

TRAFFIC LIGHT

Wanna stop traffic? You're about to make the red and green LEDs blink back and forth. This circuit will work just like a traffic light with a built in timer to control when the lights change color. But instead of using old-fashioned mechanical switches, this circuit will use capacitors and resistors to control the switching between the red and green LEDs. Enough said! Let's build it.

Start by connecting #9 to #29

Connect #29 to #24

Connect #11 to #19

Connect #19 to #21

Connect #21 to #30

Connect #30 to #32

Connect #8 to #20

Connect #20 to #23

Connect #10 to #22

Connect #22 to #26

Connect #7 to #27

Connect #27 to #31

Connect #25 to #28

Connect #28 to #34

And the last connection is #12 to #33

Hook up the battery and see what happens. If your traffic light doesn't work, check your connections. If it works, give yourself a hand of applause!

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Here's how the circuit works:

There are two possible paths through this circuit, one that lights up the green LED and the other that lights up the red LED.

If we follow the path through the Green LED, the current squeezes through the 470 kilo ohm resistor to the base of transistor "B". The valve opens up, allowing electricity to flow through the green LED, turning it on. But notice that some current is also filling up the 47 micro farad capacitor. When this capacitor gets full, the current is redirected to the base of transistor "A", which opens it's valve, allowing the current to flow away from the Green LED and through the Red LED, which then lights up.

This process repeats when the 470 microfarad capacitor fills up and diverts the current through the Green LED again. The time it takes for the lights to switch back and forth depends on how long it takes to fill up the capacitors and how quickly the resistors allow the current to flow. Larger capacitors take longer to fill up, and larger resistors slow the current down the most.

Once you figure out how to control the time it takes for the lights to change, you can use this circuit at the dinner table to see who gets to talk next!