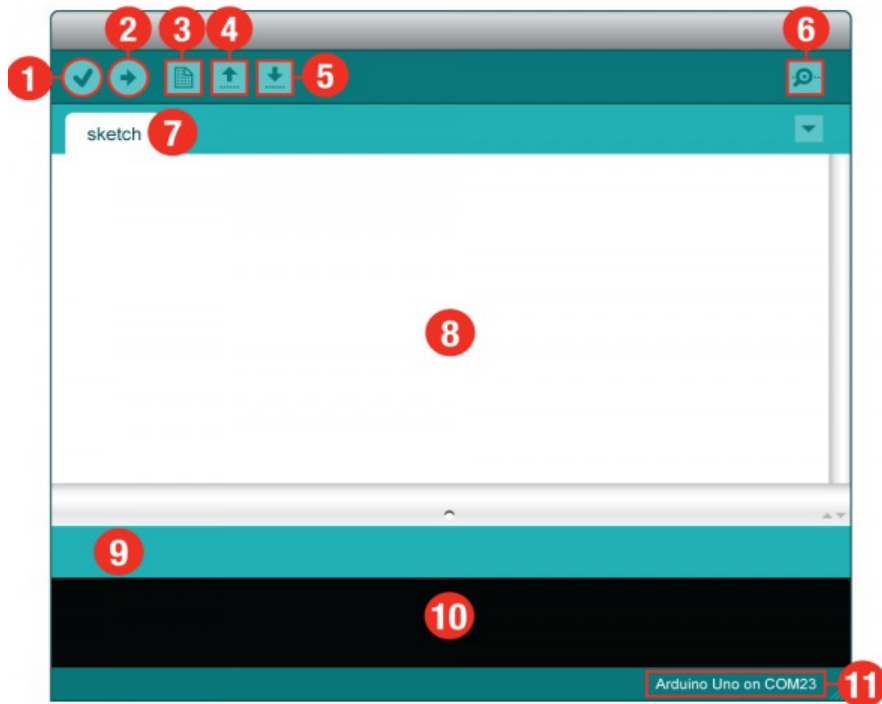# Experiment 1

Blinking LED

In this experiment, it is expected from you to,

1. Get familiar with the Arduino IDE interface

2. Learn to read resistor value

3. Learn the LED (Light Emitting Diode) structure and usage

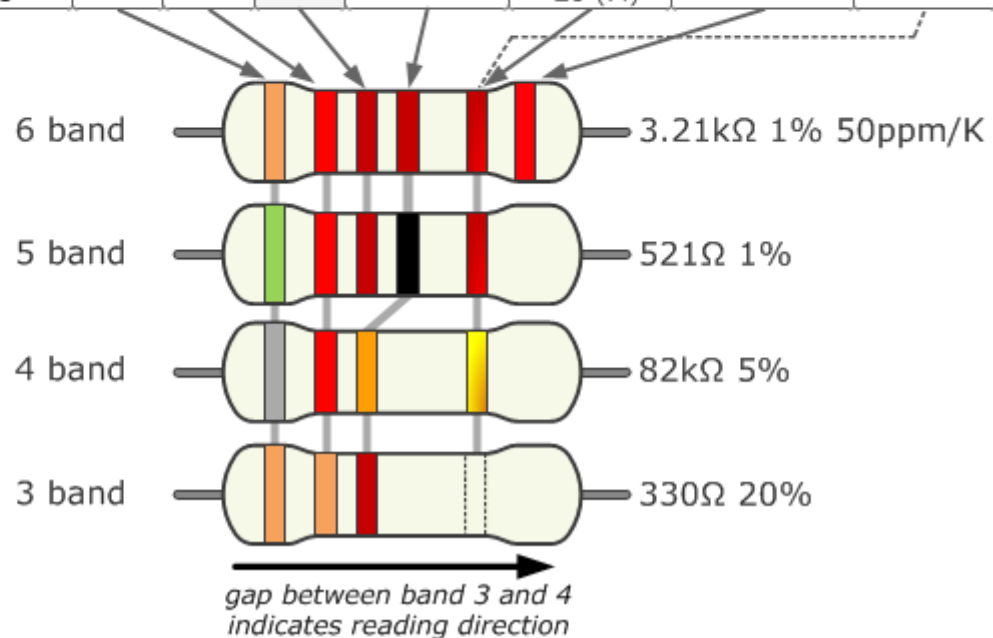4. Get familiar with assembling circuits

1. Arduino IDE

1. **Verify:** Compiles and approves your code. It will catch errors in syntax (like missing semi-colons or parenthesis).

2. **Upload:** Sends your code to the RedBoard. When you click it, you should see the lights on your board blink rapidly.

3. **New:** This buttons opens up a new code window tab.

4. **Open:** This button will let you open up an existing sketch.

5. **Save:** This saves the currently active sketch.

6. **Serial Monitor:** This will open a window that displays any serial information your RedBoard is transmitting. It is very useful for debugging.

7. **Sketch Name:** This shows the name of the sketch you are currently working on.

8. **Code Area:** This is the area where you compose the code for your sketch.

9. **Message Area:** This is where the IDE tells you if there were any errors in your code.

10. **Text Console:** The text console shows complete error messages. When debugging, the text console is very useful.

11. **Board and Serial Port** Shows you what board and the serial port selections

2. Reading Resistor Value

	Color	Signficant figures			Multiply	Tolerance (%)	Temp. Coeff. (ppm/K)	Fail Rate (%)
Bad	black	0	0	0	x 1		250 (U)	
Beer	brown	1	1	1	x 10	1 (F)	100 (S)	1
Rots	red	2	2	2	x 100	2 (G)	50 (R)	0.1
Our	orange	3	3	3	x 1K		15 (P)	0.01
Young	yellow	4	4	4	x 10K		25 (Q)	0.001
Guts	green	5	5	5	x 100K	0.5 (D)	20 (Z)	
But	blue	6	6	6	x 1M	0.25 (C)	10 (Z)	
Vodka	violet	7	7	7	x 10M	0.1 (B)	5 (M)	
Goes	grey	8	8	8	x 100M	0.05 (A)	1(K)	
Well	white	9	9	9	x 1G			
Get	gold			3th digit only for 5 and 6 bands	x 0.1	5 (J)		
Some	silver				x 0.01	10 (K)		
Now!	none					20 (M)		

6 band — 3.21kΩ 1% 50ppm/K

5 band — 521Ω 1%

4 band — 82kΩ 5%

3 band — 330Ω 20%

gap between band 3 and 4 indicates reading direction

Resistors apply their resistance on both ways which make them to be used safely on your circuits without considering the anode/cathode direction.

3. Structure of LED

Flat Edge

Short Leg

−

+
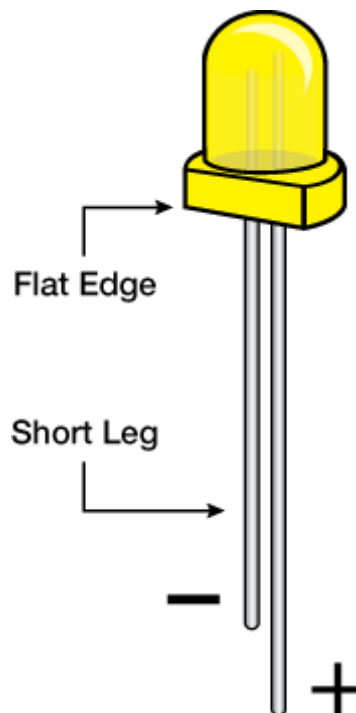
You need to be careful while using the LEDs. As shown on the image above LEDs has anode/cathode connections.

If you connect a LED to a circuit reversly, it will not emit light. Instead you will notice a rapid heating of the LED which, if you do not interfere fast, will result in melting of the inner structure of the LED and make it unusable.

Best way to interfering circuits is the disconnecting it from power as soon as possible. Sometimes removing the suspected part from the circuit is enough but not recommended.

4. Assembling the Circuit

Required Parts
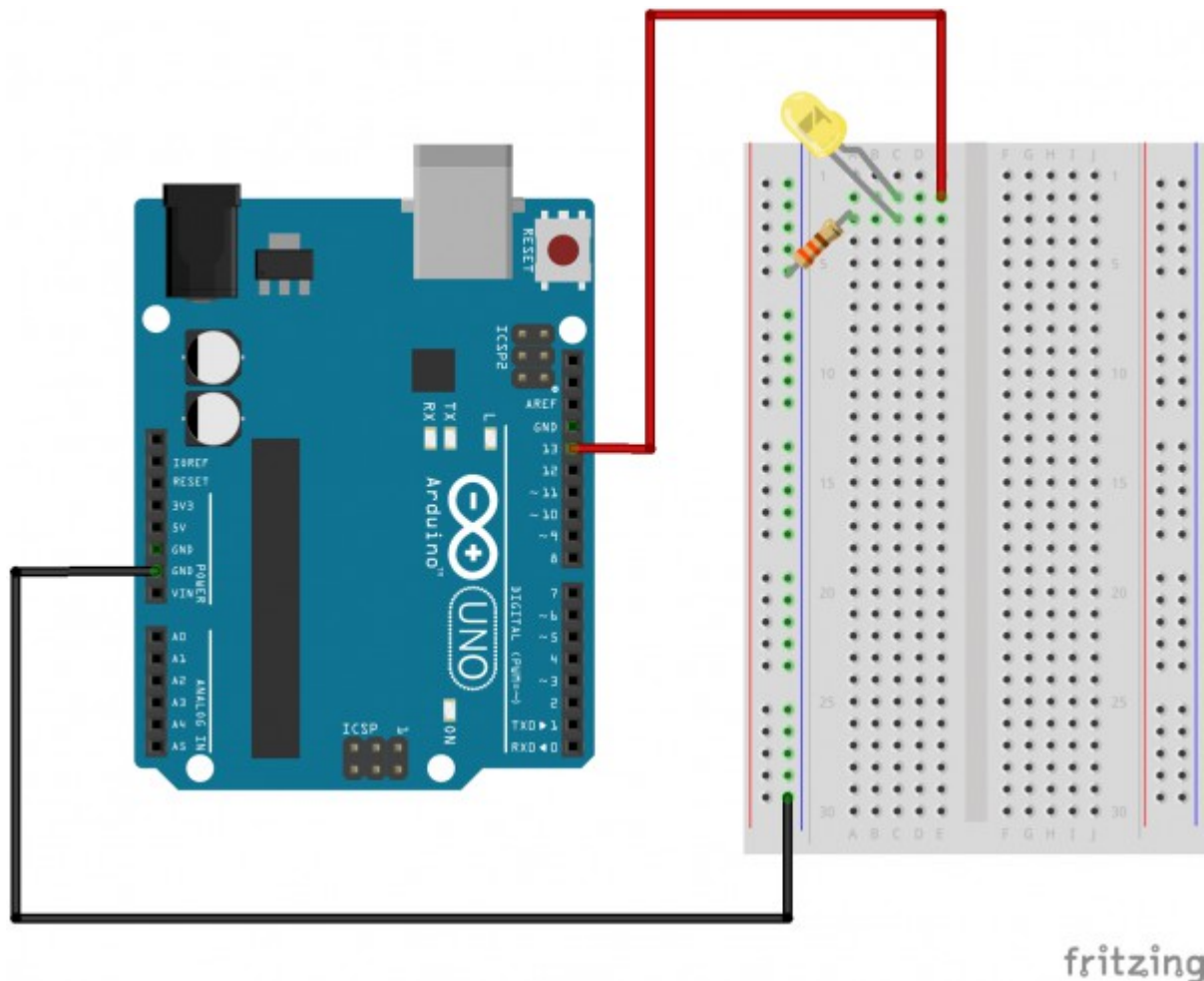
Fritzing Diagram of the Circuit

1. Select your resistor (330 Ω) by using the color code table

2. Connect your LED according to anode/cathode direction

3. Test your LED, try to turn it on before proceeding to the actual experiment

4. Verify and upload your code to the arduino board

5. Observe the result and compare it with the expected outcome

Expected Outcome: LED should be in turned on and turned off state for some time *t* for both state continuously (*Blinking*).

pinMode(13, OUTPUT); ⟹ Before you can use one of the Arduino's pins, you need to tell the Arduino whether it is an INPUT or OUTPUT. We use a built-in "function" called pinMode() to do this.
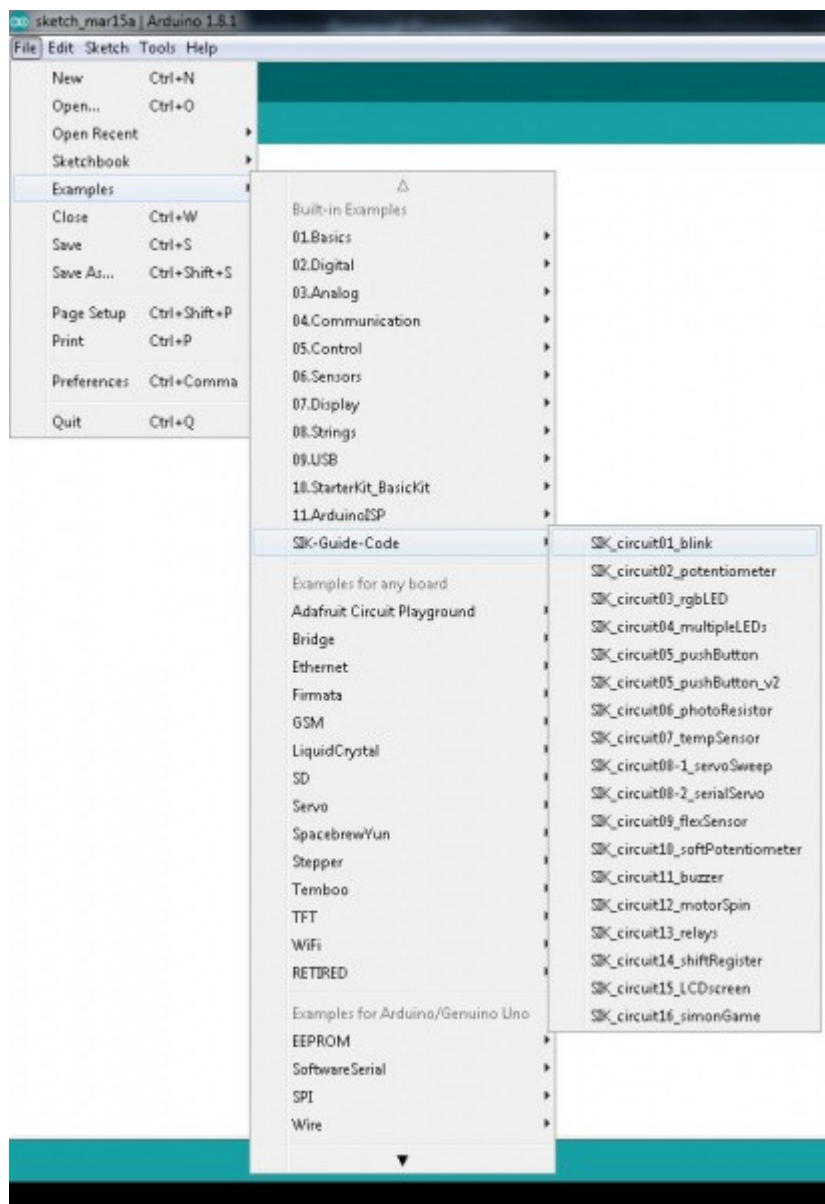
digitalWrite(13, HIGH); ⟹ When you're using a pin as an OUTPUT, you can command it to be HIGH (output 5 Volts), or LOW (output 0 Volts).
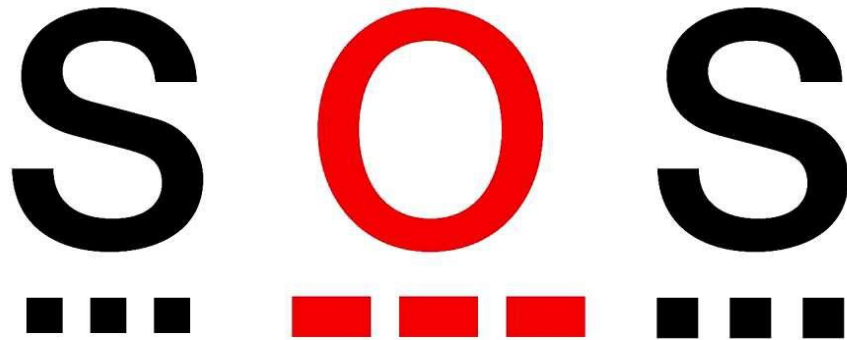
Setting the Pin Behaviour

Example Experiment Codes

Modification

In this modification we are wanting you to immitate a *SOS* signal by using a single LED.

Visualisation of SOS Signal