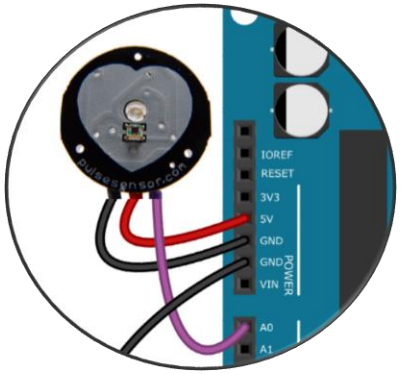
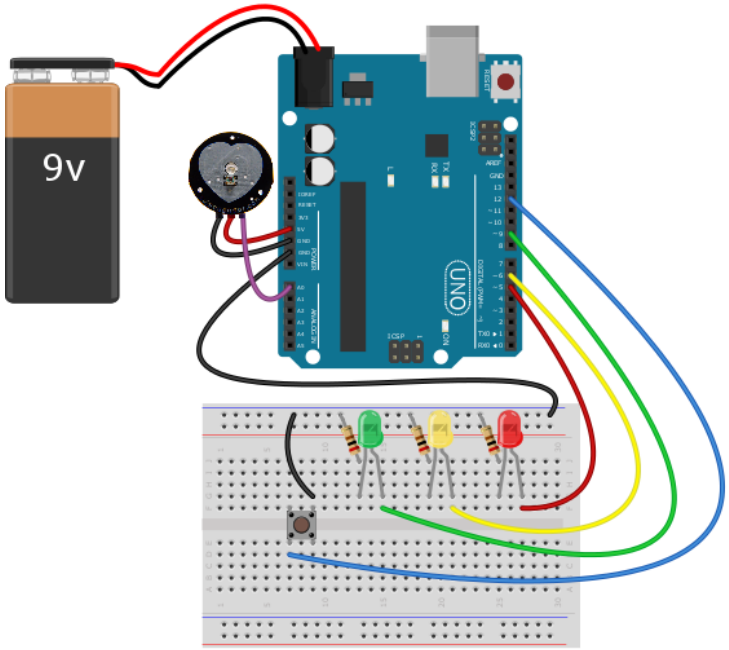
Make Your Own Pulse Sensor – Assembly Instructions

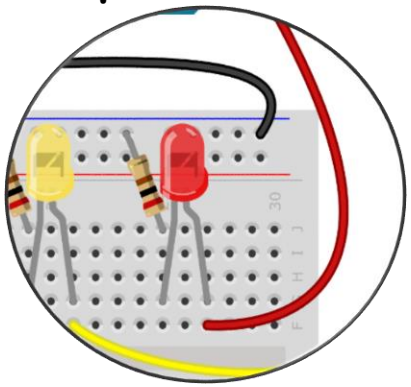
Step 1: Connect the Sensor



a) With the pulse sensor facing you so you see the heart, connect the left most wire (-ve) to the pin marked GND on the UNO (see picture to the left)
b) Next connect the middle wire (+ve) to the pin labelled 5V
c) Connect the right most wire (signal) to the pin labelled A0
d) Connect the 9V battery to the power connector on the corner of the UNO
e) To test, lightly hold the sensor to your thumb, being careful not to touch the components on the back. The heart graphic should be against your thumb. When positioned correctly the light on the UNO labelled L will pulse in time with your heart beat

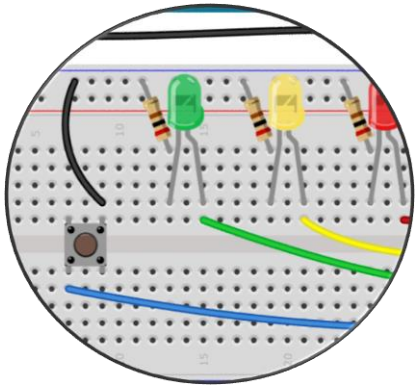


Step 2: Connect One Light Emitting Diode (LED)

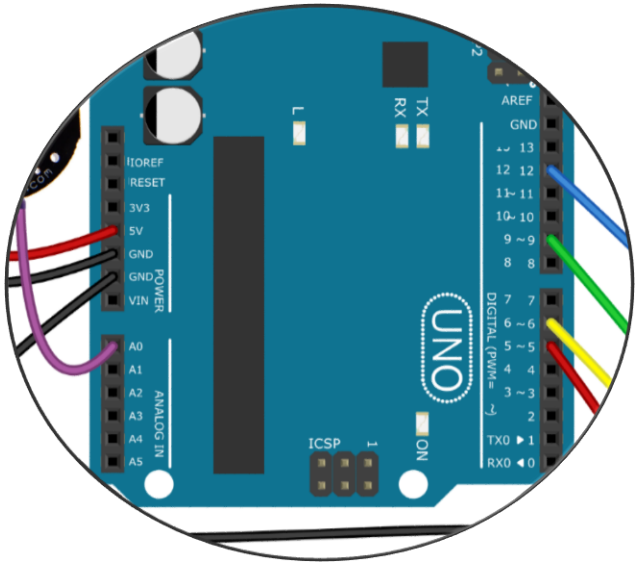


a) Before continuing, disconnect the battery
b) Install a red LED and resistor as shown. Use a 220 ohm resistor (the one with two pink stripes)
c) Using a jumper wire connect the positive side of the LED to pin 5 on the UNO
d) Connect the blue ground rail to the second GND pin on the UNO using a jumper wire
e) Now if you connect the battery and place the sensor against your thumb the red LED should blink in time with your pulse

Step 3: Connect the Remaining LEDs and Button



a) Repeat Step 2 for the remaining two LEDs and resistors. Also connect the button. Refer to the image on the right for the corresponding microcontroller connections
b) Once complete, when the battery is connected your system will change how it displays your pulse depending on how many times the button has been pushed



Make Your Own Pulse Sensor – Schematic & Resources

How it works:

What are we measuring?

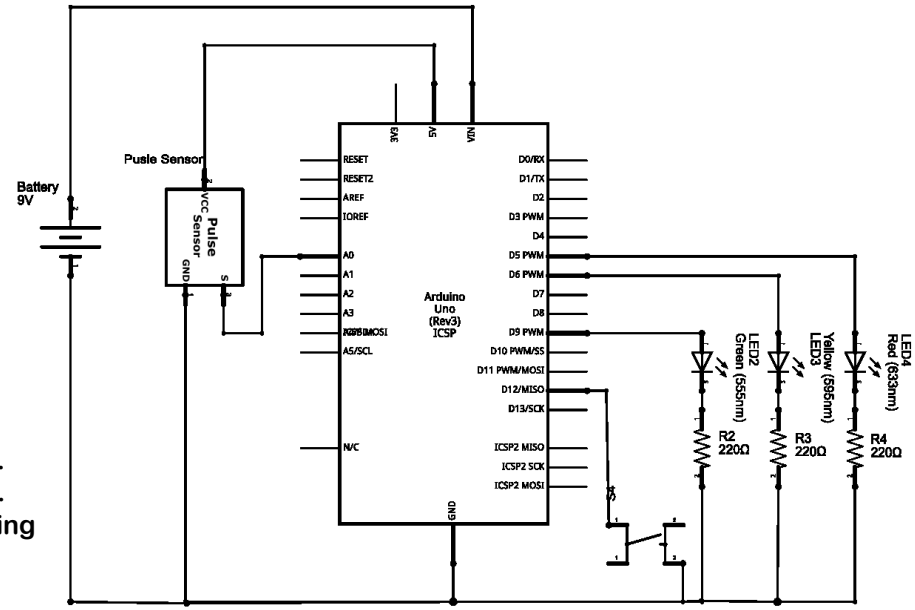
- The following is based on information from the pulse sensor manufacturer.
- With every heart beat there is a pulse wave that travels throughout all arteries and veins. In this project you will detect individual pulse waves.
- Once pulses are detected we can use that information to indicate a heartbeat, or an average heart rate, or more.

How are we measuring it?

- We are making a basic photoplethysmograph, which uses light to measure change in volume.
- This sensor has two key parts: a light sensor, and a green light source. Both parts are place next to each other facing your skin. The amount of light detected by the sensor changes with each pulse. It's that change that we pick up and use to determine a pulse rate.

How is my pulse displayed?

- If the button hasn't been pushed, the red LED will light up in time to your pulse.
- If the button is pushed once the three LEDs will light up in time with your pulse.
- If the button is pushed a second time your pulse rate will be displayed by blinking the LEDs. This way you can know if you pulse rate is 74 or 104.
- Counting the number blinks will determine the rate as follows:
  - The green LED is the hundreds column
  - The yellow LED is the tens column
  - The red LED is the ones column
  - For example if all the LEDs blinked once the pulse would be 111
- Pushing the button again will set the system back to blinking only the red LED.



Resources:

This projects source code & documentation can be found at:
https://github.com/Orion-UWaterloo/Pulse_Sensor.git

Pulse sensor code, tutorials, technical articles and more at: www.pulsesensor.com

Uno development environment: http://www.arduino.cc
Includes free development environment, guides, example code, everything you need to started creating your own projects

Some computers may not have the latest driver for the UNO boards. If you are having trouble connecting the UNO board go to the driver file located in the github link above

Contact:

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If you have any questions or comments regarding this project, please feel free to contact me. I'd love to hear about any projects this kit has inspired!

This project was created using:

Arduino/Genuino Fritzing GitHub