7   Worksheet   Flynn Duniho and Zack Kaplan

Submit one per team.

1. Write out how you would call `digitalWrite()` to set pin 33 to HIGH.

    digitalWrite(33, HIGH);

2. What voltage corresponds to HIGH for the ESP32?

    3.3V

3. Describe the purpose of using a *pullup resistor*.

    It's to guarantee that a pin reads as HIGH when a button or something else breaks the circuit

4. What are the color bands on a 2.2$k\Omega$ resistor with $\pm5\%$ tolerance? Assume a four-band resistor.

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5. In the code, what command is used to check if the button is pressed? How does the program know which pin it is connected to?

    Button.CheckButtonPress()
    the program uses a built-in constant for the boot button pin

6. When you pressed the button 10 times, did it register all 10?

    yes

7. Complete Table 1.

Value	Student 1	Student 2	Student 3	Student 4
R	326	324		
V_R	1.249 v	1.25 v		
I_{theory}	3.831 mA	3.858 mA		
$I_{measured}$	3.73 mA	3.73 mA		
V_{LED}	1.89 v	1.9 v		
V_{total}	3.14 v	3.15 v		
V_{open}	3.26 v	3.26 v		

Table 1: Results from your circuit experiments (see the text for definitions). Use as many columns as needed. Don't forget to include units!

8. How does the measured current compare to the theoretical?

9. How much current flows through the LED when it is lit? (Hint: the equation that governs current through an LED is rather complex – not something we cover in this class – but there is a very easy way to find it.)

10. Why is the open circuit voltage higher than the voltage across the circuit when the LED is connected?

because the LED has a small amount of resistance already

11. What is the measured voltage that produced an ADC reading of 2048? What did you expect it to be?

the measured voltage was   v

we expected it to be $\frac{3.3}{2} = 1.65$v