MICRO:BIT RADIO MESSAGES ON THE RASPBERRY PI

RASPBERRY JAM

MILTON KEYNES

Worksheet
And
Programme Listings

TechnoVisual education

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1. PLUG IN A MICRO:BIT TO A RASPBERRY PI

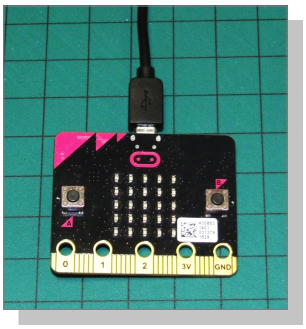
RASPBERRY JAM MILTON KEYNES

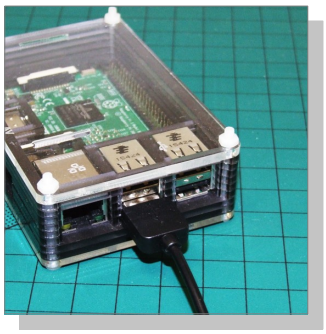
The Raspberry Pi is a very good computer to learn programming with, but you can also programme other micro-controllers with it like the BBC Micro:bit.

In this workshop we will learn how to send a programme from a Raspberry Pi to a Micro:bit. The programme we will write will send and receive messages with radio communication between two Micro:bits.

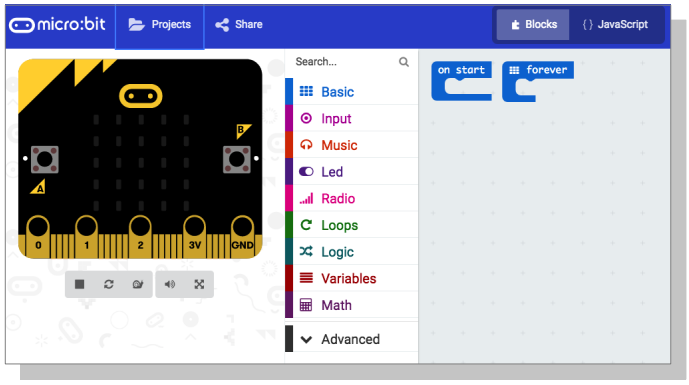
We will also learn that there are many ways of writing the same programme on the Raspberry Pi.

1. Lets start by connecting the Micro:bit to the Raspberry Pi. Plug the micro USB end of the cable into the top of the Micro:bit and the normal size USB into one of the USB ports on the Raspberry Pi. You should get a message on screen to say that a new device has been plugged in.





2. The first way of programming we will look at for our radio code is to use the Micro:bit blocks app. You can get to it by opening a browser and going to: https://makecode.microbit.org



Next: Writing A Radio Programme With Blocks

2. WRITING A RADIO PROGRAMME WITH BLOCKS

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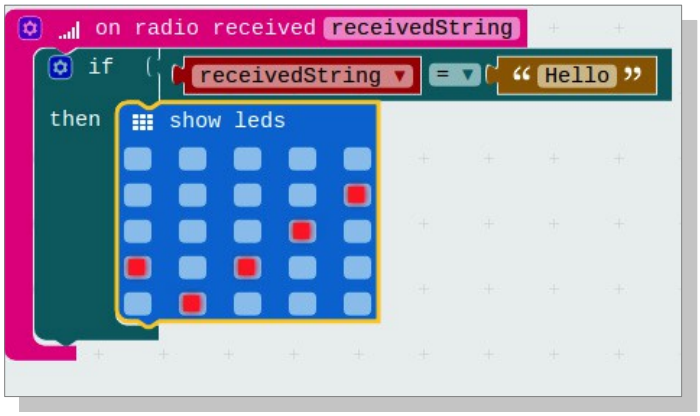
1. We can write the message sending part of our programme using the following blocks:

The group number can be any number up to 255 but is must be the same for the sender and the receiver of the message.

When we press button A on the Micro:bit we will send a message.

2. Now we can add a block to receive a message. This will be to handle a message coming from another Micro:bit.



If the message we receive is the word “Hello” then show a tick on the LED matrix.

3. Now we can flash this programme to the Micro:bit using the Download button. Make sure you send the programme to the MICROBIT drive. The orange LED on the back of the Micro:bit will flash for a while – wait until it is finished before doing anything else.

Next: Sending Radio Signals

3. SENDING RADIO SIGNALS

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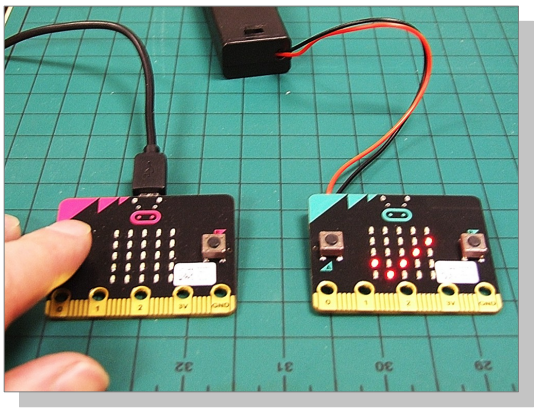
1. When we send a radio message we will want to set up another Micro:bit to receive the message. We can use exactly the same programme for our receiver Micro:bit.

   Make sure the programme has finished flashing to the first Micro:bit, then unplug it from the Raspberry Pi and plug in a second Micro:bit. Then flash the same programme as before to the second Micro:bit.

2. Now we have two Micro:bits with the same send and receive programme on them. To test our programme you will need to plug in the first Micro:bit to a power pack so that it can switch on.

3. To test our programme we press the 'A' button on one of the Micro:bits. If the programme works we should see a tick on the other Micro:bit. Then press the 'A' button on the other Micro:bit and both should now be showing a tick.



4. With the Micro:bit block editor you also have the option of seeing the programme in Javascript.

Next: Writing The Programme With EduBlocks

4. WRITING THE PROGRAMME WITH EDUBLOCKS

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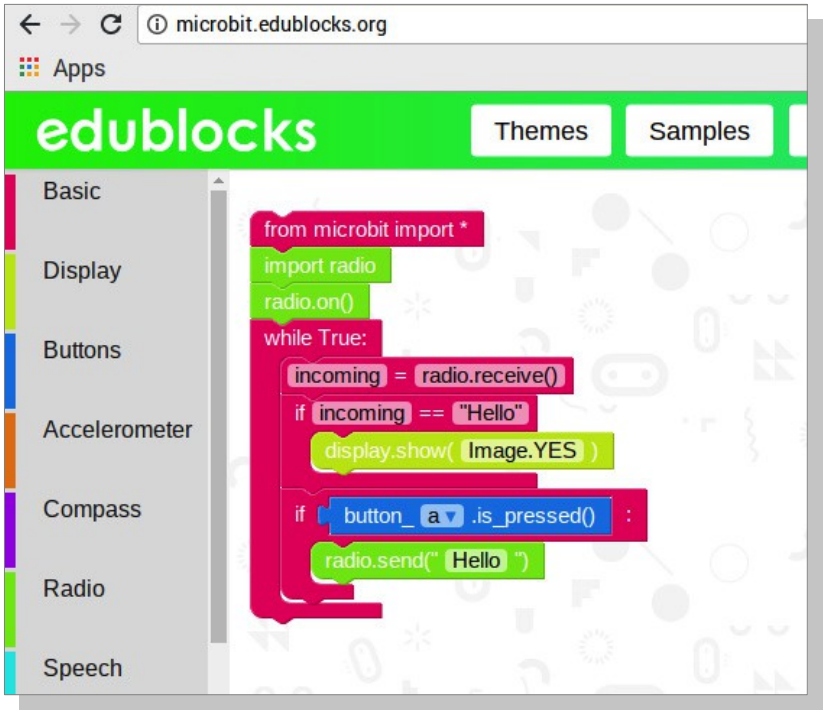
EduBlocks is a bit like Micro:bit blocks except it allows you to programme more like the Python language and switch between blocks and Python code.

1. To use EduBlocks, open a browser and go to the following website: https://microbit.edublocks.org/

2. To write the programme we need to put together the following blocks:



3. When the programme is ready, you can flash it to both Micro:bits using the 'Download Hex' button.

You can see that the programme looks a bit different than the first one we did. Have a look at the Python version of the programme – you can switch between the two on EduBlocks.

Because Micro:bit radio works a bit differently in Python than in Micro:bit Blocks, you will not be able to send messages between Micro:bits with programmes written in these different systems.

Next: Writing The Programme With Python

5. WRITING THE PROGRAMME WITH PYTHON

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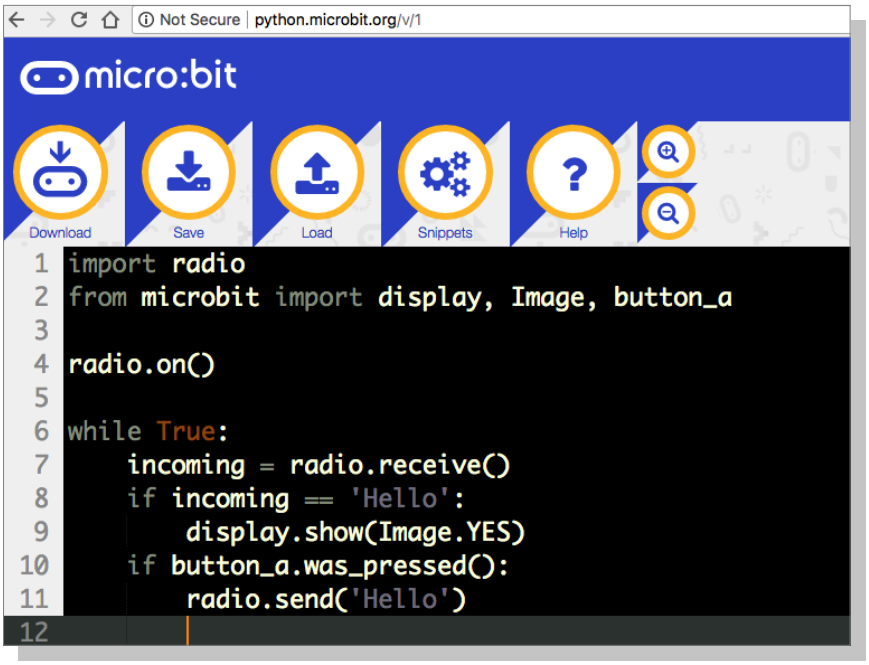
When we write a programme with Python, we don't use any blocks but type it into an editor. There are several editors which are available for the Raspberry Pi for use with the Micro:bit such as Mu which is available from: https://codewith.mu/

However, in this example we will be using the online Micro:bit Python editor.

1. First open a browser and go to: http://python.microbit.org/v/1

   You will see an example programme already there.

2. Replace the example with the following code:



3. When your programme is ready, make sure that your Micro:bit is plugged into the Raspberry Pi and flash the programme by selecting the “Download” button.

   Then test your programme by flashing the programme to the other Micro:bit and check that pressing the “A” button makes the other Micro:bit display a tick.

Next: Things to Try

6. THINGS TO TRY

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1. Try changing the programme so that the message that is sent gets displayed as scrolling text across the LED matrix of the other Micro:bit.

2. See how far away the two Micro:bits can be from each other before they stop picking up the message that is being sent.

3. You may find that you are picking up messages from other Micro:bits in the room. Think of a way that you can send a message that only your chosen Micro:bit will receive.

4. Try sending messages in a chain between many Micro:bits so that one Micro:bit sends a message to a second and that one sends a message to a third and then a fourth and each one will display a different symbol on its LED matrix as it receives its message.

A copy of this worksheet is available from:

http://www.technovisualeducation.co.uk/microbit-radio/