Learning Python With Raspberry Pi

Raspberry Pi

Raspberry Pi (/paɪ/ PY) is a series of small single-board computers (SBCs) originally developed in the United Kingdom by the Raspberry Pi Foundation in

Raspberry Pi (PY) is a series of small single-board computers (SBCs) originally developed in the United Kingdom by the Raspberry Pi Foundation in collaboration with Broadcom. To commercialize the product and support its growing demand, the Foundation established a commercial entity, now known as Raspberry Pi Holdings.

The Raspberry Pi was originally created to help teach computer science in schools, but gained popularity for many other uses for its low cost, high performance, compact size, and flexibility. It is now used in areas such as industrial automation, robotics, home automation, IoT devices, and hobbyist projects.

The company's products range from simple microcontrollers to computers that the company markets as being powerful enough to be used as a general purpose PC. Computers are built around a custom designed system on a chip and offer features such as HDMI video/audio output, USB ports, wireless networking, GPIO pins, and up to 16 GB of RAM. Storage is typically provided via microSD cards.

In 2015, the Raspberry Pi surpassed the ZX Spectrum as the best-selling British computer of all time. As of March 2026, over 75 million units had been sold.

== History ==

Carrie Anne Philbin

teachers how to code in Python programming language and the Scratch programming language. In 2014 she began to work at the Raspberry Pi Foundation. She is

Carrie Anne Philbin is an English teacher of computer science and an author. She is a director of educator support at the Raspberry Pi Foundation and chairs the Computing At School (CAS) diversity and inclusion group, #CASInclude. She wrote the computing book Adventures in Raspberry Pi (2013) for teenagers. She runs the YouTube channel Geek Gurl Diaries and in 2017, was the host for Crash Course Computer Science.

== Early life and education ==

Philbin studied history at the University of Essex. She taught herself to program and manage computer systems after she graduated. She trained as a school computing teacher and worked in East London. As of 2025 she is doing a PhD supervised by Sue Sentance at the University of Cambridge.

Thonny

the recent Python interpreter or pip-installable package. It can be installed via the operating-system package manager on Debian, Raspberry Pi, Ubuntu,

Thonny (THON-ee) is a free and open-source integrated development environment for Python that is designed for beginners. It was created by Aivar Annamaa, an Estonian programmer. It supports different ways of stepping through code, step-by-step expression evaluation, detailed visualization of the call stack and a mode for explaining the concepts of references and heap.

== Features ==

Line numbers

Statement stepping without breakpoints

Live variables during debugging

Stepping through evaluation of the expressions (expressions get replaced by their values)

Separate windows for executing function calls (for explaining local variables and call stack)

Variables and memory can be explained either by using simplified model (name → value) or by using more realistic model (name → address/id → value)

Simple pip GUI

Support for CPython and MicroPython

Support for running and managing files on a remote machine via SSH

Possibility to log user actions for replaying or analyzing the programming process

CircuitPython

Programs written for CircuitPython-compatible boards may not run unmodified on other platforms such as the Raspberry Pi. CircuitPython is being used as an emerging

CircuitPython is an open-source derivative of the MicroPython programming language targeted toward students and beginners. Development of CircuitPython is supported by Adafruit Industries. It is a software implementation of the Python 3 programming language, written in C. It has been ported to run on several modern microcontrollers.

CircuitPython consists of a Python compiler to bytecode and a runtime interpreter of that bytecode that runs on the microcontroller hardware. The user is presented with an interactive prompt (the REPL) to execute supported commands immediately. Included are a selection of core Python libraries. CircuitPython includes modules which give the programmer access to the low-level hardware of supported products as well as higher-level libraries for beginners.

CircuitPython is a fork of MicroPython, originally created by Damien George. The MicroPython community continues to discuss forks of MicroPython into variants such as CircuitPython.

CircuitPython is targeted to be compatible with CPython, the reference implementation of the Python programming language. Programs written for CircuitPython-compatible boards may not run unmodified on other platforms such as the...

RP2040

"Raspberry Pi Pico". TinyGo. Retrieved 2024-09-10. Rembor, Kattni. "Getting Started with Raspberry Pi Pico and CircuitPython". Adafruit Learning System

RP2040 is a 32-bit dual-core ARM Cortex-M0+ microcontroller designed by Raspberry Pi Ltd. In January 2021, it was released as part of the Raspberry Pi Pico board. Its successor is the RP2350 series.

== Overview ==

Announced on 21 January 2021, the RP2040 is the first microcontroller designed by Raspberry Pi Ltd. The microcontroller is low cost, with the Raspberry Pi Pico being introduced at US$4 and the RP2040 itself costing US$1. The microcontroller can be programmed in assembly, C, C++, Forth, Swift, Free Pascal, Rust, Go, MicroPython, CircuitPython, PicoRuby, Ada, TypeScript and Zig. It is powerful enough to run TensorFlow Lite.

At announcement time, four other manufacturers (Adafruit, Pimoroni, Arduino, SparkFun) were at advanced stages of their product design, awaiting the widespread availability of chips to be put into production.

Hackaday notes the benefits of the RP2040 as being from Raspberry Pi, having a good feature set, and being released in low-cost packages.

Multiple stepping levels of the chip have been produced.

MicroPython

a MicroPython port for the RP2040 (ARM Cortex-M0+, on Raspberry Pi Pico and others) was created. MicroPython has the ability to run Python, allowing

MicroPython is a software implementation of a programming language largely compatible with Python 3, written in C, that is optimized to run on a microcontroller.

MicroPython consists of a Python compiler to bytecode and a runtime interpreter of that bytecode. The user is presented with an interactive prompt (the REPL) to execute supported commands immediately. Included are a selection of core Python libraries; MicroPython includes modules which give the programmer access to low-level hardware.

MicroPython does have an inline assembler, which lets the code run at full speed, but it is not portable across different microcontrollers.

The source code for the project is available on GitHub under the MIT License.

== History ==

Code Club

community

Raspberry Pi". Raspberry Pi. 3 November 2015. Retrieved 20 April 2016. Cellan-Jones, Rory (24 June 2019). "The Raspberry Pi goes Fourth" - Code Club is a voluntary initiative, founded in 2012. The initiative aims to provide opportunities for children aged 9 to 13 to develop coding skills through free after-school clubs. As of November 2015, over 3,800 schools and other public venues established a Code Club, regularly attended by an estimated 44,000 young people across the UK. The organization also expanded internationally, and there are now over 13,000 Code Club operating worldwide. Volunteer programmers and software developers give their time to run Code Club sessions, passing on their programming skills and mentoring the young students. Children create their own computer games, animations and websites, learning how to use technology creatively.

It has Scratch, HTML & CSS, Python and a variety of other coding languages. The initiative also provide free BBC Micro:bits to children above the age of 9.

== History ==

Code Club is the brain child of Clare Sutcliffe and Linda Sandvik,

Python (programming language)

Python is a high-level, general-purpose programming language that emphasizes code readability, simplicity, and ease-of-writing with the use of significant

Python is a high-level, general-purpose programming language that emphasizes code readability, simplicity, and ease-of-writing with the use of significant indentation, an extensive ("batteries-included") standard library, and garbage collection. Python supports multiple programming paradigms but with an emphasis on object-oriented programming and dynamic typing.

Guido van Rossum began working on Python in the late 1980s as a successor to the ABC programming language. Python 3.0, released in 2008, was a major revision and not completely backward-compatible with earlier versions. Beginning with Python 3.5, capabilities and keywords for typing were added to the language, allowing optional static typing. As of 2026, the Python Software Foundation supports Python 3.10, 3.11, 3.12, 3.13, and 3.14, following the project's annual release cycle and five-year support policy. Python 3.15.0rc1 (which defaults to UTF-8) is out in preview, and the stable release is expected to launch in October 2026. Earlier versions in the 3.x series have reached end-of-life and no longer receive security updates.

Python is widely taught as an introductory programming language.

== History ==

Salvius (robot)

programming languages include: Python, Arduino, and JavaScript. Python is the supported language of the Raspberry Pi. C is used for programming the Arduino

Salvius ( ) is an open source humanoid robot built in the United States in 2008, the first of its kind. Its name is derived from the word 'salvaged', being constructed with an emphasis on using recycled components and materials to reduce the costs of designing and construction. The robot is designed to be able to perform a wide range of tasks due to its humanoid body structure planning. The primary goal for the Salvius project is to create a robot that can function dynamically in a domestic environment.

Salvius is a part of the open source movement, meaning the robot's source code is freely available for others to use, alter, add and learn. Unlike other humanoid robots, Salvius benefits from the advantages of open source software allowing problems to be quickly addressed by a community of developers. Salvius has been used as a resource by STEM educators to enable students to learn about subjects in science and technology.

The name "Salvius" dates back to the time of the Roman Empire, however, it was chosen for this robot because of its similarity to the word "salvage". Names have been a significant part of this robot's development. Salvius is tattooed with the names of the individuals...

Gekko (optimization software)

where the solution is computed and returned to Python. There are Windows, MacOS, Linux, and ARM (Raspberry Pi) processor options to solve without an Internet

The GEKKO Python package solves large-scale mixed-integer and differential algebraic equations with nonlinear programming solvers (IPOPT, APOPT, BPOPT, SNOPT, MINOS). Modes of operation include machine learning, data reconciliation, real-time optimization, dynamic simulation, and nonlinear model predictive control. In addition, the package solves Linear programming (LP), Quadratic programming (QP), Quadratically constrained quadratic program (QCQP), Nonlinear programming (NLP), Mixed integer programming (MIP), and Mixed integer linear programming (MILP). GEKKO is available in Python and installed with pip from PyPI of the Python Software Foundation.

GEKKO works on all platforms and with Python 2.7 and 3+. By default, the problem is sent to a public server where the solution is computed and returned to Python. There are Windows, MacOS, Linux, and ARM (Raspberry Pi) processor options to solve without an Internet connection. GEKKO is an extension of the APMonitor Optimization Suite but has integrated the modeling and solution visualization directly within Python. A mathematical model is expressed in terms of variables and equations such as the Hock & Schittkowski Benchmark Problem #71...