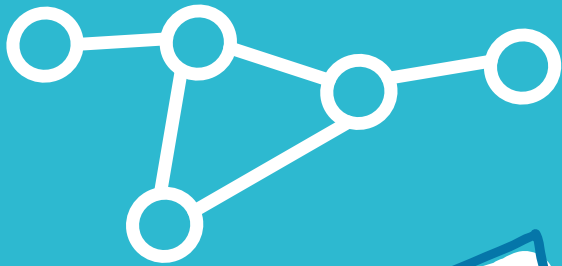


Open:UK Ezine



Open
Source
is...

SOURCE CODE:

HUMAN
READABLE

BEING
SHARED



...Sharing human
readable source code



Issue

2

A message from *the Ed*



Amanda Brock

Hi!

So how did Lesson One go? Bit different from the last Camp, if you did it! I hope that you are having fun. David Whale, who you might know as the “micro:bit Wizard”, is a famous educationalist who created our first course. This year, he’s helped us by supporting Lowena Hull (our new creative director) to build the course for you.

Lowena is a first year student studying Natural Science at Cambridge University - yup, she’s a clever person. She helped the Essex Stemettes do the first Camp last year and was so inspired by doing it that she has joined the team this year.

You will see just how clever she is when you work through the course on her coding. She very kindly shared some of her experiences with you all in her “Learn with Lowena” columns. As she’s only 19, you might find some of the experiences she’s had already interesting, and maybe, even be inspired by them.

Open Source is (of course)...sharing the human readable source code.

That sharing of the human readable code, which was a software developer’s key secret in the past, is what changed the world of software from a technical point of view. Of course, we balance open source between technology and people.

That’s because it is also very much about community, sharing, and collaboration.

The Apache software foundation talks about the Apache Way, which is “people before code”.

Amanda
CEO, OpenUK



Ask Ashleigh



Ashleigh Monagle

Identity - understanding who you are and knowing that's awesome!

Identity is all about what makes you unique, from your personality, to your hobbies and where you come from.

Building a strong sense of identity and being proud of who you are shows courage and strength. If you are unsure about your identity, try asking yourself these questions:

What do you like and what don't you like?

What makes you different from your friends?

What do you want to do when you grow up and why?

Share these answers with a friend or family member. It is a great way to get to know people and celebrate that everyone is different and that makes everyone awesome. Being proud of who you are means being comfortable and willing to express yourself, you can express yourself through your opinions and actions.

Art is a great form of expression, so next time you have to paint or draw something, why not draw something that represents you? It does not have to be a self portrait, it could just be something you love and the colours that inspire you.

Ashleigh

Digital Inclusion Lead, OpenUK



Sustainability





Cristian Parrino

Sustainability: The SDGs

The United Nations has created a map to help us understand the many different aspects of sustainability, and how they are connected. This map is called the Sustainable Development Goals (SDGs), and there are 17 of them:



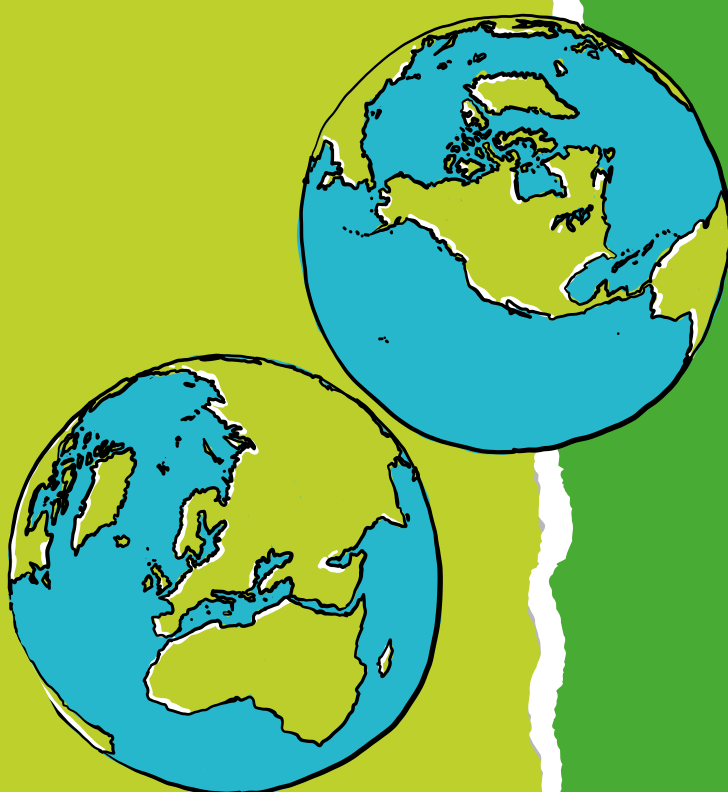


The SDGs were originally developed by an open working group of 30 countries, facilitated by the United Nations. They collaborated to develop a set of action-oriented goals designed to balance the economic, social, and environmental dimensions of sustainability. An open API and open database, maintained by the United Nations, underpin the SDGs to help countries achieve the goals, and measure their progress in meeting them. So open collaboration, open source software, and open data are at the heart of the SDGs!

Keep Coding!

Christian

Chief Sustainability Officer, OpenUK



Please Miss Boal



Pamela Boal

You, me & unicode!

The most popular code for storing each code is called the American Standard Code for Information Interchange (ASCII).

Many different computers use ASCII to represent text and this makes it easier for text to be transferred between different computer systems. ASCII uses a 7-bit code to represent each character. The 7-bit ASCII code allows for 27 (128) codes, so ASCII can represent 128 characters while 8-bit extended ASCII allows for 28 (256) codes. Nowadays, there is a need for universal character sets so a new system called Unicode has been developed.

Computer scientists created a method of using text in systems and then artists came up with the concept of ASCII Art. It's hard not to be reminded of the Steve Jobs quote - "because the ones who are crazy enough to think they can change the world usually do".

In this episode we have been learning about text and lists of all the characters which a computer can process and store is called the character set. Different types of computers may have slightly different character sets. To allow a computer to represent all the characters, a different code number is given to each character.

Your challenge in this lesson is to find out about Unicode and adjust your glove program to use it.

Keep Coding!

Pam

Computer Science Lead, OpenUK



Open Source Hero



When I was 11 in 1981 the BBC did something incredible and became a computer company. We knew it could not last. But for a short time, they made the most important computers in the world. Forget Apple and Americans. The best computer was the BBC Micro.

We didn't use the BBC to surf the Web - that didn't exist yet. Instead, we had GAMES. The best ones were on the BBC. Pacman, Scramble, Monsters, Asteroids. They are so good that old people still meet up in secret locations to play them today.

Writing games was more fun than playing them. Young people wrote the best games and shared the code with each other. Programming was cool. My friend Jeremy wrote books about it. Here he is looking like a 1980s rock music guy:

Today computers are everywhere and can do anything. Phones, TVs, cars, drones, 3D printers all run code. And the best code for this is FREE. You can use it and change it and remix it into your own program to do whatever YOU want. And then share it just like we used to with games.

We call this "open source code" and it is awesome. Oh and you are working with a spin off of the BBC Micro in your digital learning with OpenUK, the BBC micro:bit.

Alexis Richardson
CEO and Founder of Weaveworks



Industry

**The Linux Foundation is an
OpenSource Software Bakery**



Imagine your family's special chocolate chip cookie recipe with rules attached to it - similar to the kind of rules used in making open source software. If anyone in the world wanted to use your family's recipe to sell chocolate chip cookies, they would have to publish your family's original recipe on the box, along with any modifications they made to the recipe. Now Imagine a huge bakery where all the bakers could gather and bake cookies according to those rules. For open source software developers, that software bakery is The Linux Foundation.

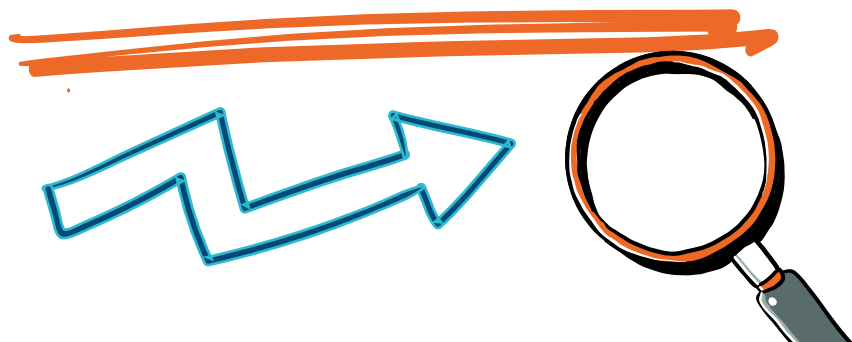
It takes a lot of the worry out of running those bakery operations from lawyers to protect software, handling all paperwork and administration to run the software bakery day to day, and making sure money is handled correctly for operational expenses. They also run the meetings and events to plan how the software is built and provide educational services so that new software bakers can be trained. Running the software bakery is not just about baking the cookies; it's about keeping the lights and machinery running, too. All of this has to be taken care of so that those software developers can do what they do best, which is to write open source software. stuff that tells your computers, iPads, and smartphones how to work.

Software developers create the software that powers the devices we use every day including things like our washing machines, cars, and much of the digital world we interact with.

The best software developers in the world realised they could work together and build software better as a group than any one of them could build on their own and started working together on building code, sharing that code with other developers to reuse in building their software, too. We call this process of working together and sharing code to make it better "open source."

And with all this sharing, people have built cool things - apps like TikTok, Instagram, and Netflix all are built using open source software. Over time, software developers wanted to build code together collaboratively, like playing a video game together online. They needed a place to build software under the rules, and one popular place to do that software creation together is The Linux Foundation.

The Linux Foundation



Open Data



What makes data 'open'? Carrie

There are many different types of data – from personal data (like someone's name or your phone number) to data about the world (like a bus timetable). When data isn't sensitive, it's good to make it open so others can use it too.

Open data is data that anyone can **access**, **use** and **share** (yes – even you!). But what does this mean?

Well, for someone to be able to **access** data, that data needs to be available online.

For someone to **use** data, that data needs to be in a common, 'machine-readable' format. This means your computer should be able to understand the data and do things with it.

And, anyone can **share** and use open data in any way they want, like open source software. This might be to make an open-source tool, to use in scientific research, or to make a new app – nothing is off limits!

But how will you know when data is open? Well, it should have an 'open data licence' – which is like a certificate that says anyone can access, use and share the data.

Open Data Institute



Learn with Lowena



Lowena Hull

Where I went from there

After the AstroPi competition, I wasn't sure what to do next. I think it's always a difficult decision, even when you have been successful, not knowing what to do next. That was especially the case as I didn't know anyone else my age in technology!

That's when I was introduced to several organisations through friends of mine (the importance of networking- you get to meet loads of people who can let you know if they see anything you might like!), primarily the Stemettes, a group created by Dr. Anne-Marie Imafidon, with the goal of teaching girls to code.

At these weekend events, I learned several useful programming skills, got to listen to people currently working in the technology industry, and got experience presenting to a large audience. I also got to meet loads of other girls around the same age who also loved to code, some of whom I've stayed in contact with years later. What a great way to spend a weekend!

So, here is my bit of wisdom: yes, it can be nerve-wracking to meet new people and to go out of your comfort zone, but everyone feels like that! By going out and talking to people, you'll work on important soft skills which are often overlooked and create your support network.



Lowena

Student, Cambridge Univeristy

NASA



Chris Mattaman

Inclusivity

A superpower that will make an open source project one that everyone wants to contribute to is the power of inclusivity, or enabling others to feel at home in your project's community. We all want to feel that our contributions matter and are valued.

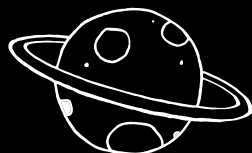
Whether someone is funded to work on open source as part of their day job, or whether they are donating their own spare time and valuable cycles, the principle of inclusivity means that everyone feels like they can belong. This ensures a safe space and shared leadership in an open source project.

Sometimes it's tempting to create barriers to entry to the project, for example, it's too complex, so "outsiders" won't get it; or to say things like "adding others will dilute our ability to maintain control."

But that's just it. You never needed that control. What you needed were more interested participants, and others to help pick up a shovel and help dig the hole as part of your open source efforts. Those other participants will appreciate your recognition of their valuable contributions and your inclusivity of them in your project!

111001101101111

111001111001100111111



Chris

Chief Technology and
Innovation Officer,
NASA Jet Propulsion Laboratory

Kubernetes

An illustrated guide. Continued from issue 1



Replication controllers provide a method for managing an arbitrary number of pods. A replication controller contains a pod template, which can be replicated any number of times. Through the replication controller, Kubernetes will manage your pods' lifecycle, including scaling up and down, rolling deployments, and monitoring.

For many days and nights the little app was happy with her pod and happy with her replicas. But only having yourself for

company is not all it's cracked up to be.... even if it is N copies of yourself. Captain Kube smiled benevolently, "I have just the thing."

No sooner had he spoken than a tunnel opened between Phippy's replication controller and the rest of the ship. With a hearty laugh, Captain Kube said, "Even when your clones come and go, this tunnel will stay here so you can discover other pods, and they can discover you!"

A service tells the rest of the Kubernetes environment (including other pods and replication controllers) what services your application provides. While pods come and go, the service IP addresses and ports remain the same. And other applications can find your service through Kubernetes service discovery.

Thanks to the services, Phippy began to explore the rest of the ship. It wasn't long before Phippy met Goldie. And they became the best of friends. One day, Goldie did something extraordinary. She gave Phippy a present. Phippy took one look and the saddest of sad tears escaped her eye.

"Why are you so sad?" asked Goldie. "I love the present, but I have nowhere to put it!" sniffled Phippy. But Goldie knew what to do. "Why not put it in a volume?"

A volume represents a location where containers can access and store information. For the application, the volume appears as part of the local filesystem. But volumes may be backed by local storage, Ceph, Gluster, Elastic Block Storage, and a number of other storage backends. Phippy loved life aboard Captain Kube's ship and she enjoyed the company of her new friends (every replicated pod of Goldie was equally delightful). But as she thought back to her days on the scary hosted provider, she began to wonder if perhaps she could also have a little privacy.

"It sounds like what you need," said Captain Kube, "is a namespace." A namespace functions as a grouping mechanism inside of Kubernetes. Services, pods, replication controllers, and volumes can easily cooperate within a namespace, but the namespace provides a degree of isolation from the other parts of the cluster.

Life was good aboard Captain Kube's boat. Together with her new friends, Phippy sailed the seas. She had many grand adventures, but most importantly, Phippy had found her home. And so Phippy lived happily ever after.



The end

Entrepreneur in residence



Matt Barker

What is Linux and why is it important?

Linux is arguably the most important open source project of them all. The reason Linux is so important is because it is used as an operating system to run on electronic devices. These devices exist in just about every aspect of our modern lives.

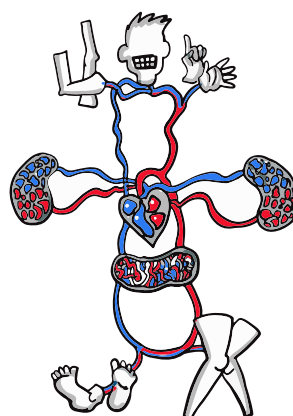
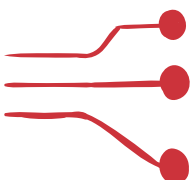
Everything from an electronic doorbell system, the latest virtual reality headsets, to the most sophisticated hospital equipment. Linux was created by Linus Torvalds who was originally an engineer working on the Unix project.

Linus named the software by taking his name and combining it with Unix to form Linux. An operating system is quite a complex piece of software. It requires drivers to run on chipsets and must be able to run different modules such as a display. It requires memory, power optimisation, performance, and security.

All these factors make it a very expensive thing to build from scratch so a free-to-use open source operating system such as Linux is very attractive for manufacturers who use it to build many different types of electronic devices.

Matt

President & Co-Founder, Jetstack



Word game



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

ASCII
Binary
Binary String
Contributor
Convert
Flash
Gestures
Human Readable
Incrementation

Input Parameter
Itch
Kernel
Linus Torvalds
Linux
Machine Code
Musical Note
Object Code
Operating System

Perl
Python
Ruby
Scratch
Shake
Source Code
Tilt Left
Tilt Right

courtesy of puzzlemaker.discoveryeducation.com

Thanks for reading!

Contributors

Editorial:

Amanda Brock – Editor @amandabrockUK

Georgia Cooke - Creative Director nuwcreative.com

Columnists:

Ashleigh Monagle - Ask Ashleigh

Pam Boal - Please Miss Boal

Cristian Parrino - Sustainability

Alexis Richardson - Open Source People

Linux Foundation - Industry

Chris Mattaman - NASA

Lowena Hull - Learn with Lowena

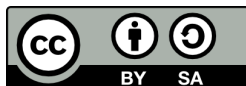
Matt Barker - Entrepreneur in Residence

ODI - Open Data <https://theodi.org/>

CNCF - Kubernetes An Illustrated Guide <https://www.cncf.io/phippy/>

The characters Phippy, Captain Kube, Goldie, and Zee and the two books are owned by The Linux Foundation, on behalf of the Cloud Native Computing Foundation, and licensed under the Creative Commons Attribution License (CC-BY), which means that you can remix, transform, and build upon the material for any purpose, even commercially. If you use the characters, please include the text “phippy.io” to provide attribution <https://phippy.io>

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Instructions: Lesson 2

micro:bit Home Share Blocks JavaScript Microsoft

Search...

- Basic
- Input
- Music
- Led
- Radio
- Loops
- Logic
- Variables
- Math
- Advanced

on start

set note to

micro:bit Home Share Blocks JavaScript Microsoft

Search...

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on start

set note to

on tilt left

set note to join note 0

play tone Low F for 1/8 beat

on tilt right

set note to join note 1

play tone High F for 1/8 beat

micro:bit Home Share Blocks JavaScript Microsoft

Search...

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on start

set note to

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set note to join note 0

play tone Low F for 1/8 beat

on tilt right

set note to join note 1

play tone High F for 1/8 beat

function playNote note

if note == '01000001' then

play tone Low A for 1 beat

else if note == '01000010' then

play tone Low B for 1 beat

else if note == '01000011' then

play tone Middle C for 1 beat

else if note == '01000100' then

play tone Middle D for 1 beat

else if note == '01000101' then

play tone Middle E for 1 beat

else

start melody wawawawaw repeating once

set note to

Instructions: Lesson 2

The screenshot displays the Microsoft MakeCode micro:bit editor interface. On the left, a virtual micro:bit board is shown with a USB cable connected. The central block palette is open, showing categories like Basic, Input, Music, and Loops. The main workspace contains the following code:

```
on start
  set note to ""

on tilt left
  set note to join note "0"
  play tone Low F for 1/8 beat

on tilt right
  set note to join note "1"
  play tone High F for 1/8 beat

on shake
  call playNote note

function playNote note
  if note = "01000001" then
    play tone Low A for 1 beat
  else if note = "01000010" then
    play tone Low B for 1 beat
  else if note = "01000011" then
    play tone Middle C for 1 beat
  else if note = "01000100" then
    play tone Middle D for 1 beat
  else if note = "01000101" then
    play tone Middle E for 1 beat
  else
    start melody wawawawaa repeating once
  set note to ""
```