

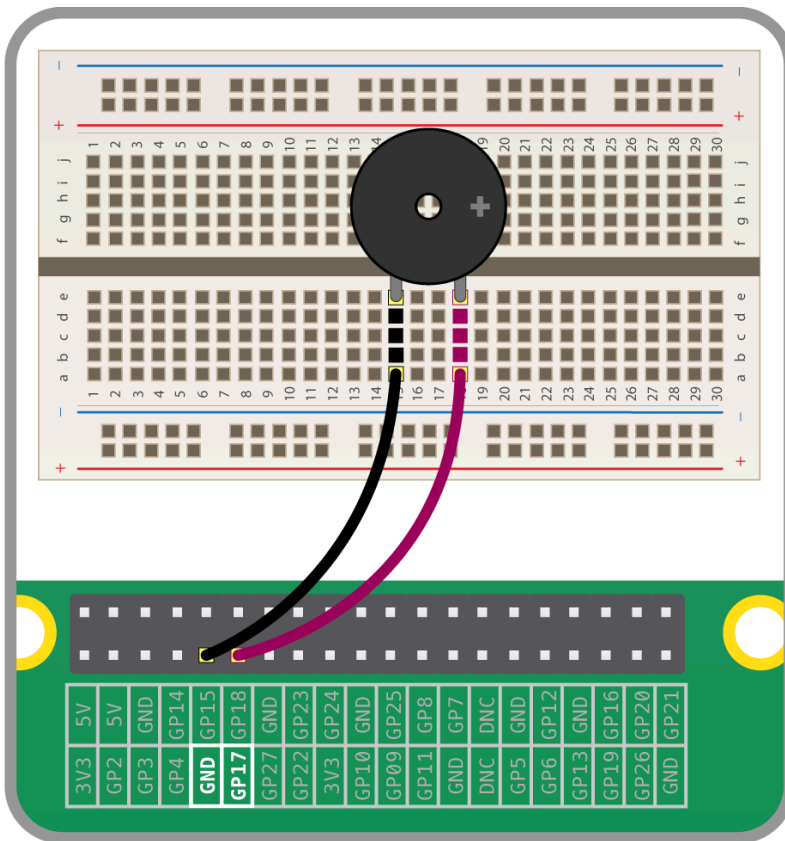
PRACTICE 3: MODERN IOT

1. a buzzer

There are two main types of buzzer: *active* and *passive*.

A *passive* buzzer emits a tone when a voltage is applied across it. It also requires a specific signal to generate a variety of tones. The *active* buzzers are a lot simpler to use

1.1 Connecting an active buzzer

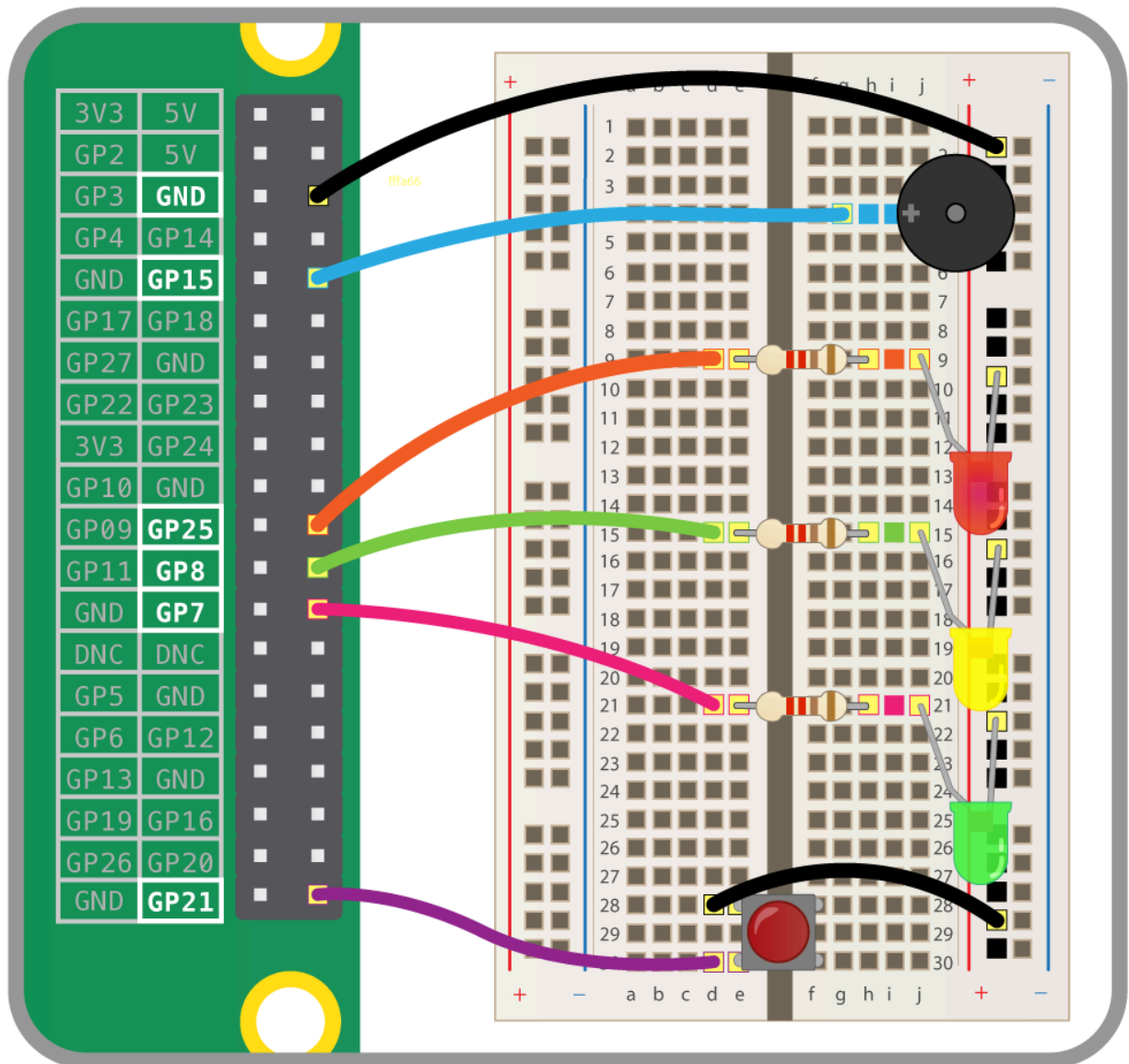


A Buzzer works exactly like an LED, so try adding on and off it.

1.2 Make Bell

We'll program the Pico with a MicroPython script to let the buzzer generate a beep tone for 1 second when a push-button is pressed.

1.3 Making traffic lights



Component	GPIO pin
Button	21
Red LED	25

Amber LED	8
Green LED	7
Buzzer	15

- a) Try adding the button for a pedestrian crossing. The button should move the lights to red (not immediately), and give the pedestrians time to cross before moving back to green until the button is pressed again.
- b) Now try adding a buzzer to beep quickly to indicate that it is safe to cross, for the benefit of visually impaired pedestrians.

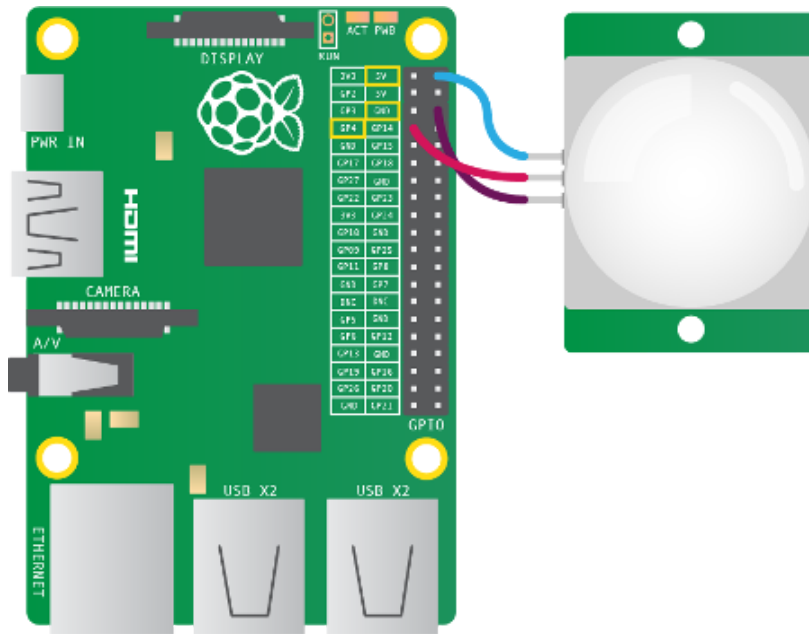
1.4 Passive Buzzers

There are many things you can do with buzzers. Try to do it.

2. Using a PIR sensor

Humans and other animals emit radiation all the time. This is nothing to be concerned about, though, as the type of radiation we emit is infrared radiation (IR), which is pretty harmless at the levels at which it is emitted by humans. In fact, all objects at temperatures above absolute zero (-273.15C) emit infrared radiation.

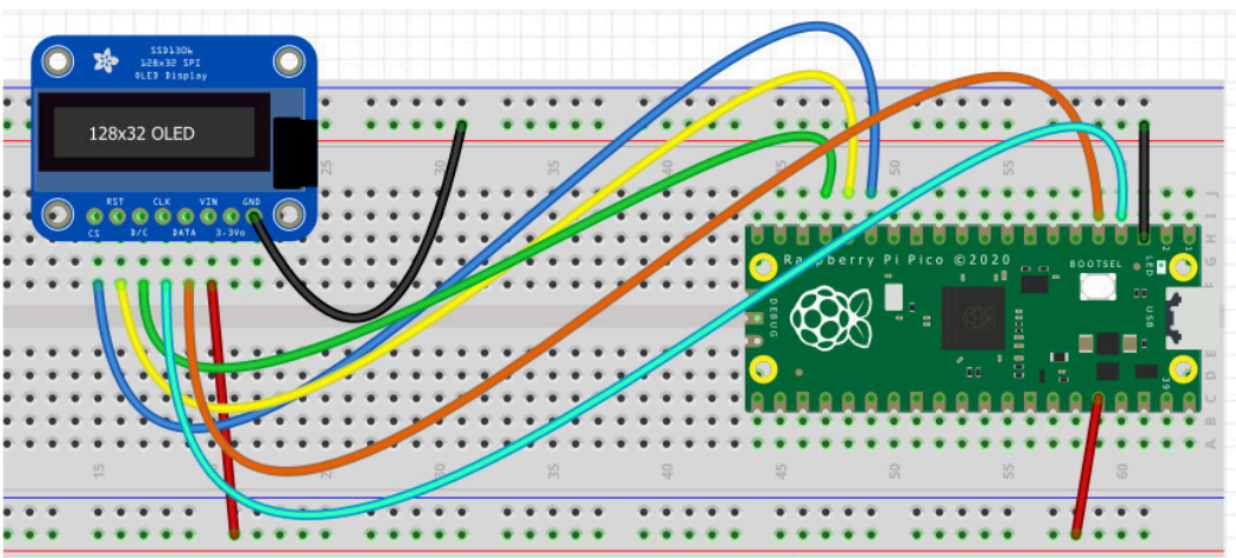
A PIR sensor detects changes in the amount of infrared radiation it receives. When there is a significant change in the amount of infrared radiation it detects, then a pulse is triggered. This means that a PIR sensor can detect when a human (or any animal) moves in front of it.



- The PIR detects motion, the output pin will go "high" to 3.3V and light up the LED, called "non-retriggering".
- LED does stay on the entire time that something is moving, called "retriggering". if there isn't any movement after 10 second, it automatically turns off the light

3. OLED, LCD display

3.1 Use a temperature sensor and display on OLED the temperature and humidity data



3.2 Use a temperature sensor and display on LCD the temperature and humidity data each minute