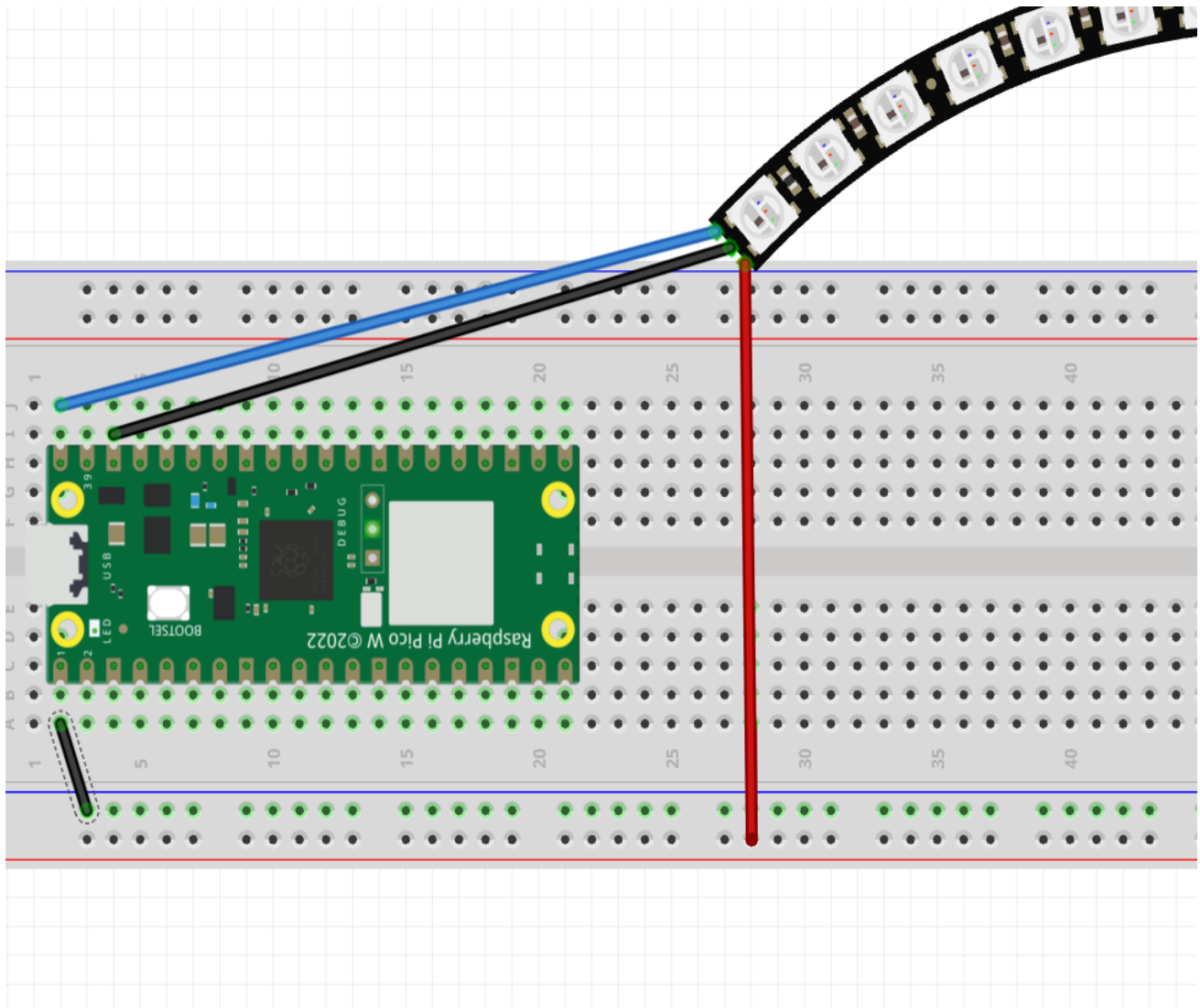


LESSON 9

Create a Random-Colour NeoPixel Chase

Raspberry Pi Pico W - Student Guide



Lesson Objective

Learn how to make one NeoPixel LED light up at a time using changing random colours.

Pin Numbers and Connections

Use these connections for the NeoPixel strip.

NeoPixel Wire	Pico Connection	Physical Pin	Purpose
Data In (DIN)	GP0	Pin 1	Sends colour data to the NeoPixel strip
Power	VBUS	Pin 40	Provides 5 V power while the Pico W is powered by USB
Ground	GND	Pin 3, 8, 13, 18, 23, 28, 33, or 38	Completes the circuit and provides a common ground

Connection Steps

1. Connect the NeoPixel DIN wire to GP0 (Pin 1).
2. Connect the power wire to VBUS (Pin 40).
3. Connect the ground wire to any GND pin.
4. Make sure the data wire is connected to the DIN end of the strip.

Important

The Pico W and NeoPixel strip must share the same ground. Connect the data wire to DIN, not DOUT.

Python Code

File name: lesson9.py

```
import neopixel
from machine import Pin
from time import sleep
import random

number_leds = 8
GPIO_0 = 0

np = neopixel.NeoPixel(Pin(0), number_leds)

cycles = 1
print(len(np))

while cycles < 50:
    for i in range(len(np)):
        print(i)
        colour1 = random.randint(0, 20)
        colour2 = random.randint(0, 20)
        np[i] = (10, colour1, colour2)
        np.write()
        sleep(0.2)
        np[i] = (0, 0, 0)
        np.write()
    cycles += 1
```

Understanding the Code

Code	Meaning
import random	Loads the random-number library.
number_leds = 8	Tells the program that the strip has 8 LEDs.
for i in range(len(np)):	Moves through each LED from index 0 to index 7.
random.randint(0, 20)	Creates a random colour value between 0 and 20.
np[i] = (10, colour1, colour2)	Turns on one LED using a fixed red value and two random colour values.
np.write()	Sends the updated colour to the NeoPixel strip.
sleep(0.2)	Keeps the LED on for 0.2 seconds.
np[i] = (0, 0, 0)	Turns the current LED off before moving to the next LED.
cycles += 1	Adds 1 after a full movement across the strip.

How the animation works

One LED turns on with a random colour, waits for 0.2 seconds, turns off, and then the next LED lights up.

LED 0 -> LED 1 -> LED 2 -> LED 3 -> LED 4 -> LED 5 -> LED 6 -> LED 7 -> repeat

About the cycle counter

Because **cycles** starts at 1 and the loop runs while it is less than 50, the complete chase runs 49 times.

Key Learning Point

The program combines a **for loop**, random numbers and NeoPixel indexing to create a moving light effect with changing colours.