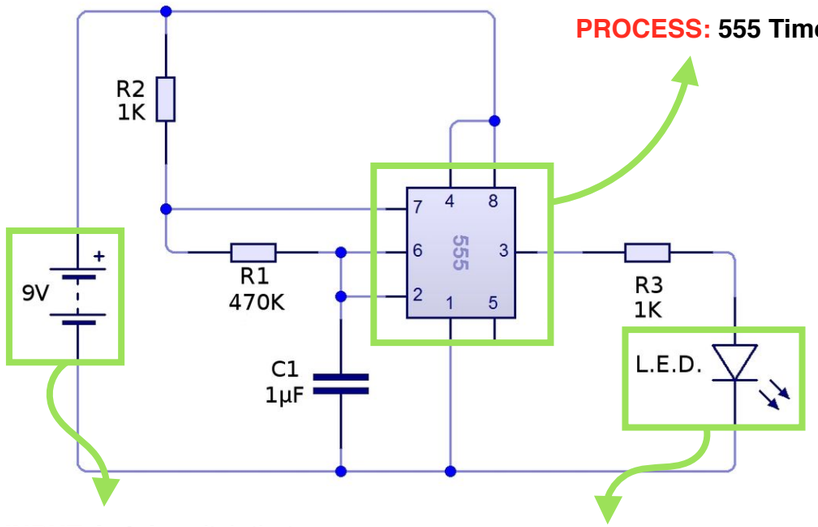
555 Project: This is a single blinking LED circuit

Input - Process - Output:



INPUT: **Latch** switch that allows the **voltage** to flow from **Anode** (+) to **Cathode** (-)

OUTPUT: Light Emitting Diode - **Lights up** when electricity passes **through** it

Calculations

Calculating Frequency (Hertz) $= \frac{1.44}{[1k + 2(470k)](0.000001)} = \frac{1.44}{0.941}$

$$f = \frac{1.44}{(R1 + 2R2)C} =$$

1.53 Hz: 1.53 flashes per second

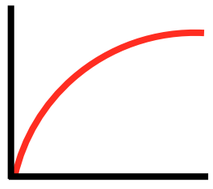
Time Constant:

t (sec) = **C** (farads) x **R** (ohms)

t = (0.000001) x (472k) = **0.472 sec**

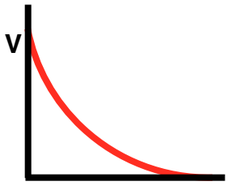
Time taken to rise or fall 0.632 of the difference between its old and new value

Capacitor in this Circuit



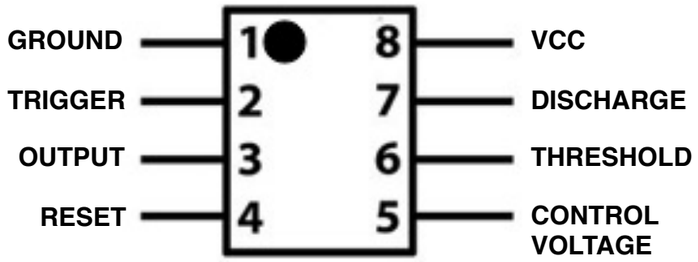
The capacitor is **charged** through the **resistor** to control the **speed** of charge. **2/3** of the supply voltage is called the **time constant.**

The **voltage** will not be a constant as it **discharges** the capacitor, but will discharge **rapidly** at first then **slow down** as it empties. **1/3** is **empty**.



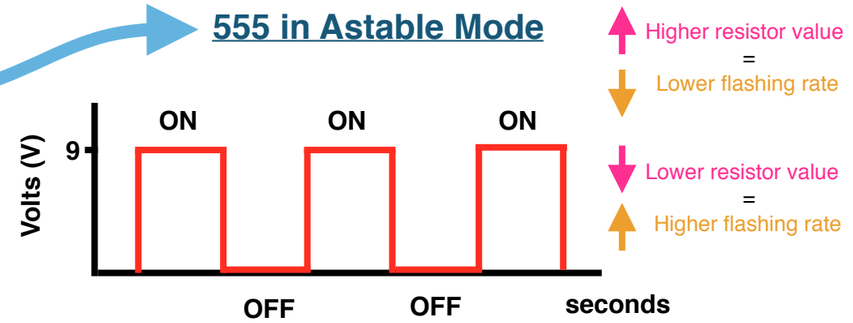
Purpose of the 555 Timer

In this circuit → 555 in Astable Mode



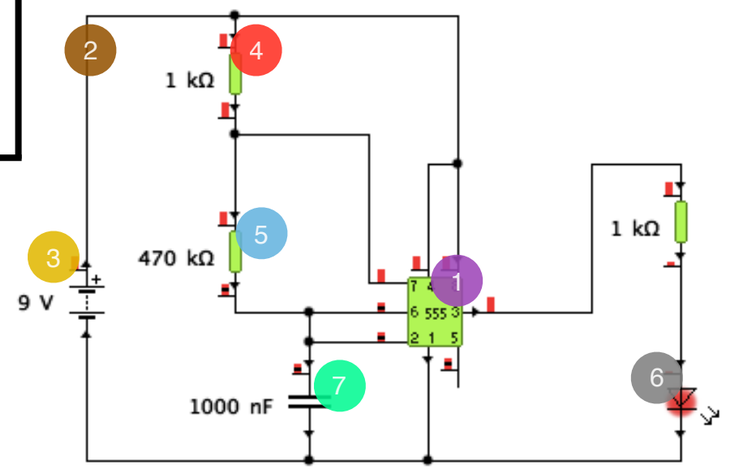
Pin 1: Ground (0V)
Pin 2: Voltage below 1/3 Vcc to trigger the pulse
Pin 3: Pulsating output, causes LED to blink
Pin 4: Resets the 555 timer at an active low input
Pin 5: Access to the internal voltage divided; 2/3 Vcc
Pin 6: Pulse ends when voltage is greater than Control
Pin 7: Open collector output; discharge capacitor
Pin 8: Supply Voltage (9V)

Not used in this circuit



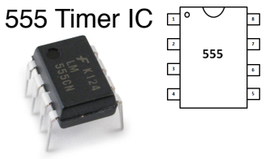
- Signal is **not** stable
- On off on off…
- Repeat **loop**
- **No** PTM/trigger switch
- Good for **flashing** lights/sounds
- Pins **2** and **6** - directly connected
- **Oscillating** signal - **Frequency** (Hz)

Yenka Circuit Simulation



Circuit Components and Symbols

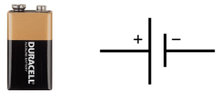
1 555 Timer IC



IC = Integrated Chip, along with **capacitor**, **flashes** the LED at a **fixed rate** and acts as a **timer**

2 Conducting Wires

3 9V Battery

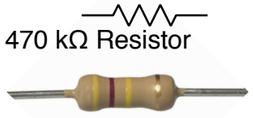


Allows electrical **flow** from **Anode** (+) to **Cathode** (-)

4 1 kΩ Resistor x2

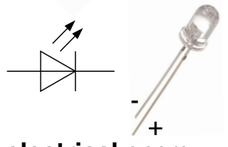
Protects the **LED** from **blowing**

5 470 kΩ Resistor



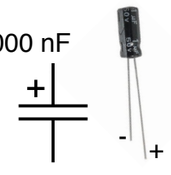
Limits electrical current passing **through** it

6 LED



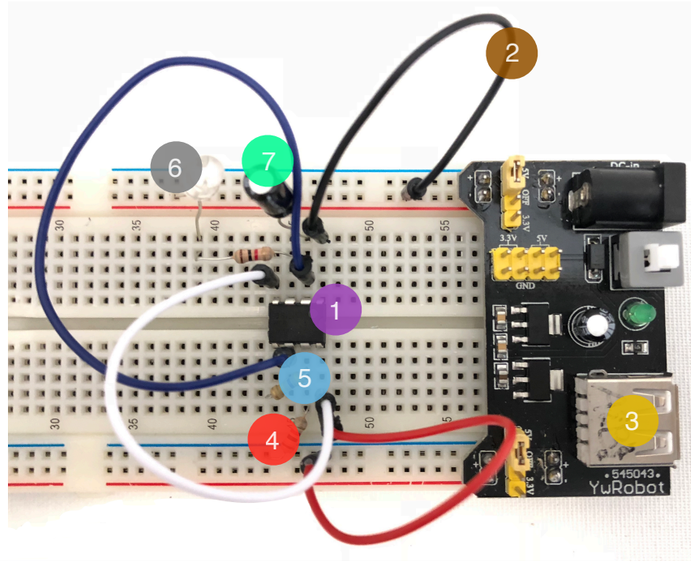
Converts **electrical** energy into **light** energy, **lights up** when electricity passes **through** it

7 1 µF or 1000 nF Capacitor



Component that **stores** electricity and then **discharges** it into the circuit when there is a **drop** in electricity. It's **capacitance** is measured in **Farads** (C)

Photo and Labelled Circuit



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