This EP

TRAINER

GLOVE

CODE, BUILD, CREATE, COMPETE
Do ya, do ya, do ya wanna dance?
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.

Instead, 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

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...

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 technology can 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
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

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 variables. 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.
INDUSTRY INSIDER

GAMING AND CODE

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 its own programming language! Some simulate a more realistic world but require a more powerful computer because they need to do more computations.

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 entertaining – 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.

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 they can be used and reused for Open Source Software.

What’s the big deal?

It’s important for people who create Open Source Software to always add a licence to let other people and companies know what rules the creator wants them to follow when using their software work.

A licence means others can use that software with confidence, often changing or adding to the original software to make it do new and better things. That’s one of the reasons Open Source is a great way to make software.

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.

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

Deb Bryant

Why Software Licences Matter

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Deb Bryant

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

Matthew

LEDs and Light Sensing
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.

Click here to view the film

click to view the film
openuk.uk
Across
8. What is another word for cerebral, or relating to something, or practice something to get better at?
9. What is another term for information technology security? (Two words, 5 and 8 letters)
10. What is another word for arrange, or sort?
11. What is a type of dance that you see in certain media and public about a specific area or field called? (Two words, 5 and 8 letters)
12. What is another term for remember, or retain information?
13. What is another word for for-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)
14. What is another word for for-profit? (Two words, 10 and 12 letters)
15. What is another word for detector, or detect? (Two words, 7 and 8 letters)
16. What is another word for detector, or detect? (Two words, 7 and 8 letters)
17. What is another word for cerebral, or relating to something, or practice something to get better at?
18. What is another word for cerebral, or relating to something, or practice something to get better at?

Down
1. What is another term for information technology security? (Two words, 5 and 8 letters)
2. What is another term for information technology security? (Two words, 5 and 8 letters)
3. What is another term for information technology security? (Two words, 5 and 8 letters)
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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.

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 need:

- your assembled MiniMU glove;
- the MakeCode web coding editor;
- a mirror to practice your dance moves in front of.
Figure 1: The MakeCode web coding editor.

Figure 2: A string of characters, is like a name bracelet. A character is a letter, digit, or symbol.

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

Figure 4: The OnStart event handler and NextMove function.
OpenUK MiniMU INSTRUCTIONS

LESSON SEVEN

Figure 5: The BeepMove function.

Figure 6: Indexing a name bracelet is like indexing a string. 0='R', 1='O', 2='B', 3='I', 4='N' and the length is 5 characters.

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

Figure 8: Javascript ‘Open Source’ code for melodies. Click: JavaScript >> Explorer >> Core >> Melodies.ts Scroll to: getMelody
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:

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

ASCII

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