nustem

Toggle switches and RGB LEDs

Use toggle switches to create a colour mixing demonstration.

Ingredients

Platform:	Raspberry Pi / Raspbian Python3
Components:	blinkt Hat toggle switches
Libraries:	blinkt gpiozero

Glossary

pull-up resistor

A pull-up resistor ensures that an input reads high, unless shorted to ground by a switch.

toggleLights.py

All the code for this worksheet is in `Digital-Making/examples/toggle-lights/`. Start by loading `toggleLights.py` in Thonny.

Run the code. Your toggle switch should control the red and blue channels on the Blinkt LEDs. The Blinkt is a tiny little HAT which carries 8 extremely pretty full-colour LEDs.

The GPIOzero library knows about a wide range of input devices, but it doesn't know about toggle switches specifically. However, GPIOzero's basic `DigitalInputDevice` class does everything we need. See the documentation here:

`https://gpiozero.readthedocs.io/en/stable/api_input.html#digitalinputdevice`

Take a closer look at the function `theFloorShow`, can you work out what it does? What do you think `r`, `g` and `b` might stand for? What does this line do:

```
for pixel in range(8):
```

There are two more commands in this function:

`set_pixel(pixel,r*255,g*255,b*255)` and `show()`

`set_pixel` takes a 4 arguments – the number of the pixel to be illuminated (0 is the first pixel), and then red, green and blue values for that pixel. These can be any whole number from 0–255. 0 being 'no colour' and 255 being 'give me all the colour'.

The `g*255`, takes the toggle switch value (0 or 1) and multiplies it by 255 giving a new value of either 0 or 255 (no green or all-the-green).

`show()` then sends the `set_pixel()` instructions to the pixels.

Add some green

We have two switches to control the red and blue channels. Use the extra toggle switch to control the green channel. Use the green jumper cable to connect the switch to pin 4 on the PHAT Stack.

Then add the code you need to `toggleLights.py`. Run the program to see if you were successful.

Northumbria University NEWCASTLE