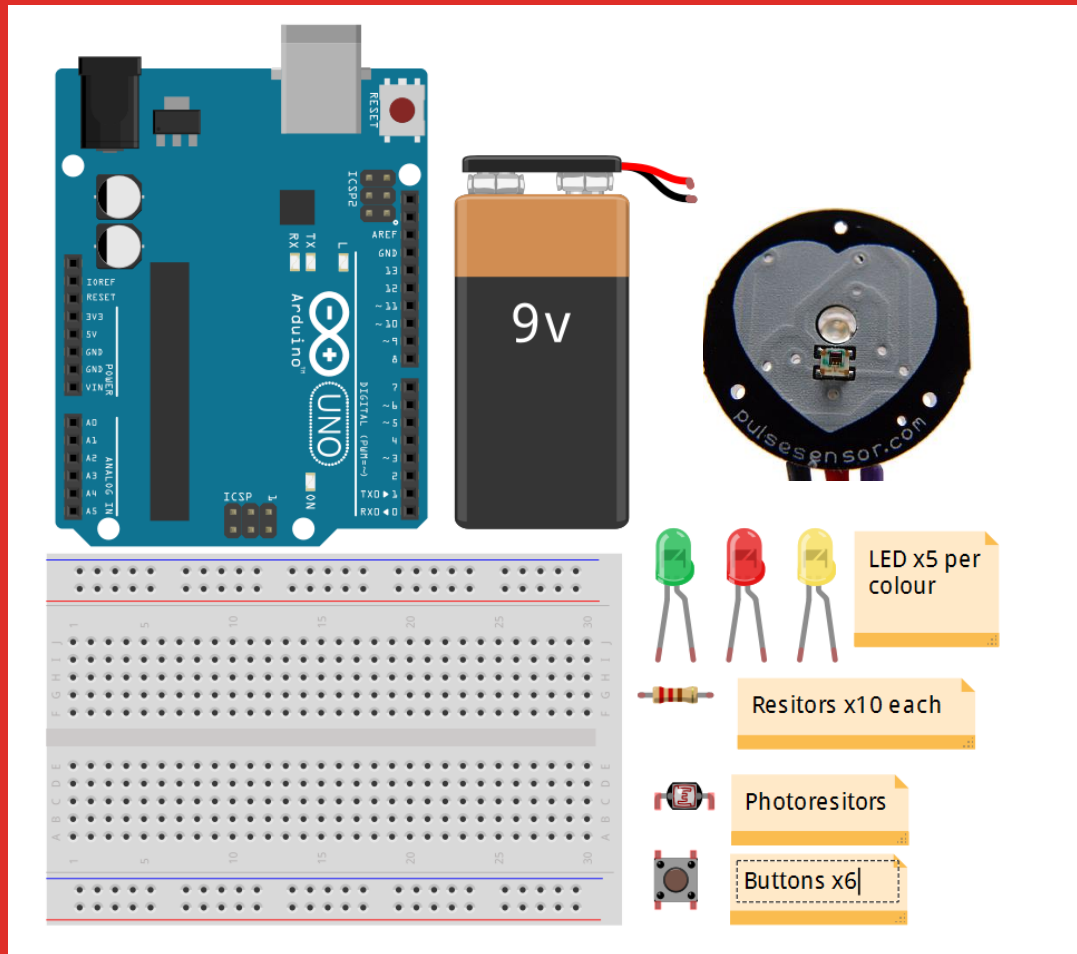




Hack the System

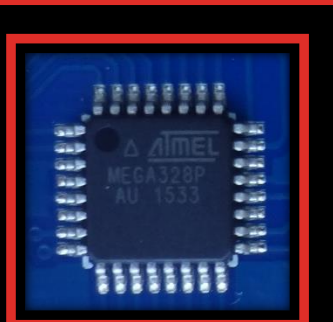
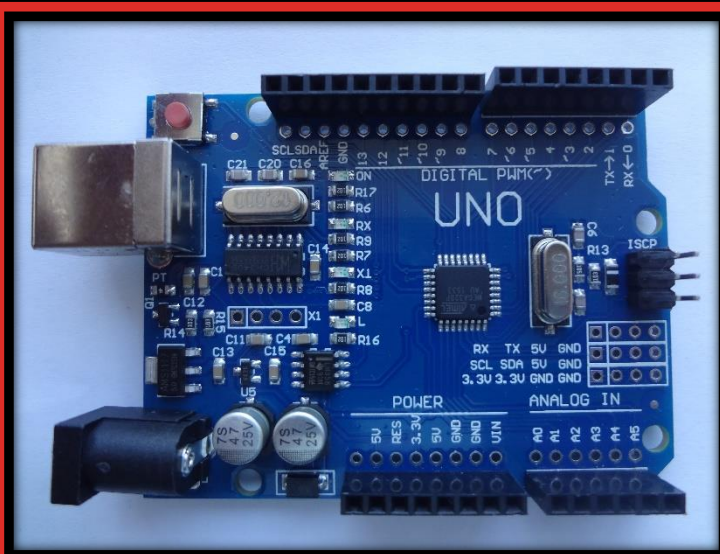
Get In Touch With Biomed

Kit Contents



- Uno R3
- Pulse sensor
- USB cable
- 20 male to male jumper wires
- 400 hole breadboard
- 5 red, green, yellow LEDs
- 10 resistors 220, 1k, 10k, 100k Ohms
- 1 photoresistor (varies with light)
- 6 buttons
- 9V battery with connector
- 40 pins

What is a Microcontroller?



"A microcontroller is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals"

<http://en.wikipedia.org/wiki/Microcontroller>

PulseSensorAmped_Arduino_1dot4-UWaterloo | Arduino 1.6.7

File Edit Sketch Tools Help

PulseSensorAmped_Arduino_1dot4-UWaterloo AllSerialHandling-UWaterloo Interrupt-UWaterloo Timer_Interrupt_Notes-UWaterloo

/*Original code from Pulse Sensor Amped 1.4 by Joel Murphy and Yury Gitman <http://www.pulsesensor.com>
Modified by Orion Bruckman to add additional effects to display pulse information

----- Notes -----

This code:

- 1) Blinks an LED to User's Live Heartbeat PIN 13
- 2) Fades an LED to User's Live HeartBeat
- 3) Determines BPM and blinks LEDs to match
- 4) Prints All of the Above to Serial

Read Me:
https://github.com/WorldFamousElectronics/PulseSensor_Amped_Arduino/blob/master/README.md

```
*/  
  
// Variables  
int pulsePin = 0;           // Pulse Sensor wire connected to analog pin 0  
int blinkPin = 13;         // pin to blink led at each beat  
int fadePin = 5;           // 1st pin to do fancy classy fading blink at each beat  
int fadePin2 = 6;         // 2nd pin to do fancy classy fading blink at each beat  
int fadePin3 = 9;         // 3rd pin to do fancy classy fading blink at each beat  
int fadeRate = 0;         // used to fade first LED on with PWM on fadePin  
int fadeRate2 = 0;        // used to fade second LED on with PWM on fadePin2  
int fadeRate3 = 0;        // used to fade third LED on with PWM on fadePin3  
int buttonPin = 12;        // the button connects to this pin  
int buttonCounter = 0;     // holds the number of times the button has been pushed  
int buttonState = 0;      // holds the current state of the button  
int lastButtonState = 0;  // holds the previous state of the button  
int holdBPM = 0;          // holds the current BPM value  
int ones = 0;             // used to hold the ones column values of BPM  
int tens = 0;             // used to hold the tens column values of BPM  
int hundreds = 0;        // used to hold the hundreds column values of BPM  
  
// Volatile Variables, used in the interrupt service routine!  
volatile int BPM;         // int that holds raw Analog in 0. updated every 2mS  
volatile int Signal;      // holds the incoming raw data  
volatile int IBI = 600;   // int that holds the time interval between beats! Must be seeded!  
volatile boolean Pulse = false; // "True" when User's live heartbeat is detected. "False" when not a "live beat".  
volatile boolean QS = false; // becomes true when Arduino finds a beat.  
  
// Regards Serial OutPut -- Set This Up to your needs  
static boolean serialVisual = true; // Set to 'false' by Default. Re-set to 'true' to see Arduino Serial Monitor ASCII
```

Done uploading.

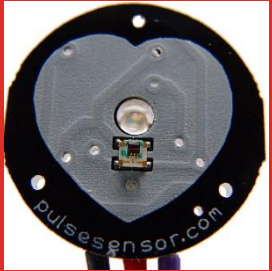
Sketch uses 5,540 bytes (17%) of program storage space. Maximum is 32,256 bytes.
Global variables use 511 bytes (24%) of dynamic memory, leaving 1,537 bytes for local variables. Maximum is 2,048 bytes.

41 Arduino/Genuino Uno on COM17

Discrete Components

Input Peripherals

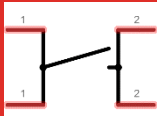
Pulse Sensors



Kit contains 1 pulse sensor

This sensor uses light to detect your pulse

Switches



Switch
Symbol

Switches are used to make and break electrical connections

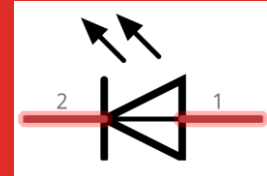
Output Peripherals

Light Emitting Diodes (LED)



Kit contains 15 LEDs

LEDs emit light when their anode has a positive voltage relative to their cathode, and current is able to conducting through it.



LED
Symbol

LEDs require the correct polarity (i.e. direction matters)

Applications



Household Appliances



Smart Meters



Vending Machines



Industrial



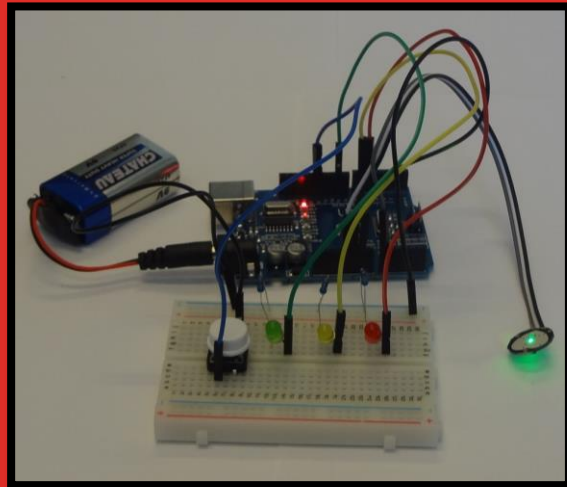
Medical



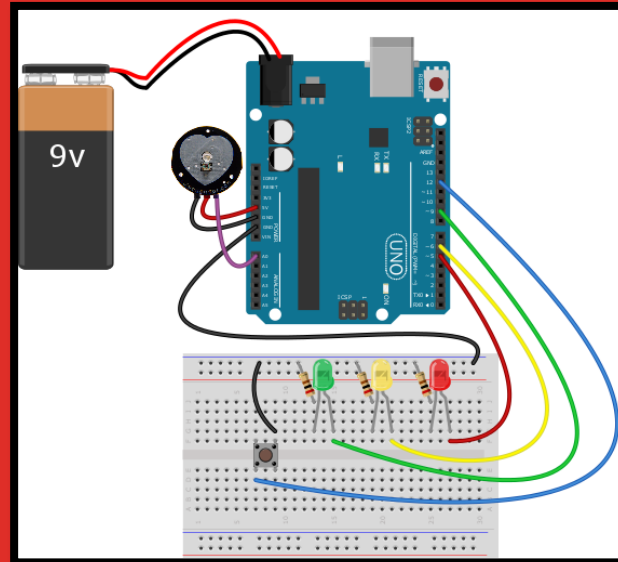
Automotive

Today's Project

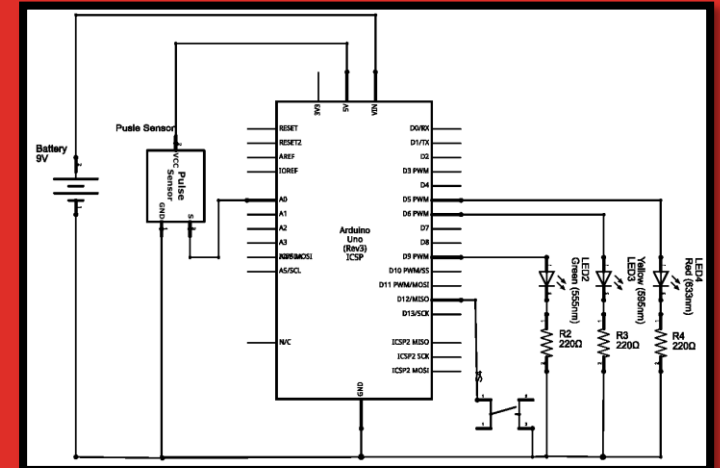
Actual



Breadboard

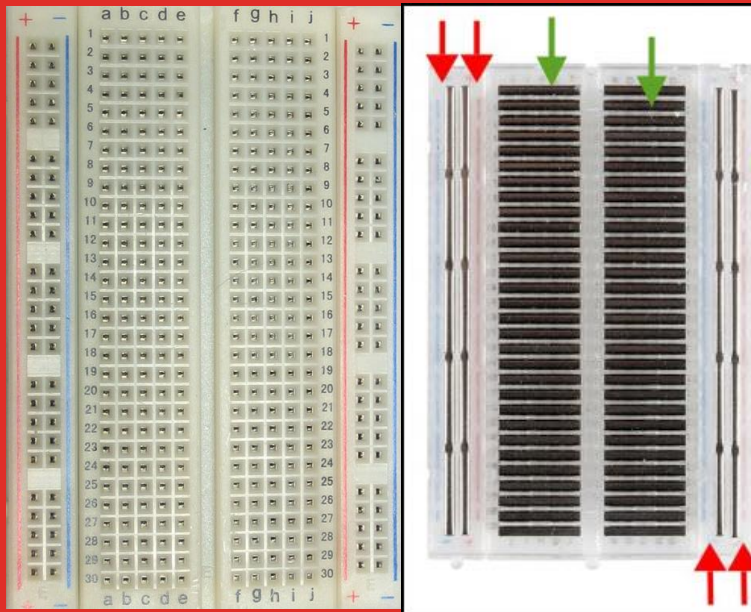


Schematic



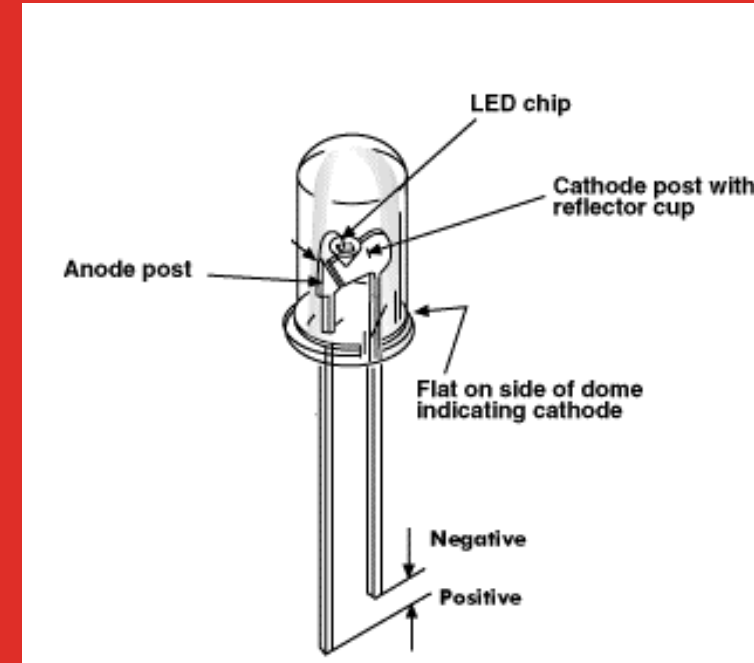
Construction Notes

Breadboard Connections



- Each red and blue vertical “rail” is a single connection.
- Each row has two sections of horizontal connections.

LED Polarity



- The orientation of LEDs matter!
- Cathode (negative) terminal has a “flat spot” and a shorter pin.