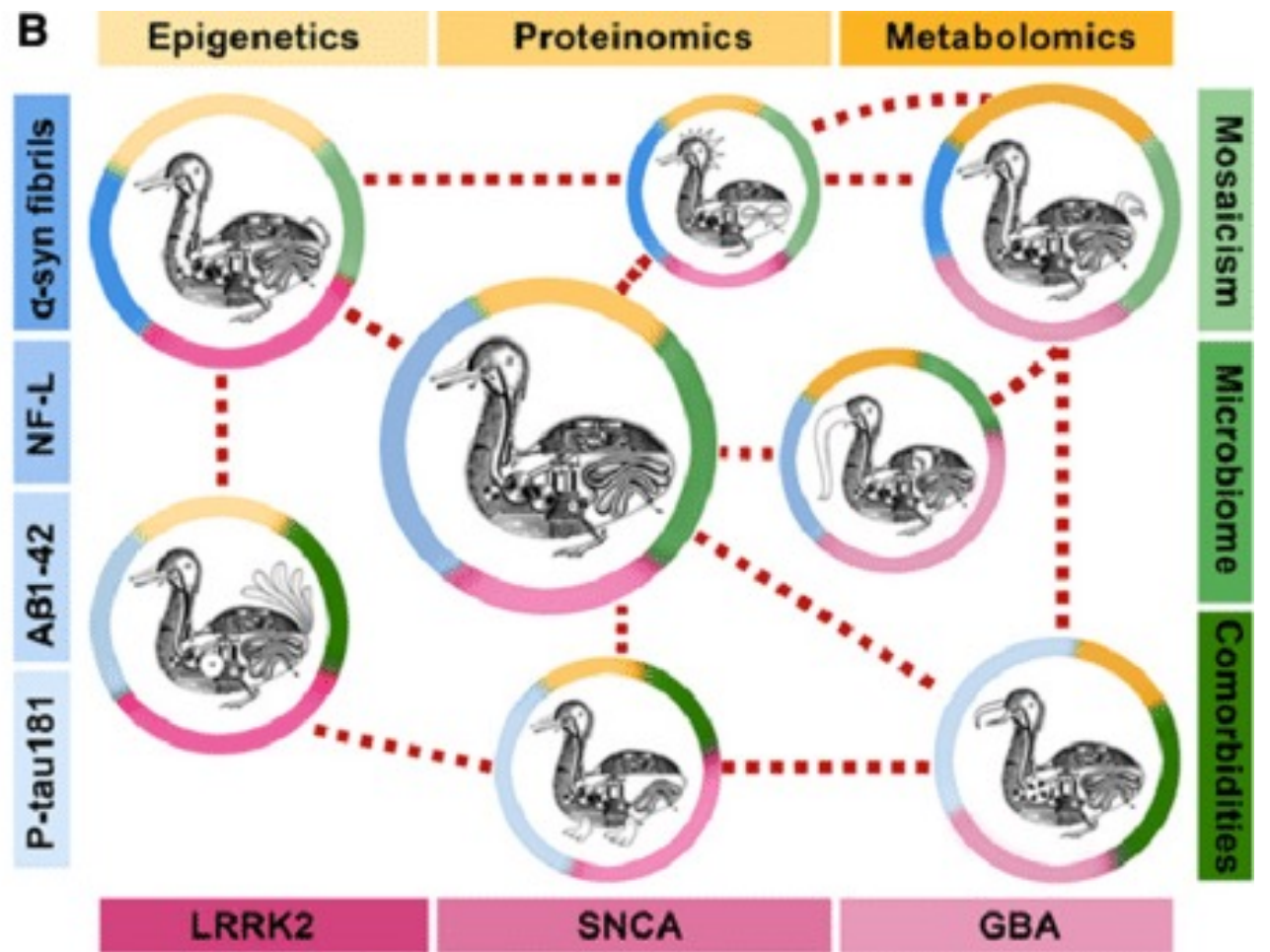
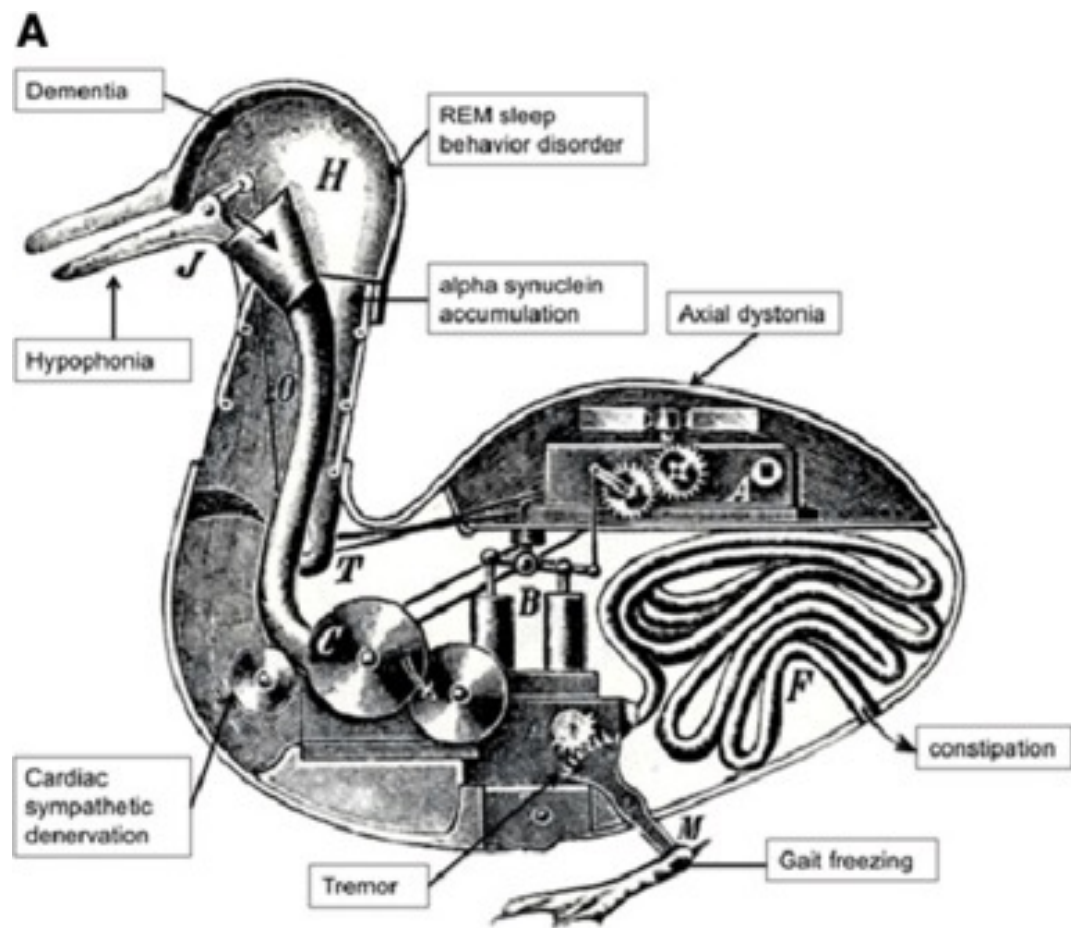
# How long has the idea of robots been around?



Egyptian Water Clock (4th Century BCE)



# How long has the idea of robots been around?

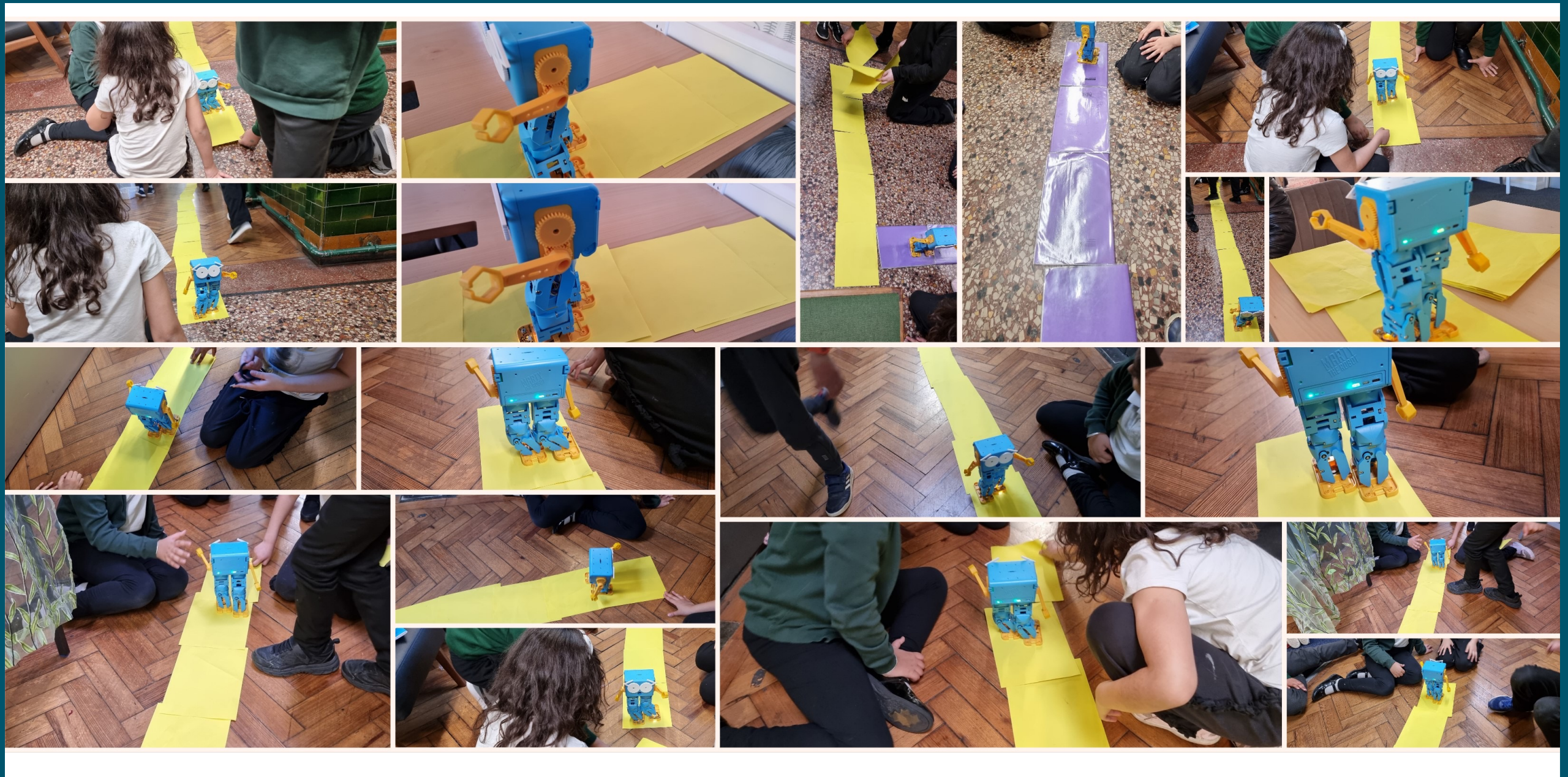


# How long has the idea of robots been around?



Daleks first appeared in 1963

# Marty from Robotical Ltd, Hour of Code: 17 March 2022



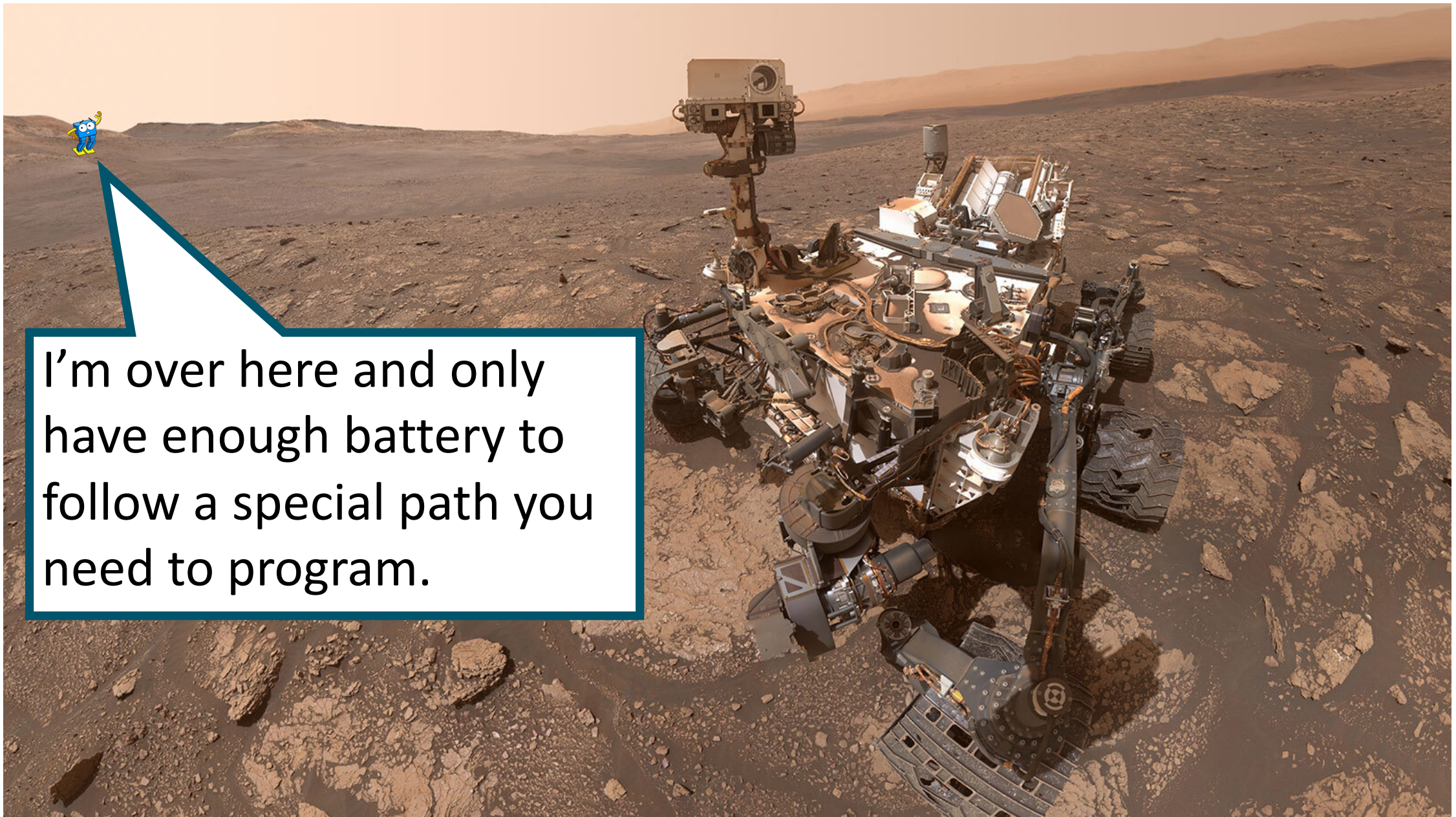


Where are the robots? Are they already here?



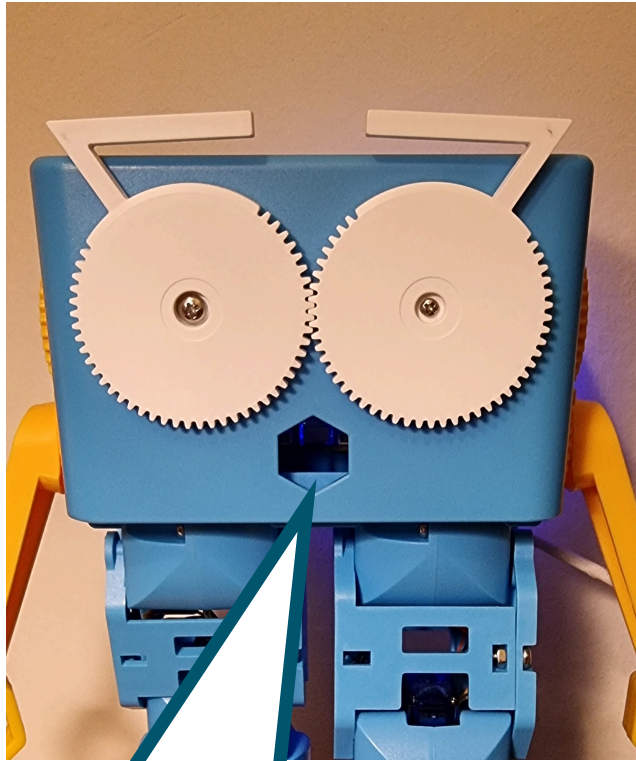
Robot that is able to operate on the pavement roll pavement. (Photo courtesy of Serve Robotics, 2022)

# Marty Mission on Mars Challenge



I'm over here and only have enough battery to follow a special path you need to program.

# Marty Mission on Mars Challenge



You can only use these blocks in MartyBlocksJr



Makes me move forward.



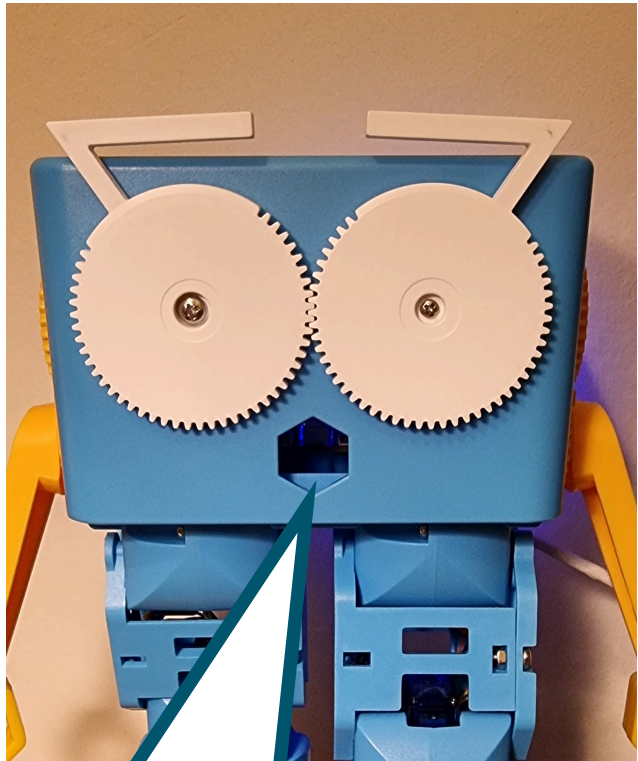
Makes me move backward.



Makes me move to the right.



Makes me move to the left.

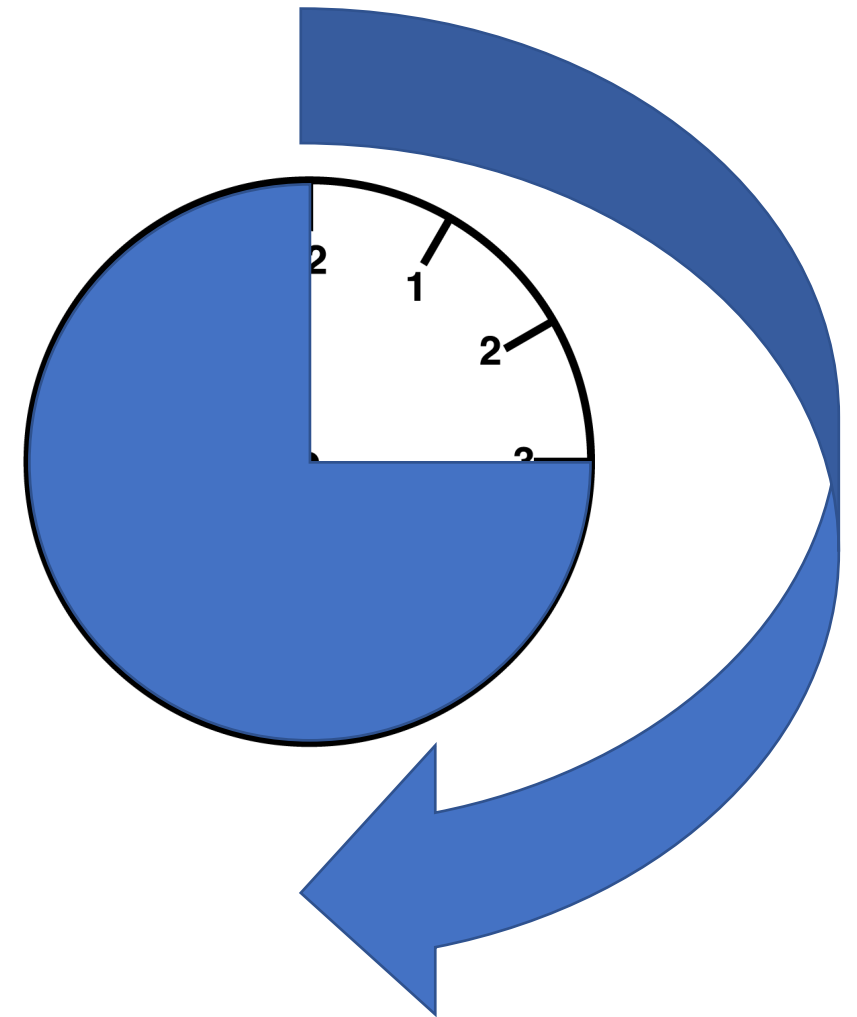


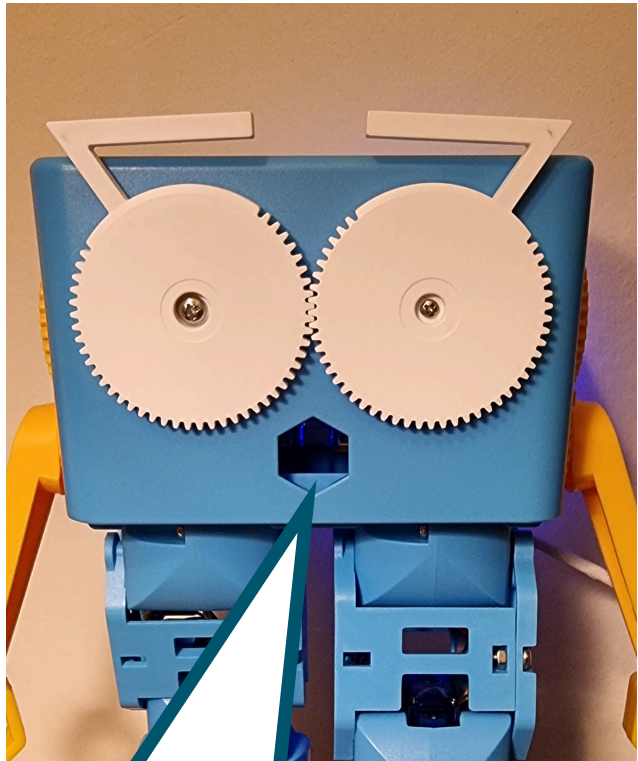
I can turn too but that uses up more battery...



Turn clockwise like this...

Turn	Size of turn
3	quarter turn
6	half turn
9	three quarter turn
12	whole turn

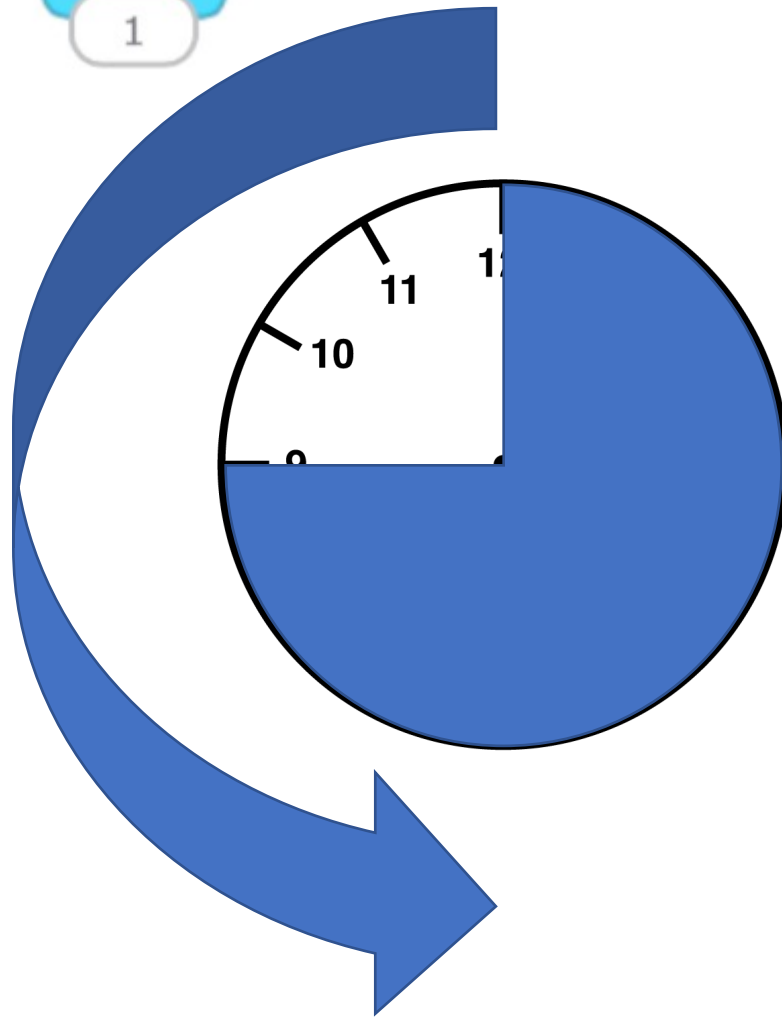




I can turn too but that uses up more battery...

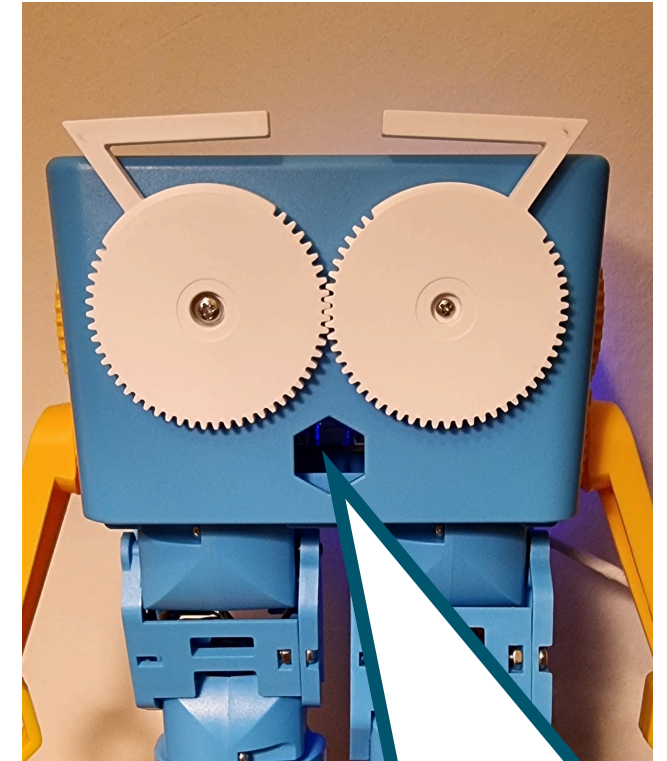
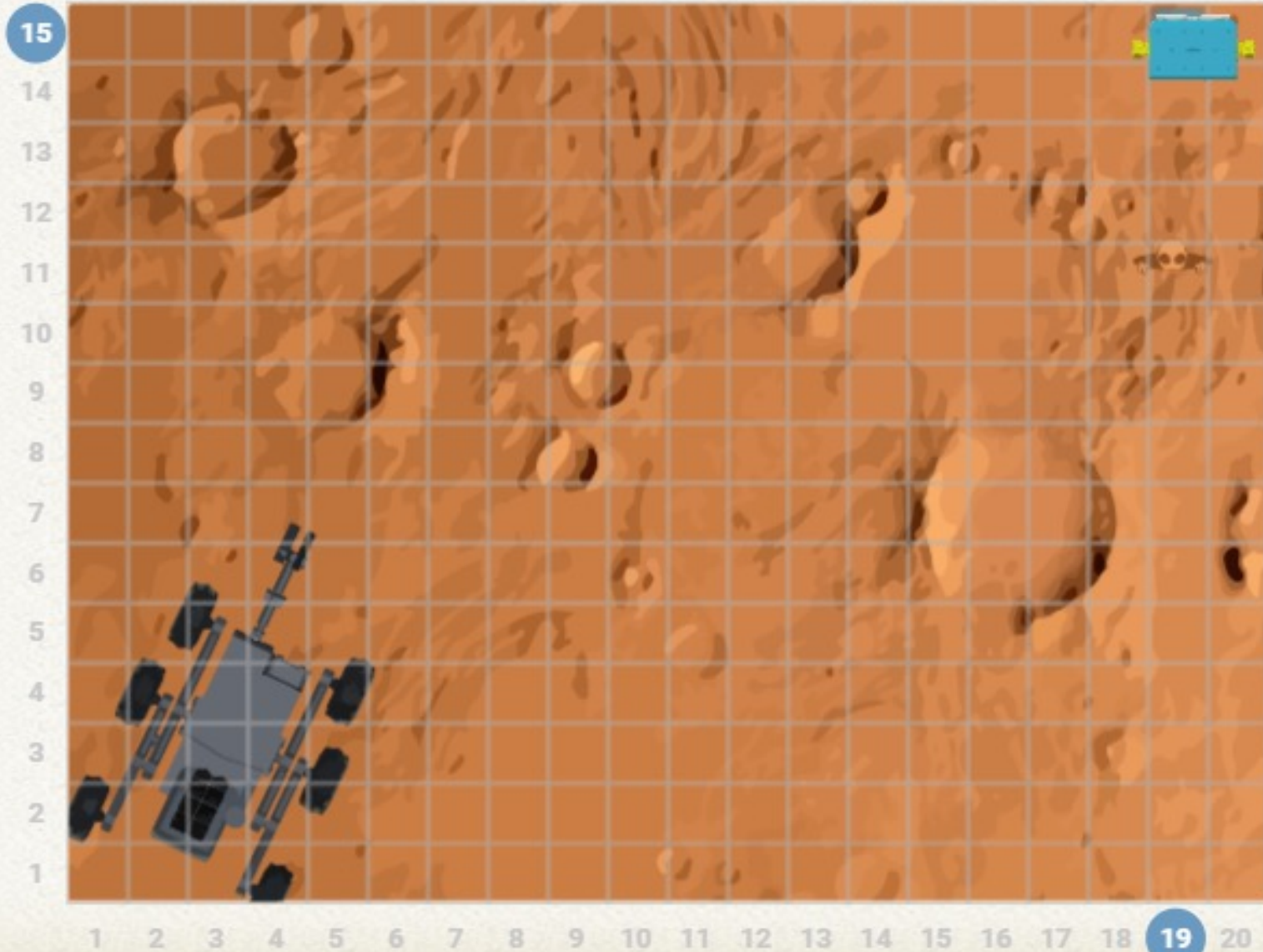


Turn anti-clockwise like this...



Turn	Size of turn
3	quarter turn
6	half turn
9	three quarter turn
12	whole turn

# Marty Mission on Mars Challenge



Remember to avoid  
the hills and the holes.

Marty is stuck on Mars. Can you help it get back to Earth?

# Marty Mission on Mars Challenge

The screenshot shows a web browser window with the title "Marty the Robot" and the URL <https://marty-webapp.web.app/marty-blocks-jr>. The main interface features a central grid-based map of Mars with a rover icon at the bottom left. The grid is numbered 1 to 20 on both the x and y axes. To the left of the map is a sidebar with a home icon, a "CONNECT TO A MARTY" button, and a "Marty" block. Above the map is a toolbar with icons for a grid, line graph, sine wave, data table, landscape, text, undo, and a flag. To the right of the map is a small inset map of Mars with a rover icon and a plus sign. At the bottom of the browser window is a red toolbar with icons for chat, navigation, user, volume, network, and a red button. Below the browser window, a small blue block is visible on the left, and a sequence of four blocks (yellow flag, blue arrow, blue up arrow, red button) is shown at the bottom, with the second and third blocks labeled "12" and "13" respectively.

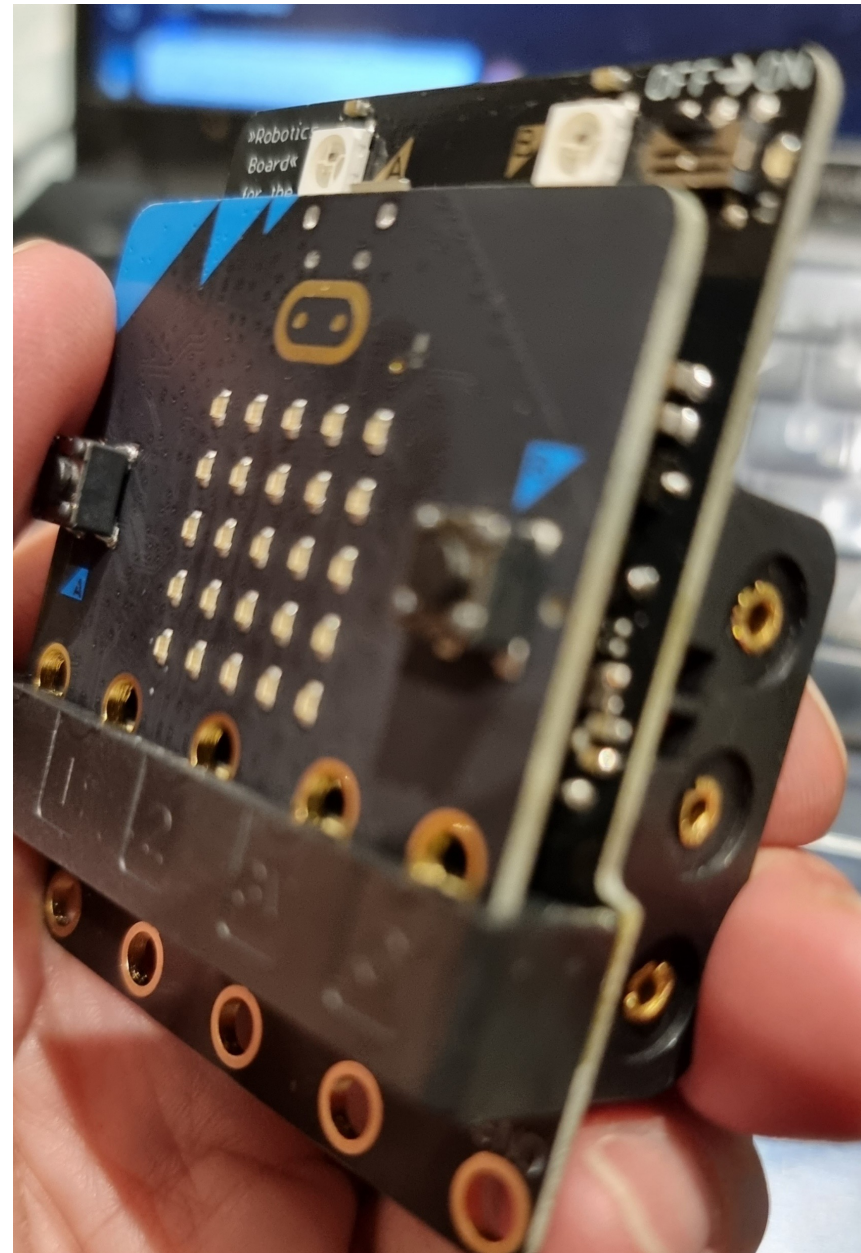
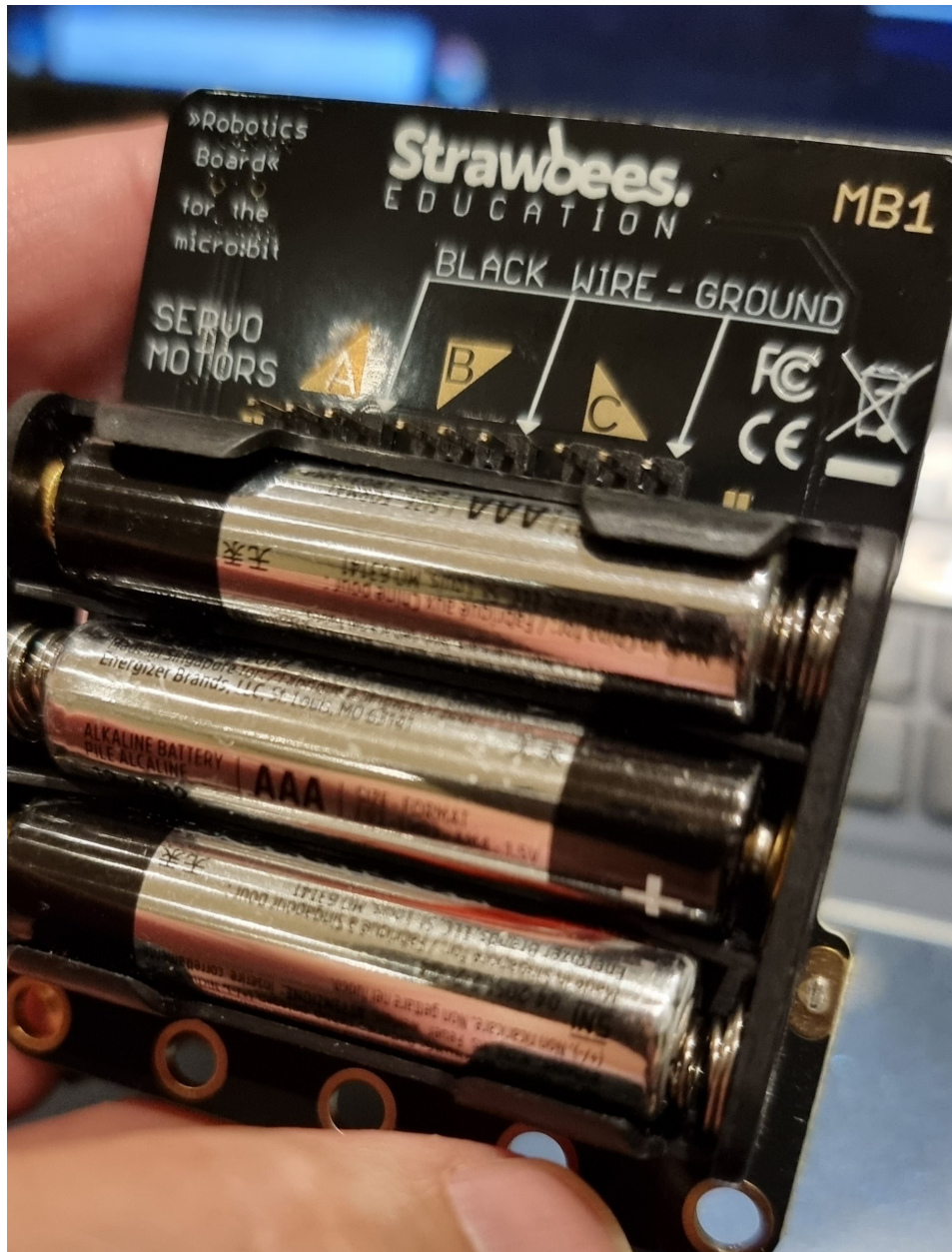
The best efforts will be uploaded before the end of the lesson to Marty live to see if the program actually works.

# Programming targets from the Primary National Curriculum for schools in England since 2014

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Give instructions to my friend and follow their instructions to move around.	Give instructions to my friend using forward, backward and turn and physically follow instructions.	Break an open ended problem up into smaller parts.	Use logical thinking to solve an open ended problem by breaking it up into smaller parts.	Decompose a problem into smaller parts to design an algorithm for a specific outcome and use this to write a program.	Deconstruct a problem into smaller parts, recognising similarities to solutions used before.
Describe what happens when I press buttons on a robot.	Tell the order I need to do things to make something happen and talk about this as an algorithm.	Put programming commands into a sequence to achieve a specific outcome.	Use an efficient procedure to simplify a program.	Refine a procedure using repeat commands to improve a program.	Explain and program each of the steps in my algorithm.
Press buttons in the correct order to make a robot do what I want.	Program a robot or software to do a particular task.	Keep testing my program and recognise when I need to be debug it.	Know to keep testing a program while putting it together.	Use variables to increase programming possibilities.	Evaluate the effectiveness and efficiency of my algorithm while continually testing the programming of the algorithm.
Describe what actions I will need to do to make something happen and begin to use the word algorithm.	Look at my friend's program and say what will happen.	Use repeat commands.	Recognise that an algorithm will help sequence more complex programs.	Change an input to a program to achieve a different output.	Recognise when using a variable is needed to achieve a required output.
Begin to predict what will happen for a short sequence of instructions.	Use programming software to make objects move.	Describe the algorithm needed for a simple task.	Use a variety of tools to create a program.	Use 'if' and 'then' commands to select an action.	Use a variable and operators to stop a program.
Begin to use software or apps to create movement and patterns on a screen.	Watch a program execute and spot where it goes wrong so that I can debug it.	Detect a problem in an algorithm which could result in unsuccessful programming.	Recognise that algorithms will help in other learning such as Maths, Science as well as Design & Technology.	Use logical reasoning to detect and debug mistakes in a program.	Use different inputs (including sensors) to control a device or onscreen action and predict what will happen.
Use the word debug when I correct mistakes when I program.			Use a sensor to detect a change which can select an action within my program.	Use logical thinking, imagination and creativity to extend a program.	Use logical reasoning to detect and correct errors in algorithms and programs.
				Talk about how a computer model can provide information about a physical system.	

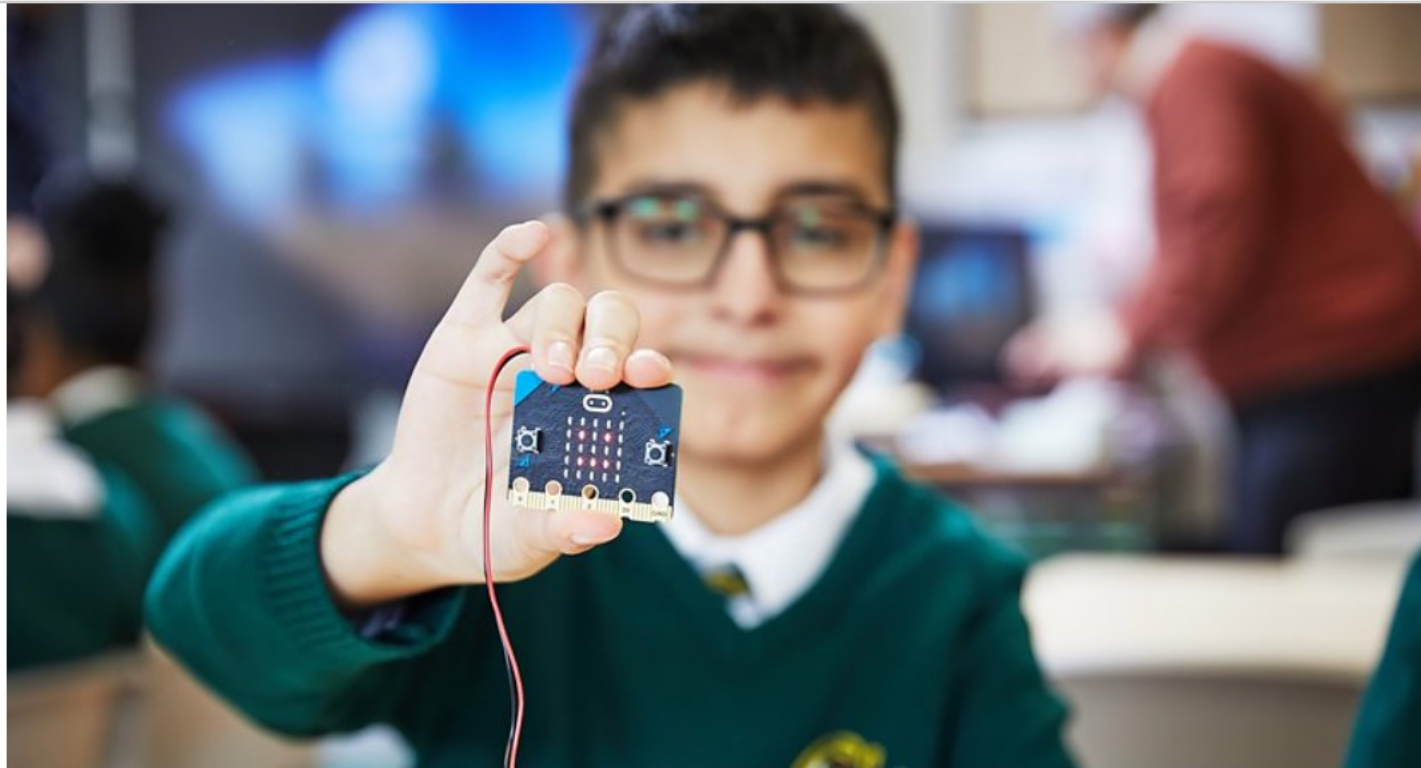


# Strawbees Robotics Board for the Micro:bit

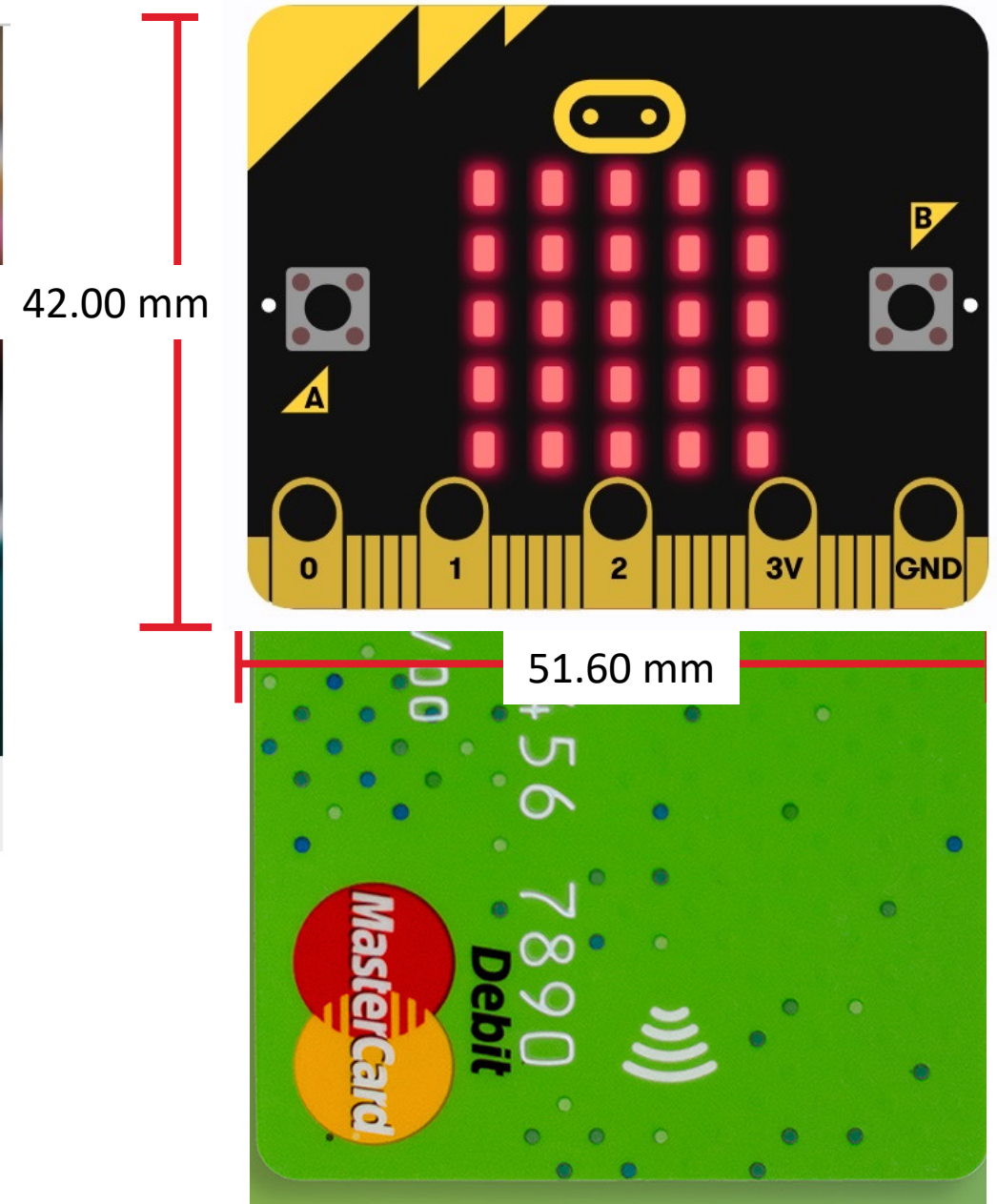


Robot being used by Police in Hawaii to help take temperatures of people to see if they might be ill from Covid-19. (January 2022)

# Brief history of the BBC Micro:bit



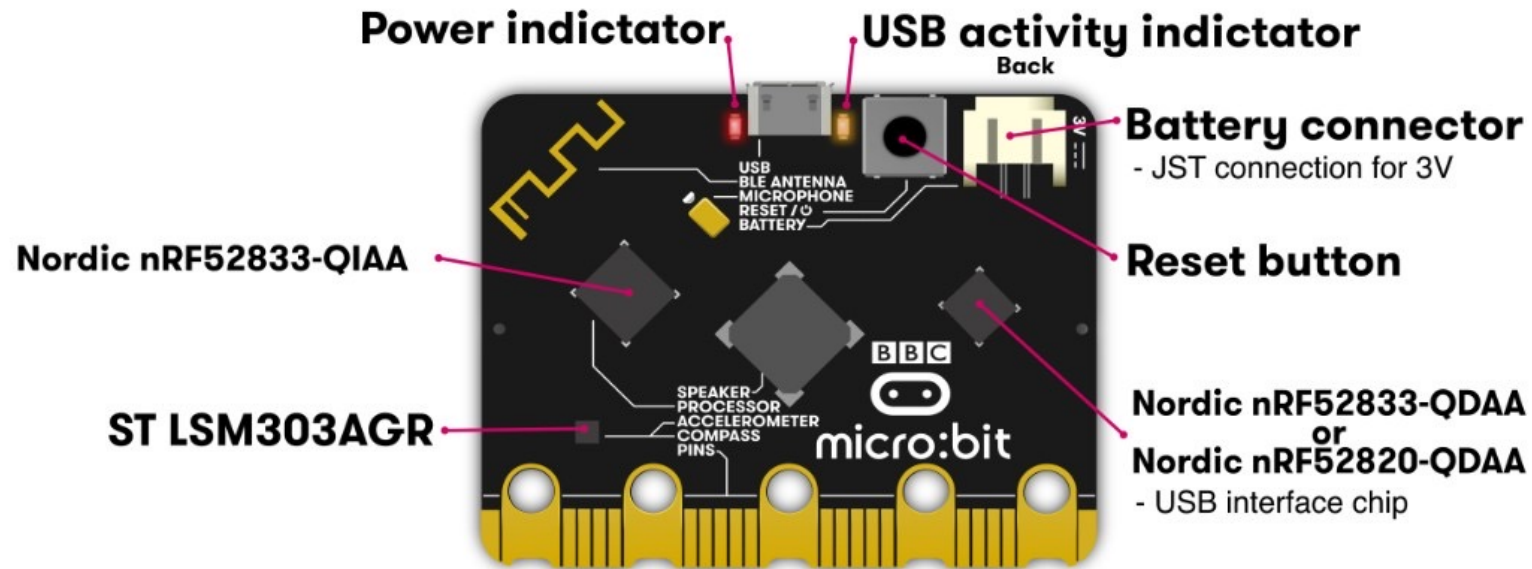
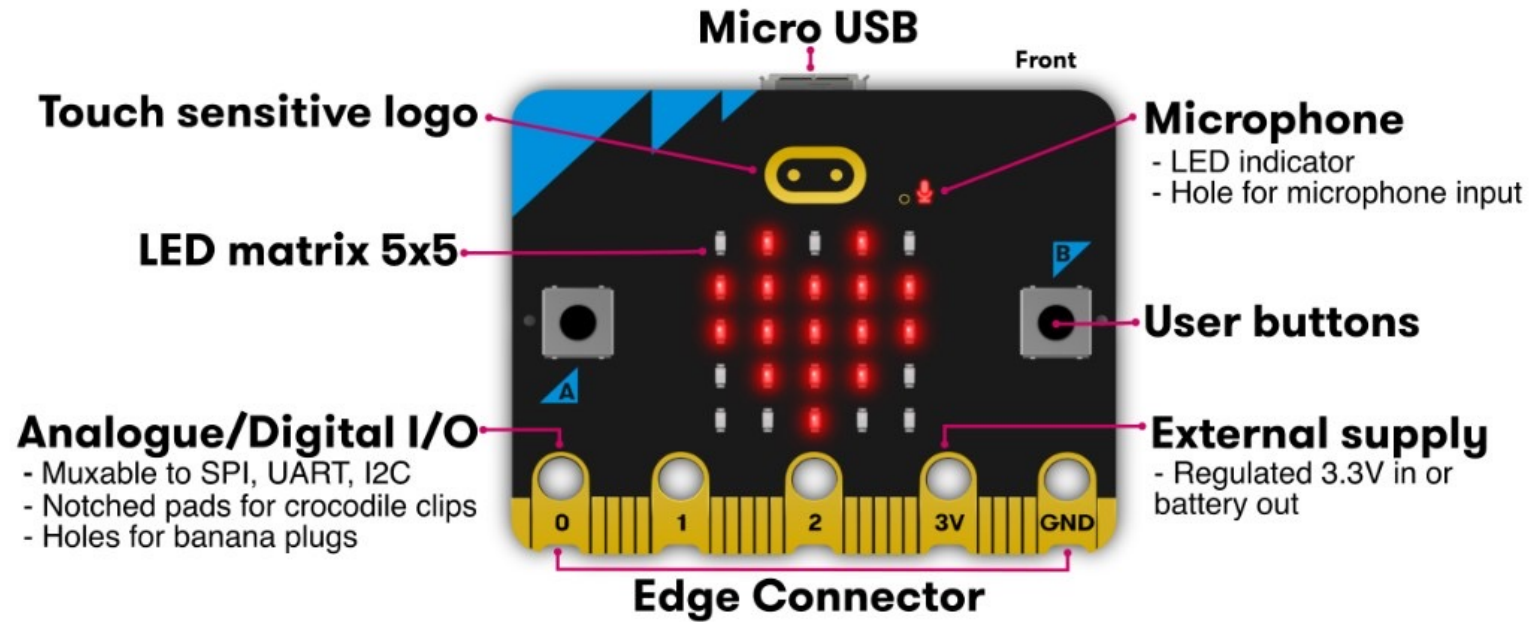
A primary school child holds a micro:bit displaying a smiley face



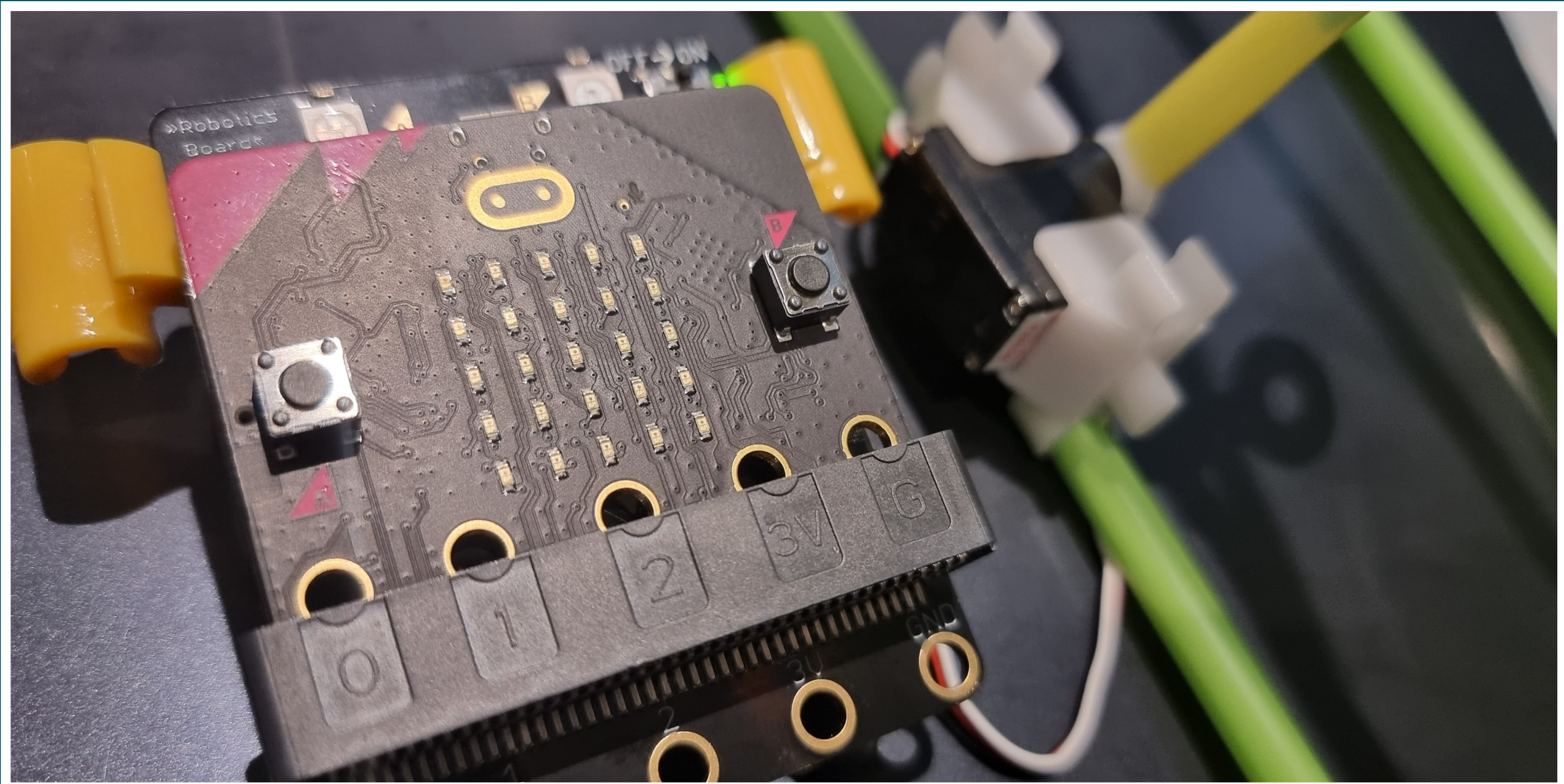
## The history of the micro:bit

The first micro:bit was invented by the BBC and partners and launched in 2015, honouring the BBC's legacy of computing that stretches back to the original BBC Micro computer of the 1980s. Our original campaign aimed to put a BBC micro:bit in the hands of every Year 7 child in the country and we reached 98% of our target audience.

# BBC Micro:bit technical details



# BBC Micro:bit and the Strawbees Robotics Board



# BBC Micro:bit and the Strawbees Robotics Board Crane controller

```
on start
  set position to 0

forever
  set servo A position to position %

forever
  set movement to acceleration (mg) x
  set hue to map movement from low -1023 high 1023 to low 0 high 100

on button A pressed
  change position by -10
  set RGB LED A to green
  set RGB LED B to green
  if position < 0 then
    set position to 0

on button B pressed
  change position by 10
  set RGB LED A to red
  set RGB LED B to red
  if position > 70 then
    set position to 60
```

The image displays a Scratch script for a BBC Micro:bit program. The script is organized into several functional blocks:

- on start:** A blue block containing a red 'set position to 0' block, highlighted with a yellow border.
- forever loop 1:** A blue 'forever' loop containing a pink 'set servo A position to position %' block.
- forever loop 2:** A blue 'forever' loop containing two red 'set' blocks: 'set movement to acceleration (mg) x' and 'set hue to map movement from low -1023 high 1023 to low 0 high 100'.
- on button A pressed:** A purple block containing three red blocks: 'change position by -10', 'set RGB LED A to green', and 'set RGB LED B to green'. It also includes a teal 'if position < 0 then' block with a red 'set position to 0' block inside.
- on button B pressed:** A purple block containing three red blocks: 'change position by 10', 'set RGB LED A to red', and 'set RGB LED B to red'. It also includes a teal 'if position > 70 then' block with a red 'set position to 60' block inside.

# Strawbees Robotics Board Pedestrian lights controller

```
on button A pressed
  repeat 12 times
    do
      pause (ms) 5000
      set RGB LED A to green
      set RGB LED B to green
  repeat 4 times
    do
      pause (ms) 5000
      set RGB LED A to orange
      set RGB LED B to orange
  repeat 3 times
    do
      pause (ms) 5000
      set RGB LED A to red
      set RGB LED B to red
  set RGB LED A to green
  set RGB LED B to green

on button B pressed
  repeat 12 times
    do
      pause (ms) 5000
      set RGB LED A to green
      set RGB LED B to green
  repeat 4 times
    do
      pause (ms) 5000
      set RGB LED A to orange
      set RGB LED B to orange
  repeat 3 times
    do
      pause (ms) 5000
      set RGB LED A to red
      set RGB LED B to red
  set RGB LED A to green
  set RGB LED B to green
```

# Strawbees Robotics Board Festive Disco Lights

The screenshot shows the Microsoft MakeCode editor for micro:bit. The browser address bar displays `https://makecode.microbit.org/#editor`. The interface includes a top navigation bar with 'Microsoft', 'micro:bit', and tabs for 'Blocks' and 'JavaScript'. A left sidebar contains a search bar and a category list: Basic, Input, Music, Led, Strawbees, Radio, Servos, Loops, Logic, Variables, and Math. The main workspace contains the following JavaScript code:

```
forever loop
  set RGB LED A to red pick random 0 to 100 % green pick random 0 to 100 % blue pick random 0 to 100 %
  set RGB LED B to red pick random 0 to 100 % green pick random 0 to 100 % blue pick random 0 to 100 %
  pause (ms) 100
```

# Strawbees<sup>®</sup>



HOUR  
OF  
CODE

 micro:bit

## BUILDING THE FUTURE

with Allen Tsui

6th December, 3.30pm GMT

