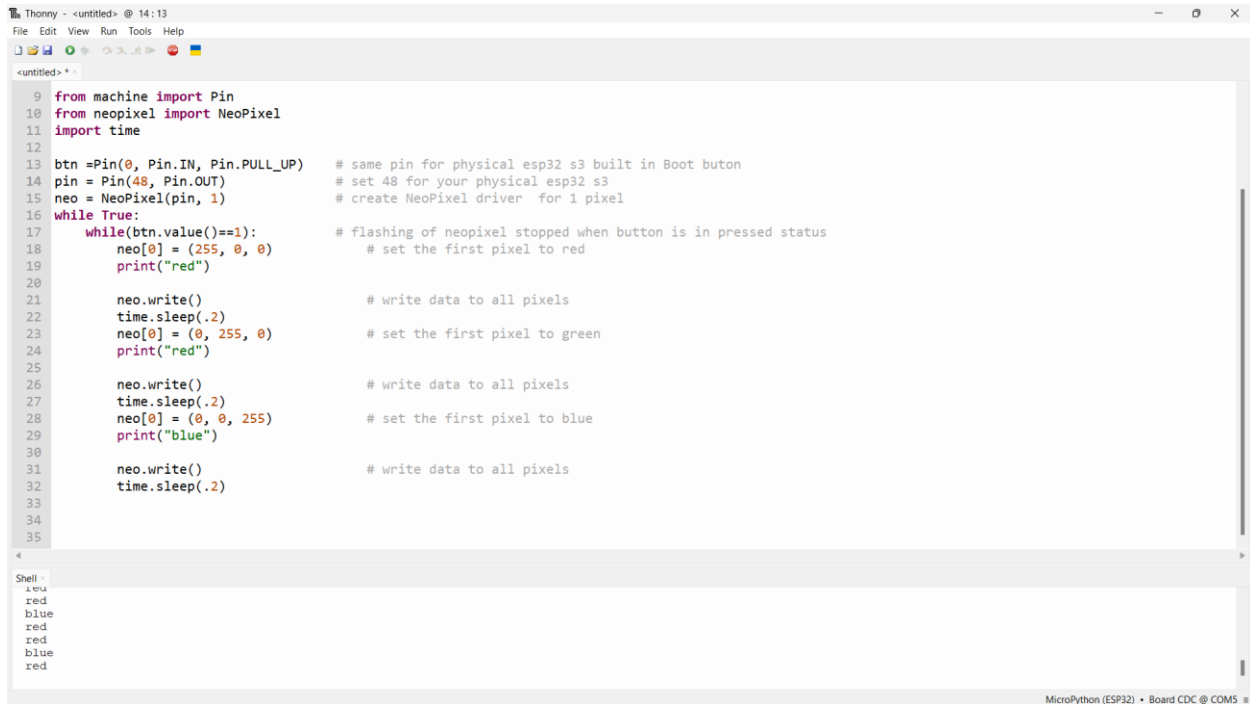




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1. Upload the same code to a physical ESP32 S3:

- Run the code.
- Take a snapshot of Thonny.
- Record a short video of your physical device (change the pin from 33 to 48 for the physical device).



```
9 from machine import Pin
10 from neopixel import NeoPixel
11 import time
12
13 btn = Pin(0, Pin.IN, Pin.PULL_UP) # same pin for physical esp32 s3 built in Boot buton
14 pin = Pin(48, Pin.OUT)           # set 48 for your physical esp32 s3
15 neo = NeoPixel(pin, 1)          # create NeoPixel driver for 1 pixel
16 while True:
17     while(btn.value()==1):      # flashing of neopixel stopped when button is in pressed status
18         neo[0] = (255, 0, 0)    # set the first pixel to red
19         print("red")
20
21         neo.write()             # write data to all pixels
22         time.sleep(.2)
23         neo[0] = (0, 255, 0)    # set the first pixel to green
24         print("red")
25
26         neo.write()             # write data to all pixels
27         time.sleep(.2)
28         neo[0] = (0, 0, 255)    # set the first pixel to blue
29         print("blue")
30
31         neo.write()             # write data to all pixels
32         time.sleep(.2)
33
34
35
```

Shell -

```
+vu
red
blue
red
red
blue
red
```

MicroPython (ESP32) • Board CDC @ COM5

<https://wokwi.com/projects/423428183892556801>

2. Investigate the Neopixel color behavior:

- a. Why does the Neopixel always turn blue when the button is pressed?

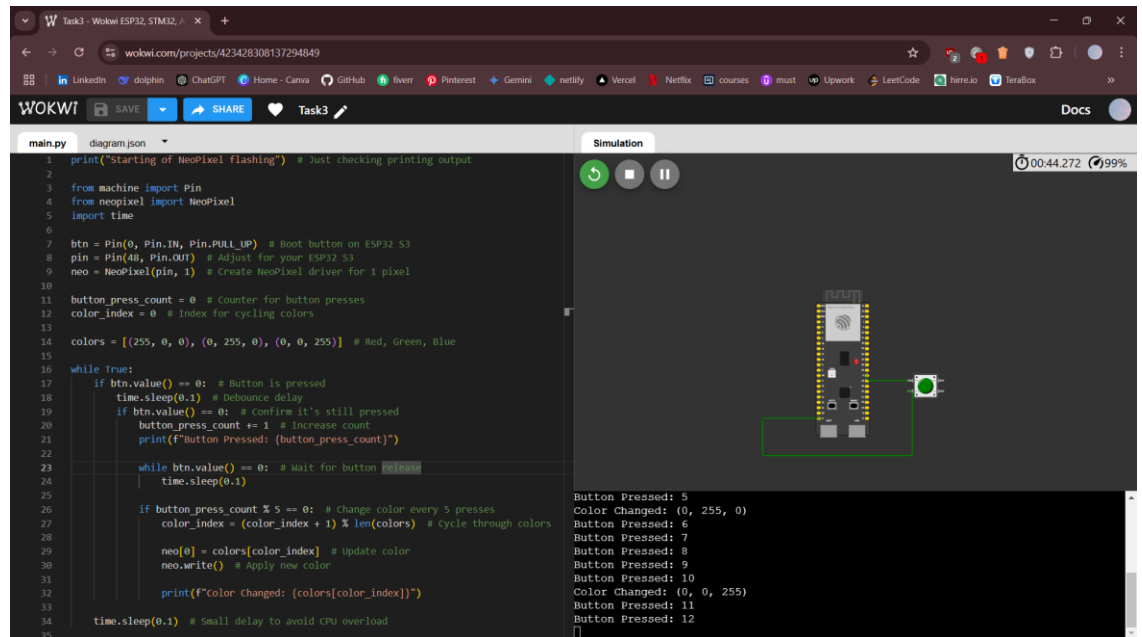
The LED always turns blue because the button logic is set up. The button starts with a value of 1, which keeps the loop running. When we press the button, the value changes to 0, stopping the loop. But since blue was the last color displayed; the LED always gets stuck on blue.

- b. How can it be made to stop on different colors in real-time (e.g., sometimes red, sometimes green, sometimes blue)?

- We can use a list of colors to store different LED colors.
- Track the current color using a variable like `color_index`.
- Update `color_index` before exiting the loop when the button is pressed.
- LED stays on the last displayed color, instead of always stopping at blue.

3. Modify the code for button presses:

- Change the color after every 5 button presses.
- Examine the result: Does the color change exactly after 5 presses, or is there abnormal behavior?
- If there is abnormal behavior, what could be the reason?



```
1 print("Starting of NeoPixel flashing") # Just checking printing output
2
3 from machine import Pin
4 from neopixel import NeoPixel
5 import time
6
7 btn = Pin(0, Pin.IN, Pin.PULL_UP) # Boot button on ESP32 S3
8 pin = Pin(48, Pin.OUT) # Adjust for your ESP32 S3
9 neo = NeoPixel(pin, 1) # Create NeoPixel driver for 1 pixel
10
11 button_press_count = 0 # Counter for button presses
12 color_index = 0 # Index for cycling colors
13 colors = [(255, 0, 0), (0, 255, 0), (0, 0, 255)] # Red, Green, Blue
14
15 while True:
16     if btn.value() == 0: # Button is pressed
17         time.sleep(0.1) # Debounce delay
18         if btn.value() == 0: # Confirm it's still pressed
19             button_press_count += 1 # Increase count
20             print(f"Button Pressed: {button_press_count}")
21             while btn.value() == 0: # Wait for button release
22                 time.sleep(0.1)
23
24             if button_press_count % 5 == 0: # Change color every 5 presses
25                 color_index = (color_index + 1) % len(colors) # cycle through colors
26                 neo[0] = colors[color_index] # update color
27                 neo.write() # Apply new color
28                 print(f"Color Changed: {colors[color_index]}")
29
30             time.sleep(0.1) # Small delay to avoid CPU overload
31
32
33
34
35
```

Simulation

00:44.272 99%

Button Pressed: 5
Color Changed: (0, 255, 0)
Button Pressed: 6
Button Pressed: 7
Button Pressed: 8
Button Pressed: 9
Button Pressed: 10
Color Changed: (0, 0, 255)
Button Pressed: 11
Button Pressed: 12

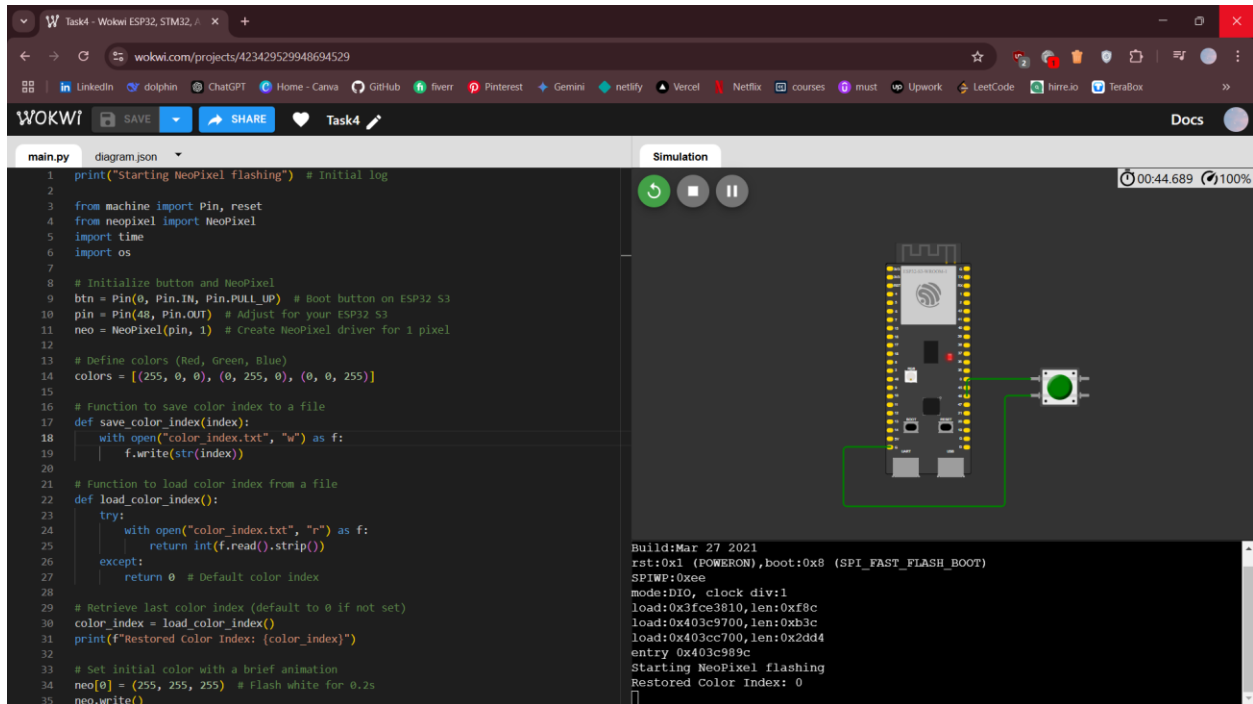
<https://wokwi.com/projects/423428308137294849>

Unusual Behavior:

- Inconsistent Color Change:** The LED changes color before or after 5 presses.
- Multiple Counts Per Press:** A single press registers multiple times, causing unexpected color changes.
- No Color Change:** The LED doesn't change color even after 5 presses.

4. Implement your own changes to the code.

This version saves the last selected color in it when the ESP32 restarts.



<https://wokwi.com/projects/423335410791447553>