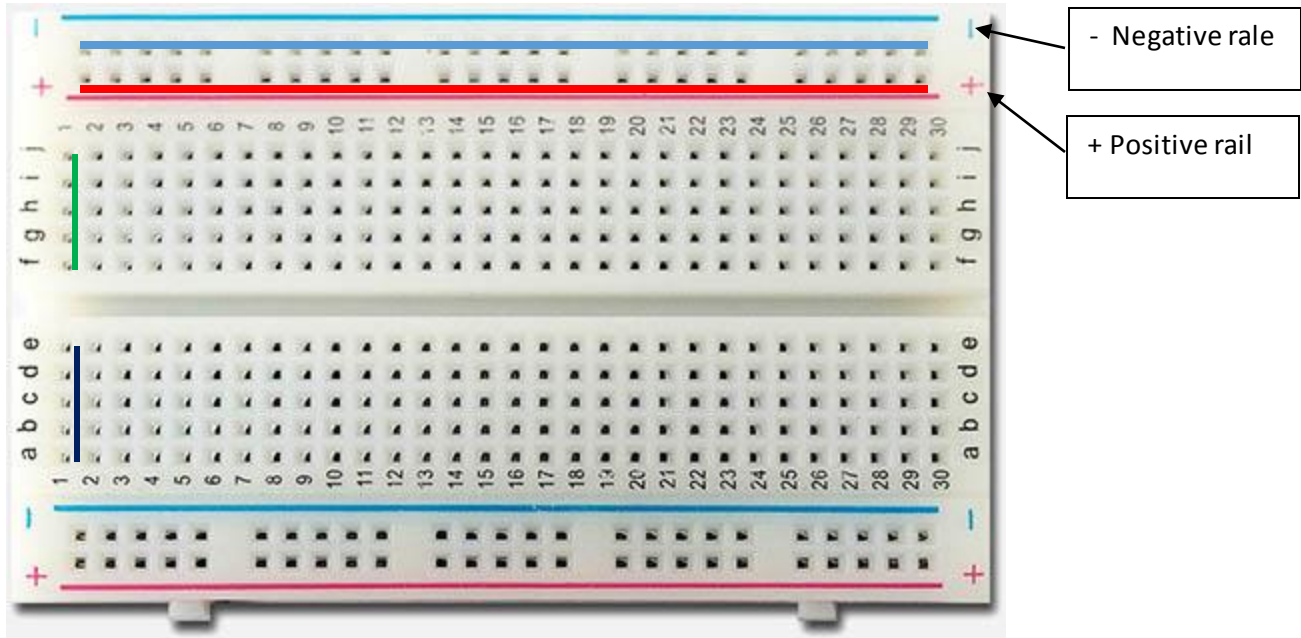


GoldSTEM_Lesson_5_External_LED_Blink

tm 3-20-16

For this experiment we need to introduce some additional components.

The Breadboard



The breadboard is used to connect electronic components together.

There is a + positive and – negative rail on either side of the breadboard

All of the pins on each of the positive rails are connected together. Denoted by the red line.

All of the pins on each of the negative rails are connected together. Denoted by the blue line.

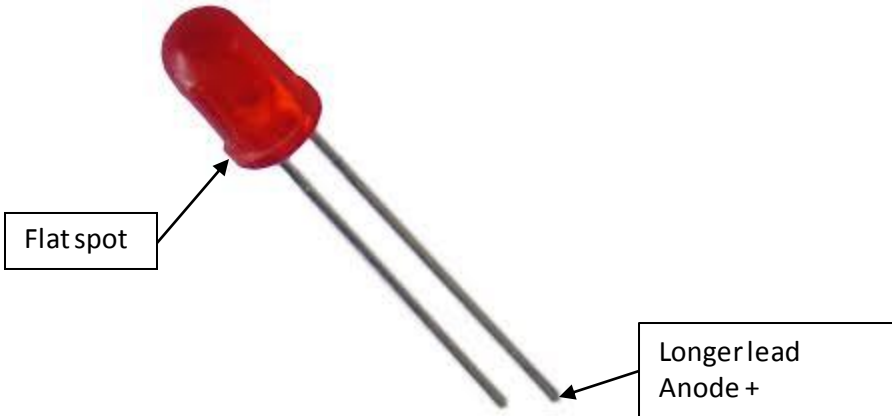
The top rails and bottom rails are not connected to each other.

You will see rows 1-30 and columns abcde and fghij

The columns abcde for each of the rows are connected together. Denoted by the black line.

The columns fghij for each of the rows are connected together. Denoted by the green line.

The Red LED



You will notice that one lead of the LED is longer than the other and on the side of the short lead there is a flat spot on the LED.

Anode Longer lead +

Cathode Shorter lead – Flat spot

The Resistor

Resistor 1K 4 band code



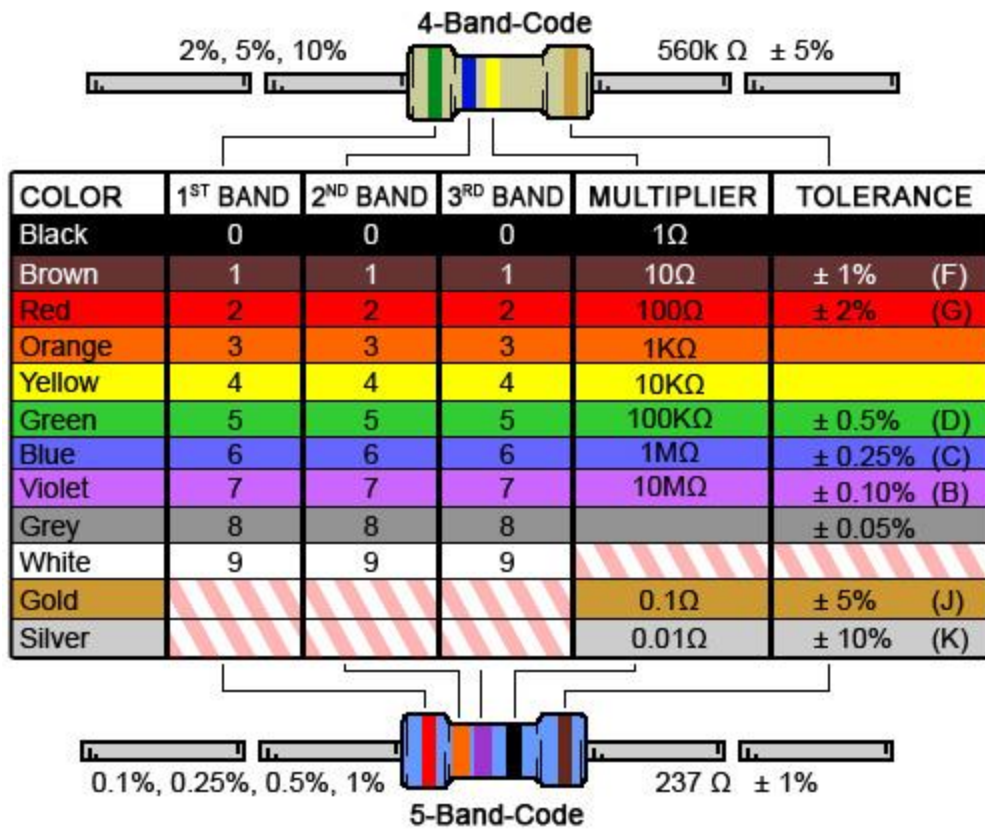
E12 Range, Resistor 1K Ω , 5% Tolerance, Carbon Film



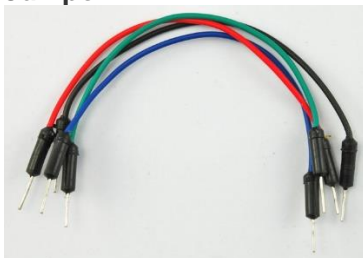
If your Kit has resistors with blue bodies they are metal oxide 1% resistors with a 4 band resistor code.

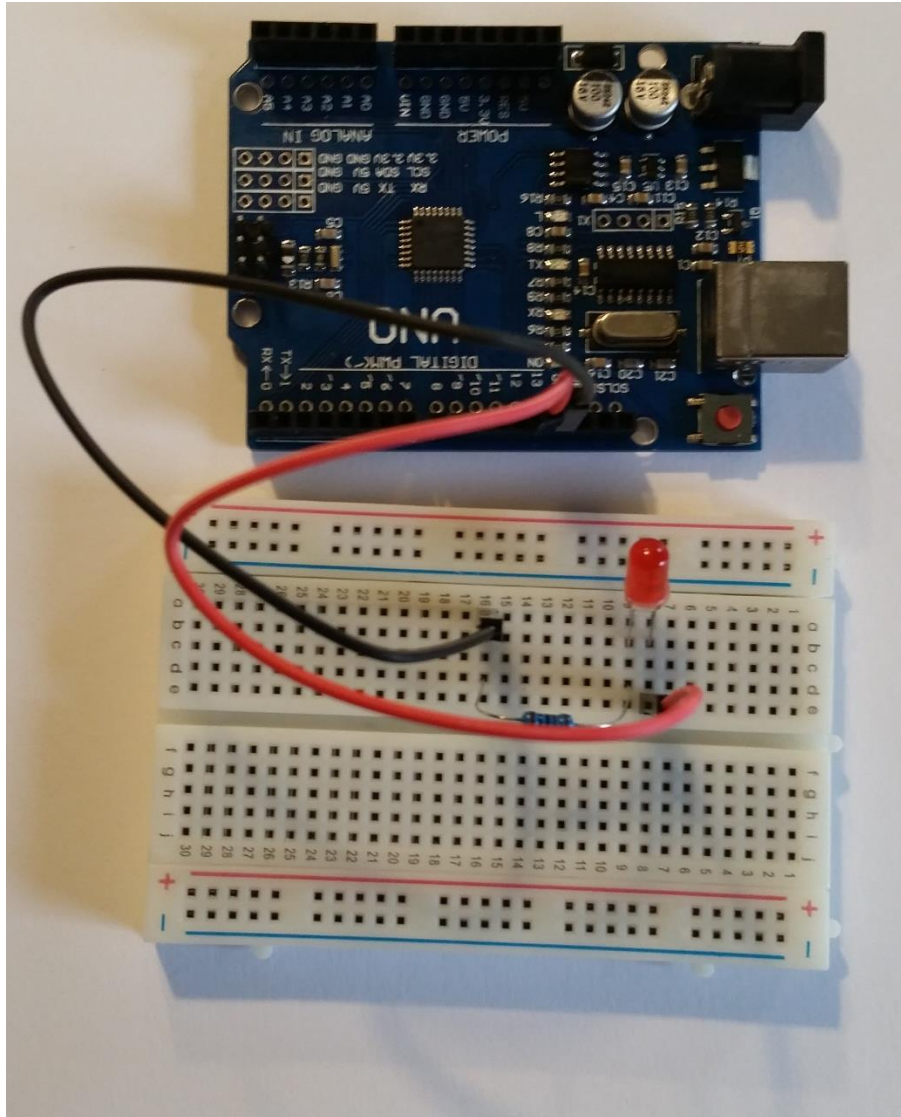
Brown Black Black Brown Brown

1 0 0 0 1% = 1K at 1%



Jumper





Wiring of circuit

LED Anode long lead to b8

LED Cathode short lead to b9

1K resistor e9 and d16 (doesn't matter which side of the resistor goes to e9 or d16)

Black jumper a16 to UNO GND 4th pin from USB

Red jumper e8 to UNO Digital pin 13 5th pin from USB

Loading the code

Load **GoldSTEM_Lesson_5_External_LED_Blink**

This code is similar to lesson 4 with fewer comments.

/*

GoldSTEM_Lesson_5_External_LED_Blink GoldSTEM tm 2-23-2016

Turns on externalLED for one second, then off for one second, repeatedly.

```
*/
```

```
void setup() {  
  // initialize digital pin 13 as an output.  
  pinMode(13, OUTPUT);  
}  
  
// the loop function runs over and over again forever  
void loop() {  
  digitalWrite(13, HIGH); // turn the LED on (HIGH is the voltage level)  
  delay(1000);           // wait for a second  
  digitalWrite(13, LOW); // turn the LED off by making the voltage LOW  
  delay(1000);           // wait for a second  
  
}
```

Question 2

Why did we need to use a 1K resistor in the circuit?

End of Lesson