CamJam EduKit Robotics - Introduction

Project Setting up your Raspberry Pi

Description Set up your Raspberry Pi and run your first python program to print "Hello World" to the screen. You will not be connecting any of the contents of the CamJam EduKit to the Raspberry Pi for this short exercise.

The CamJam EduKit 3 Worksheets

The CamJam EduKit 3 - Robotics is the third kit in the CamJam EduKit series. You do not have to have used the first two kits to be able to use this kit, although depending on your knowledge of the Raspberry Pi, its GPIO (General Purpose Input/Output) pins and electronics, you may find it worth reading through the previous worksheets to understand some of the more basic concepts. You can download the worksheets, for free, at http://camjam.me/edukit.

The EduKits are compatible with all flavours of the Raspberry Pi computer.

Notes and Assumptions

Throughout these worksheets, it is assumed that you are using Raspbian (Stretch), and you are editing your code with the Python 3 IDLE editor or Thonny.

In this version of the worksheets you will be using the GPIO Zero Python 3 Library to interact with the Raspberry Pi's GPIO pins.

If you are viewing these worksheets on your Raspberry Pi, you should not copy and paste the code from the worksheets as the spacing at the beginning of lines will not necessarily be pasted correctly and the code will not always work; the indentation at the beginning of Python code is important – it is Python's way of recognising how code should be grouped in 'conditions', 'loops' and 'functions'. Instead, type it in or download the code from GitHub with the instructions at the end of this worksheet.

Equipment Required

For this worksheet you will require:

- A Raspberry Pi
- An SD card to fit your version of the Pi (8GB recommended) with Raspbian Stretch with Desktop operating system on it. Instructions for setting up Raspbian can be found on the Raspberry Pi website (https://www.raspberrypi.org/downloads/).
- Monitor & cable to connect to the HDMI or composite output of your Pi
- A keyboard and mouse
- A Raspberry Pi power supply
- The EduKit 3 kit, available from The Pi Hut (https://thepihut.com/edukit)

Setting up your Raspberry Pi

Find your Raspberry Pi.

- Plug in the microSD card (or SD on the original Models A and B).
- Plug the HDMI/video cable into the Pi and the monitor.
- Plug the keyboard and mouse into the USB ports. You will need an adaptor if you are using a Pi Zero, and a USB hub if you only have one USB port available.
- Plug in the power cable.

When all wired up it should look like the one above. The A+, B+, Pi2, Pi3 and Pi Zero will look slightly different.

Updating Raspbian

It is good to keep your Raspberry Pi's operating system up to date with the latest fixes and improvements. You can only do this if your Raspberry Pi is **connected to the internet**. It may take some time (perhaps up to an hour), so you should only do this when you have time.

To update Raspbian, open a terminal by either clicking on the icon on the menu bar that looks like this:

Or choosing Accessories → Terminal on the menu bar at the top.

Type in the two commands below, one after the other, leaving each command to complete before starting the next.

```
sudo apt-get update
sudo apt-get upgrade
```

Writing Code

You are now going to create your first small piece of Python code that will simply print "Hello World" to the screen.

First, you are going to create a folder where the code for the EduKit worksheets will be stored. Open the 'File Manager' from the menu bar:

It should start in your 'home' folder. Create a new folder by navigating the File Manager menu to File → Create New… → Folder. Type in 'EduKit2' into the prompt window and press OK. You can now close the File Manager by clicking on the X in the top right hand of the window.

Open 'Python 3 (IDLE) ' or 'Thonny Python IDE' from the Menu (under Programming), and create a file using the IDLE menu item 'New file' or 'New' in the File menu (or use Ctrl+N).

Type in the following code exactly as seen into your preferred editor:

```
# Print Hello World!
print("Hello World!")
```

Everything on the same line after a '#' is a comment and will be ignored by Python.

Save the file in the EduKit1 folder created above, calling the file `1-helloworld.py`.

Running the Code

To run your code, select the menu option Run → Run Module, or press F5.

You will see "Hello World!" printed to the Python Shell.

Downloading the EduKit Code from GitHub

The code written for the CamJam EduKit, and listed in the worksheets, is also stored on GitHub. Follow these instructions to download all of the EduKit code.

GitHub Repository

All of the repositories for each EduKit can be found online at https://github.com/CamJam-EduKit. You may download individual files or whole repositories from there.

Installing Git

Before you can 'clone' the code from GitHub, you must first ensure that the Git tool is installed on your Raspberry Pi. To do this your Raspberry Pi must be connected to the internet. Open a terminal window and first update the Pi repository using:

```
sudo apt-get update
```

Then install GIT using:

```
sudo apt-get install git-core
```

Downloading to the Raspberry Pi

The EduKit code and worksheets can be downloaded using the following command:

```
cd ~
git clone git://github.com/CamJam-EduKit/EduKit3.git
```

The code will be stored in the `Code` subfolder under the `EduKit3/CamJam Edukit 3 - GPIO Zero` folder.