

2006-2012

Origins



Raspberry Pi has been a ten-year journey, starting when I was teaching at the University of Cambridge in 2006. We discovered that every year, fewer high-school students applied to study Computer Science.

Also, the students had become less skilled: in 1995 most students could program when they arrived, but ten years later many had only designed simple HTML web pages.

Our theory



We still do not know exactly why this decline happened. Our theory is that as 8- and 16-bit microcomputers like the Commodore 64, MSX, X68000 and BBC Micro were replaced by games consoles and PCs, children no longer had programmable computers in their bedrooms, and so had no route into programming.

In 2007, we set out to develop a machine to fill this gap.

Goals



Our machine would have to fulfil four criteria:

- Obviously, it would have to be programmable, in as many languages as possible.
- It would have to be interesting to children, which for us meant playing games and videos.
- It would have to be small and robust, so that children could carry it to school.
- And it would have to be cheap – we chose \$25, which we thought was the price of a textbook.

The Foundation



By 2008, I had left the University, and was working for Broadcom, one of the world's largest chip companies. Broadcom develops mobile phone graphics chips, which are ideal for building the sort of device we wanted. A group of six of us founded the Raspberry Pi Foundation (a UK charity) that year.

We chose Raspberry in honour of other fruit-named companies (Apple, Acorn), and Pi for the programming language Python.

Announcement



By May 2011, we had a working prototype. We wanted to put the BBC (British Broadcasting Corporation) brand on the device, but we could not for legal reasons. However, a BBC journalist, Rory Cellan-Jones, put a video of the Raspberry Pi on his very popular blog, and we got 600,000 page views in two days.

We had accidentally promised 600,000 people we would make them a \$25 computer!



Launch



We spent the rest of 2011 working out how to build Raspberry Pi for \$25, originally in China. All six of us contributed money (\$250,000 in total) to build the first 10,000 units. We thought we would sell these in a few months. However, before we launched at the start of 2012, RS Components agreed to build Raspberry Pi under license.

This was lucky, because we sold 100,000 in the first day!

2012-2016

Made in the UK with Sony



Throughout 2012, we and our partners worked very hard to keep up with demand. For the first few months, there were shortages, and we rationed people to one unit each, but by the end of the year they were in good supply.

In August 2012 we started building units at the Sony UK Technology Centre in Wales, and now the vast majority of Raspberry Pi units are made there. It is much more efficient for us to build with Sony.

Cameras

The chip in the Raspberry Pi has a very powerful image processor, which has been used in many high-end camera phones.

When we visited Japan last, we announced the launch of \$25 5-megapixel camera boards for visible and infrared light.

Three years later we are shipping our second-generation cameras, using the 8-megapixel Sony IMX219 sensor designed here in Japan.



Display

Most people use Raspberry Pi with a television or computer monitor. But some people want a more portable solution.



Last year we introduced a 7 inch, 800×480-pixel touchscreen that connects to the Raspberry Pi's DSI port.

People use it in their robotics projects, in cars, and even in some industrial automation applications.

Official case



So many people were using Raspberry Pi as a media player that we decided we wanted to produce a beautiful plastic case for it.

Our team knew nothing about injection molding, and made many stupid mistakes, but finally we were successful. It has been designed so children can remove the lid to see the electronics inside.

I now know far too much about injection molding!!!

Compute Module



Many people want to embed Raspberry Pi into their own product. To help them, we produced the “Compute Module”. This is a Raspberry Pi on a small SO-DIMM PCB, which fits into a socket on the main product PCB.

This picture shows the latest “Compute Module 3” (due to launch early in 2017) inside a Large-Format Display from NEC Display Solutions.

Raspberry Pi B+, 2 and 3



When we visited Japan in 2013, we were shipping the original “Model B”. Since then we have launched three new versions:

- Model B+, with more USB and GPIO, and an improved design
- Raspberry Pi 2, with a 32-bit quad-core, 6× performance and 1GB RAM
- Raspberry Pi 3, with a 64-bit quad-core, 12× performance, 1GB RAM, WiFi and Bluetooth

We have sold over 11 million Raspberry Pi units now!

Raspberry Pi Zero



Before Raspberry Pi, small ARM Linux computers cost perhaps \$125. At \$25, Raspberry Pi was a factor of five cheaper.

We wondered if we could do it again, so one year ago we launched "Raspberry Pi Zero" in the UK and USA at a price of \$5. It has been a great success, selling over 300,000 units even though it is rationed to one per user.

We hope to bring it to Japan in 2017.

Publishing



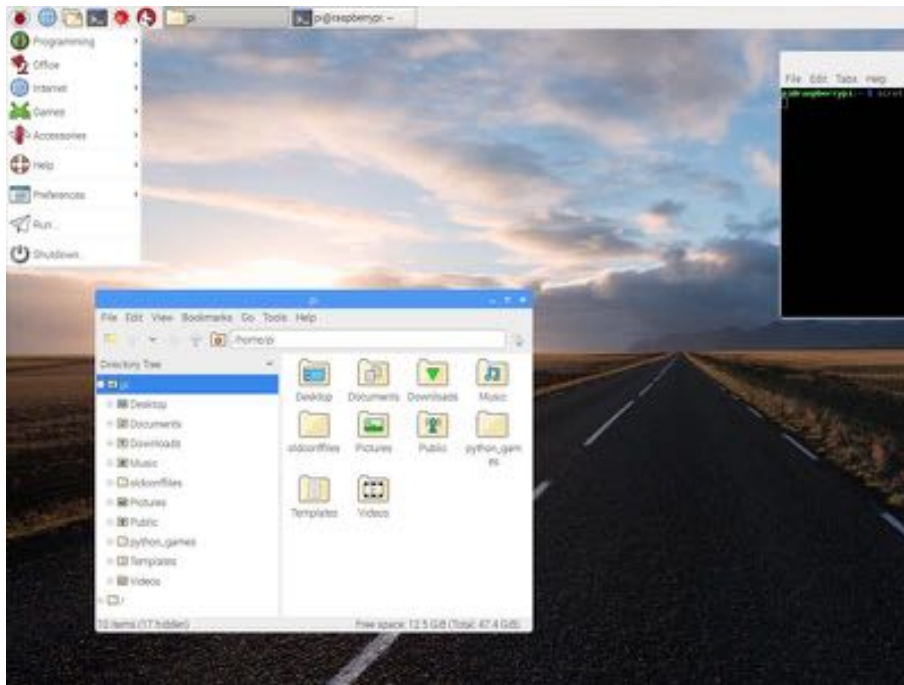
We publish our own Magazine, “The MagPi”. This used to be a fan magazine, but became an official publication at the start of 2015. Each issue has 100 pages of news and projects. You can subscribe, or download a PDF for free.

We publish books about programming topics including Scratch, Python and C.

We hope to produce a Japanese “mini-MagPi” in 2017.

PIXEL Desktop

Since Simon Long joined us in the summer of 2014, we have made great progress in improving the user interface on Raspberry Pi.



At the start of October we announced the PIXEL desktop environment for Raspberry Pi. This is a lightweight user interface based on LXDE, with high-quality icons and background photos.

We bundle Oracle Java, Wolfram Mathematica, Chromium and Flash.

Made in Japan



We have been working with our friends at Sony and RS Components to introduce “Made in Japan” Raspberry Pi boards. These are made at Sony’s Inazawa facility, and were introduced in October 2016.

We are very excited by this development, and are grateful to our partners for their efforts. We hope to see some “Made in Japan” boards on this trip.

Education

Raspberry Pi in Space



One of our most exciting education programs is “Astro Pi”. We sent two Raspberry Pi units to the international space station with British ESA astronaut Major Tim Peake in 2016. He used them to run experiments designed written by UK schoolchildren.

We are repeating “Astro Pi” with the European Space Agency this year. Hopefully in the future we can collaborate with NASA and even JAXA to bring “Astro Pi” to Japan.

Training Teachers

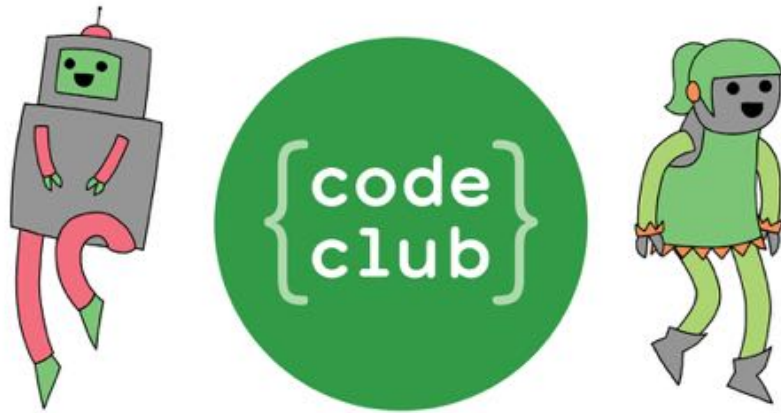


In 2015 the UK government introduced an improved curriculum for Computer Science. Less Word and PowerPoint, more Scratch and Python! But not enough money has been spent training teachers.

The Raspberry Pi Foundation runs its own “Picademy” teacher training program, which has trained more than 1,000 teachers in the UK and USA. It is a fun two-day program of classes and workshops. We hope to bring it to other countries soon.

Code Club

Code Club is a UK not-for-profit, founded in 2012. It runs over 8,000 after-school clubs for 9-11 year-olds.



We were so impressed with them, that we merged the Raspberry Pi Foundation with Code Club at the end of 2015. Together we can do even more to promote coding.

You can find Code Clubs all around the world. 40% of attendees are girls, which is a very positive sign for the future.

Resources

The Raspberry Pi Foundation employs a team of educators, who create exciting educational resources for teachers and students.



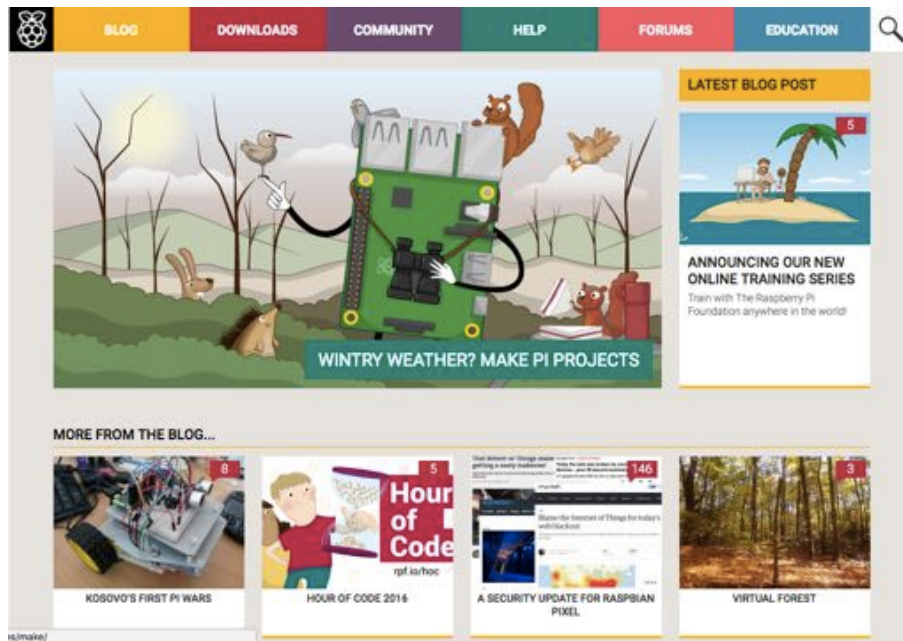
These show students how to use the Raspberry Pi to learn computer science and coding, and teachers how to use Raspberry Pi with their classes.

Our resources are released under a Creative Commons license, so users are free to translate and remix them.

Website

Our website is www.raspberrypi.org. It includes a blog, and forums. There is a Japanese forum run by the Japanese Raspberry Pi Users Group.

For the first year of our project we only wrote about our own work. For the next year months we mostly wrote about what adults, like you in this room, were doing. More recently we have been able to write about what children have been doing: these stories keep our morale high when we have tough days. I will share a few highlights with you.



Favourite projects in 2016

Astrophotography



TJ Emsley built a mount to connect a Raspberry Pi and camera module to his telescope, and was able to take amazing pictures like this one.

Tiny Arcade Games

One of the best things about running Raspberry Pi has been having the opportunity to hang out with Limor Fried and Phillip Torrone at Adafruit.

Earlier this year, they used a Raspberry Pi Zero to make this tiny, fully-functional MAME arcade cabinet. It's not very easy to play, but it's certainly small!



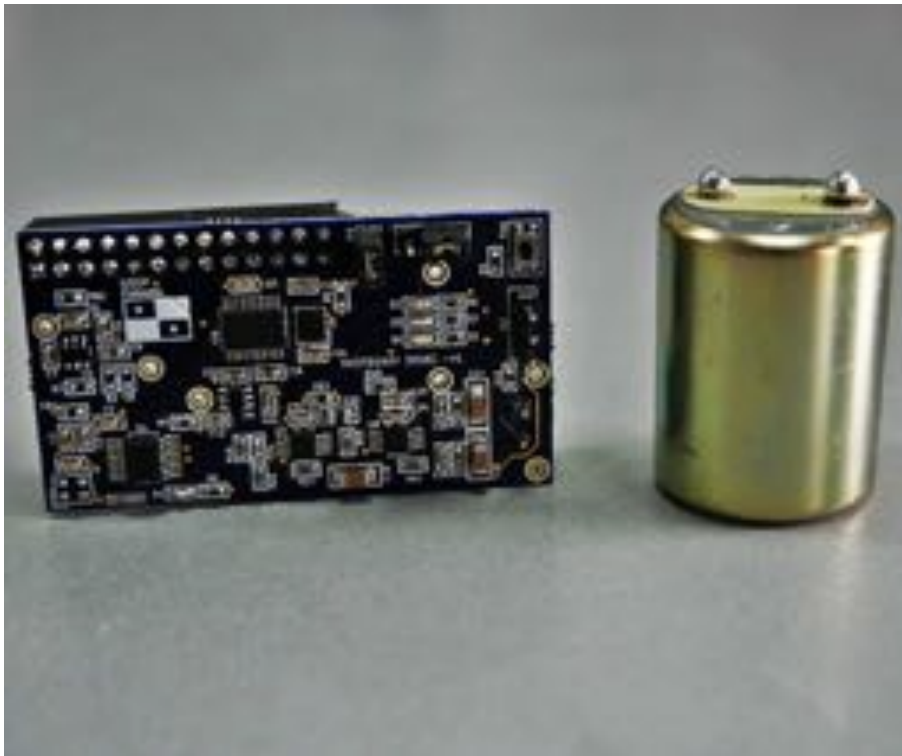
Cucumbers



Makoto Koike was helping on his parents' cucumber farm here in Japan. His mother had to spend a lot of time sorting cucumbers to find the straightest, thickest, freshest ones.

He built a machine-learning system using Google TensorFlow and Raspberry Pi to automate this process, achieving >70% accuracy based on a hand-labelled training set of 7,000 cucumbers.

Earthquakes



Professional seismographs, used to study earthquakes, can cost tens of thousands of dollars. “Raspberry Shake” is a Kickstarter project for a \$99 seismograph.

The creators describe it as the “Volkswagen of seismometers – yes there are Lamborghini seismographs but both the Lamborghini and the Volkswagen will get you from point A to point B.”

Formula Pi

Our friends at PiBorg have created a sports league for autonomous cars built around Raspberry Pi Zero. Competitors write code to help guide the robots around a track.



There have been many entrants, including IT staff from a Formula One team, and a group of Scouts in the UK. Liz and I will be attending the final in January 2017.

Credits

Once again, Liz and I have been made to feel very welcome here in Japan.



I would like to thank RS Components, all of the members of the Japanese Raspberry Pi Users Group, and in particular Masafumi Ohta, for their help in arranging this week's events.

One more thing

Announcing PIXEL for PC and Mac



We are very proud of our PIXEL desktop. It has an attractive user interface, and good educational and productivity software.

We want people who do not own a Raspberry Pi to be able to experience PIXEL, so today we have an exclusive announcement: we have ported PIXEL to run on i386 Debian, allowing you to boot it as a live DVD or USB stick on your PC or Mac.

We would love to hear feedback!

Questions?