Kayden Roloff, Joshua Sand, Logan Kimura

Building Circuits

Basic Circuit

6. 5 Amps
    a. This is not sufficient
    b. I think the circuit will short and maybe damage the Rpi
7. By Ohm's Law, the current drawn would only be .05 Amps
    a. We used a resistor that we measured around 150 ohms, and across our 5 volts we measured a current of .03 Amps, which is what we expected.

1. LED Circuit
        i. The longer side has to be on the positive side of the terminal.
    b. The voltage drop is 1.75 ohms. Yes, because on the LED sheet said it take 3.2 Volts
    c. 3.2 Volts.
2.
    a. The LED will get brighter.
3. Higher resistor means that the LED will get less bright and vice versa.
    a. It does change slightly. We increased the resistor from 150 to 300, and the voltage drop across the LED dropped from 3.25 to 3. Not a massive change but yes there was a change.
4.
    a. I expect nothing to change, because the voltage drop is 3.3 anyways.

b. This was wrong, it does change. Even though I expected the green LED to have just 3 - 3.3 volts, the brightness changed. The voltage drop was just 3.3 with the 3.3, but was over 4V won the 5V voltage drop.

5.

a. Not connected to the step up circuit with a 1000 ohm resistor, the voltage drop was 2.5V across the resistor and 2.6 V across the LED. Then when connecting to the Step up Circuit makes the voltage drop across the resistor 7.5V, and the LED goes up the 3.1 V.
b. The LED was slightly brighter with the step up circuit, which makes sense given the increase in the voltage drop across it.

6. We would quantify it by the voltage drop across it. This makes sense as that is essentially how much 'energy' the LED is using up.

7. Using the chart provided with the LEDs, we would infer that the red would be less bright and have a smaller voltage drop. After checking under several set ups, our prediction was confirmed. With the setup with 1000 ohm resistor and the step up circuit for example, the voltage drop across the green LED was 3.1V, but the red LED was only 2 V.

Photo-Diode

2. The voltage drop across the resistor is 0V, The drop across the photo-diode is 5V. We are really struggling to get an accurate, stable number. Apparently this was correct!

3. When we cover it, nothing happens. When we change it to the 3.3 V diode, nothing happens.

a. The dark Current is very small. Using V = IR, our 1000 ohm resistor, and the maximum observed voltage drop while connected to a 5V source (and shining a flashlight) of 1.5 V, the calculated dark current is 1.5 microA.
b. Yes, 5V is, but 3.3V is not.

c. The current increases but not insanely

4. We managed to get the saturation current up to .3milliA, with a voltage drop of .3V across the resistor. The dark current as mentioned before was about 1.5 microA.