ISSUE 8

openuk zine

The OpenUK open source how to guide

THIS EP

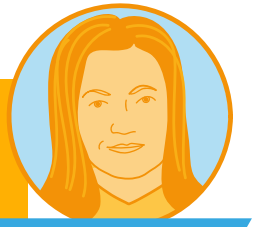
RECORDING GLOVE

CODE, BUILD, CREATE, COMPETE

fmt.Println("hello")

& WELCOME TO EP 8

To see Lesson 8 click here



Amanda, Editor

Have you noticed our credits page?

In it, you will see the names of the contributors to each Ezine. They stay the same from Ezine to Ezine with the exception of the Heroes. If you want to know more about the people involved, we have shared their Twitter handles and you can find and/or follow them on twitter if you use it. You can also look them up on a search engine like Google.

They all have something in common - they are part of an Open Source community, and contribute to it.

Contributions to Open Source are not always made in code. Some folk contribute by developing code, others contribute by working on documents, some by translating things into different languages, some by organising communities, and others by working on what we call governance – sorting out licensing, making sure attributions **in** code etc are all correct.

RECORDING GLOVE

Everyone's help is needed for us to make Open Source Software that everyone can share. We meet each other at conferences face to face, but often work together all over the world, digitally.

You can meet other people taking part in the course on **instagram, facebook or twitter** if you use them. Tag your posts with #openkidscamp and meet other people involved. By doing this, two things are happening:

Firstly, you are contributing to a community of users of this Kids Camp. Being part of a community is great. As you become part of one, you will see what I mean.

Secondly, you are networking. Getting to know people is great! Open Source communities allow us to collaborate with people all over this planet. Collaboration improves what we create, but it also allows us to get to know people and to help and support each other over time.

Many people in my network have contributed to the Ezines, the Lessons and making the Kids Camp happen.

I, and I hope you, are grateful to them all.

Keep coding

Amanda Brock is CEO at OpenUK

KEEP IN TOUCH

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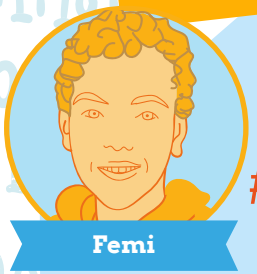
TEEN ZINE



Femi

Your step-by-step guide to coding genius

#08 NETWORK IT!

Networking is a key 21st century skill. Go to events, meet other people and get talking. During lockdown there have been lots of virtual meet-ups. Just make sure you are supervised by a responsible adult.

When you network, it is really important to ensure you record who you meet. Bring along your notebook from Ezine 1. Ensure you take down the details of people you talk with: their name, company, job title, email and even some notes on what you talked to them about and their specialism.

Creating and then widening your contact network is really useful. It means that when you come to a new project and need some advice or help, you can reach out to your network for help and advice.

Even if a connection doesn't really seem very useful at the time, still record the details and take notes. You never know, you may find you would like to contact them in the future.

Networking is a key skill in the tech world and if you can network effectively, then it will help your prospects and it's actually really enjoyable.

Femi Owolade-Coombes, age 14

micro:bit WIZARD

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

David

Q ***How far can you send a radio signal between micro:bits?***
Abbie, Telfording, Essex

A I did some testing of the micro:bit range, and it varies depending on what other objects are in the way. In an open field, I managed to send a message over 200 metres away. But inside a busy school building, the range can be limited to about the length of a classroom. It is worse if there are people and walls or other objects in the way. You can use the ***signal strength*** block in the MakeCode ***editor*** to work out how strong the received signal is.

Q ***Has anyone used the micro:bit for an industrial use?***
Murat, Essex

A Yes, I read about a project where an 'IET' engineer had made a pottery kiln controller. The micro:bit had an external wide-range temperature ***sensor*** on it, and it monitored the kiln temperature (which gets as high as 2400° Fahrenheit!). It takes several hours to get to the right temperature, which then has to be carefully maintained. The micro:bit communicated wirelessly with a radio-controlled plug which would turn the kiln on and off to maintain the correct temperature.

David Whale is a Software Engineer

MARVEL & WONDER!

Sometimes, you have to stop and wonder at the marvel of technology.

When I started coding 30 years ago, we were drawing shapes on screen in class and Computing Science was seen as the place for geeks. Now, in just 7 lessons, you are able to produce a glove that records and plays music.

It really is inspiring that: "From phones to cars to medicine, technology touches every part of our lives. If you can create technology, you can change the world." Susan Wojcicki, CEO YouTube.

Let's look at what we have learned this week…

An ***array*** is a series of ***memory*** locations each of which holds a single item of data, but with each box sharing the same name. All data in an ***array*** must be of the same data type. Each item in an ***array*** can be identified by a number called the ***index*** which starts at 0.

It is a common programing technique to try to access each item stored in the ***array*** so that the data can be checked. This is called ***traversing an array***. This will involve using a ***fixed loop*** and creating a ***variable*** (loop counter) that will track the position of the item currently being accessed.

In this lesson, you were encouraged to look at the licence of MakeCode. This licence gives you permission to ***modify*** the code which means that you are allowed to make changes and ***enhancements***.

Why not have a go at creating some new melodies? Just remember to leave a copyright notice and a licence for your work!

Pamela Boal is an Educationalist

openuk.uk

INDUSTRY INSIDER

TESTING CODE

When we write in English, we can make mistakes.

The same thing happens when developers write code.

However, there is a major difference with a text written in English and code. As humans, we are able to understand an English language text, even if there are some **misstakkes** in it! Computers are not that smart: even the smallest misspelling in a program breaks everything.

Fortunately, developers have ways to avoid, detect, and correct mistakes. They use ***editors*** (just as the one you used to write your code). These tools provide autocorrects that suggest fixes for most misspellings just as autocorrect fixes our English mistakes.

Autocorrects are more efficient at detecting mistakes in source code than in human languages because programming languages are way simpler than human languages!! Yet, some errors cannot be automatically detected: we need testing to find them!

We define some expectations for our program and check them by ***running*** the program. For instance, in Episode 3, we expect that if we drop the virtual glass, we lose the game. To ***test*** that our program works, we can actually drop the glass and see if the game reports that we lost.

Developers always include ***tests*** to ensure that their programs behave as expected.

Mihail Popov is a Software Researcher

OPEN SOURCE HERO

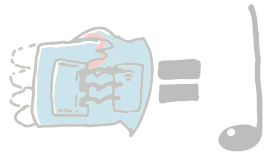
DENISE COOPER EMPOWER & ENGAGE

I have worked in Open Source Software for 20+ years and most recently have been living and working in Ireland, where I have been working with the Irish Health Services Executive, helping them to build a COVID tracing app.

You might have seen people (like OpenUK's CEO, Amanda) talking about these apps on tv and in newspapers.

Governments think that the apps are really important to help understand and manage the spread of the virus - being able to work out who someone that is diagnosed with COVID-19 has been in contact with, before they even show symptoms of the virus.

The app is made with Open Source Software and that's really important for a number of reasons. I think one of the most important things about Open Source is efficiency.

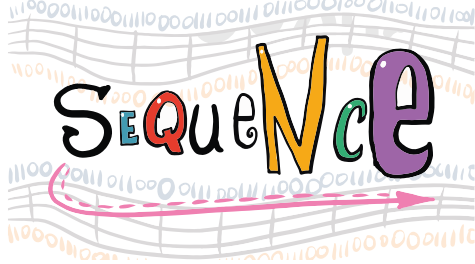


Because the Irish app is Open Source the code is available for re-use. NearForm, the company I work with, is also making an app for Scotland and one for Northern Ireland using the same code which has been shared in a public repository.

Although I work as a Computer Scientist and learned to code a long time ago, I didn't study code at College.

Like many developers I am a self-taught coder.

The most important thing about being successful isn't what you study at college, it's believing that you can always learn anything and be whoever and whatever you want to be.



Danese Cooper is a Computer Scientist

WELL BEING

HOW TO FIND INSPIRTION FOR YOUR PASSION

Matthew

Have you ever struggled to find inspiration? Even if it's for something you are extremely passionate about, some days you might just not feel motivated.

No need to worry though, getting stuck is simply part of the creative process. Everyone struggles, even architects, app developers, designers, musicians, entrepreneurs and others we think are creative.

However, there are ways to boost your inspiration:

- Learn from the greats: What's the story of those at the top of the industry of your dreams? How did they get there? No one's path is straightforward, but I am sure that you'll notice similarities between your problems/ challenges and the ones these people have already encountered and solved. Pro tip: follow these thought-leaders on Twitter.

- Power up your body. Sometimes, the best way out of a brain fog (or lack of inspiration) is exercise! Even just 60 seconds of jumping jacks or jump squats will positively affect your body, mood, energy and thereby your thinking.

- Change your perspective (literally). Something as little as going to sit under a tree, by a river or a lake can get the creative thoughts flowing.

- Make a list of your favorite motivational and inspirational quotes. For example, one of mine is "Creativity is inventing, experimenting, growing, taking risks, breaking rules, making mistakes, and having fun." Mary Lou Cook

You are extremely lucky to have so many additional resources online, so please take some time to research more tips and tricks.

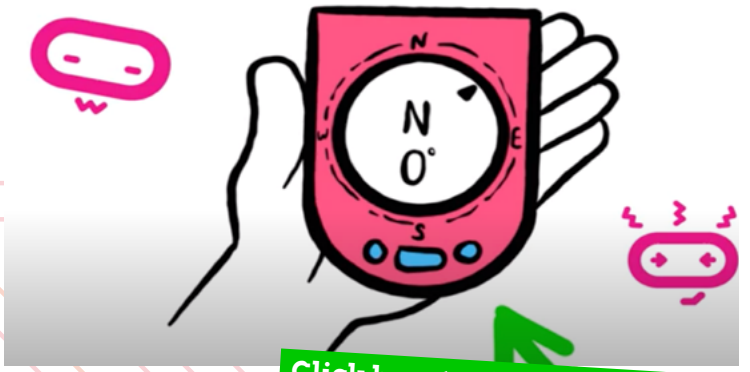
micro:bit REUSE

Wise words from the bit brain

micro:bit

COMPASS

A digital compass is an input ***sensor*** that detects magnetic fields. Your BBC micro:bit has an inbuilt compass that can detect the direction in which it is facing.



Click here to view the film

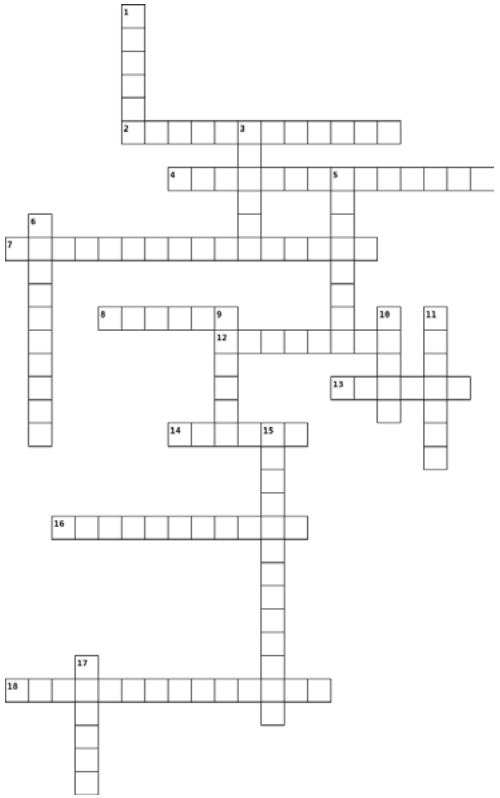
openuk.uk

BRAIN GAMES COMPETITION

Just email your finished puzzles to enter ezine8@openuk.uk

Crossword

courtesy of crosswordlabs.com



Across

2. What are improvements in code called?
4. What is the conversion of information into something that is understood by a computer called? (Two words, 4 and 10 letters)
7. What is a person over the age of 18 who is in charge of a minor called? This can be a parent, step-parent or guardian (Two words, 11 and 5 letters)
8. What is the name of the shape (often an arrow or blinking line) on your computer screen that shows where actions made with the keyboard or mouse will make a change?
12. What is the name of a person who designs, builds and/or maintains engines, machines or structures?
13. What is the name for data you place at the beginning of a block (or body) of data?
14. What is the copyright and permission text in a licence otherwise known as?
16. What is a radio wave used to transmit and receive messages called? (Two words, 5 and 6 letters)
18. what is this lesson called? (Two words, 9 and 5 letters)

Down

1. What is being able to do something while in a different place to something else called, such as being able to access a computer from a distance?
3. What is to make something different called?
5. How do you hide some code from view, so that it appears under an up arrow sign?
6. What is it called when you link up computers to allow them to operate interactively?
9. What is the process of restarting your computer called?
10. What is a collection of variables of the same type known as (shown in this lesson as letters on a name bracelet)?
11. What is another way of saying turn on your computer? (Two words, 5 and 2 letters)
15. What is working with another individual or a group of people called?
17. What is another word for changing something?

Word search

courtesy of puzzlemaker.discoveryeducation.com

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

ARRAYSPALATTE
COUNTED
FLASH
LOOP
PLAYBACK
STORE
COMPLEX
EMPTYARRAY
FUNCTIONS
LOOPS
PROGRAMS
TRUE
COUNT-CONTROLLED
EVENTHANDLERS
GESTURES
PAREMETER
RECORD
WEBCODINGEDITOR

PRIZE

Win a Huawei MatePad T8

To enter the prize draw you must submit the completed Crossword and Word Puzzle from Ezine1, by email to **ezine8@openuk.uk**. All entries are subject to our terms and conditions which you can read **https://openuk.uk/ezine-8-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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Kit designed and distributed by @pimoroni

The OpenUK glove kit giveaway and Ezine are made possible thanks to the generous support of

HUAWEI 20 YEARS CONNECTING THE UK

OpenUK MiniMU INSTRUCTIONS
LESSON EIGHT

Limor saw the 'trainer glove' project that you built last week and absolutely loved it! But, she wants to build something that she can improvise with, without having to flash new code to it all the time. She has done some programming before, and she suggests that using something called an 'array' would be a good way to do this. Can you make a glove that records gestures and then plays them back as a tune?

Limor has heard how good your coding is getting now, and wants to set you a challenge to make her a recording glove! Can you help her to solve this problem? In today's lesson you will build a program for Limor's glove, called the 'recording glove'.

By doing this, you will learn about:
- ❑ event handlers;
- ❑ variables, including boolean variables;
- ❑ if statements;
- ❑ count-controlled loops;
- ❑ functions;
- ❑ passing a parameter to a function;
- ❑ using an array to store and retrieve a collection of values.

You will also learn how a licence allows you to create new things from open source software.

You will need:
- ❑ your assembled MiniMU glove;
- ❑ the MakeCode web coding editor;
- ❑ a small piece of music to practice.

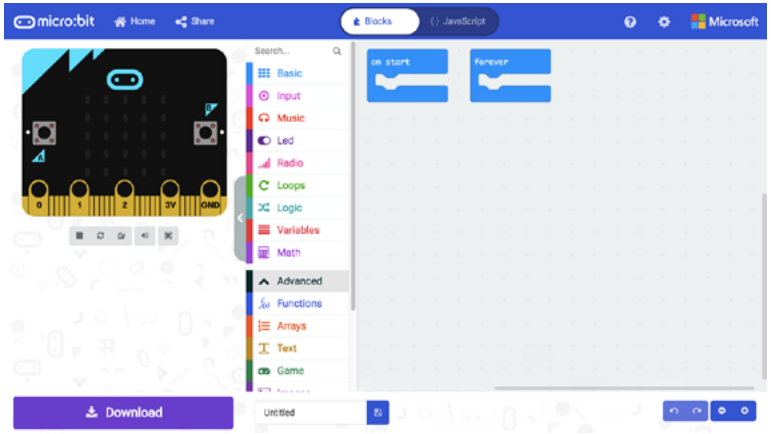


Figure 1: The MakeCode web coding editor.

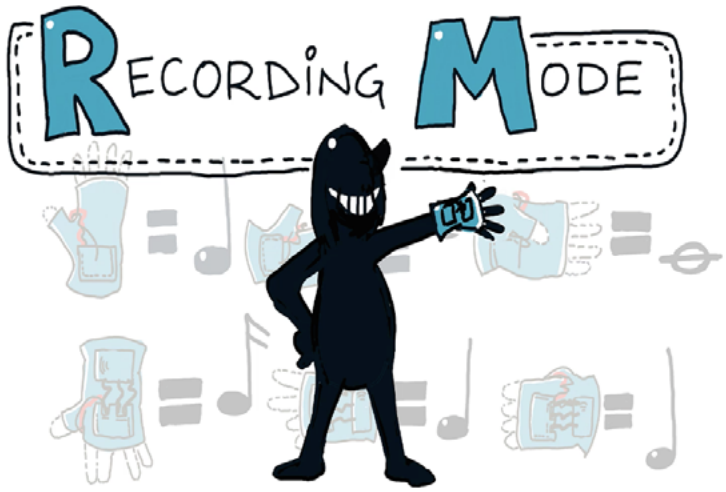


Figure 2: Recording mode is entered by turning your glove 'palm up' (which is micro:bit 'screen down')

OpenUK MiniMU INSTRUCTIONS
LESSON EIGHT

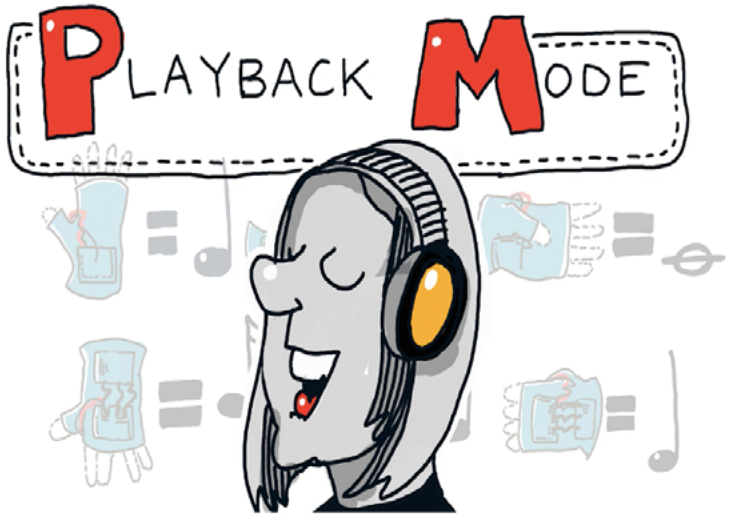


Figure 3: Playback mode is entered by holding the glove like a 'stop sign' (which is micro:bit 'logo up')

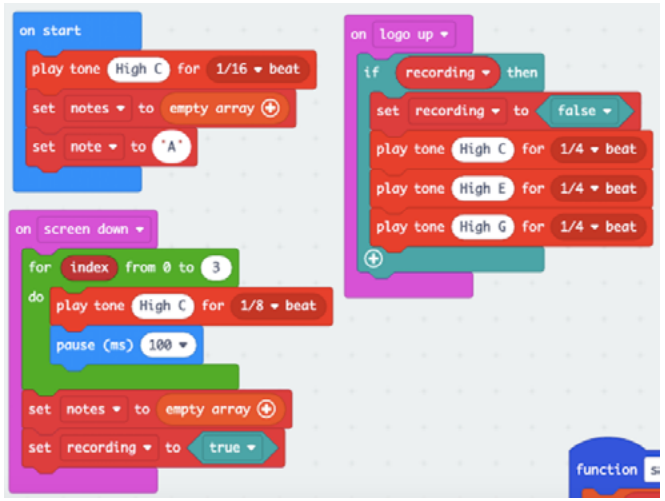


Figure 4: The first part of the program enters recording mode (screen down) and enters playback mode (logo up)

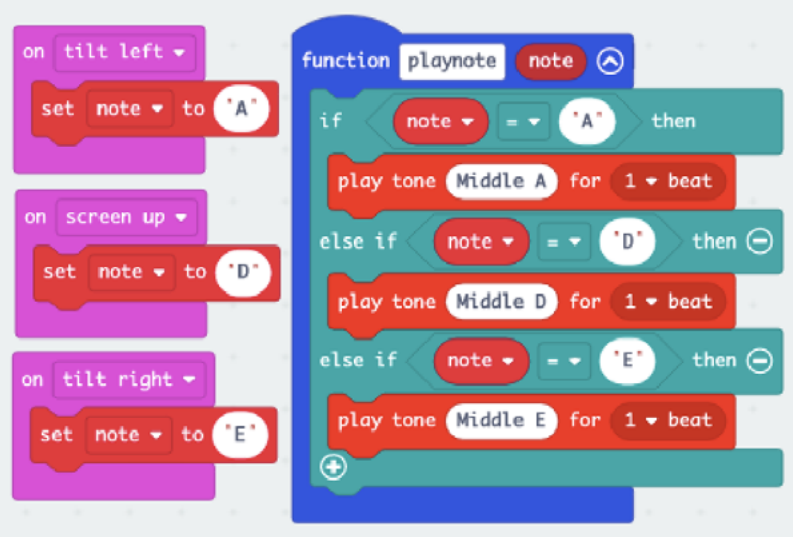
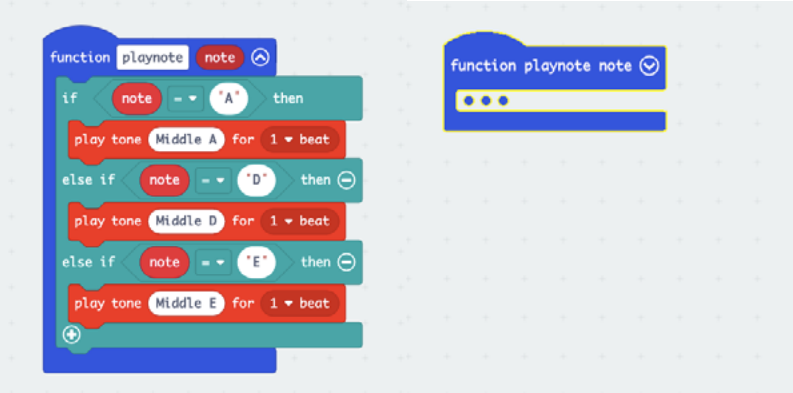


Figure 5: The second part of the program has 3 gestures for 3 different notes. It also introduces the 'play note' function.



Figures 6&7: The arrow on the function block will collapse and expand the code inside it. This makes more space on the screen.

OpenUK MiniMU INSTRUCTIONS
LESSON EIGHT

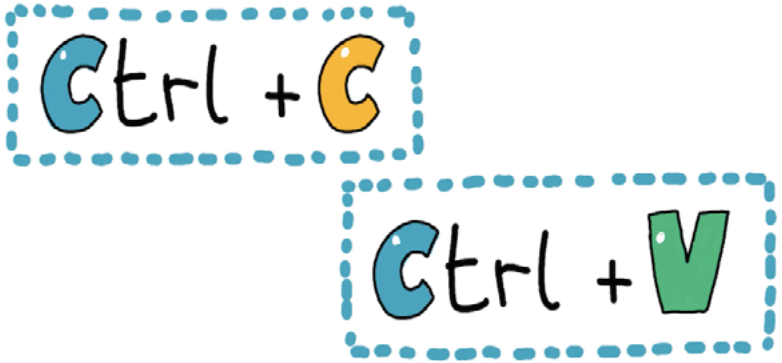


Figure 8: CTRL-C and CTRL-V will work inside MakeCode, you can copy code sections between projects this way.

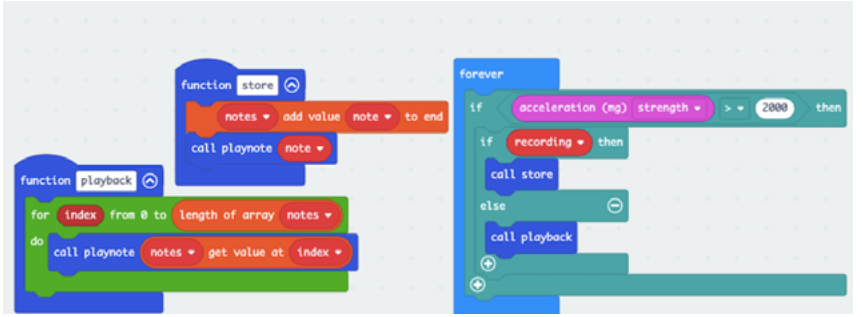


Figure 9: The third part of the program introduces the store and playback functions, and the 'forever' loop that calls 'store' or 'playback' depending on the mode ('recording' boolean).

Figure 10: The final program is now quite big.

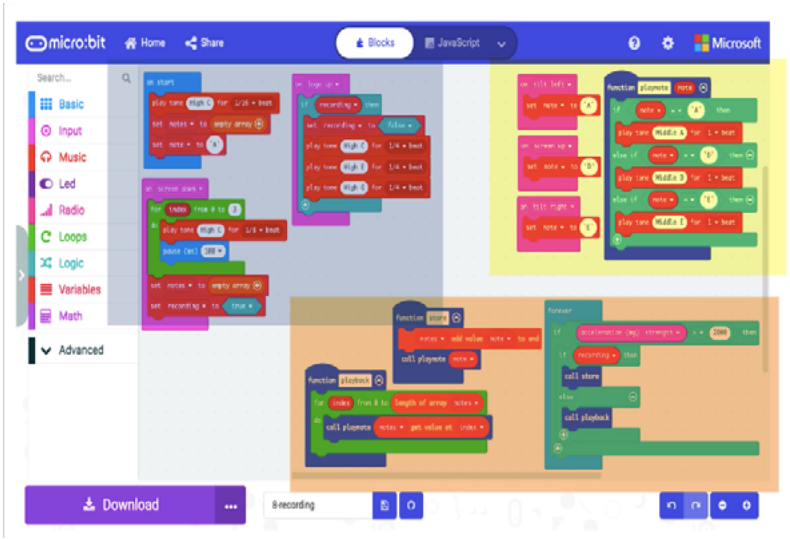


Figure 11: The final program with the 3 logical sections marked.

OpenUK MiniMU INSTRUCTIONS
LESSON EIGHT

Figure 12: The gesture palette of built-in gestures.

Figure 13: The MIT licence allows you to modify the source code.

OpenUK MiniMU INSTRUCTIONS
LESSON EIGHT

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