Equipment required

- Raspberry Pi
- Breadboard
- 1 LED
- 1 330 Ohm resistor
- 2 tactile switches (buttons)
- 2 male-to-male wires
- 4 male-to-female wires

Software required

All required software is included with a default installation of the Raspbian operating system on the SD card.

Project notes

This project creates a game between two players who try to press the buttons first when the light turns off. It is written in Python and is intended for children with a little experience with programming, such as with Scratch, but not necessarily to much exposure to Python. It is not expected that the children will understand absolutely every line of the code.

On **page 1**, the electrical components are put together. It can sometimes be hard putting the components, especially the resistors, into the breadboard as the wires can be soft and bend easily.

The instructions indicate that the children should check that the board has been set up correctly. Some things that may need to be checked are;

- The LED must go the right way round because it will only let electricity go through it one way, like a valve. Notice that one side is slightly flat and one wire is longer than the other.
- Likewise, the buttons must be the right way round.
- The wires connecting to the Raspberry Pi must be connected to the correct pins.

The programming concepts that are introduces, in the order in which the appear, are;

- Writing code in a text editor, running it and then making modifications. This is done on page 2 and it is important that this is understood before carrying on.
- Variables. The line 'led = 23' in the code on page 2 sets a variable in the same way as the 'set ... to ...' block in Scratch.
- Loops. The line starting 'while' in the code on page 3 and the line following it form a loop, like the 'repeat until ...' block in Scratch. Page 6 shows a different type of loop, which runs once for each value in a list instead of waiting for a condition. This is similar to the 'repeat (number)' block in Scratch.
- If. The code on page 3 also shows two examples of 'if' statements that work the same as the 'if' blocks in Scratch. On page 5 there is a more complex example of an 'if' statement that allows

for multiple options to be chosen. Scratch has the 'if ... else ...' block but this example shows that it is possible to do – If one thing happens, do A; otherwise, if another thing happens, do B; otherwise, if a third thing happens, do C; otherwise ... (etc)

- Displaying and reading text. The 'print' and 'raw_input' on page 3 display information to the screen and read in things typed at the keyboard respectively. They allow the program to interact with the user.
- Functions. The line 'def winGame(player)' on page 4 defines a function that allows a block of code to be used in lots of different places without having to be re-written. Functions are an essential part of good programming.

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