

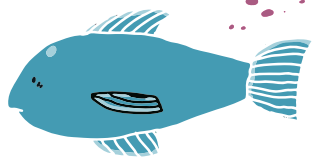
ISSUE 6

openuk zine

The OpenUK open source how to guide

THIS EP

WATER
GLOVE



CODE, BUILD, CREATE, COMPETE

`printf ("hello");`



To see Lesson 6 click here



WELCOME TO EPISODE 6!

I hope you are finding the Lessons interesting. David Whale designed them all. He's also written the factoids in the micro:bit Wizard column. The micro:bit wizard is a nickname he was given when he worked at micro:bit.

Open Source developers often use a "**nic**" or nickname. They go by it when they are contributing code. If you join a community you may well hear people referred to by their nic's not their real name.

I used to work with an elmo and an agy. In agy's case it was his initials that made up his nic. Mine is brocka, you will find me on GitHub under that nic or username.

I always find that when I am doing something I enjoy, like when I am on the first half of a 10-day holiday then the first half is longer than the second. The first 5 days seem longer than the second 5.

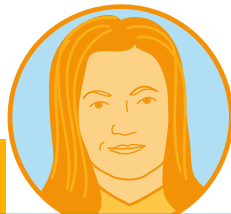
That's not logical is it...

Most things about coding are very logical. Are you finding that? Logic and experience tend to help coders to work out solutions when things go wrong.

But it's the way it feels!



Amanda Brock is CEO at OpenUK



Amanda, Editor

WATER GLOVE



KEEP IN TOUCH



openuk.uk

TEEN ZINE

Your step by step guide to coding genius

#06 GOOGLE'IT!



Femi

One key skill in coding is being able to search or 'Google' code.

You can't be expected to know any or every coding language inside out and so in many cases Google is your best friend if you have a question.

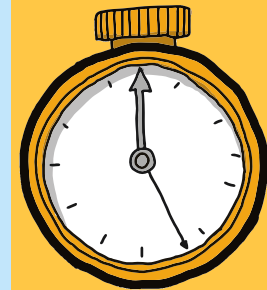
When debugging, you can take your error messages and copy them into Google.

Sites like Stack Overflow, GitHub and W3Schools are great places to find other people's solutions to your errors and bugs.

On top of this, you can also use GitHub or GitLab to find other Open Source projects and review their code, collaborate or even use it as a basis for your own projects (make sure you credit them for their contribution).

Many well-known developers and Open Source Heroes started their coding careers by debugging.

Remember, it is really important to stay safe when you are using the internet, follow this link for some common sense internet safety tips:
<https://www.saferinternet.org.uk/advice-centre/young-people>



Femi Owolade-Coombes, age 14

micro:bit WIZARD

Your micro:bit questions answered by micro:bit expert **David Whale**!



What other applications could the MiniMU glove be used for?
Guy, Perthshire



David



Any application where gestures and sound work well together would be a good application for the MiniMU glove – for example, detecting hand movements and turning these into speech or any form of musical performance that is **gesture-based**. You could add **flex sensors** and also detect finger movements, it might also be really handy in sporting applications such as an automatic tennis coach that analyses your serve performance. Your imagination is the only limit!



Why when pins touch together does my micro:bit play the same note over and over again?

Adonai, Essex



If the 3V and 0V **pins** touch together, this will cause the micro:bit to **reset** and it will **re-run** your program from the start again. If you have programed your micro:bit to play a tune but it only plays one note, check that your crocodile clips on 3V and 0V are not shorting together or shorting against the little **pins** in between, as this will cause it to repeatedly reset and then play the first note of your tune, reset again, etc. Always make sure to attach the crocodile clips at 90 degrees to the board to get a good connection.



David Whale is a Software Engineer

PLEASE

MISS

BOAL



Pam

CREATE, INNOVATE!

The Irish politician Edna Kennedy stated that “Learning to code is learning to create and innovate”. Let’s consider some new code learning to improve our creations and inventions.

Functions are self-contained **blocks of code** that accomplish a certain task. They normally take in data, **process** it, and **return** a result. **Functions** are first **defined** meaning they are created and then **called** which means the code is run.

Once written, **functions** can be reused in lots of places in a program. They can even be **called** from the inside of other **functions**. When finished a **function returns** to the point in the program that it was **called from**.

Some **functions** and code make use of **constants** which are **variables** which store a number that doesn’t change. We indicate **constants** by giving them uppercase **variable** names as a reminder not to change their **value**.

We have learned a lot about **selection** but how do **If statements** work? They evaluate an **expression** such as **running time > alarm time** to decide if it is True or False. If the **expression** is True, then the **code is run** and if it is false then the code is **not run**.

By now, you should have some confidence about innovating some ideas and making some creations of your own.

When you write your own code remember to include a licence. This legal document lets others use the copyright in the code which belongs to you the creator of the code and gives other developers details of the permission that they have to reuse your code.

Keep Coding!

Pamela Boal is an Educationalist

openuk.uk

INDUSTRY INSIDER



Mihail

BUGS & FIXES – THE PLACE MOST CONTRIBUTORS START

Open Source projects can be very large with millions of lines of code. Most of the lines are simple with pre-known coding patterns. However, the size of the projects can make the collaboration among developers difficult. Misunderstandings between developers cause program errors – these are **bugs**!

As new developers, we want to directly contribute to a project by writing new **features**. The problem is that this can be difficult to do. We need to understand the whole structure of the program.

Fortunately, there is an easy way to start: **bug fixes**!

In Lesson 5, you defined a **function**. It took a specific input (two **variables**), performed a defined task (**compare variable**), and returned a specific **output** (sound depending on the check).

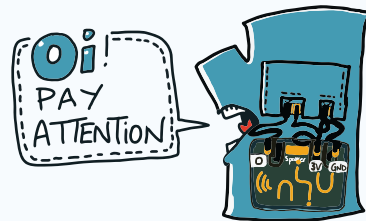
We do not need to understand the whole program to check if this function is correct, we can study each **function** separately!

Open Source projects are divided with many different **functions**. So, for every **bug** identified, we can easily start checking if each **function** is behaving as expected.

This approach has two benefits:

Firstly, you help the project by fixing a problem and people will recognise you for doing that!

Secondly, you learn more about the project which is necessary to become a senior contributor!



Mihail Popov is a Software Researcher

OPEN SOURCE HERO



Chris

I'm the founder of the Tika Open Source project. Tika is a content detection and analysis toolkit that **extracts** text, **metadata** and language information from any type of **file** including 1000s of **files** that are present on the Internet.

If you've ever done a search on the Internet, chances are Tika helped the **search engine** to **index** information about the results.

Tika also helped to expose financial fraud amongst the world's elite, and was the key technology that helped the world's journalists to analyse the Panama Papers which won the 2017 Pulitzer Prize in Exploratory Reporting.

At NASA's Jet Propulsion Laboratory, I manage the Artificial Intelligence, analytics and custom development activities for the laboratory.

We are using Tika, Python, TensorFlow and other Open Source Software to help to put Rovers on Mars; to make crucial measurements of the Earth's signals like temperature, CO2, or cloud cover; and to explore interstellar space with Voyager launched over 40 years ago.

Not only are we using Open Source, we are contributing to it daily.

CHRIS MATTMANN - ROVERS ON MARS & OTHER STORIES



Chris Mattmann is Division Manager of the Artificial Intelligence, Analytics and Innovative Development Division at NASA's Jet Propulsion Laboratory

WELL BEING

BENEFITS OF DRINKING WATER (OVER SOFTDRINKS!)



Matthew

I used to love sugary drinks when I was younger. Their sweet taste and variety of flavours would always make me want to drink them over water or tea.

But one day, in my early twenties, I read my favourite soft drink's label. I was so shocked with the level of sugar and unpronounceable additives in that bottle that I decided to stop drinking soda altogether!

I don't expect you to stop too, but you should definitely try to develop a love for water and definitely drink more of it.

Why? It's crucial for our bodies' performance.

Making sure you stay hydrated is the number one rule in health and nutrition. Did you know that humans are made up of 70% water? Our blood, sweat and digestive fluids are mostly made of

water. This is why the body can go weeks without food, and only a few days without water.

Water also helps your mood and memory.

Research shows that even mild dehydration can negatively affect your memory and mood. It causes you to be upset, tired, and unable to concentrate.

On the flip side, the sugar in soft drinks is terrible. It causes cavities, unhealthy fats, and a number of diseases and conditions including diabetes, even for young people.

I hope that I have inspired you to drink more water. If so, recommended amounts are between 1.3 and 1.5 litres each day for girls aged 9-13, and 1.5-1.7 litres a day for boys aged 9-13. For those of you aged between 14 and 18 (both boys and girls), the recommended water intake is 1.9 to 2.6 litres a day.

Matthew Springer is a Founder

micro:bit

REUSE

Wise words from the bit brain



ACCELEROMETER

An **accelerometer** is a motion sensor. The micro:bit can sense movement using its **accelerometer**, it can tell which direction it is moving and you can program it to respond to this movement. This is the star feature of your musical glove.



Click here to view the film

openuk.uk

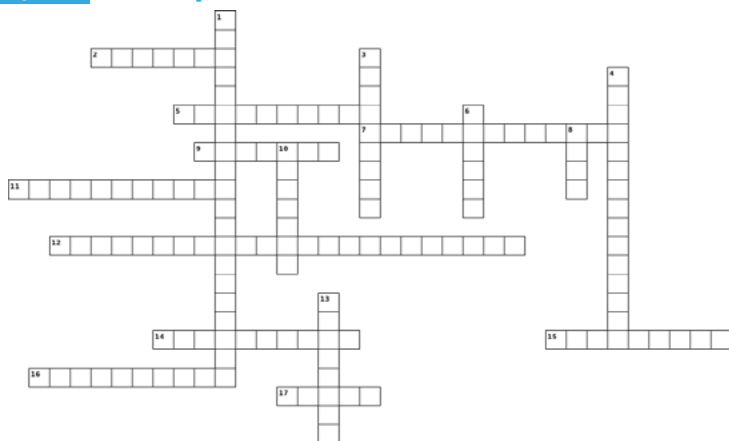
BRAIN GAMES

COMPETITION

Just email your finished puzzles to enter
ezine6@openuk.uk



Crossword courtesy of crosswordlabs.com



Across

2. What is it called when you have formal permission to use, perform or release something?
5. What is a person who writes computer programs called?
7. What measures proper acceleration?
9. What is a collection of instructions that can be executed by a computer to perform a specific task called?
11. What is it called when your micro:bit remembers how long it has been since it was last reset? (Two words, 5 letters, 1 punctuation mark, 3 letters)
12. What does EULA stand for? (Four words, 3, 4, 7 and 9 letters)
14. What is it called when you keep an eye on the progress of something?

Down

1. What does OSI stand for? (Three words, 4, 6 and 10 letters)
3. What is it called when you replace water in the body?
4. What is a licence called that has been authorised by the OSI? (Two words, 8 and 7 letters)
6. What is an input device that records data about the physical environment around it called?
8. What is it called when you check something is working properly?
10. What is it called when a program, code or software is working smoothly?
13. In computing what is it called when you store a value that doesn't change?

Word search

courtesy of
discoveryeducation.com

K S B W C W G R E L D N A H C
C T T E C O N V E N T I O N O
O E N N W T I G K A Q J C D N
L E R E E I T R E C X O M E S
B D M U V M C C S S D H N S T
T F O E S E E W O I T O M P A
A P U G S A T T N M I U L A N
E L T N W S E G A T P O R L T
B A P N C M D M A T O L X E S
E Y U R T T S C Z P S T E H S
U T T V A R I A B L E F Q X I
L O S A O L M O P R O T I D E
A N G B P S V S N I P X J C Y
V E W P A U S E R S P G X C C
V E A N O I T I D N O C J J F

APPLICATION
COMPLEX
CONVENTION
EDITOR
EMESS
GESTURES
LOOP
OUTPUTS
PLAYTONE
VARIABLE

BEATBLOCK
CONDITION
ELAPSED
EVENT
HANDLER
MEASURE
PAUSE
TIME
WEB

CODING
CONSTANTS
ELAPSED
FUNCTIONS
IFSTATEMENTS
MISDETECTING
PINS
VALUE

PRIZE

Win a Huawei MatePad T8



HUAWEI MatePad T8
Everything You Need, On The Go



To enter the prize draw you must submit the completed Crossword and Word Puzzle from Ezine1, by email to ezine6@openuk.uk. All entries are subject to our terms and conditions which you can read <https://openuk.uk/ezine-6-comp-terms-and-conditions>. By entering you agree to them and confirm that you have parental or guardian permission if you are under 16 years of age. One winner will be drawn from completed entries received by 10 September. No cash alternative. UK residents only. Judges decision is final. No correspondence will be entered into. Surname and county of prize winners will be made available on request. Promoter, OpenUK.

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OpenUK MiniMU INSTRUCTIONS

LESSON SIX



Adam's Mum keeps nagging him to drink more water so that he doesn't get dehydrated in the hot weather, and this gave him the idea of using his MiniMU glove as a reminder system.

Instead of his Mum reminding him to drink more water, his glove could sense when he lifts his bottle to drink, and then start a timer. When the timer runs out, his glove could beep to remind him that it is time to drink more water - It would certainly be much more fun than his Mum nagging him all the time! Adam is a bit stuck with the coding though, can you help him out?

In today's lesson you will help Adam to design a program for the 'Water Glove' project.

By doing this you will learn about:

- ☐ event handlers;
- ☐ variables, including boolean variables;
- ☐ if statements;
- ☐ functions;
- ☐ and constants.

You will also learn how to measure elapsed time on the micro:bit, as well as making a more complex gesture out of two simple gestures.

You will need:

- ☐ your assembled MiniMU glove;
- ☐ the MakeCode web coding editor;
- ☐ a water bottle with some water in it.

OpenUK MiniMU INSTRUCTIONS

LESSON SIX

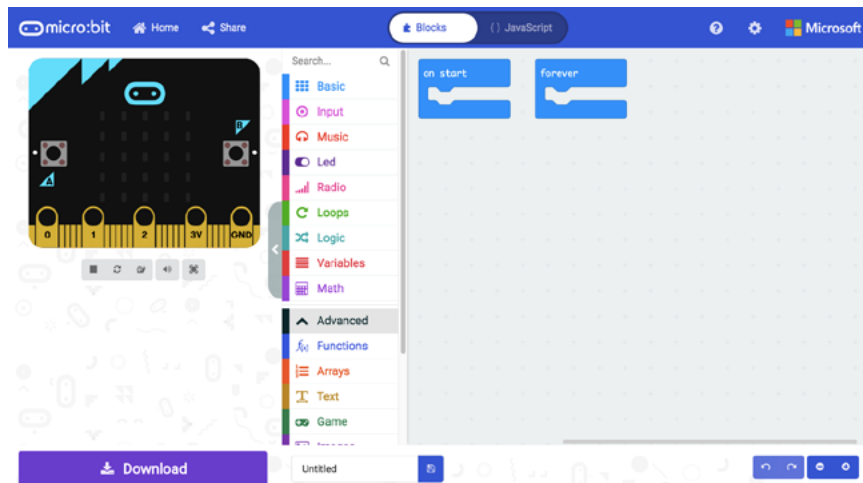


Figure 1: The MakeCode web coding editor.

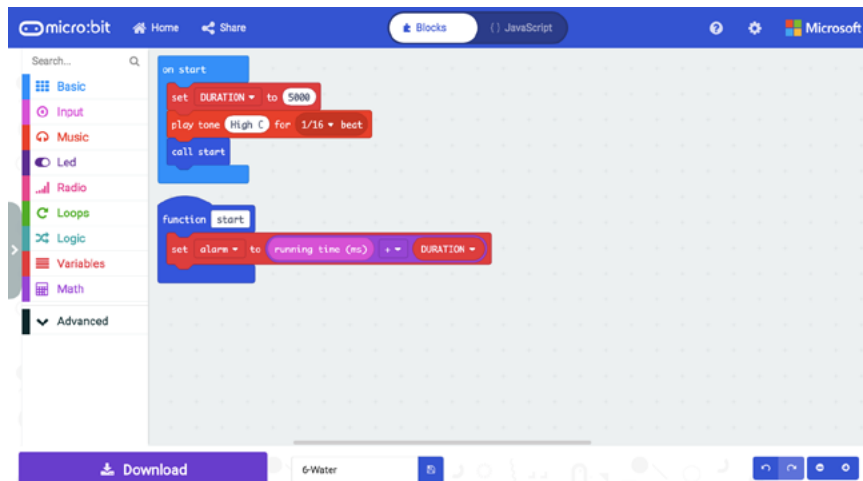


Figure 2: The OnStart event handler, and 'start' function.

OpenUK MiniMU INSTRUCTIONS

LESSON SIX



Figure 3: Forever loop – this sounds the alarm.

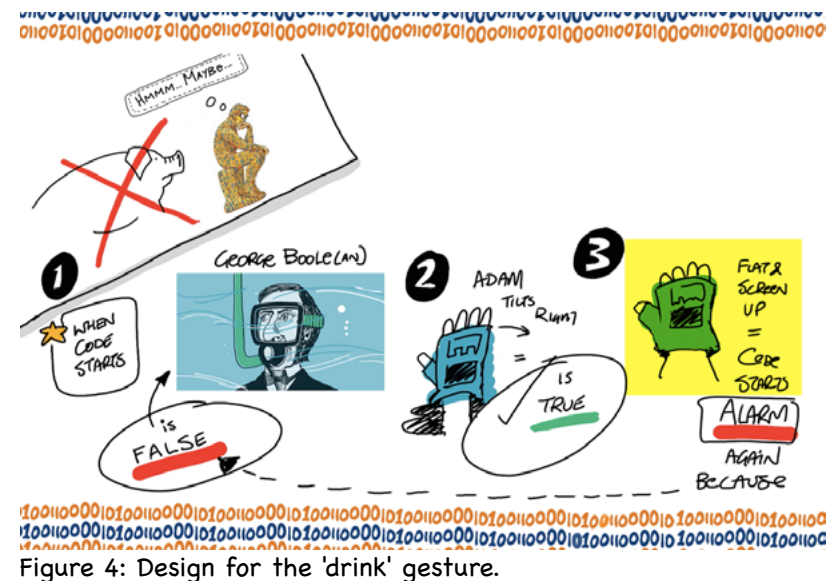


Figure 4: Design for the 'drink' gesture.

OpenUK MiniMU INSTRUCTIONS

LESSON SIX



Figure 5: OnTiltRight and OnScreenUp gestures (drink gesture).

OpenUK MiniMU INSTRUCTIONS

LESSON SIX

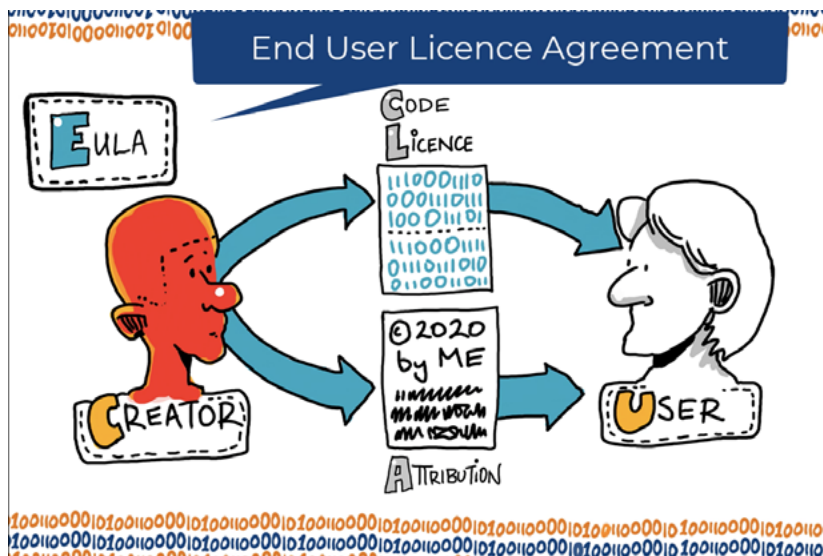
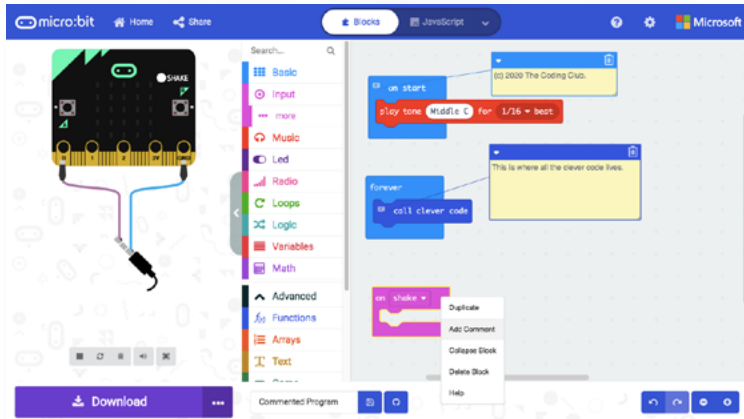


Figure 6: Copyright, Licence (EULA) and Attribution.

OpenUK MiniMU INSTRUCTIONS

LESSON SIX

Additional Information – adding comments to MakeCode



To add a comment to a MakeCode program, right-click with the mouse pointer on any block. From the pop-up menu, choose 'Add Comment', and it adds a yellow note attached to the block.

You can then type in any text you want in that comment.

If you click on the small triangle in the top left corner of the comment, it will hide it.

You can show the comment again by clicking on the speech bubble icon in the top left corner of the block.

To delete a comment, click on the dustbin icon in the top right corner of the comment.