

mindSPARK⁺
electronics



Pi Pelican
Simple Pedestrian
Crossing



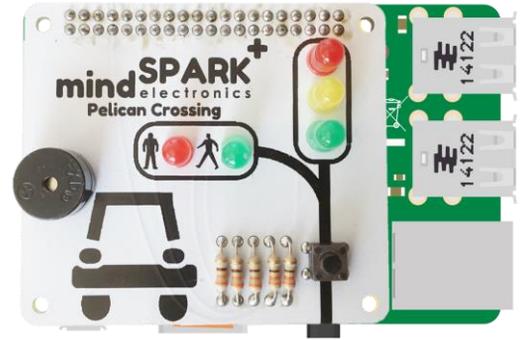
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Getting Started

For this worksheet, you will need the following:

- A fully soldered PiPelican board.
- A Raspberry Pi with GPIO headers. You can use the A+, B+, 2, 3, 3B+, Zero or Zero W
- An SD card loaded with Raspbian OS
- A way to access your Pi (Screen, SSH or VNC).



Make sure that before you boot up your Raspberry Pi, you place the PiPelican board on top of your Pi. It should look like the one above.

Let's Code!

So, now we have got our Raspberry Pi all setup and our PiPelican attached, we are ready to start coding.

You will need to have EduBlocks installed to complete this worksheet, you can find instructions on this at edublocks.org/#download. Once downloaded, you can access EduBlocks from the Raspberry Pi menu. Click on the Pi logo in the top left hand corner. Select Programming and then EduBlocks. Once it has loaded, it's time to start coding!

Now its time to build our code. We can drag our code blocks from the EduBlocks toolbar which is on the left hand side of the screen. The yellow block can be found in GPIOZero >> General, the pink ones in Basic and the orange ones in GPIOZero >> Boards & Accessories. Take a look, they are colour co-ordinated. Drag the blocks onto the workspace as shown in the diagram.

```
from gpiozero import *
```

```
import time
```

```
traffic = TrafficLights( 13, 4, 17 )
```

This section of code will import GPIOZero to control the board, the time library will allow us to pause the program. The third block will tell Python what pin numbers the 3 traffic LEDs are connected to.



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Let's Code!

Let's continue configuring the pins on the PiPelican. The top 2 red blocks can be found in GPIOZero >> Outputs >> LED. The third block can be found in GPIOZero >> Inputs >> Button and the fourth in GPIOZero >> Outputs >> Buzzer. Drag them over to the workspace and connect them to the previous blocks. You can configure the variable names by clicking on the dropdown and click 'Rename Variable'.

```
redman = LED( 5 )
greenman = LED( 6 )
button = Button( 26 )
buzzer = Buzzer( 22 )
```

This section of code will continue setting up all the pins for Python to control our PiPelican.

We have now done the setup for the board, let's get onto programming the sequence. Again, the orange blocks can be found in GPIOZero >> Boards & Accessories >> Traffic Lights, the red ones in GPIOZero >> Outputs >> LED and the blue ones in GPIOZero >> Input >> Button.

```
traffic . green . on ( )
redman . on ( )
button . wait_for_press ( )
time.sleep( 5 )
traffic . green . off ( )
traffic . amber . on ( )
time.sleep( 3 )
```

This section of code turn on the green light and the red man, it will also wait for a button to control our PiPelican.



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Let's Code!

Now we need to code the part where we can cross the road. This will consist of a buzzer beeping, the red light turning on and the green man on too. Below is the code we need to do this. Orange blocks can be found in GPIOZero >> Boards and Accessories >> Traffic Lights, Pink in basic and Red in GPIOZero >> Outputs >> Buzzer.

```
traffic . amber . off ()
traffic . red . on ()
greenman . on ( )
for i in range( 20 ):
    buzzer . on ( )
    time.sleep( 0.3 )
    buzzer . off ( )
    time.sleep( 0.3 )
```

This section of code will turn off the Amber light, turn on the red light, and beep the buzzer 20 times.

Congratulations! We are nearly at the end of coding our PiPelican add on board. Just 2 more sections to go. In this section we are going to create the flashing amber loop. The blocks can be found in the same places as last time, take a look, they are all colour coded.

```
traffic . red . off ()
greenman . off ( )
for i in range( 10 ):
    greenman . on ( )
    traffic . amber . on ()
    time.sleep( 0.7 )
    greenman . off ( )
    traffic . amber . off ()
```

This section of code will flash the amber light 10 times. It will also turn off the Red light and the Green Man.



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Let's Code!

Now onto the final section. This is where we will turn on the green light and then end the program.

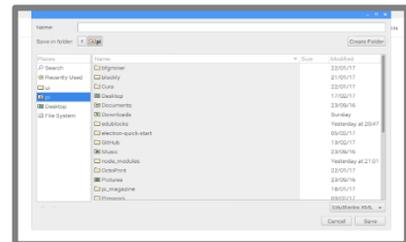
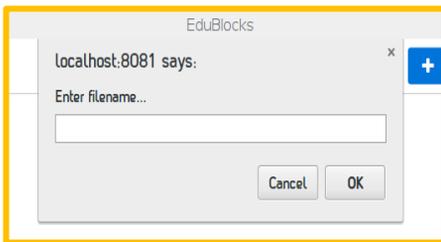
```
redman . on ( )
traffic . green . on ( )
time.sleep( 2 )
redman . off ( )
traffic . green . off ( )
```

This section of code turn the red man on and the green light on and then turn them both off.

Save & Run

Before we run our code, lets save it. Click on the save button in the top right hand corner of the EduBlocks window. Name the file **pipellican.xml**.

Now select which folder you would like the save the file. The default folder 'Pi' will do.



Now it's time to run our code. Click on the run button in the top right hand corner of the EduBlocks window. You should see the code that we have written run on the PiPelican board!

Outcomes

In this worksheet, we have successfully programmed our PiPelican board to do a simple pelican crossing sequence. Now try and adapt the code to make it do something different.