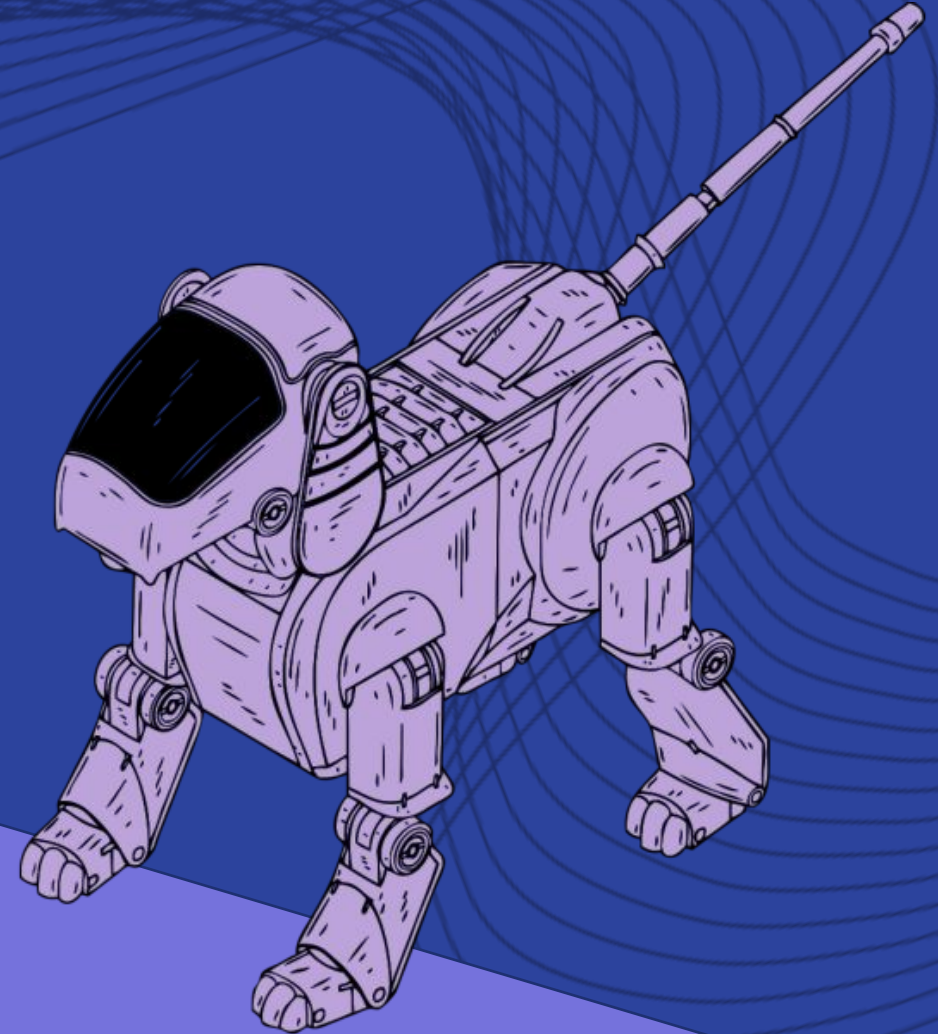


Buzz Wire Game

Level 2 – Scratch

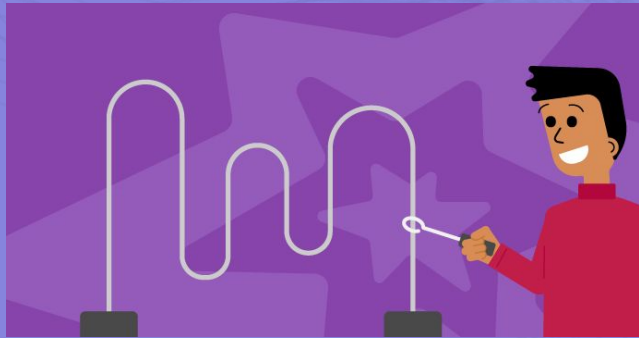
Helping Others



Introduction

A Buzz Wire Game

Many professions, such as surgeons, require you to have a steady hand. One way people can practice this is by playing with the wire buzz machines.



Task

Buzz Wire Game

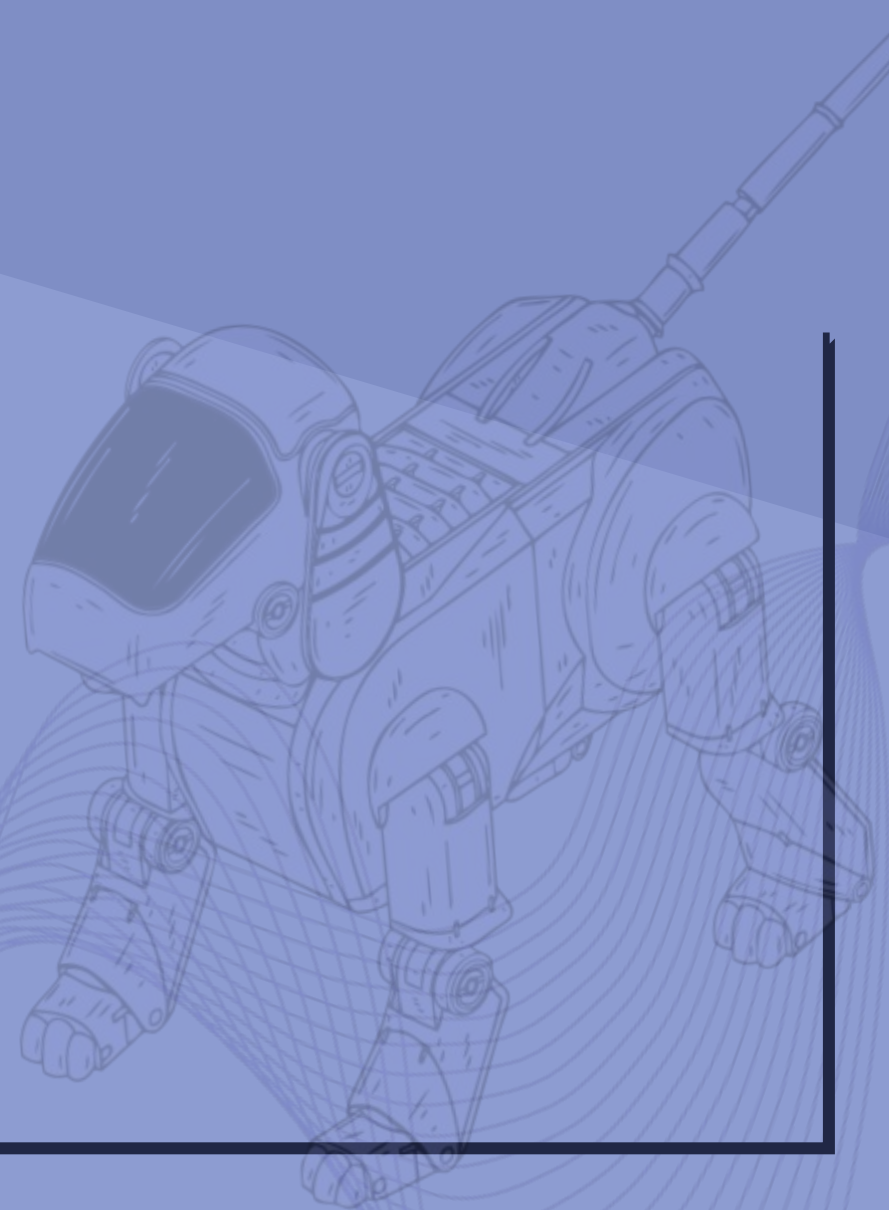
A hospital has asked you to create a wire loop game to help train their junior doctors in their focus and ability to keep their hands steady!



Process

Buzz Wire Game

- Use a buzzer with a Raspberry Pi and Scratch.
- Use a button to sound a buzzer.
- Use a variable to keep a score.



What you will need

Buzz Wire Game

- A Raspberry Pi.
- A buzzer.
- 5 Pipe Cleaners.
- 2 Male-to-Female jumper wires.
- 2 Male-to-Male jumper wires.
- 2 Crocodile clip wires.
- Aluminium foil.
- Plasticine or BluTack.

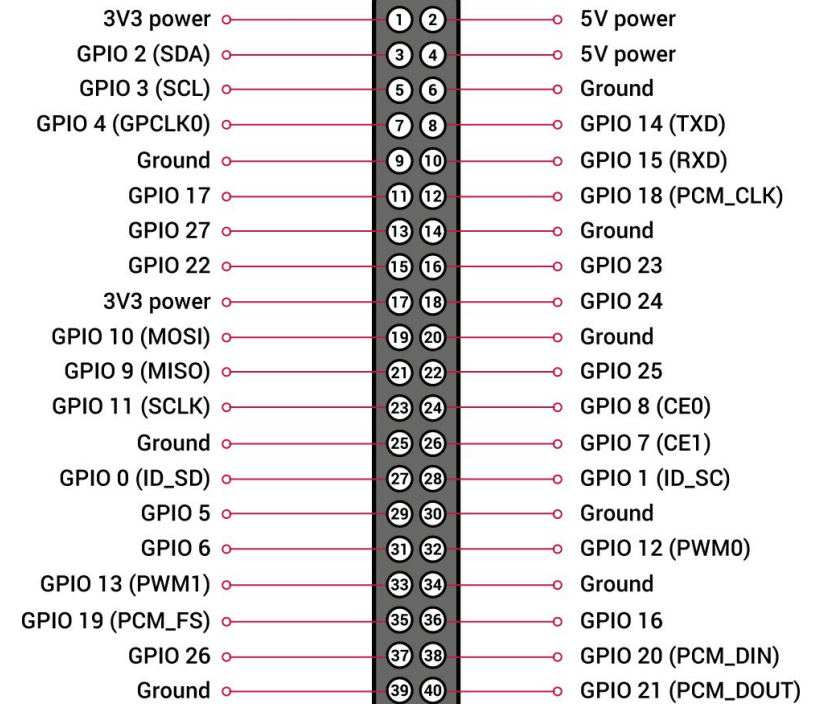
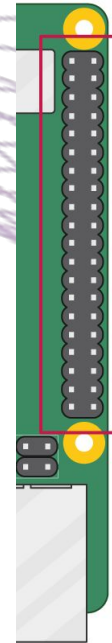
GPIO Pins

GPIO Pins are general-purpose input/output pins that allow us to interact with electronic components outside of our Raspberry Pi.

Each Raspberry Pi has a unique GPIO pinout, so before you wire up your components, find the appropriate pinout for your Raspberry Pi.

You can find these in the [Raspberry Pi Documentation](#).

On the right is a pinout for the Raspberry Pi 4.



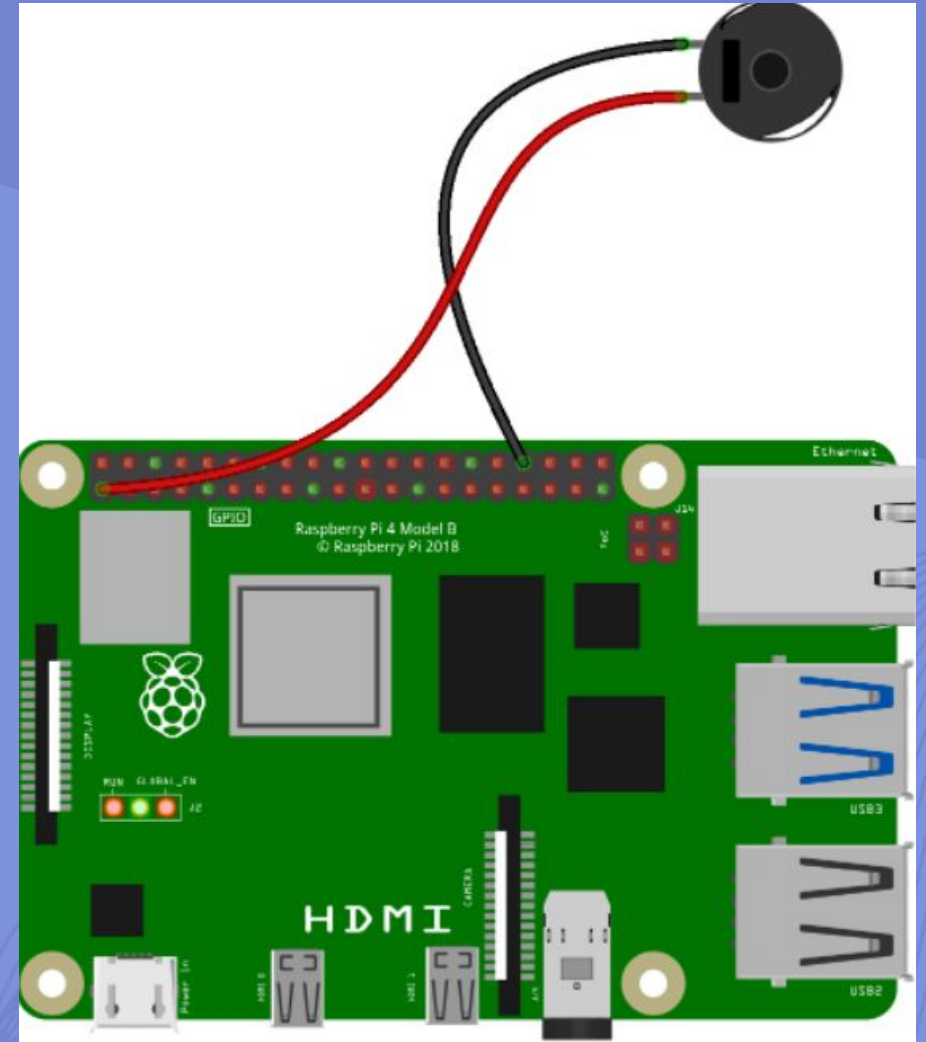
Step 1

Wire and test a buzzer

Once you have turned on your Raspberry Pi...

Use two F-F jumper wires to attach your buzzer to your Raspberry Pi. The long leg of the buzzer must be wired to 3V3 and the short leg should be wired to a GND pin.

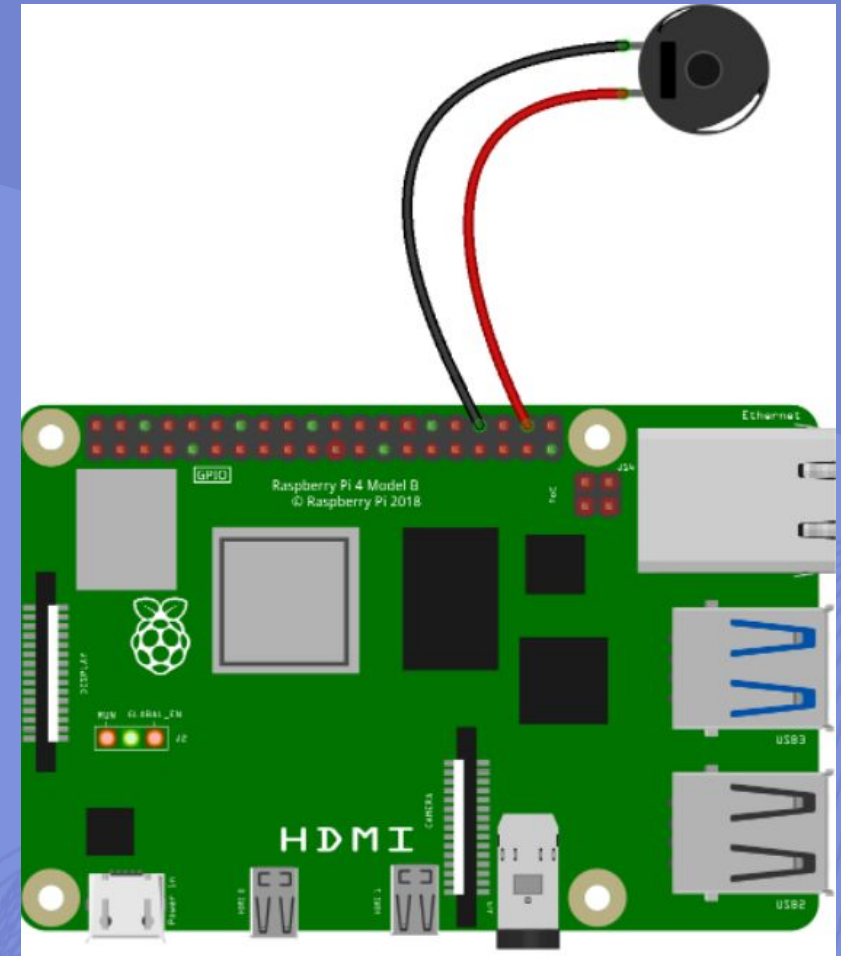
It should sound straight away, so you know that it works.



Step 2

Wire and test a buzzer

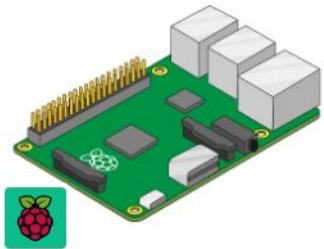
Move the wire from the 3V3 pin to GP20 as shown in the diagram below. The buzzer should stop sounding.



Step 3

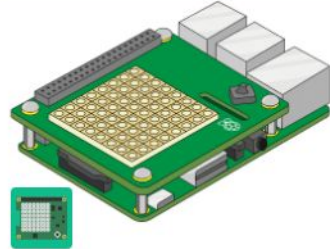
Wire and test a buzzer

Open Scratch on your Raspberry Pi and add the Raspberry Pi **Simple Electronics** extension.



Raspberry Pi GPIO
Control Raspberry Pi GPIO lines

Collaboration with
Raspberry Pi



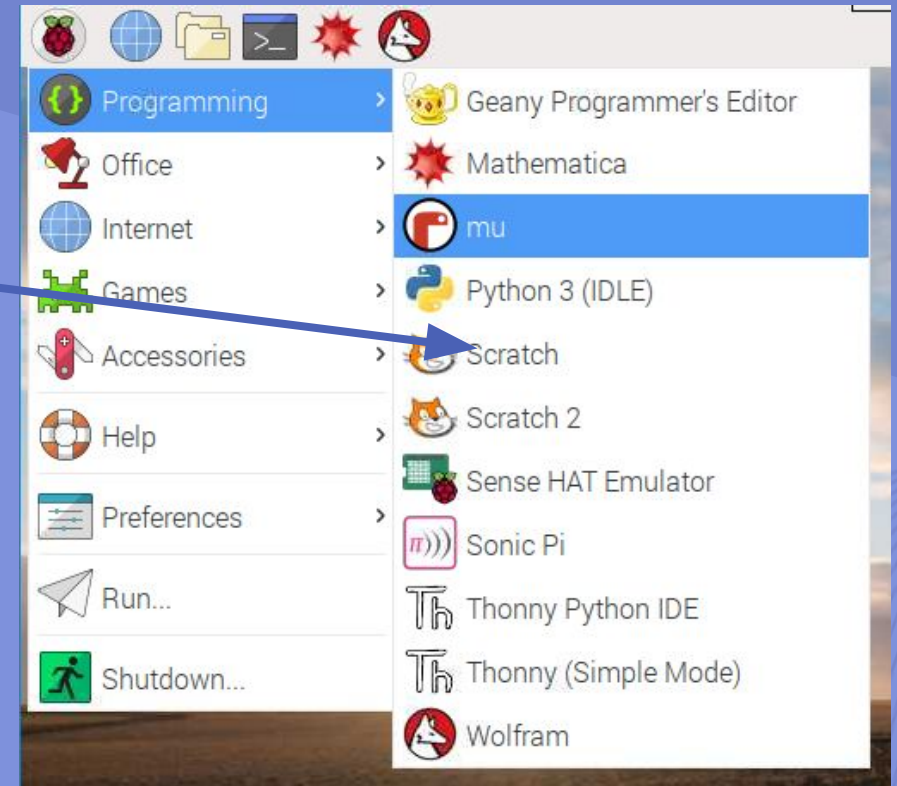
Raspberry Pi Sense HAT
Control Raspberry Pi Sense HAT

Collaboration with
Raspberry Pi



Raspberry Pi Simple Electronics
Simple electronics with Raspberry Pi

Collaboration with
Raspberry Pi

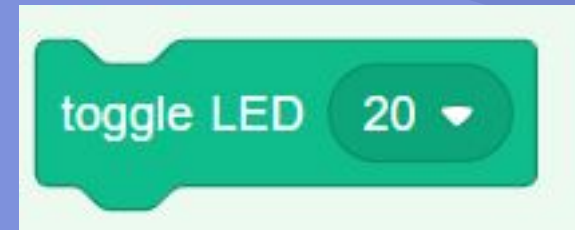


Step 4

Wire and test a buzzer

From the Raspberry Pi [Simple Electronics](#) extension, find toggle LED 0 in the menu, and use the drop-down menu to change 0 to 20.

Click on the block and your buzzer should sound. Click again and the buzzer should turn off. It doesn't matter that the block says LED, because buzzers and LEDs work in the same way. They are either ON or OFF.

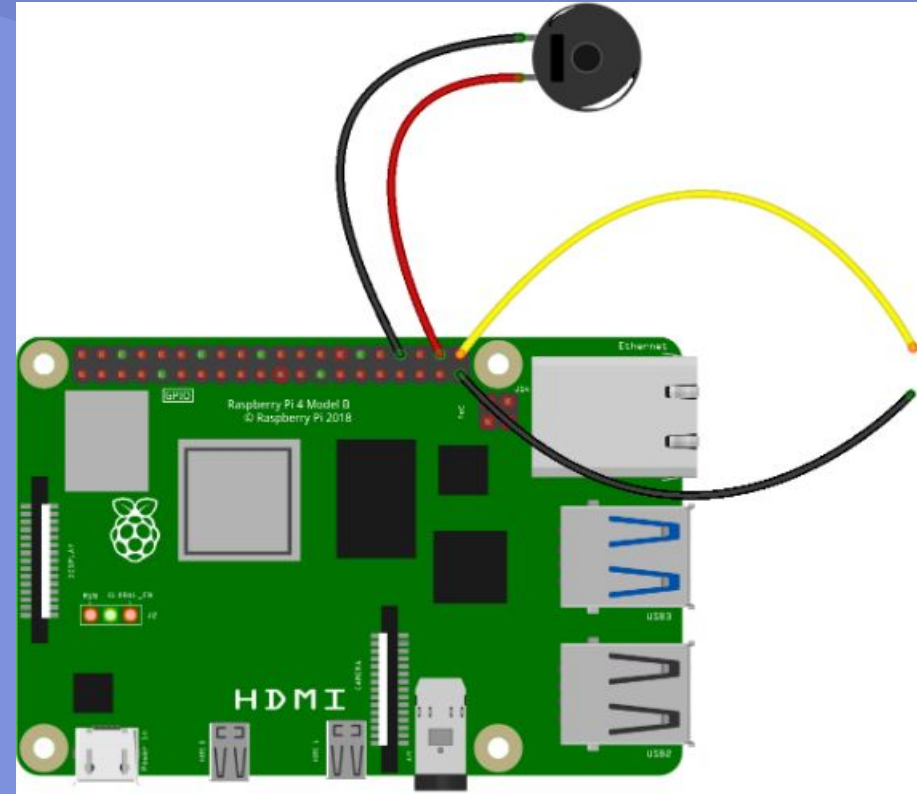


Step 5

Add a button

In this step, we'll add a simple button, which will control the buzzer.

Add an M-F wire to GP21 and another M-F wire to a second GND pin.

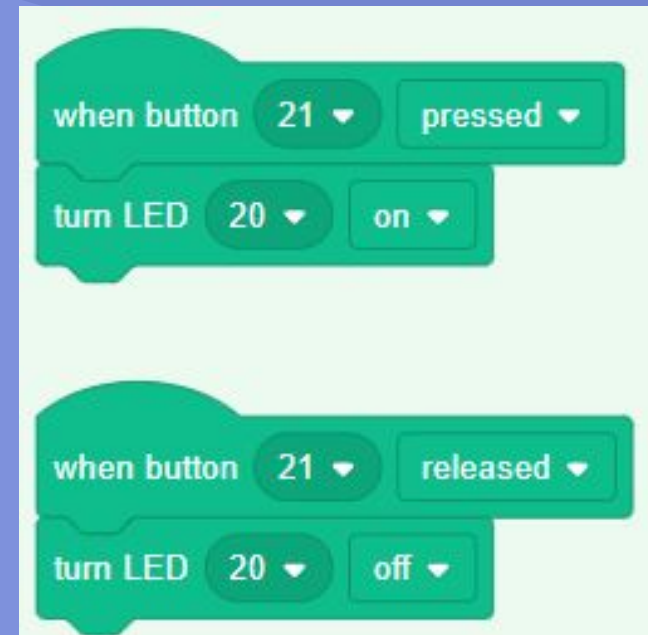


Step 6

Add a button

From the Raspberry Pi [Simple Electronics](#) extension, add the following blocks to control your buzzer.

Run your code and then touch the two M-F jumper wires together. The buzzer should sound. When you take them apart, the buzzer should stop.



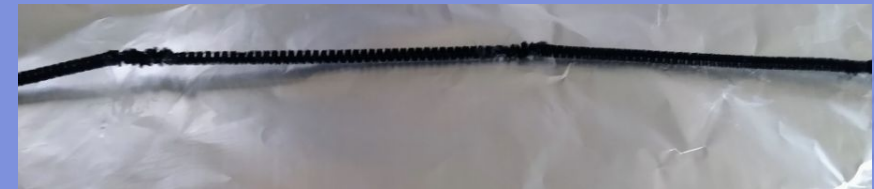
Step 7

Building the wire loop game

In this step, we will build the physical frame of our wire loop game to use with our existing scratch code.

Get 4 pipe cleaners and twist the ends of them together.

Wrap the pipe cleaners in a piece of aluminium foil so that they are covered from end to end.



Step 8

Building the wire loop game

Take another pipe cleaner, wrap it in foil, and bend it into a loop.

Take the long, wrapped set of pipe cleaners and bend them into an interesting shape. Thread the wire loop you made onto the long wire.

Then use BlueTack to attach the ends of the long wire to a flat surface.

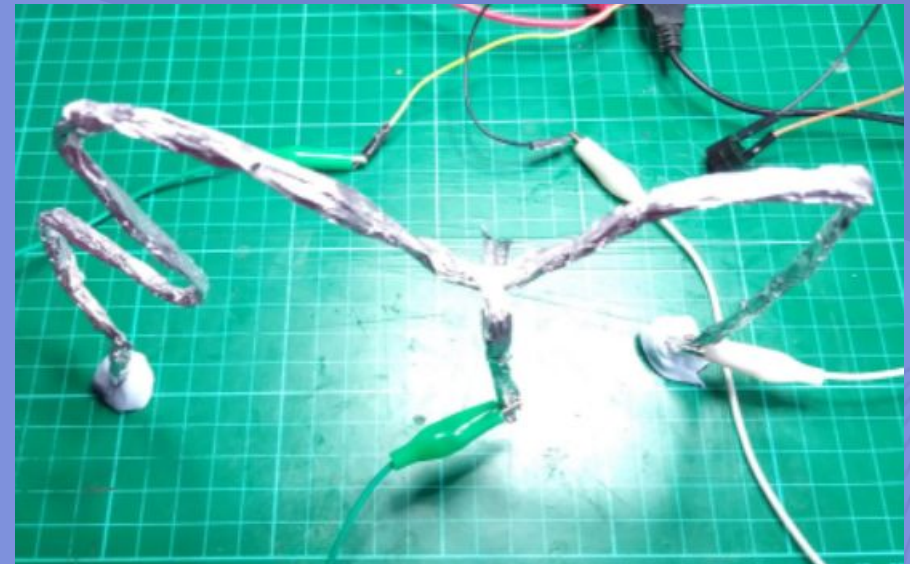


Step 9

Building the wire loop game

Use a crocodile clip lead to attach one end of the long wire to one of the M-F jumper wires, and add another crocodile lead to attach the handle of the wire loop to the other M-F jumper wire.

Run the program and try and move the wire loop along the wire. Each time they touch, a buzzer should sound.

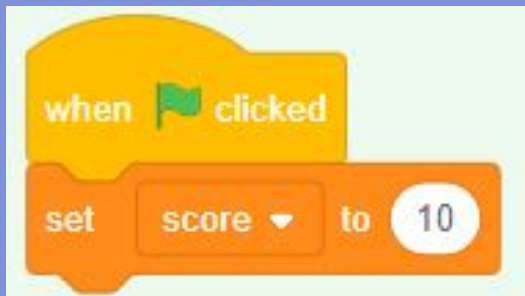


Step 10

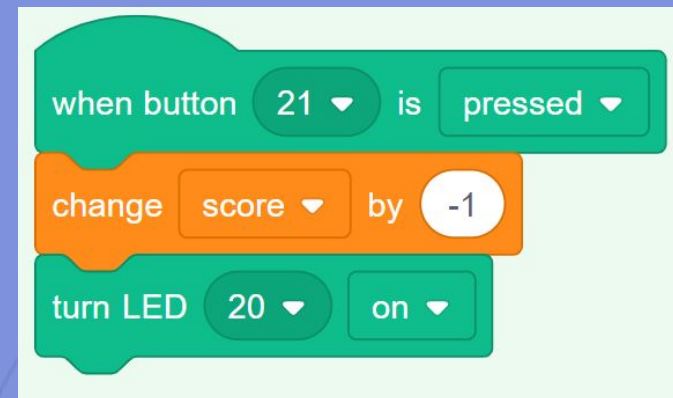
Add a score

Now that you have a working game, you can add some code to keep a score of how the player is doing.

Create a new variable and call it score. When you run the programme, the score should start at 10.



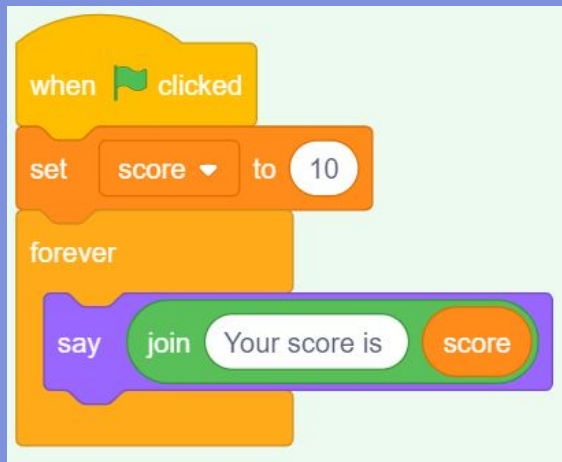
Each time the loop touches the wire, the score should decrease by 1. Alter the section of your code that starts with **when button 21 is pressed** so that it looks like this:



Step 11

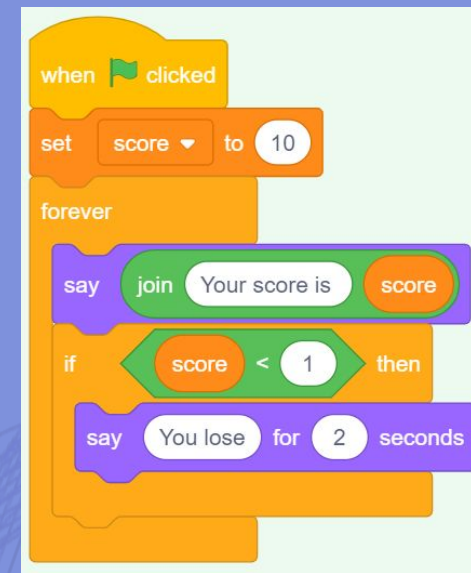
Add a score

Use a forever loop to report the score.



Run your programme. Each time you touch the wire it should decrease.

Add an IF THEN block to your code, so that you can tell the player that they have lost when their score is less than 1.



Conclusion

Learning outcomes

- ✓ Learn how to wire a simple circuit.
- ✓ Write a program to control the circuit.
- ✓ Use a buzzer with a Raspberry Pi and Scratch.
- ✓ Use a button to sound a buzzer.

Congratulations!
You have completed the project

