

CODE, BUILD, CREATE, COMPETE



To see Lesson 7 click here

WELCOME TO EP 7



If the answer is yes, you are in the right place.

Welcome to TrainerGlove! Our friend Robin likes Bollywood, but there are all sorts of dances to love, as our Wellbeing columnist Matt points out. There are just about as many different kinds of dance you could take up, as there are kinds of technology.

Femi starts to explore those in this issue and we meet Deb Bryant, an engineer who has contributed to Open Source Software communities for many years. One of the ways Deb contributes is by volunteering her time for the "Open Source Initiative" or OSI. It's the home of Open Source Software!

The term Open Source was actually coined by Christine Peterson back in 1998. For software to be considered Open Source it needs to be made available for others' use, by its creator.

The creator shares their copyright, their right to stop anyone else using their code, through a licence, as Deb explains.

The OSI, is where licences are approved. There's no point in us all writing our own licences. What a waste of time that would be.

nstead, we rely on the OSI to approve licenses and we reuse them again and again. It means we all get to know the licences and it's easy for us to understand what the creator allows us to do with it or requires us to do when we receive it on an approved licence.

If you have looked closely at the Lessons you will have seen MIT licence in one of our screenshots.

It's an OSI approve licence, so if you use it for your code, you can call it Open Source Software.

Happy coding.

Amanda Brock is CEO at OpenUK



Amanda, Editor



KEEP IN TOUCH



Your step by step guide to coding geniu

- #07 EXPLORE IT!
- One of the great things about tech is that there are so many different areas: AI, Cybersecurity, EdTech, FinTech, BioTech, Gaming, etc.

This means that there is so much to explore and learn...

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Femi

Get stuck in! Explore different areas of technology, what you find interesting and dig deeper into those areas.

For me, I've explored the worlds of FinTech, Cybersecurity and a bit of Gaming and have developed a real interest in Artificial Intelligence and Machine Learning. So, I dug a lot deeper and I'm now working on an app using Machine Learning and Computer Vision to help deaf learners with their literacy skills.

All this technologycan be quite daunting but when you start to discover how technology is used and can be applied in the real world, it makes more sense and you can then begin to specialise.

Femi Owolade-Coombes, age 14



ARAMETER

micro:bit MIZARD

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

> What impact did COV-ID-19 have on micro:bit? Avye, London



Because the micro:bit is a physical computing device, it has to be cleaned between uses if children are sharing devices. So, The micro:bit Educational Foundation recently had to write some advice on how to safely disinfect the micro:bit [https://bit.ly/2XwbjVs]. There are always many events around the country that the MEF contributes to, and these had to be paused – as a result of that, 5000 micro:bits that had were due to be used in schools were repurposed and sent out as a summer giveaway [https://bit.ly/31kONjj]. The Foundation wrote a lot of online learning material to support children studying at home. https://bit.ly/30tQr2H

What is the most creative use of a built-in sensor? Murat, Essex

> I'm a bit embarrassed to say this, but it might have been a project that I designed for the BBC Doctor Who series of lessons. I used the built in light-sensing to send a message from inside a video on the website, across via light, to the micro:bit. You can read all about the project here: [https://bbc.in/39Zrv6D].

David Whale is a Software Engineer

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KEEPING IT AGILE!

PLEASE

Robert C. Martin is one of the founders of a development method called **agile**. He is quoted as saying: "Truth can only be found in one place: the code". The ability to view the code and understand how it works is one of the key advantages of Open Source Software.

Which concepts from this week might we find in this code?

We were introduced to **string variable**s. A **string variable** stores a collection of **characters** which can be a combination of letters, symbols or numbers. Indexing allows you to access individual **characters** in a **string** directly using a number **value**. **String indexing** is zero-based, meaning that the first **character** in the **string** has index 0, the next is 1, and so on.

Our **function** knowledge has been expanded to include **parameters**. **Parameters** are names which are used to indicate the information which has to be passed into a **function**. They are normally used for numerical information such as stating the size of an object. For example, we can create a **function** that draws a triangle – but for it to be useful we need to use a **parameter** to specify the length of each side.

So, finishing this lesson's challenge sees you try creating a new program using **string variables** and **functions** with **parameters**.

Why not see if you can find out a little about the **agile** development methodology? That will be handy for later Lessons.

Pamela Boal is an Educationalist



Pam

NDUSTRY NSIDER **GAMING AND CODE**



OPEN SOURCE HERO



Video games are programs for entertainment. They are fascinating because they involve many diverse concepts.

Let's consider a 3D platformer. We control a character in a 3D world. Our goal is to reach a point by avoiding obstacles and enemies (controlled by the game). This involves many diverse tasks!

First, we need to allow our character to move in a 3D world! The game **simulates** the physics of the real world to give the illusion of movement. This task is performed by the **game** engine.

There are different engines, each with their own programing language! Some *simulate* a more realistic world but require a more powerful computer because they need to do more computations.

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A game is not only about the graphics but also about gameplay! Developers write the mechanics of the game. For example, this includes the artificial intelligence of the characters that are controlled by the program.

Finally, video games are not only eIntertaining – they are also a major motivation for computer science innovation.

3D engines require a lot of computations. As a result, computers constantly improve to match the new game requirements. This is how we get more beautiful games as technology evolves!



Mihail Popov is a Software Researcher

A software licence is how someone who writes a piece of software tells the person who wants to use it that they are legally allowed to use it, as well as how they can use it and who else they can give it to.

they can be used and reused for

It's important for people who

create Open Source Software to

always add a licence to let other

rules the creator wants them to

follow when using their software

people and companies know what

Open Source Software.

What's the big deal?

work.

At the non-profit **Open Source** Initiative (OSI), we care about Open Source Software licences.which means licences that let you freely use, modify (change), and share the software. We approve Open Source Software licences so that

LICENCES

DEB BRYAN1

Supporting OSI as a Board director makes me happy. It helps me do my job in the software industry where I work, and it feels good to know that

Deb

this kind of software is helping do many good things throughout our society.

A licence means others can use

that software with confidence.

often changing or adding to the

to make software.

original software to make it do new

and better things. That's one of the

reasons Open Source is a great way

Open Source Software is used to make important things like the Internet and Cloud work, but also for humanitarian purposes like helping people during times of crisis know where to send people and supplies - all good stuff worth championing!

Deb Bryant is a Board director at the **Open Source Initiative**.

WELL BEINC THE 7 BENEFITS OF DANCING



Dancing is a lot of fun. Unsurprisingly, it's also packed with benefits and you have a wide range of styles to choose from: breakdancing, Bollywood, ballroom and ballet... or you can just let loose and follow the rhythm!

What are the benefits?

1. It's a great way to release pent up energy and feel amazing. Being a form of exercise, dancing releases endorphins, which, in turn, make you feel happy.

2. Dancing is linked to better lungs, heart and muscular strength. It also improves endurance, coordination, agility and flexibility.

3. It helps with your cognitive abilities and memory. Science shows that those areas within the brain which deal with memory and skills – like organising and planning – can be improved by dancing. 4. It teaches discipline and that anything can be achieved with practice and hard work! Memorising different steps, routines, and timing can be hard, challenging, and will require a good amount of determination... but trust me: what you'll feel after getting a difficult move or choreography right is invaluable!

5. Practicing and performing frequently will give you a great confidence boost that you'll be able to apply in other situations. Presenting an idea in class, writing for the school ezine, or entering a competition... nothing will scare you, if you believe in yourself!

6. It builds community and friendships, increasing communication skills and teamwork.

7. Dancing also boosts your balance as you move through rhythm and music. Hitting certain moves may be a bit tough - but as your skills develop, so will your balance.

Give it a go!

Matthew Springer is a Founder

Wise words from the bit brain

micro:bit

LEDS AND LIGHT SENSING

micro:bit

An LED, or light-emitting diode is an **output** device that gives off light. Your BBC micro:bit has a display of 25 LEDs for you to program. A light **sensor** is an **input** device that measures light levels. Your BBC micro:bit uses the LEDs to sense the levels of light and lets you program your micro:bit as a light **sensor**.



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8



Across

- What is a form of AI that allows machines to learn from data without being programmed specifically? (Two words, 7 and 8 letters)
- 7. What is one of the 'happy hormones' called?
- What is it called when you learn to do something, or practice something to get better at it?
- **9.** What is another word for cerebral, or relating to one's mental functions or abilities?
- **10.** What is a type of music (and also a culture and art movement), which was born in the Bronx in the 1970s? (Two words, 3 and 3 letters)
- 13. What is it called when you distribute something to different people, such as tasks, or schedule a certain amount of time to something?
- 15. What is another word for arrange, or sort?16. What is a type of dance that you see in certain
- kinds of Indian musicals? (Two words, 9 and 5 letters)17. What is it called when you look at the
- similarities and differences between two or more different things?
- 18. What is a type of dance that originated in the US in the early 1970s, that includes toprock and downrock moves?

Down

- What is another way of saying detecting light? (Two words 5 and 7 letters)
- 2. What is another term for information technology security? (Two words, 5 and 8 letters)
- **3.** What is it called when you feel sure of yourself and your abilities?
- 4. What is an organisation (normally private or notfor-profit) that has been set up to educate the media and public about a specific area or field called? (Two words, 11 and 10 letters)
- 6. What does AI stand for? (Two words, 10 and 12 letters)
- 11. What is another word for remember, or retain information?
- **12.** What is the name of a TV character who travels through time in a ship called the Tardis? (Two words, 6 and 3 letters)
- 14. What is a type of dance where dancers typically have metal attached to the soles of their shoes which make sounds as they dance? (Two words, 3 and 5 letters)

Word search

courtesy of discoveryeducation.com

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H D R E C S O U R C E D I L S

ADVANCED	CHARACTERSTRING	CONSTANT
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Win a Huawei MatePad T8 HUAWEI MatePad T ® Everything You Need, On The Go Hud Tourised I Dealer Wer I That Held Read Participant

To enter the prize draw you must submit the completed Crossword and Word Puzzle from Ezine1, by email to **ezine7@openuk.uk**. All entries are subject to our terms and conditions which you can read **https://openuk.uk/ezine-7-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 SEVEN



Robin loves Bollywood dance, but needs some help learning the moves. They wonder if it is possible to use the glove to help them learn a sequence of moves, so that they can practice for a competition.

Instead of watching a video, Robin thinks it will be possible to program a sequence of moves into the glove, and get the glove to beep a different note when they move their hand to that position; that way, the glove will be 'training' them to learn the dance sequence.

Robin has heard that you are a real whizz with your micro:bit coding now, and has come to you to ask for some help with the code. Can you help them with this problem? In today's lesson you will help Robin to design a program for the 'Trainer Glove' project.

By doing this, you will learn about:

- event handlers
- □ if/else statements
- variables, including string variables
- string literals
- □ indexing into string variables
- passing parameters to functions.
- You will also learn a bit more about the benefits of open source.

You will need:

- □ your assembled MiniMU glove;
- □ the MakeCode web coding editor;
- □ a mirror to practice your dance moves in front of.

OpenUK MiniMU INSTRUCTIONS LESSON SEVEN

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Figure 1: The MakeCode web coding editor.

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OpenUK MiniMU INSTRUCTIONS LESSON SEVEN

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Figure 3: String variable 'MOVES' has one letter for each move.



move 💌

length of MOVES -

OpenUK MiniMU INSTRUCTIONS LESSON SEVEN

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O Music	play tone High C for 1/	16 + beat	play tone Middle C for 1-1	beat			
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_al Radio			play tone (Middle E) for 1 - 1	beat			
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Figure 5: The BeepMove function.



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OpenUK MiniMU INSTRUCTIONS LESSON SEVEN



Figure 7: CheckMove function with parameter, and gestures for LogoUp, ScreenUp, TiltLeft, TiltRight.

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EADMEmd		74	<pre>switch (melody) {</pre>
ure	~	75	case Melodies.Dadadadum:
frank In	. 9	76	return ['r4:2', 'g', 'g', 'g', 'eb:8', 'r:2', 'f', 'f', 'f', '
Desic.is		77	case Melodies.Entertainer:
buller/s		78	return ['d4:1', 'd#', 'e', 'c5:2', 'e4:1', 'c5:2', 'e4:1', 'c5
	•	79	case Melodies.Prelude:
	•	80	return ['c4:1', 'e', 'g', 'c5', 'e', 'g4', 'c5', 'e', 'c4', 'e
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		85	case Melodies.Ringtone:
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helpers.ta	•	87	case Melodies.Funk:
	•	88	return ['c2:2', 'c', 'd#', 'c:1', 'f:2', 'c:1', 'f:2', 'f#', '
	A	89	case Melodies.Blues:
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Figure 8: Javascript 'Open Source' code for melodies. Click: JavaScript >> Explorer >> Core >> Melodies.ts Scroll to: getMelody

OpenUK MiniMU INSTRUCTIONS LESSON SEVEN



OpenUK MiniMU INSTRUCTIONS LESSON SEVEN

Additional Information

Characters stored in strings usually conform to the ASCII code. This assigns a unique code to each letter, digit and symbol. Each code in the ASCII character set takes up 7 bits of storage.

Later extensions and improvements have been made to support a wider range of symbols and letters for worldwide support of all languages, and UNICODE provides many additional 'pages' of character codes that support all the different written languages.

The ASCII code was published in 1969 by Vint Cerf when he was at UCLA, and is defined in a document called RFC20. An RFC is a 'request for comments' and is a document that proposes a new internet standard.

Vint Cerf is one of the pioneers of The Internet, and has authored many internet standards.

He currently works as Chief Internet Evangelist at Google. You can read more about him here:

[1] https://en.wikipedia.org/wiki/Vint_Cerf

[2] https://research.google/people/author32412/

ASCII

[3] https://www.bbc.co.uk/bitesize/guides/zp73wmn/revision/4