CamJam EduKit Sensors Worksheet One

Project　　Printing to the screen using Python

Description　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 Sensors to the Raspberry Pi for this short exercise.

The CamJam EduKit Sensors Worksheets

The CamJam EduKit Sensors is the second kit in the CamJam EduKit series. You do not have to have used the first kit to be able to use this kit, although depending on your knowledge of the Raspberry Pi, its GPIO pins and electronics, you may find it worth reading through them to understand some of the more basic concepts used within the CamJam EduKit Sensors worksheets.

You can obtain the original EduKit worksheets, for free, at camjam.me/edukit.

The EduKits are compatible with all four flavours of the Raspberry Pi – Models A, B, A+ and B+.
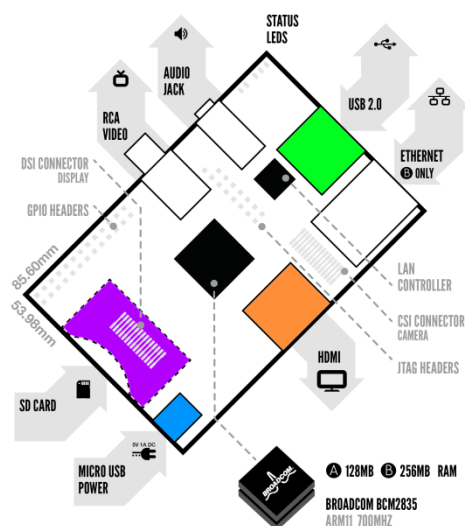
Equipment Required

□ Raspberry Pi & SD Card　　□ Monitor & HDMI Cable　　□ Keyboard & Mouse　　□ Power supply

Setting up your Raspberry Pi

Find your Raspberry Pi.

- Plug in the SD card (or Micro SD on the B+).
- Plug in the HDMI cable into the Pi and the monitor.
- Plug in the keyboard into the USB ports.
- Plug in the mouse into the USB ports.
- Plug in the power cable.

Setting up your Raspberry Pi

When all wired up it should look like this. The A+, B+ and Pi2 will look slightly different.


After the Raspberry Pi has finished booting, you will see either the Graphical User Interface (as in the image below right) or the 'terminal' (as in the image on the right). If you see the 'terminal' screen on the right:

- Type in the user name "pi"
- Type in the password "raspberry"
- Type `startx` to load the graphical user interface
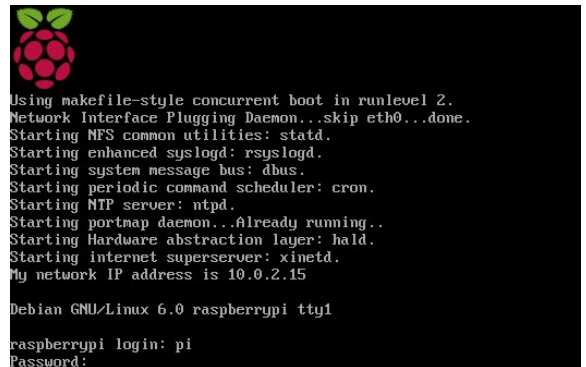
Double click on "LXTerminal" icon on the desktop. This will load the "terminal" window where you will enter your commands.
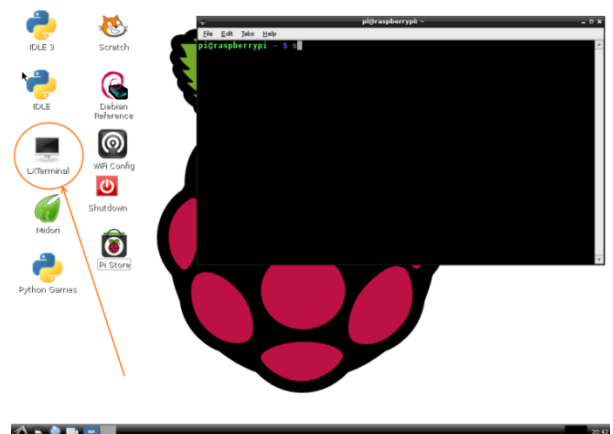
It is good to keep your Raspberry Pi's operating system up to date with the latest fixes and improvements. You can only do this if your Raspberry Pi is connected to the internet. It may take some time (perhaps up to an hour), so you should only do this when you have time. Type in each of the three commands on the right, one after the other, leaving each command to complete before starting the next.

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

Setting up your Raspberry Pi

If you have updated your operating syetem with the above commands, or if you think you have the latest version of Raspbian (the OS) then you need to do the following to update the configuration and allow you to use the temperature sensor.

Open up a terminal window.

You need to edit the 'boot configuration' file using the 'nano' editor:

```
sudo nano /boot/config.txt
```

add the following line to the bottom:

```
dtoverlay=w1-gpio,gpiopin=4
```

To save the file in the file, type "Ctrl + x" then "y" then "enter".

For the changes to take effect you will need to reboot using:

```
sudo reboot
```

Code

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

First, we are going to create a directory where the code for the EduKit worksheets will be stored.
Type in the following commands, pressing the 'return' key at the end of each line.

`cd ~`	Changes to your home directory.
`mkdir EduKitSensors`	Makes a new directory called 'EduKitSensors'.
`cd EduKitSensors`	Changes to the 'EduKitSensors' directory.
`nano 1-helloworld.py`	Opens the 'nano' editor with the name '1-helloworld.py'

You will now be in the text editor called 'nano' where you will type in your code.

Type in the following code exactly as seen.

`#Print Hello World!`	A comment; everything on the same line after a '#' is a comment and will be ignored by Python.
`print "Hello World!"`	Print "Hello World!" to the screen.

To save the code in the file, type "Ctrl + x" then "y" then "enter".

- "Ctrl + x" tells nano that you want to exit. It will ask you whether you want to save the file, to which you answer 'y' for 'yes'.
- It will then prompt for the name of the file, which we set when we opened the file. Just press the "enter" key to take the default.

Running the Code

Make sure you are in the EduKitSensors directory using the following command:

```
cd ~/EduKitSensors
```

To run this code type:

```
python 1-helloworld.py
```

You will see it print "Hello World!" to the screen.

Notes

If you are viewing these worksheets on your Raspberry Pi, you should not copy and paste any of the code from the worksheets as the spacing will not necessarily be pasted and the code will not always work. Instead, type it in.

The indentation at the beginning of Python code is important – it is Python's way of recognising how code should be grouped in 'loops' and 'functions'.