

The unofficial micro:bit community magazine

micro  
:mag

Issue 4  
April 2019

micromag.cc  
@micro\_mag

# GLOBAL Challenge



We meet the inspiring young people  
helping to make the world a better  
place with micro:bit

In This  
Issue

Robots in Malaysia | **Barclays Pensioners Club** | Bird Blox |  
**micro:bit club** | Battery Eliminator | **Make a neopixel board** |  
Cyber:bot | **Play with magnets** | Meet the micro:bit Ops Team



# do your :bit

A digital challenge for the Global Goals



arm



## A brand new micro:bit challenge for kids around the world!

Launching June 2019 - do your :bit is a new BBC micro:bit challenge for young people to combine creativity and technology in solutions for the United Nations' Global Goals.

This challenge will focus on Goals 14 & 16. We'll be asking you to come up with innovative ways to use your micro:bit to help protect life on land and under water.

The Micro:bit Educational Foundation will provide everything you need - from free resources about the Global Goals to a step-by-step process to help you develop your solution and enter the challenge

Watch our new video and sign up for updates now at [doyourbit.microbit.org](https://doyourbit.microbit.org)



arm



In partnership with  
unicef

# Welcome to Issue 4

# Hi

Welcome to issue 4 of micro:mag! We can't wait for you to read the amazing content we have this issue.

It's been exactly a year since we released the first call for contributions for Issue 1 and we can't thank our readers and contributors enough for helping us get to where we are today. We started micro:mag to see if something like this for the micro:bit would work and we are overwhelmed by the response we have got from the community. We've had an amazing first year with tens of thousands of readers in over 100 countries.

You may notice that Issue 4 is smaller than Issue 2 & 3, this is based on reader feedback. We're going to be

making micro:mag 44 pages for the foreseeable future making it easier to read all of the content in the magazine. In doing this, we are hoping to build up a bank of articles so that we can release these smaller issues more frequently (we'd like to have it monthly at some point, but don't hold us to this). We hope that you enjoy this smaller package, do email us with your feedback!

This issues cover feature is all about the recent "Global by the foundation and a number of partners. We meet the winners of this challenge and hear a bit more about their projects.

We hope you enjoy Issue 4 as much as we enjoyed putting it together for you!

**Joshua Lowe**  
Assistant Editor

## Team

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### Assistant Editor

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## Meet the team



**Kerry Kidd** is a freelance programmer/educator who enjoys writing tutorials and tinkering with the micro:bit



**Joshua Lowe** is a young coder, creator of the Edublocks tool for micro:bit and has done lots of workshops around the world.



**James Bastone** runs a local Makerspace and joined the team because he genuinely enjoys proofreading articles.



**This could be you!** We're looking for a Design & Layout coordinator to join the team. Learn more at [go.micromag.cc/dlc](https://go.micromag.cc/dlc)

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# Join micro:mag

## We're looking for a Design & Layout coordinator to join us!

If you're interested in joining the team as a volunteer and helping us build a more professional looking micro:mag, we'd love to hear from you!

Apply: [go.micromag.cc/dlc](https://go.micromag.cc/dlc)

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# GLOBAL Challenge



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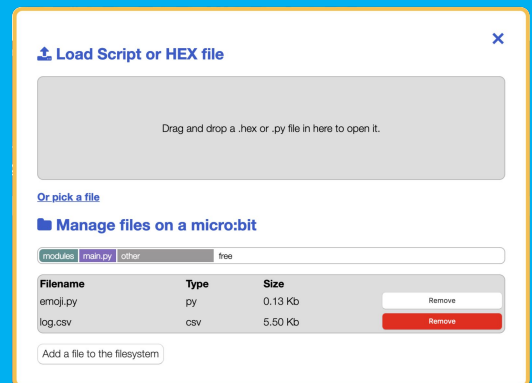
Robots in Malaysia | Barclays Pensioners Club |  
micro:bit club | Battery Eliminator | Make a neopixel  
Cyber:bot | Play with magnets | Meet the micro:bit

# MicroPython Editor UPDATE

You can now add libraries to the BETA of the editor.

A heavily requested feature has been added into the early BETA of the online MicroPython editor, you can now add micropython libraries to the online editor! Before this, the only option to add libraries in Python was via Mu.

This new feature is in the very early stages and it's advised not to write any tutorials with it, however, by signing up to the micro:bit BETA testing program, you can test this feature out and add libraries to your micro:bit via the online editor!



[go.micromag.cc/mpeup](https://go.micromag.cc/mpeup)

## cyber:bot



- ✓ Learn Python with microcontrollers
  - ✓ Build electronic circuits with sensors & components
  - ✓ Extend the use of your micro:bit
- ...for only \$200!





OVER  
**40** micro:bit  
ACCESSORIES  
by

Kitronik

[Kitronik.co.uk/microbit](http://Kitronik.co.uk/microbit)

# Global Challenge VIDEO

Foundation release  
video from winners day

The recent micro:bit challenge, "Global Challenge", had it's winners meetup day in London recently where all the winners were invited to a special day in London as part of their prize for winning an award within the challenge.

The Micro:bit Educational Foundation have released a video interviewing winners, Foundation members and also members from Challenge partners Arm and the World's Largest Lesson. Check out the video using the link.



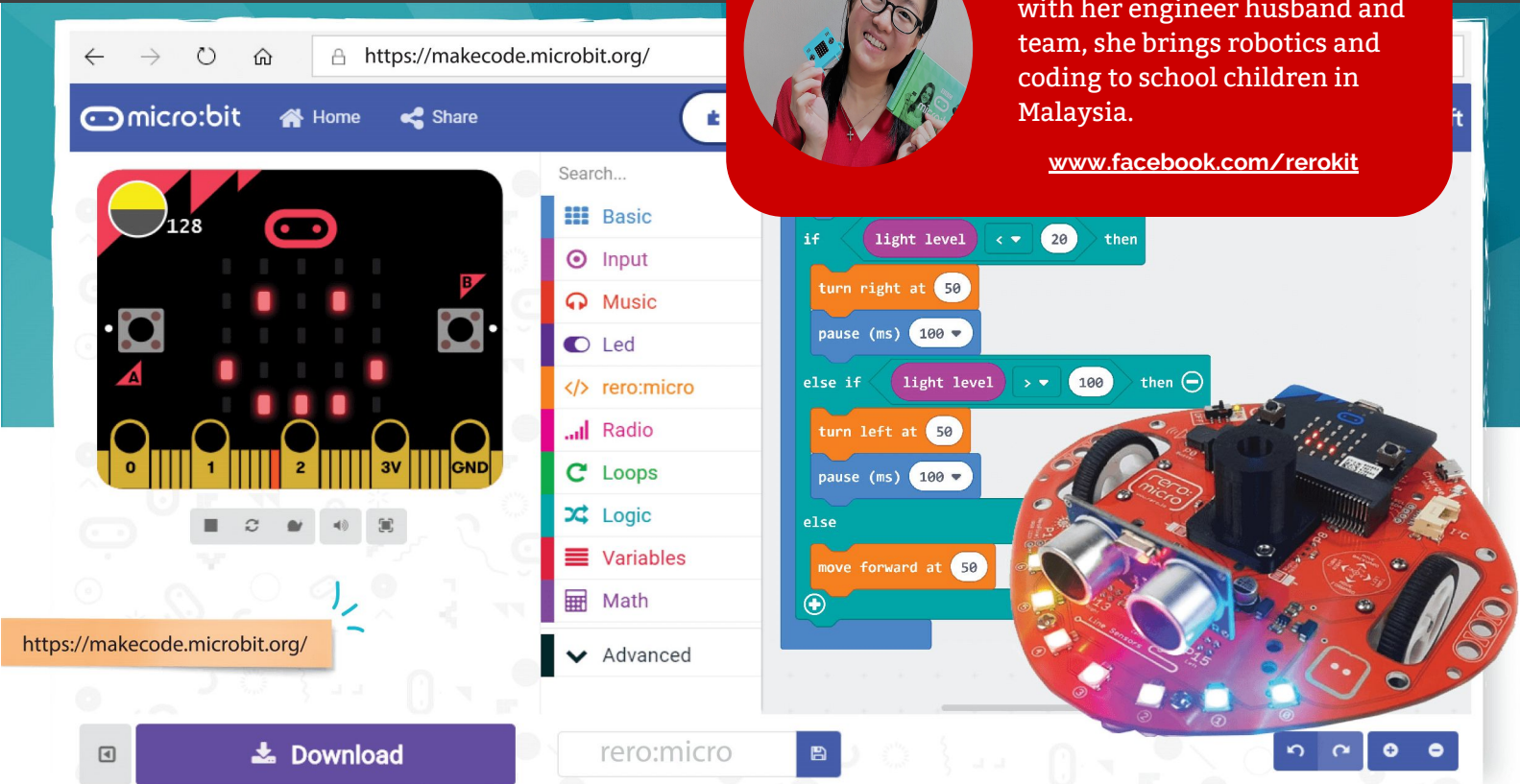
[go.micromag.cc/gcvid](http://go.micromag.cc/gcvid)





Cheryl leads rero EDUteam at Cytron Technologies. Together with her engineer husband and team, she brings robotics and coding to school children in Malaysia.

[www.facebook.com/rerokit](https://www.facebook.com/rerokit)



# micro:bit robot from Malaysia

## An Educator-Engineer Partnership to Bring Robotics and Coding to the Masses

### From a Language Teacher to Mrs Robot Maker

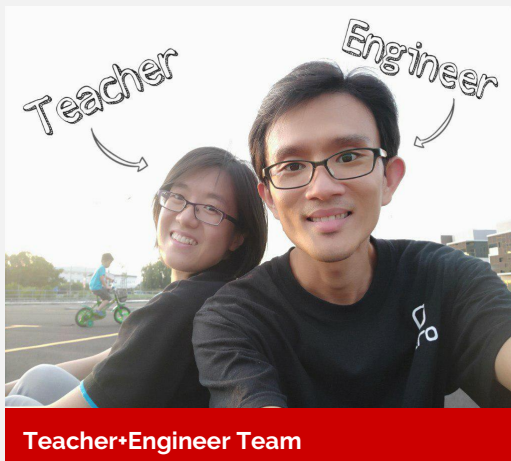
Ten years ago, I was a public school language teacher, not a particularly tech-savvy one; and then I married an engineer, who happened to be a Robot Maker. I quit teaching to be a full-time stay-at-home-mom (SAHM) when my son was around 9 months old. Besides feeding and attending to the little one, my daily routine included doing laundry, cooking and cleaning - nothing exciting.

One fine day, when my baby was taking his afternoon nap, I got bored. My husband's

robotics kit from work caught my attention and I decided to give it a try. Why not, right? Anyway, I followed the step-by-step instructions and, lo and behold, I built my first robot in my life! It was a WOW moment for me, and I got hooked.

When my son started attending playschool, I joined my husband and together we developed a module to teach kids how to build and program their own robots. Hence the unplanned birth of an Educator-Engineer partnership.

**Bringing Robotics & Coding to the Masses**



Teacher+Engineer Team

## Falling in love with micro:bit

I received my first micro:bit board as a Christmas present from my techie husband. For months prior to that, he had been excitedly telling me about how cool it was and I jokingly told him to get me one. Together, we explored and brainstormed for ideas to include micro:bit in our next project.

The micro:bit is a really cool piece of kit on its own. We decided to use it as the “brain” for our next robot. We gave it a pair of wheels plus some extra accessories, and ta-da, rero:micro robot was born! It can sing and dance, detect an obstacle in its path and even follow lines. It’s our new baby.



The kit comes with a game track and a 10-lesson booklet with step-by-step guide, fun facts and coding challenges.

## rero:micro - micro:bit robot with a Mission

rero:micro was officially presented to the public on 14<sup>th</sup> January 2019. rero:micro has been entrusted with a great mission to bring robotics and coding to school children in Malaysia.

Over the coming months, I’ll be touring every state in Malaysia together with rero:micro and my team of trainers. We will conduct a free training workshops to equip and empower school teachers. These teachers will then use rero:micro together with our module to introduce coding to their students.







Teachers had a great time exploring micro:bit and MakeCode Editor at our recent Educators Conference.

## Robotics and Coding in Malaysia

In 2017, coding was formally included in the official syllabus for all Malaysian public schools. Concentrated effort to promote robotics and coding to school children is gaining momentum in Malaysia as a result of the national #mydigitalmaker initiatives. This movement is spearheaded by MDEC, a government-owned agency that brings together a public-private-academic partnership, and aims to transform Malaysian youth from digital users to producers in the digital economy.

Working in collaboration with MDEC and the Ministry of Education, we have been running

outreach programmes to spark students' interest in STEM education, especially in robotics and coding. We also organise RERO Annual Championship (RAC) as a platform for students to hone their skills and showcase their talents.

## Vision, Dream and Aspiration

Our vision is to bring robotics and coding to the masses. I personally hope to see every child having the opportunity to explore robotics and coding in a fun manner. With rero:micro and micro:bit international platform, we hope to expand our impact beyond the borders of Malaysia!



RERO Annual Championship - the highlight of the year. A merry gathering to celebrate our students' achievement



Scan to find out more.





# Mad Hatter's Tea Party for Barclays Pensioners Club

**A pilot workshop in collaboration with Tech Age Kids and Barclays Eagle Labs**

## Bournemouth Eagle Lab

One of the first Eagle Labs to open, Bournemouth incubates ambitious businesses; helping them to innovate and grow through co-working, events and rapid prototyping.

[@eagle\\_labs\\_bmth](#)



### Sharon Jones

Named in the Telegraph's WE50 in 2018, Sharon is a facilitator and engineer in Bournemouth Eagle Lab, supporting the community in innovating and rapid prototyping.

[@JonesDE10](#)

## Tech Age Kids

Tech Age Kids helps parents and educators find constructive and creative uses of technology for children and teens through the [techagekids.com](http://techagekids.com) blog and published content.

[@techagekids](https://twitter.com/techagekids)



### Elbrie de Kock

From trained designer to self-made geek, Elbrie runs Tech Age Kids and authors books about introducing beginners to creative technology, including electronics, coding and digital making.

[@elbriedk](https://twitter.com/elbriedk)

*You can't teach an old dog new tricks* was definitely not a phrase that rang true during a recent pilot workshop hosted by Tech Age Kids at the Barclays Eagle Lab in Bournemouth. Sharon Jones, from Barclays Eagle Labs Bournemouth, brought together two unlikely groups to try to learn coding and modern making skills using the micro:bit. The test subjects included a small group of people from the Barclays Pensioners Club and the author of *micro:bit in Wonderland*, Elbrie de Kock.

The workshop aimed to introduce an older generation to modern skills like coding, laser cutting and 3D printing. The project material from *micro:bit in Wonderland* provided a perfect reason to make something based on a much loved and familiar story.

The participants learned to code the micro:bit using a block-based coding program, Microsoft MakeCode to make an electronic price tag for the Mad Hatter's top hat. They learned how a laser cutter works, to precision cut 2D shapes and then make a 3D model of a top hat. Finally,

they were introduced to fabrication with a 3D printer to make a heart-shaped paperclip for the Ace of Hearts playing card character that needed to stand on its head.

The workshop projects were taken from the Bonus Project material for *micro:bit in Wonderland*. There are 3 projects that follow a similar approach as an additional 12 projects in the book. makerspaces, like the Barclays Eagle Labs, are able to use these bonus projects to introduce modern skills and get started with the micro:bit. The projects are available as a free download from the Tech Age Kids website. There is also a workshop pack available for a minimal fee which includes a presentation and files for 3D printing and laser cutting. [\[alice.techagekids.com\]](http://alice.techagekids.com)





## Following your passion

Sharon Jones and Elbrie de Kock met 5 years ago at the Festival of Code by Young Rewired State in Birmingham. The Festival of Code brought together groups of young people from across the United Kingdom to showcase apps, websites and tech tools they developed. Sharon and Elbrie were part of a team of volunteers to support the young people at the event. Over the years, they have kept in touch and supported other events like Hacksoton and The Creativity Challenge.

Their passion to introduce more people to digital making skills and their own desire to continually learn led to the realisation of this pilot workshop.



## Trying something different

The unknown can be a bit daunting, but Sharon and Elbrie were blown away by the positive feedback from the pilot. They started with a lot of questions.

Could a workshop that was completely out of the comfort zone of its participants, spark creativity, curiosity and interest? Could makerspaces, be places where all sorts of people gather to learn, create and share? What if grandparents could learn new skills and then

share them with their grandchildren? What if more grandparents took their grandchildren on days out to a makerspace to learn about laser cutting, 3D printing, electronics and coding?

The Barclays Eagle Lab was the perfect setting for the workshop. Participants got hands-on experience of the fabrication tools in the lab and it came alive as they were making parts to complete their projects.

Time pressure on modern parents means that finding other ways to support the development of future skills in children and teens is important. It made a lot of sense to tap into a valuable resource like retired adults.

To find out more about the pilot and run your own at a makerspace/Fab Lab, please contact Elbrie de Kock / Sharon Jones.





## About Tech Age Kids

Tech Age Kids is an online company that helps parents and educators find constructive and creative uses of technology for children and teens. The company creates educational material and online content for [techagekids.com](http://techagekids.com), including approachable project ideas, news and reviews of the latest educational and creative technology products, as well as advice on digital parenting issues. Tech Age Kids believes that modern children should develop skills in coding, electronics and design so that they can understand the present and shape the future. The company supports the STEAM (Science, Technology, Engineering, Art and Mathematics), Maker and Digital Making Movements. Tech Age Kids has published micro:bit in Wonderland, a coding and craft beginners project book for the micro:bit. Authors, Elbrie de Kock and Tracy Gardner also wrote the Get Set Go Computing series from Miles Kelly Publishing and soon to be published ScratchJr activity books by the same publisher.

**Contact:** Elbrie de Kock | Tech Age Kids | [techagekids.com](http://techagekids.com) | @techagekids



## About Barclays Eagle Labs

Eagle Labs is building a platform to connect the UK's entrepreneurial ecosystem to drive digital skills development to help grow the economy through innovation and change. Barclays is on a mission to help make the UK the best place to start and grow innovative businesses by promoting creativity and entrepreneurship. Through our activities, we create opportunities for individuals and businesses of all sizes to access a broad range of skills to support this mission. Eagle Labs also support the transformation of businesses, industries and larger organisations through the delivery of structured innovation programming and access to new and emerging technologies.

With Eagle Labs all over the UK and more in the pipeline, our aim is to provide high-potential businesses with the services they need to help their businesses. From each location, we cultivate a community of like-minded entrepreneurs who benefit from access to a collaborative co-working and office space, structured mentoring and a curated events programme.

**Contact:** Sharon Jones | Barclays Eagle Labs Bournemouth | [labs.uk.barclays](http://labs.uk.barclays) | @eagle\_labs\_bmth





# micro:mag needs you!

Contribute to a future Issue of micro:mag! We're especially looking for MicroPython tutorials to go with our MicroPython cover feature in Issue 5. If you have any micro:bit projects to share, why not write an article!

## Get in touch!

[micromag.cc/contribute](https://micromag.cc/contribute)

[hello@micromag.cc](mailto:hello@micromag.cc)

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# micro:bit GLOBAL Challenge

In 2015, world leaders came together to decide on a series of "Global Goals" to build a better world. In 2018, Micro:bit Educational Foundation with Arm and World's Largest Lesson challenged students aged 8-12 across the globe to consider how these Goals could change the lives of themselves and others and to design solutions to these Goals using the micro:bit. The challenge was supported by a number of delivery partners, the Global Challenge competition saw hundreds of entries from a diverse range of countries, cultures, and backgrounds. There were hundreds of entries showcasing unique ideas tackling the Safety challenge or the Non-communicable diseases challenge! In this exciting cover feature, we learn more about the challenge and meet the winners.







# Meet the winners

## Latin America Winner



**Kathellen  
Lima**

Kathellen Lima from Manaus in Brazil was the Latin America regional winner. Kathellen noticed that the river in her city was becoming polluted by litter and decided she wanted to do something about it. She created a buoy that sets off an alert when there is rubbish in the water. The device uses the micro:bit accelerometer to detect when litter is thrown into the water, which disturbs the water and shakes the device. The micro:bit is connected to a piezo, which activates an alarm, as well as an LED which turns on when rubbish is detected.

Kathellen was introduced to the micro:bit through workshops held in her city.

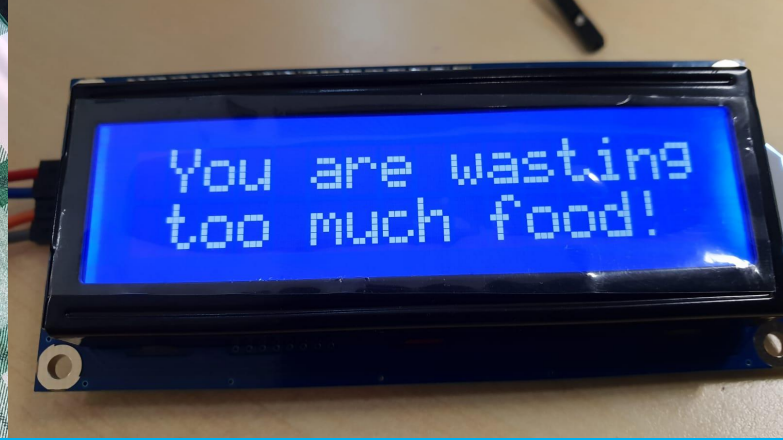
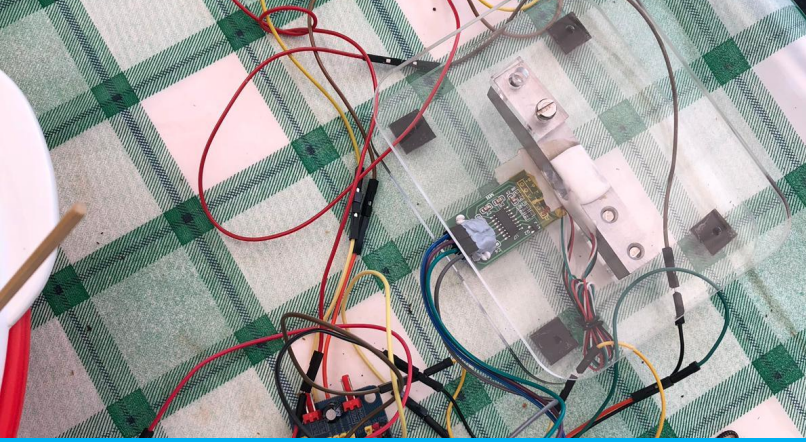
## Africa Winner



**Joseph  
Adewole**

The Africa regional winner was Joseph Adewole from Nigeria. Joseph designed a system that detects the temperature of students in a class and lets their teacher know if their temperature is high. The teacher is given a micro:bit that communicates with the other micro:bits in the room. The student's devices use a temperature sensor to monitor the student's temperatures. They then transmit this data to the teacher's micro:bit, which logs each student's temperatures in Excel. The teacher can then react to temperature changes in real time to ensure students immediately get medical treatment when they need it.

He designed the device so that students can be treated quickly if they are ill and don't miss too much school.



**Tricia  
Goh Lok Yee**

## Asia and Pacific Winner

The winner for the Asia and Pacific region, Tricia Goh Lok Yee, was part of a team called the Food Waste Watchers from a primary school in Singapore. They designed a device that helps to reduce food waste. The device measures the amount of food being thrown away and if it's more than 30g displays a message to remind them not to waste so much food! The device is attached to scales that detect changes to weight and calculate the amount of food waste. This device is placed within a bin and connected to a small LED display, which displays the weight of the wasted food and displays a warning to prevent further food waste.

Tricia and the team were inspired after they learnt about food waste and poverty at school and realised just how much food was wasted. The team installed the device in their school's food waste bin and after it was piloted, they reduced the amount of waste in the school by 50%!



**Elizabeth  
Gatten**

## North America Winner

Elizabeth Gatten from America was the North America regional winner. Elizabeth was worried about how many homes were being broken in to in her community so she decided to design a low-cost security system. The system can be fitted on to a door and detects movement. It emits a high pitched noise and displays flashing lights to scare burglars away or alert the house owner. When the micro:bit is connected to the battery pack the alarm is set and a notification scrolls across the micro:bit LEDs. The micro:bit is connected to a piezo that makes a high-pitched noise when the device is shaken, alerting neighbours. The device is also connected to rows of LEDs that flash red and blue, simulating the lights of a police car.

This solution aims to prevent break-ins through the front door by scaring off burglars and alerting neighbours, and the whole solution costs less than \$25! Elizabeth first started using the micro:bit after attending a pumpkin lighting coding event with her Mum.



# Middle East Winner

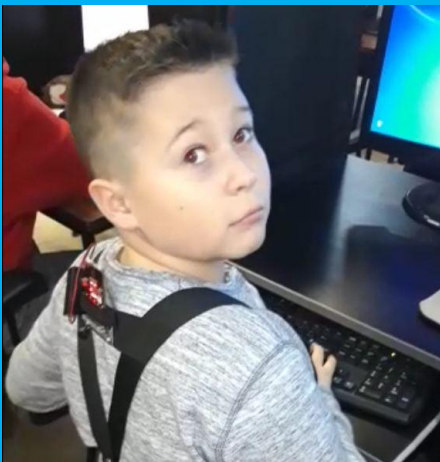


**Zayd  
Nashed**

Zayd Nashed is 10-years-old and was the winner for the Middle East region. Zayd created 'Doctor Robot', a device to help young asthma sufferers living in dusty regions. The robot gives the child medicine on time, contains a dust sensor to alert the child to a dusty environment, and interacts with the child through its facial expressions! Zayd's intricate device contains a multitude of motors to control the robot's movement, arms, and facial expressions, as well as the medicine drawer. The micro:bit acts as the brain of the robot, controlling the movement and working with the dust sensor to trigger the opening of the medicine compartment. His entry also included a micro:bit-powered 'smartwatch' to interact with the robot, as well as a controller that uses the micro:bit's accelerometer to move the robot.



# Europe Winner



**Fran  
Mikulcic**

Fran Mikulcic and his team, Team Veliki, were the winners for Europe. They created 'spine:bit' - a device that tells you if your posture is incorrect. The micro:bit sits in a lightweight backpack and detects when the wearer is sitting incorrectly and sets off an alert. The device uses the micro:bit accelerometer to detect posture. The micro:bit is connected to a piezo, and when the accelerometer detects poor posture it plays a warning sound effect and displays a sad face on the micro:bit LEDs. When the wearer's posture is then corrected, the device displays a happy face and a different sound effect.

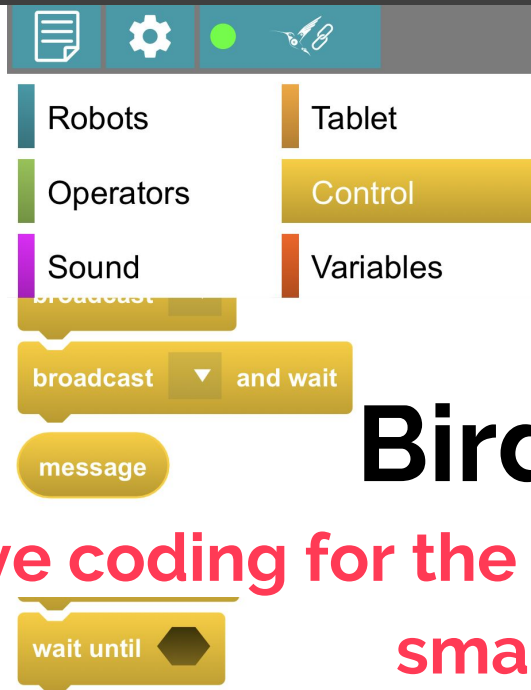
Fran and the team were inspired to create the device because one of their Dad's at their computer club has problems with his back. They wanted to create something that would help him and other people they knew with back problems.



Tom is the founder and CEO of BirdBrain Technologies, a Pittsburgh-based firm devoted to inspiring deep and joyful learning for all students through creative robotics.

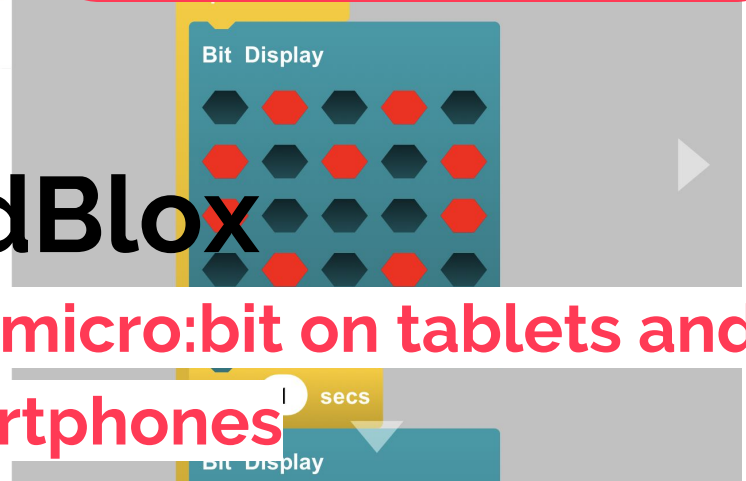
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# BirdBlox

## Live coding for the micro:bit on tablets and smartphones

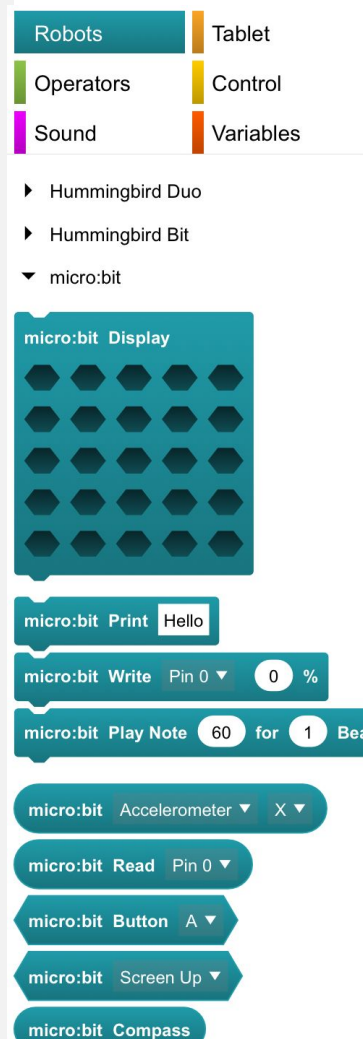


BirdBlox is a free and open source app for programming the micro:bit and the Hummingbird robotics kit on iOS and Android tablets and smartphones. My company, BirdBrain Technologies, developed BirdBlox to meet the needs of schools and other places in which iPads or Fire tablets are the main computing option.

BirdBlox is an iOS and Android app for live coding the micro:bit. By “live coding” we mean that, as with Scratch and other blocks-languages, a user can tap on a block or collection of blocks to instantly see what those blocks do. BirdBlox blocks are organized into six categories – Robots, Operators, Sounds, Tablet, Control, and Variables; **Fig 1** shows the blocks in the robots category assuming one micro:bit is connected. Except for the Robots and Tablet blocks, these blocks allow you to do similar things as blocks in Scratch and Snap. Unlike Scratch and Snap, BirdBlox does not have a stage or sprite system, and so blocks related to sprites,

such as movement or looks, do not exist. It is beyond the scope of this article to detail every block, but we have complete tutorials for using BirdBlox for both stand-alone micro:bits and our HummingbirdBit Robotics Kit.

Information between BirdBlox and the micro:bit is sent over a Bluetooth low energy (BLE) connection that is initiated from the app. We call this Bluetooth tethering and it is the same approach Scratch 3 takes in supporting micro:bit. When combined with live



**Fig 1: Blocks categories and micro:bit blocks**



coding, Bluetooth tethering has important advantages as well as some limitations.

### Advantages:

1. **Instantaneous feedback.** The live coding approach allows users to explore how blocks work instantaneously. This quality seems most important for younger kids and absolute beginners, who are more likely to be tablet users, as it allows for playful exploration of the blocks.
2. **Tablet functions.** As the micro:bit is linked to the tablet or phone, we can incorporate sensors and outputs such as the tablet's accelerometer, speakers, and display. For example, students can record sounds in BirdBlox, and then shake the micro:bit to play those recordings.
3. **Multiple devices.** BirdBlox can support up to three connected micro:bits on iOS/Android, and two on Fire tablets. This allows activities using multiple devices, much like the radio functionality in MakeCode. Unlike with radio, all devices are controlled from the same program, allowing for quicker multi-device development.

### Limitations:

1. **Connection Required.** BirdBlox programs require a tablet connection to work, and the program will stop working if the BirdBlox app is closed or the tablet is powered down.
2. **Pre-loaded firmware.** To work with BirdBlox, a micro:bit must have our

BitFirmware.hex file loaded onto it. To do so quickly requires a laptop and USB cable, so for at least one step in the process, a laptop is needed. If the micro:bit is then used with MakeCode or another program that loads the firmware, our BirdBlox firmware must be loaded again prior to starting a BirdBlox session.

3. **Limited control of pins.** BirdBlox has support for using micro:bit pins 0, 1, and 2 as either digital or analog inputs or outputs, but we do not support the other pins on the edge connector. This will prevent some of the micro:bit hardware extensions from working with BirdBlox. Our support of pins 0, 1, and 2 also does not currently extend to devices such as servos or Neopixels.

### Connection system

One of the neatest things about BirdBlox is how we have optimized our connection dialogs and system for classroom use. A combination of a built-in naming scheme and Bluetooth signal strength detection allows a classroom of twenty 8-year-old children to easily connect to their micro:bits. The naming scheme relies on the uniqueness of the BLE chip's MAC address. It takes the last five characters of this address and converts them into an adjective, a colour, and an animal; **Fig 2** shows some of the resulting names. Prior to connection, the micro:bit will flash the initials of this name on its 5x5 LED display. When a student goes to connect, they will see the full name as well as the initials in the connection dialog. Signal strength detection

adds a second layer by sorting micro:bits that are physically closer to the student to the top of the list. After an entertaining brainstorming session and some internet research, we believe we have eliminated combinations of initials that might make English speaking 12-year-olds giggle, though we make no promises about other languages.

Connect Device
GOT - Graceful Olive Tuna (micro:bit)
ISS - Inky Sand Snail (Bit)
GSR - Graceful Silver Raccoon (micro:bit)
CSS - Charming Silver Squid (micro:bit)

**Fig2: The connection dialog showing some micro:bit names**

The naming scheme was developed in partnership with the Carnegie Mellon CREATE Lab, BirdBrain Technologies' research partner and the originator of our products.

## Localization

**Fig 3** shows the list of languages for which we have translated all blocks and dialogs. We have a translation process and estimate that it requires about four hours for someone to translate the app. If you would like to contribute a translation, please contact us!

## Origins of BirdBlox

BirdBlox was initially made for our Hummingbird Duo robotics kit, which is a kit of parts that allows anyone to build robots with arts and crafts or other recyclable materials. The app has been developed over the last three years, via the efforts of a number of key contributors, notably Tom Wildenhain, Brandon Price, Terence Sun, Aditri Bhagirath, Mike Yuan, Kristina Lauwers, Bambi Brewer, and Raghu

Jangam.

The app's interface was inspired by Scratch and Snap; in fact, an early version of the app attempted to wrap the Snap interface and add the Bluetooth functionality needed to connect with robots and other electronics.

In 2018, we prepared to launch the Hummingbird Bit robotics kit, which is built on and extends the micro:bit. Extending BirdBlox to both Hummingbird Bit and standalone micro:bits was a critical component of this launch, as it allowed us to meet the needs of all schools, regardless of whether they use tablets or Laptops. We are thrilled that the updated BirdBlox and the Hummingbird Bit are both now available. We hope that BirdBlox will be a helpful tool to the micro:bit community, and hope you can use it to inspire deep and joyful learning.



**Fig 3: List of available languages that you can use in BirdBlox**





Sam loves to code in his spare time. He originally got started coding using a micro:bit and loves showing others how to get started too.

## Lunchtime micro:bit club

### Getting younger kids into coding using the micro:bit and MakeCode

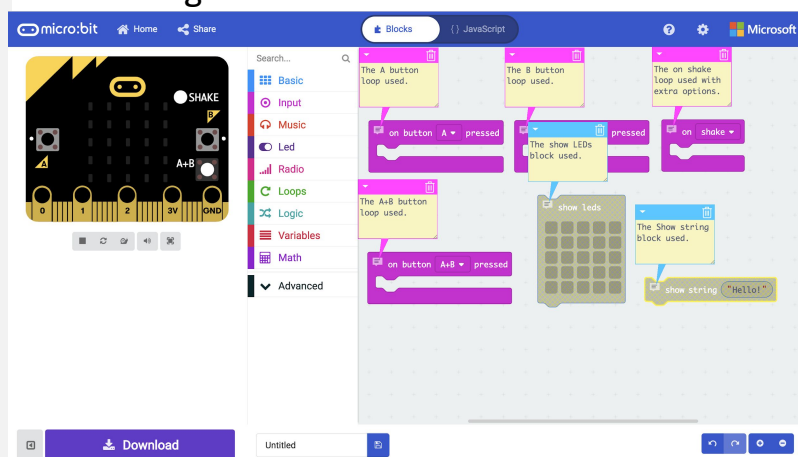
A couple of weeks ago I decided to start running a club with three younger kids and help them get started with the micro:bit using different things to get different reactions from it.

After I spoke to the deputy head teacher of my school I was told I was allowed to run the club once a week. She helped me choose the children who were all in year 3 although none of them had used or even seen a micro:bit before.

The first week of the club I told and showed the three children how to make the BBC micro:bit react when they pressed certain buttons on it. Initially, I showed them how to make Google Chrome ask them where to save a file before doing so so that we would not have the hassle of having to locate the micro:bit download file and then move it to the micro:bit. Then I showed them the micro:bit. The next thing I did was tell them to go to [go.micromag.cc/makecode](https://go.micromag.cc/makecode). See **fig 1**

Once they had all opened the website I told them

to click on new project and drag and drop an 'on button A pressed' block into the coding area. They then put a 'show string' or 'show LEDs' block within it and customised it to what they wanted using the 'show string' block to display their own message or the 'show LEDs' block to show images on the micro:bit screen.



**Fig 1: The editor, loops and blocks used by me and the three children to program the micro:bit.**

In week 2 of my club, I decided to show the children how to use the 'on shake' loop and the multiple options within. Most of the children used the 'freefall' option of the 'on shake' loop although a few changed it to the 'logo down' or 'logo up' options within the 'on shake' loop as the 'freefall' and 'shake' options were too alike.

All of the children experimented with the 'on shake' option and enjoyed solving how to make the 2 messages from 2 different options be distinguishable from each other (I plan to show them the Rock, Paper, Scissors programming in a few weeks time using the 'on shake' loop)

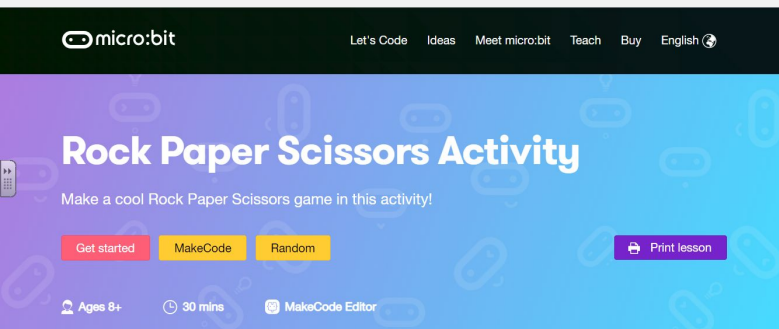


Fig2: How to code a micro:bit to play rock, paper, scissors

In week 3 I plan to use the 'Interactive badge' worksheet which can be found [here](#) on the Code Club website as we have already covered most of the areas within this worksheet in the previous 2 weeks of the club. Although I needn't plan too far ahead for the weeks to come, I believe for week 4, I may use the 'against the clock' project found [here](#) at the code club projects page. Although the three children in the club had no previous experience with the micro:bit, I believe that in a few weeks time they will all be capable of coding things like the speaker:bit and I will be able to move onto another group of children and teach them all how to code to the standards that the current group may be at in a few weeks time. Although the three children are only in year 3, I hope that they will never forget how to code the micro:bit and take the experience on with them and it may help fuel their future career and the rest of their lives.

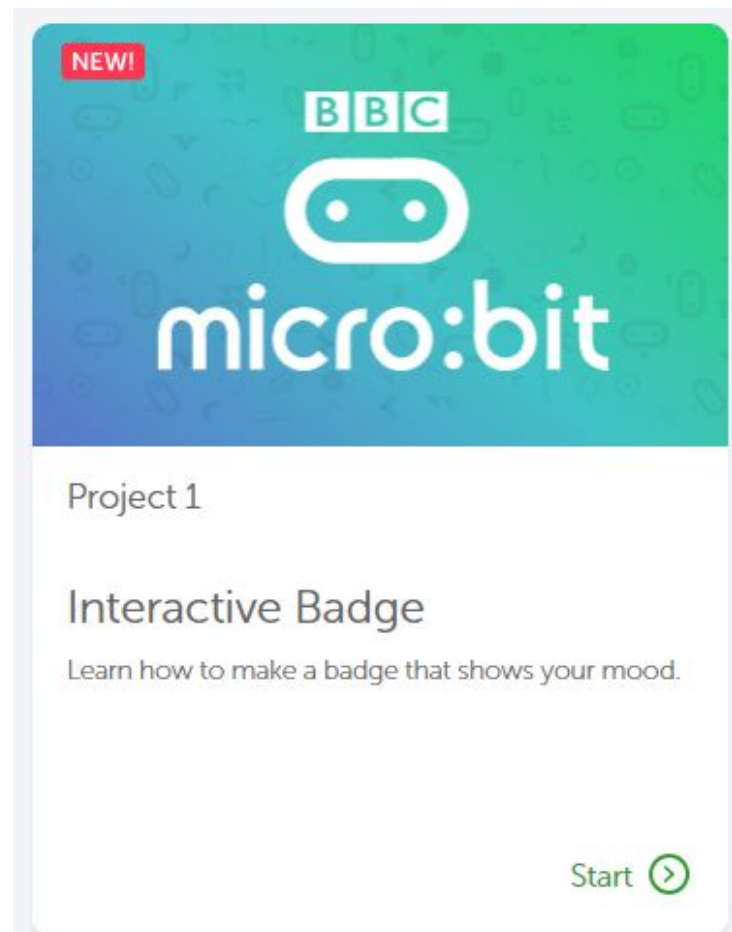


Fig 3: The Code Club downloadable booklet containing the Interactive Badge project



Fig 4: A speaker add-on for the micro:bit which may be used at my club in the future



# Help us cover the costs of micro:mag

A close-up, angled view of a black Micro:bit board. It features a silver square sensor at the top, a blue triangle with the letter 'A' below it, and two yellow circular ports labeled '0' and '1' at the bottom.

micro:mag is run by a team of dedicated volunteers - but we still need to cover our costs. Donating helps us continue to deliver the community micro:bit magazine free of charge.

A close-up, angled view of a black Micro:bit board, showing the yellow circular ports labeled '2', '3V', and 'GND' at the bottom.

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## David Booth



David designed military electronics and worked with time sharing computers. I love getting the most out of electronic and computing devices like the micro:bit. There are so many exciting possibilities.

## Ed Bye



Ed spent most of his career in R&D, designing medical devices for neuromuscular control. I maintain a hobbyist interest in all sorts of electronics from early school-boy days.

# Battery Eliminator for the micro:bit

## How to build a 3.3V regulated supply to feed a micro:bit battery terminal

### You Will Need:

- MCP1700-3302E/TO Regulator
- USB Type A male on cable (cut off other end)
- A 2 pin JST-PH plug with two leads.
- Strip Board 0.1 inch pitch, 8 strips x 11 cols
- Two 1 $\mu$ F ceramic capacitors. Through the hole.
- A 1N4001 silicon diode.
- Red and Green 5mm LEDs
- Two Resistors 1/4W 5% 180 $\Omega$  and 560 $\Omega$ .
- A small clear Tic Tac box
- Tools for soldering to Strip Board

Sometimes a micro:bit project requires a reliable source of power beyond that of a battery, possibly available for many days unattended or where a computer USB port is not available. The natural choice for such projects is the 240V mains. However, this requires an adapter, such as a USB charger, which is not recommended in general or forbidden for some versions of the micro:bit.

The circuit described here overcomes these limitations and allows a micro:bit to be powered from an approved and certified 5V USB outlet of any description as it makes a connection via a current limited 3.3V regulator to the micro:bit battery connector.



# Battery Eliminator for micro:bit :make

It also provides additional current to a safe level above that available from the micro:bit 3V rail for external modules to a total of 250mA. The output is short circuit and thermally protected. Other d.c sources from 3.7V to 6V could be used in place of the USB Charger.

Figures 1 & 2 show the final item housed in a small Tic Tac box and the stripboard.

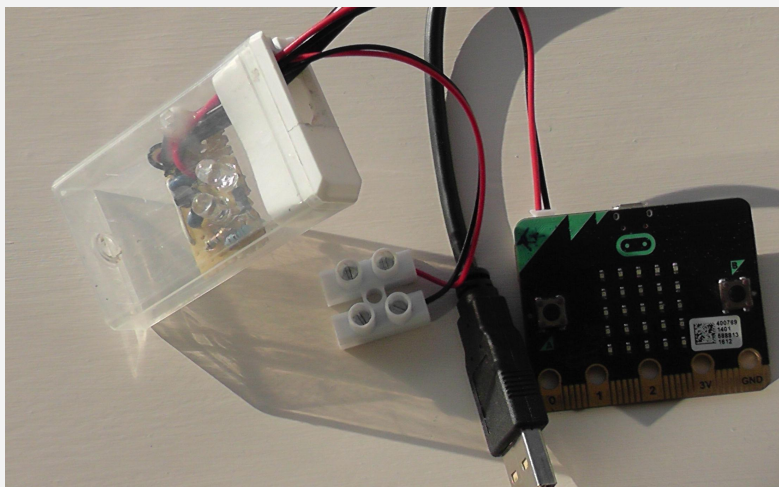


Figure 1: Battery Eliminator - The TicTac box houses the battery eliminator which is fed by the USB cable and supplies the battery terminal of the micro:bit and a terminal block.

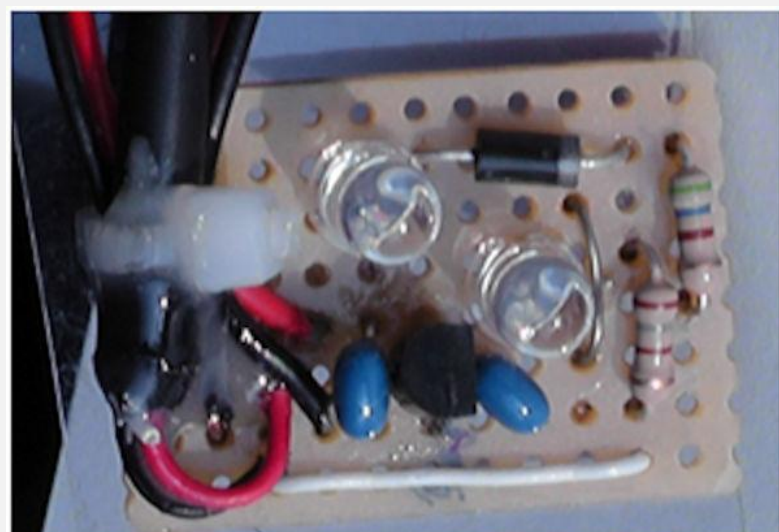


Figure 2: The stripboard. Compare it to the layout, figure 4

## The circuit How it works

The circuit diagram is shown in figure 3. There

are five parts to the circuit:

1. The input section – this is a USB cable with standard type A plug attached. The plug connects to the output of a 5V USB charger to deliver power to the regulator.
2. The regulator – the heart of this circuit is a Low Drop Out (LDO) fixed voltage regulator from the MCP1700 series. It drops the 5V power to 3.3V. Capacitors on the input and output help stabilise the output voltage and reduce any noise on the power lines.
3. The “On” indicator – comprises of a green LED and 180 Ohm resistor in series. When correctly operating this LED illuminates.
4. The “Fault” indicator – comprises of a red LED in series with a diode and 560 Ohm resistor. As the level of current taken from the output increases beyond 250mA the intensity of this LED increases, thus indicating when an overload occurs.
5. Output section – there are two parts to this, the first being a 2-pin JST-PH plug for connection to the micro:bit battery socket, the second being a shrouded terminal block to allow additional circuitry to be powered.

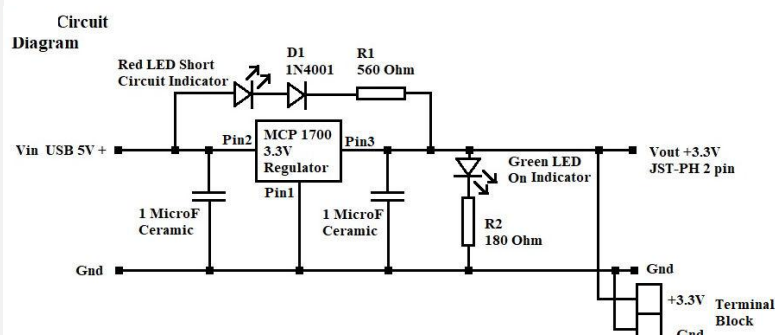


Figure 3: Circuit Diagram. Use this diagram to understand the circuit components functions.

## Safety

A mains derived a USB charger is used. To ensure electrical safety only genuine devices certified and approved to national standards should be used.

micro:bit safety instructions

<https://microbit.org/guide/safety-advice/>

advise that the USB port on the micro:bit versions v1.3B and v1.5 can be powered from any USB port. High current charging ports are not recommended. The original micro:bit must not be powered from any charging port or portable battery charger due to excessive current present.

The authors consider this project suitable to power all versions of the micro:bit as it contains a built-in current limiter to ensure the current remains less than that available from a standard USB outlet.

## Performance

At a load of 5mA, the output was 3.302V. At a load of 260mA, the output was 3.280V giving a regulation of 0.66% over this current range.

More current can be taken, however, at some point, the MCP1700 will reduce its output voltage. Thus there is no need to be concerned with safety issues resulting from an excessive load or short circuit on the unit's 3V rail.

## Construction

The circuit is built on Strip Board figure 2 and the layout is shown in figure 4. It is important to get the orientation of the MCP1700, LEDs,

1N4001 diode, JST plug and USB plug, the correct way round and the polarity of these devices is compared to their shape in figure 5. If you are using an existing USB cable and cutting off the opposite end to the Type A male plug, strip the far end by about 2 cm and expose four insulated wires. Figure 5 shows that the pin1 should be red and carry +5V relative to 0V or GND (the black wire) on pin 4. This should be tested using a voltmeter.

Drill a 6mm hole in the bottom of the Tic Tac box for ventilation. Remove the flap on the lid of the TicTac box and thread the USB cable through.

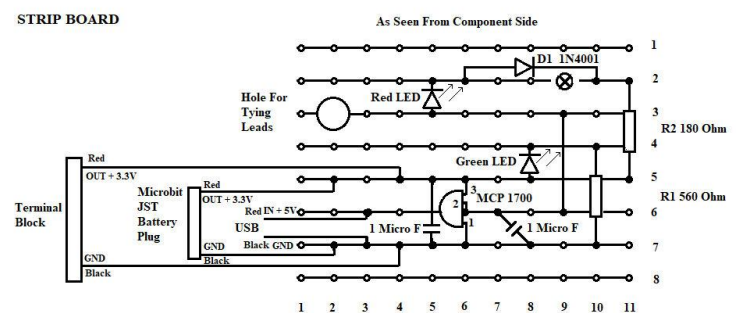


Figure 4: Circuit Layout. It is very important that you get the orientation of the; MCP1700, Diode and LEDs the right way round. This is as seen from the component side. Use figure 5 for help.

Cut the strip board to size, drill the tie hole and break the copper track at junction row 2, column 9. Remove copper burrs and ensure no short circuits between tracks. Assemble components starting with low profile resistors and wire, (not connector wires). Put them in position on the stripboard (none copper side) with wires through the holes and hold them in place with a short strip of masking tape.

Turn the board over and solder a few components at a time. Cut off the excess wire. Examine each joint through a magnifying glass



# Battery Eliminator for micro:bit :make

to see that it is a good joint and that no solder has jumped the gap between copper strips.

Add the capacitors, then the MCP1700 and the LEDs. Before soldering, check the orientation of all components which have a polarity. Finally add the terminal leads, battery plug leads and the USB leads. Now add a small cable tie to secure the leads to the board.

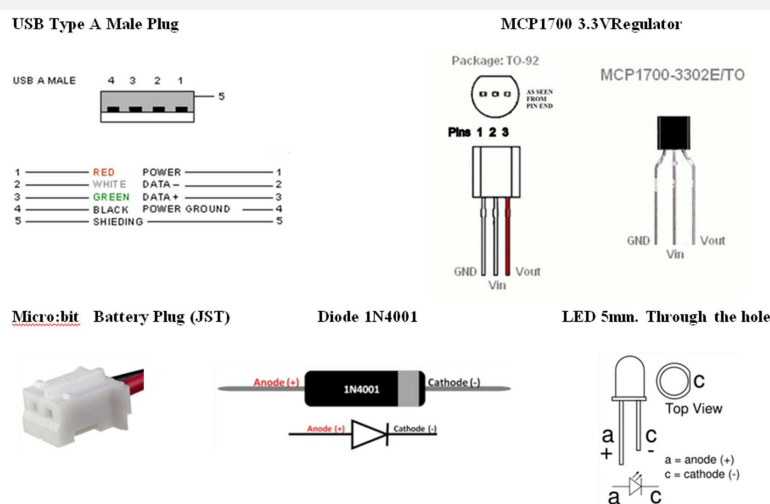


Figure 5: Component Orientation. Check each component before and after soldering.

## Testing

Before using the unit to power a micro:bit the circuit must be tested. Plug the unit into a live USB charger socket. The green LED should light. If the red LED lights then there is a short or unexpected load. If nothing lights use a voltmeter to check there is 5v between strips 6 (+5V) and 7 (GND). If so then check the voltage between strip 5 (3.3V) and strip 7 (GND). If there is, then LED circuits, or JST or terminal circuits may be broken.

When these tests have been passed, check the JST socket is supplying 3.3V. Then apply a short

circuit to the +3.3V and GND terminals. The green LED should go out and the red LED should come on.

Apply a small dab of epoxy resin to bond the leads to the board and then slide the completed board into the Tic Tac box.

If all these tests pass then you can try it powering a micro:bit which you have loaded with code that displays on the 5 x 5 LED screen in order to show it is working.

The battery eliminator is now ready for use.

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tanyafish.com

Tanya has been Pimoroni pirate since 2016 - making learning materials for schools, running workshops, & doing talks. Often to be found in possession of cardboard and glitter.

# Make a neopixel-style LED board for under £1!

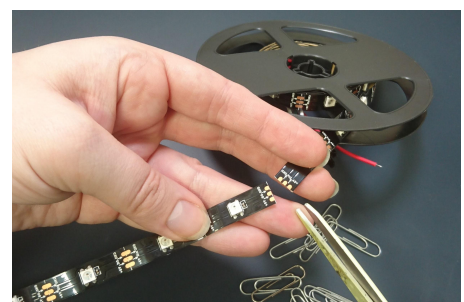
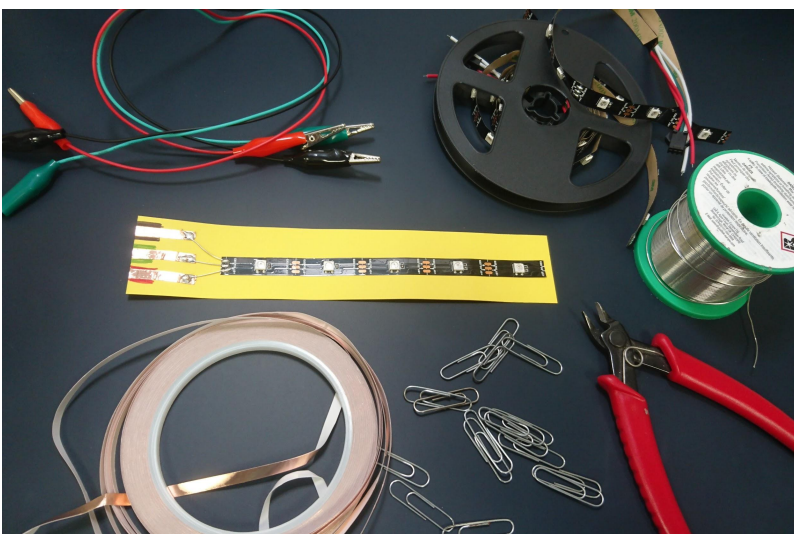
Use readily-available materials to make an addressable RGB LED "board"

## You Will Need:

- Roll of WS2182 LEDs (this one is 30 LEDs per metre, 5m was £24)
- Card
- Scissors
- Colouring pens/pencils
- Copper tape or foil and glue
- A paperclip
- Snips
- Solder and soldering iron

From one 5m reel of LEDs, you can make 30 of these boards, useful when you have limited funds and a bit of spare time. It takes me 2 minutes to make one board (but I've had a lot of practice)! They work with the neopixel library in block code, MicroPython, and with other non-micro:bit devices and neopixel libraries.

Cut a section of LEDs off the roll. Make sure you cut through the **centre** of the gold contacts on the tape. I am using 5 LEDs for this tutorial.

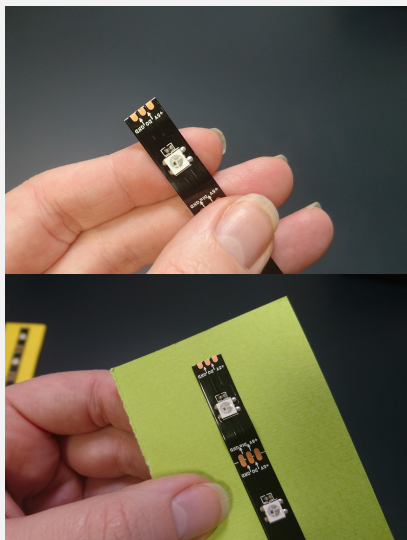




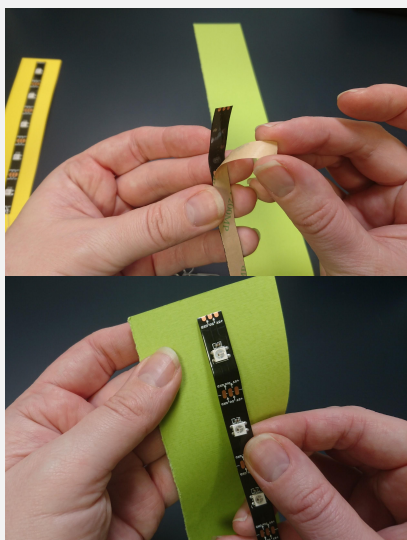
# Make a neopixel-style LED board for under £1!

**:make**

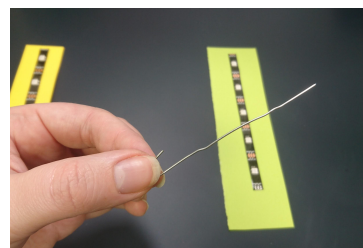
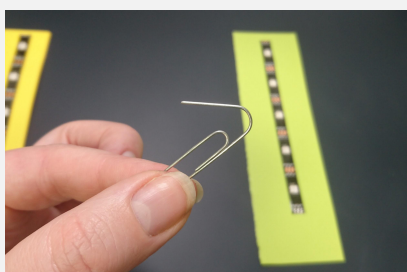
Look at the ends of the tape. There should be labels and arrows. The arrows pointing at the end of the tape should be at the top end of your card, as shown.



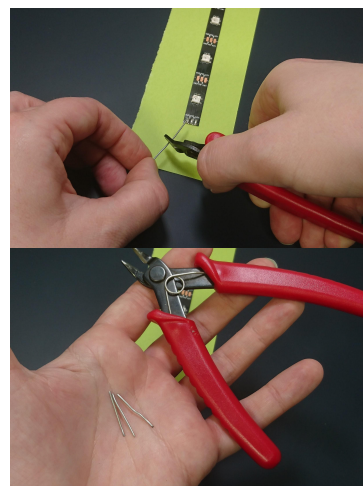
Peel off the backing on the tape and stick it down firmly to a piece of card, making sure there is a space at the bottom for adding the contacts.



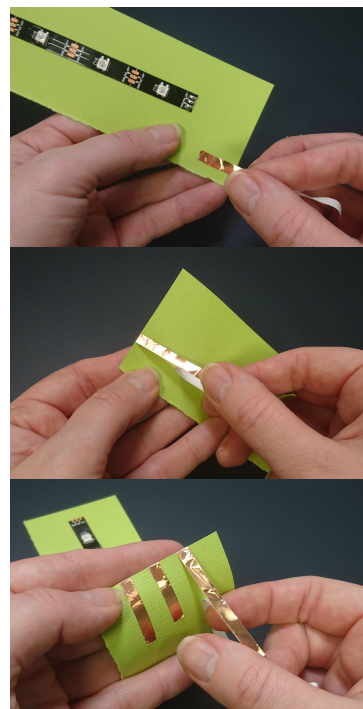
Next, take a paper clip and unbend it. If you have some bare wire you can use that instead.



Cut the paper clip using snips, into 3cm long pieces. You will need three of these. Put them to one side.

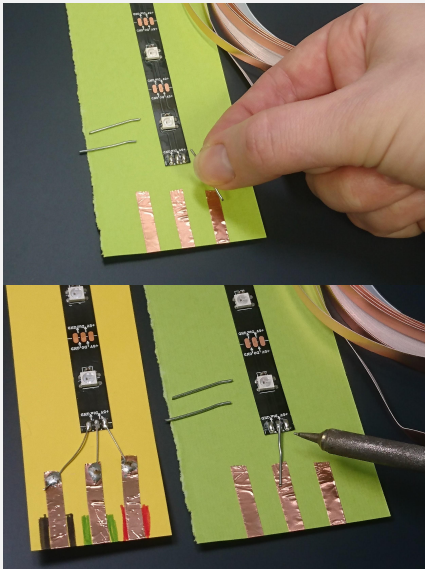


Use copper tape to make three contact pads at the bottom of the card. Press the tape down, bend it around the card, and press down on the other side of the card. This makes a good pad for the crocodile clips to grip onto.

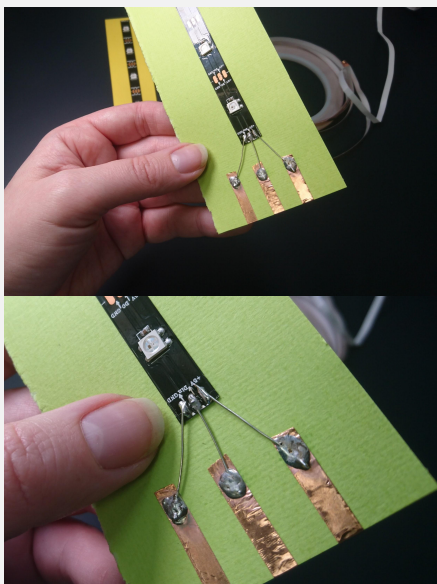


# Make a neopixel-style LED board for under £1!

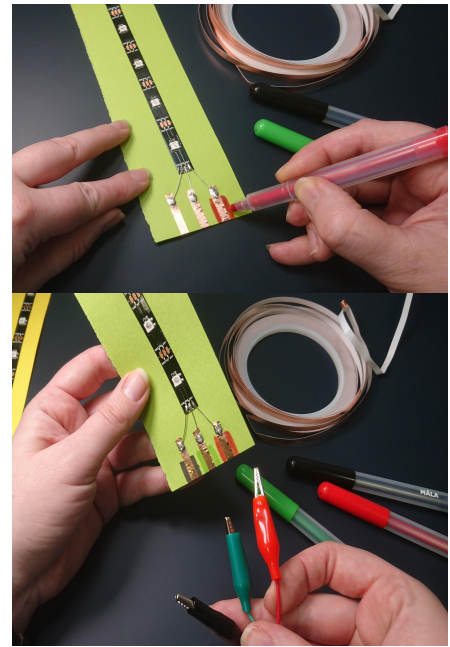
Your paperclip pieces are the joins between the pads and the end of the LED tape. First solder the tape ends, melt the solder and push the paperclip in.



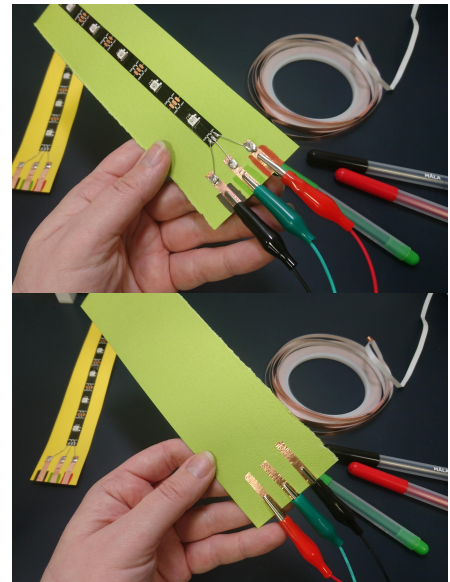
Next, solder the other end of the paperclip pieces to the metal tape. The metal tape (or glued down foil, if you used that) protects the cardboard from the heat of the solder. If you need to push the paperclip piece down, use the flat end of a pencil and **not** your fingers!



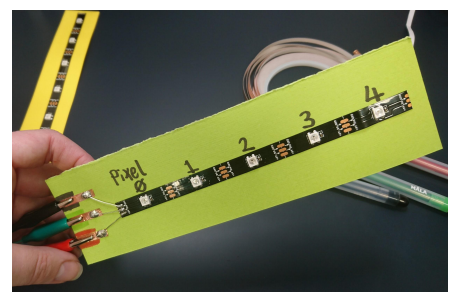
Finally, colour either side of the contacts to help people with the connections. I used red for power, black for ground, and green for data.



Connect your crocodile clips to join the board to the micro:bit. You can also label the pixels if you want.



**Note** that although these LEDs are labelled 5V, they will work at 3.3v from the micro:bit. Five LEDs is enough for learning how to code neopixels, and not so much that it will draw too much power.







@ParallaxKen  
[www.parallax.com](http://www.parallax.com)

Ken is the CEO of Parallax and a lifetime maker of gizmos around R/C, robotics, and electronics. Father of two boys.

# Cyber:bot robot with Whisker Touch Sensors

How the micro:bit can be extended with a Python robotics library using the Mu code editor

## You Will Need:

- cyber:bot kit from Parallax or distributors

An important progression with microcontrollers and single-board computers is learning to read schematics, build electronic circuits and code in Python.

The variety of programming environments for the micro:bit allow anybody to write code and build things. For example, code environments can start with MakeCode and advance to Python. Similarly, electronics can move from crocodile clips and fruit [\(like the popular Banana Keyboard\)](#) to components and breadboards (using a robot, or a science fair project). Next, you might learn printed circuit board (PCB) design or more about analog/digital electronics - steps towards developing a complete engineering skill set.

These new skills are acquired simply by doing a project. In this case, we will use the cyber:bot robot with “whiskers” - physical touch sensors to demonstrate circuit building and use of Python.

What’s the cyber:bot? It’s an educational robot which accepts many different accessories from Parallax, including grippers, colour sensors, ultrasonic sensors, lasers and line following kits. The cyber:bot PCB holds the micro:bit firmly in place with a few screws, making contact with the micro:bit I/O through springy contact pins. The I/Os are available directly through the Propeller Multicore Microcontroller, which is essentially transparent to the micro:bit programmer. The coprocessor was required to perform many of the timing-specific advanced functions required in robotics for motor control, real-time sensors and I/O control.

The tutorials are open source and available on <http://learn.parallax.com>. **Fig 1** shows the

cyber:bot built with whiskers.

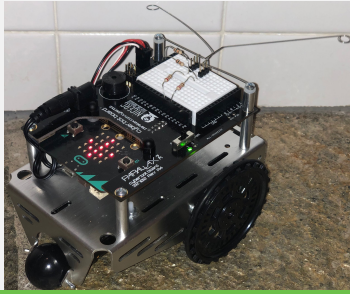


Fig 1: Assembled cyber:bot

The easiest way to learn how to read schematics is by seeing a helpful picture (also called a pictorial) of the same circuit on a breadboard. Robot “whiskers” are basically touch sensors—contact switches built on the breadboard that let the robot detect an obstacle, move back and turn away.

Most of us would initially prefer to build the whiskers circuit from a pictorial as shown in **Fig 2**. A schematic won’t show exactly how the mechanical part of the whiskers is built, so some circuits require a pictorial.

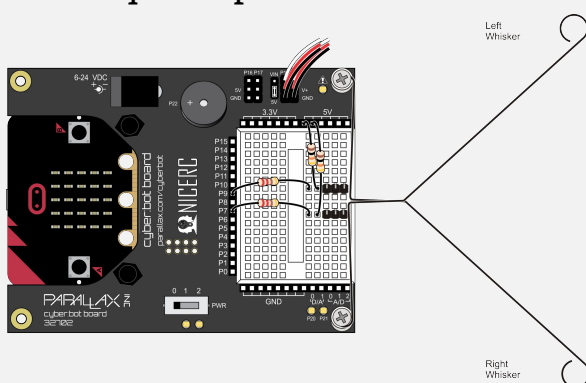


Fig 2: Whiskers trigger when the robot rolls into an object

A whisker is a mechanical extension of the cyber:bot’s ground. These act like a light switch, which is either off or on. When pressed, the springy whisker connects the cyber:bot I/O pin to ground through the chassis. An actuated whisker grounds the I/O pin and the state is a 0

(low). When not pressed, the pin reads a logic level of 1 (high).

The schematic shows this electrical diagram of the circuit built from the pictorial. In this case, you actually need both the circuit pictorial and schematic to build the circuit. When there’s not such a close dependency between the two, students can normally build the circuits from a schematic (**Fig 3**). By seeing circuits in a pictorial and schematic view, it’s much easier to start reading schematics.

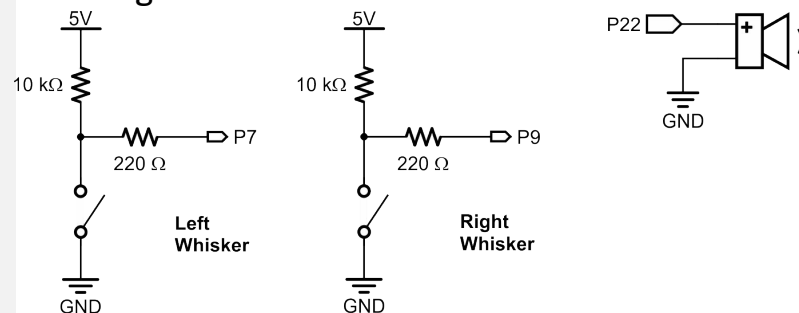


Fig 3: Whisker schematic—an actuated whisker reads a digital low (o)

Progressing with robotics will introduce many types of schematics for different sensors including ultrasonic, infrared receivers, colour, line following and light.

The cyber:bot is programmed using a library called cyberbot.py. We prefer to use the Mu editor because it allows the cyber:bot library to be most easily imported onto the micro:bit, giving us access to a powerful set of methods and functions used in robotics. There’s also a Propeller Multicore Microcontroller acting as a co-processor for a real-time robotic program.

Here’s how you bring the cyber:bot library into the micro:bit file system (the full instructions are on [learn.parallax.com](http://learn.parallax.com)):

1. Copy the cyberbot.py (from the folder where you extracted them) file into your computer's mu\_code folder. On Windows, the path is:

C:\Users\

On Macintosh, the path is: Macintosh HD>Users>username>mu\_code

2. Connect your micro:bit to your computer via USB cable
3. Click on the Files button- a file management pane will appear at the bottom of the editor
4. Drag and drop the cyberbot.py file from the right pane to the left pane. Mu will transmit the file to your micro:bit

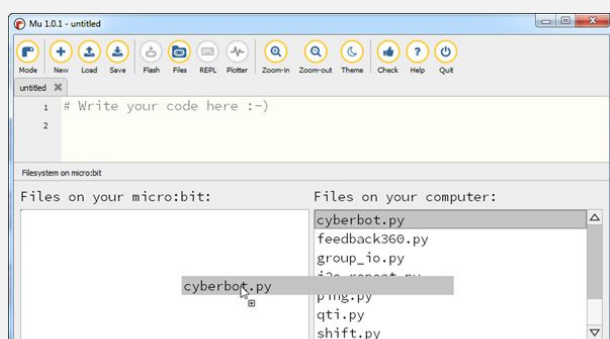


Fig 4: Drag the cyberbot.py library onto the micro:bit

5. Click on the Files button again to close the file management pane. Now you can use the library in your cyber:bot code.

With the circuit built and library imported to the micro:bit, your programming capability gets to leverage the entire cyber:bot API! The API is a complete set of functions allowing easy creation of robotic applications that have the following programming for analog, digital, sensors, parallel I/O control, servo control, sound, and communication (I2C, serial). These capabilities are possible because of the Propeller Multicore

Microcontroller, the firmware running in it, and the cyberbot.py library.

Yet this first example is quite simple, for whiskers only. Take a look at the first few lines of code.

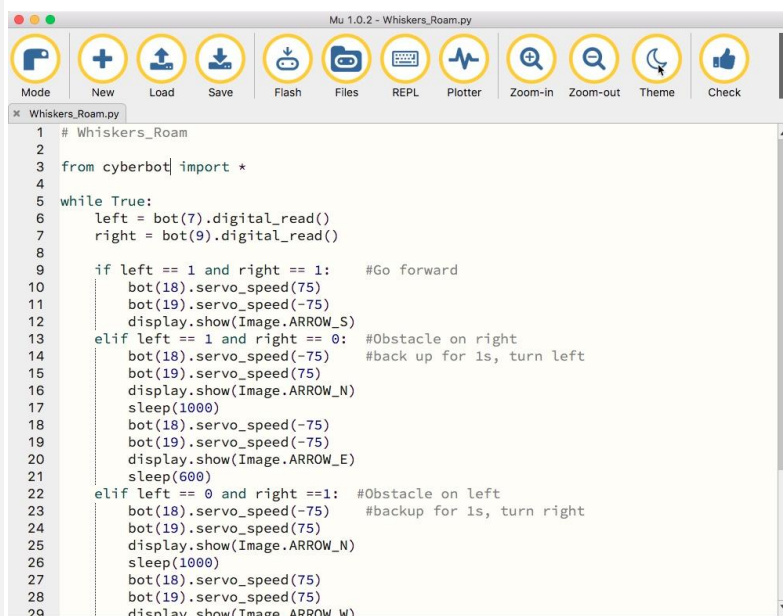


Fig 5: Cyber:bot whisker roaming code

The code is really quite simple. The cyberbot library has a method named “bot” which provides the digital states of I/O pins. When both whiskers read a logic high (1) the cyber:bot goes forward and displays the arrow for the direction of travel.

The speed ranges for the cyber:bot is -100 to 100, with a fair amount of linear speed control in between these values.

A video available on the micro:mag web site shows the cyber:bot running this code.

The Parallax tutorials will enlarge your world of programming and circuit building. Take a look at the cyber:bot tutorials as we are publishing them this Spring on [learn.parallax.com](http://learn.parallax.com).



# Playing with Magnets

## Using a magnet to alter the micro:bit compass

Magnets are wonderful things to experiment with and in this project, we shall use a magnet to alter the built-in compass of the micro:bit. Changing where it believes North will be and using it to create a simple alarm.

**Parents:** **Please note** that children should only use fridge magnets and not rare earth/neodymium magnets as they can be harmful if swallowed.

For this project, we shall be using the Javascript Blocks Editor [go.micromag.cc/makecode](http://go.micromag.cc/makecode) and we should already be comfortable copying code to our micro:bit.

### Step 1: Startup Screen

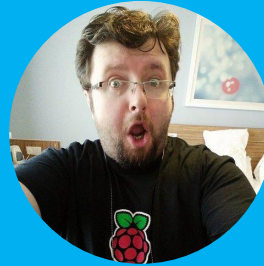


When our micro:bit starts up we need to test that our compass is working, and so we use a repeat 4 times loop found in the Loops section.

### Step 2: Check Your Heading



## Les Pounder



Les is a maker and trainer who has worked with the Raspberry Pi Foundation and the BBC to deliver computing training.

[@biglesp](https://twitter.com/biglesp)

[bigles.es](http://bigles.es)

We can find the compass heading block in Inputs. Drag the block over. But how can we use it? We need to use a block to scroll it across the micro:bit.

### Step 3: Show The Heading

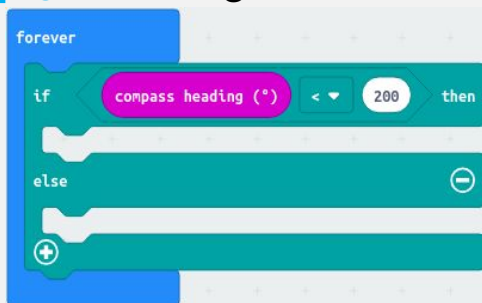


Inside of the repeat loop we use the Show Number block from Basic to scroll the compass heading across the micro:bit. This tests that our compass is working.

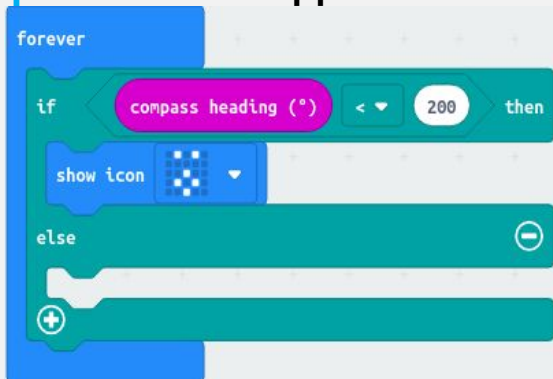
### Step 4: A Little Logic Goes A Long Way



From Logic, we need to grab the "if true then..else" block and place it inside the forever block. This will check to see if a certain condition has been met.

**Step 5: Checking values**

From Logic we use the “ $0 < 0$ ” and place it over “true”, then we use another “compass heading” block in the first 0 and change the other to 200.

**Step 6: So what happens if...**

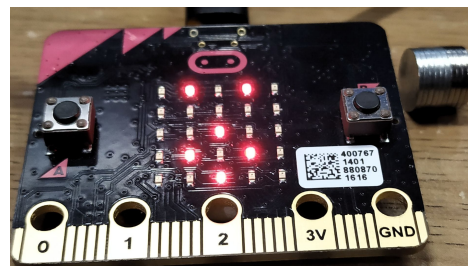
Compass headings can be between 0 and 360, the value 200 found using the startup script and noting the normal value. But if the value is below 200, then we show the surprised icon from Basic.

**Step 7: All Is Normal**

But if the magnet is still in place and so we use the else condition and another “show icon” block to show a happy face.

**Step 8: Final Code**

Here is the final code for the project, does it match yours? Check for any bugs before downloading the code to your micro:bit.

**Step 9: Magnetic alarm**

The compass is located in the top right of the micro:bit, and when we use the magnet it alters where the micro:bit thinks magnetic north is and so we can control the direction.

That's it, now download the code to your micro:bit and when it has finished, move the magnet towards and away from the micro:bit and watch the screen change.

Well done you have made your own magnetic alarm. You can attach this to a door and add a speaker to make loud noises to scare away parents/pets/ siblings. You can learn how to connect a speaker by reading Issue 2 where we make a countdown timer.

# Meet the Foundation:



**Meet the people behind the scenes managing social media, writing blog posts and running events**

## Kavita Kapoor, Chief Operating Officer (COO)

As COO, Kavita is tasked with working across education and technology to deliver brilliant products and super services – as well as making sure that everything's running smoothly. Kavita has a long history in tech: she started her career as a coder in Silicon Valley, before tackling tech at BBC Worldwide and Channel 4 Television. She has worked for organisations such as the London Organising Committee of the Olympic and Paralympic Games as well as creating and selling tiny start-ups. Like other people in the Foundation, she was once awarded a BAFTA Interactive Award for Online Learning. Go, Kavita!



## Steph Lucas, Events Co-ordinator

Steph is part of the team behind the Foundation's fantastic events and works hard to engage and enthuse as many young people as possible. She recently worked on micro:bit [Global Challenge](#) Grand Finale and is looking forward to helping coordinate [do your :bit](#) in 2019.

## Jo Inglis, Producer, Global Challenge

Jo ran the recent [Global Challenge](#) campaign for the Foundation. She's worked on a range of education engagement campaigns in the past, including at BBC Learning, where she first got involved with the micro:bit. Her latest project is the [Do your:bit](#) campaign, which challenges young people to address the [Global Goals](#) using just a micro:bit and their creativity. Watch out for more info about this soon!

## Bisi Safo-Antwi, Administrator

Bisi provides the glue that holds the Foundation together, tackling a range of tasks from HR to updating the accessory guide. She's relatively new to micro:bit and has enjoyed getting to grips with the world of coding. "I love how compatible and versatile the micro:bit is. I have learnt so much since I started, and it's been so much fun to be part of new and exciting projects each week!"

## Finn Concannon, Social Media Manager

As you may have worked out from his job title, Finn manages and creates content for the Foundation's social media channels. He also produces and edits content for [microbit.org](#) and our e-newsletters. Finn has worked in social media marketing for over a decade; he discovered the micro:bit in 2018 and has enjoyed engaging with the community ever since.

## Roz Sutton, Project Manager

Roz is currently focused on increasing the digital skills of 11-14-year-olds, enabling them to make the best use of the opportunities that technology offers them in their futures. When she's not managing digital projects, Roz enjoys seaside walks with her dog along Brighton seafront.

## Hellen Norman, Wordsmith

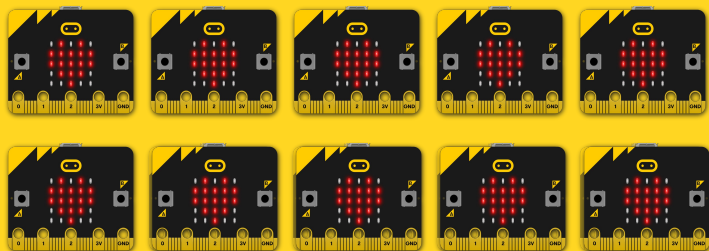
By day, Hellen is wordsmith and content creator for [Arm](#), one of the Foundation's founding partners ... but by night, she pulls on her micro:bit cape and flies in to help with articles, newsletters or anywhere else that wondrous words are required. When she's not at her keyboard, she's probably playing with her five-year-old son, who's looking forward to getting his hands on a micro:bit very soon.

# Pimoroni Bear Badge Kit

Build and code your own wearable bear badge with the scroll:bit micro:bit kit.



The badge is very easy to put together. You are provided with some really cool tutorial/instruction cards to make the badge easy to build and program. Building the acrylic stand is just a case of getting the pieces, following the build instruction card and using the provided nylon nuts and bolts to put it together. One thing we did find was that tightening the nuts with your hands doesn't grip on tight enough, we used a tightener that gets included with Pimoroni's PiBow Raspberry Pi cases and found that these did the trick, this would be a nice simple addition to the kit.

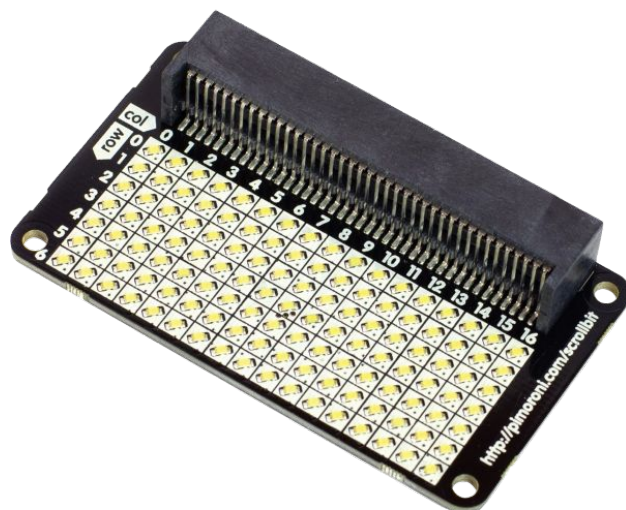


To go alongside their range of micro:bit add-on boards, popular maker company Pimoroni have released two new "bit:kit's" in the form of a Bear Badge Kit (powered by the scroll:bit) and a Weather Station Kit (powered by the enviro:bit). The aim of the bear badge kit is to provide a nice little programmable name badge for use at events or just for fun.

## 10/10

### What's in the box?

- BBC micro:bit
- Battery Box
- Micro USB Cable
- Tutorial cards
- Scroll:bit
- Acrylic badge
- Acrylic "T-Shirts"
- STICKERS!!



The scroll:bit is a neat matrix of 119 bright programmable LEDs. This is the display used to scroll text in this kit

# Pimoroni Bear Badge Kit :review



The Bear badge kit build and displaying heart icons

Photo: Pimoroni

The kit comes with a lovely Pimoroni branded lanyard and it certainly drew attention when we demoed it at BETT this year.

## Programming

Programming your name badge is made simple with the easy to use scroll:bit makecode extension. It allows you to do all sorts of things like draw icons to just simply scrolling text. Even better, the nice tutorial cards included in the box will help you get started with the Makecode extension, this is a nice touch and one that we'd like to see in more micro:bit beginner kits. For more advanced users, there is a Python library available from Pimoroni, but

you won't find any resources in the box for this. The kit is also a really reasonable price for what you get, £42 (which includes a micro:bit) makes it great value for money

## Overall thoughts:

**The bear badge kit is an amazing kit if you're looking for a stylish micro:bit powered name badge. Priced at just £42, including a micro:bit, what more could you ask for?**

**Buy the Bear Badge Kit:**  
[go.micromag.cc/bearbadge](https://go.micromag.cc/bearbadge)



# Advertise in micro:mag!



micro:mag is the community magazine for micro:bit lovers - if you want to reach an audience of students, teachers and hobbyists at reasonable cost, micro:mag is the place to do it! We've got full and half pages available, at reasonable rates, and you'll help cover the costs of producing the magazine.

Get in touch for more  
info - email us on  
[hello@micromag.cc](mailto:hello@micromag.cc)



# Product Reviews

If you make cool products for the micro:bit, then micro:mag is the place to get it reviewed! With thousands of community readers per issue, it's also a great place to get your product/addon noticed.

Get in touch for more  
info - email us on  
[hello@micromag.cc](mailto:hello@micromag.cc)

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