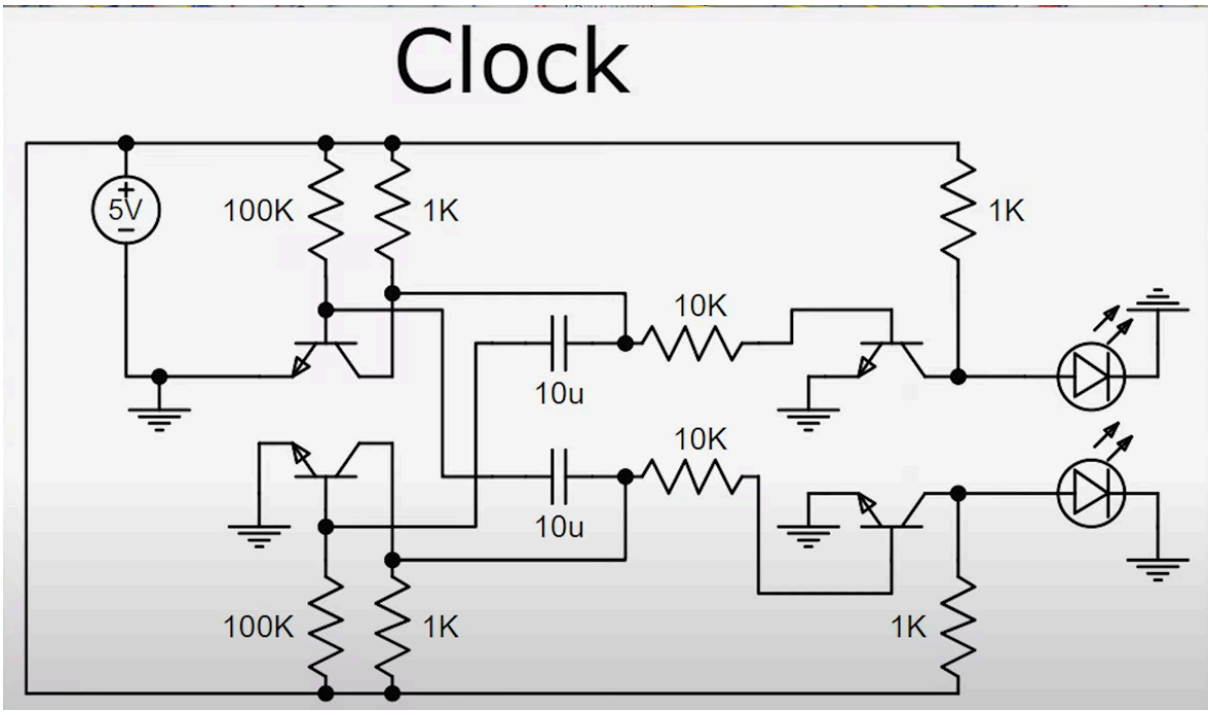
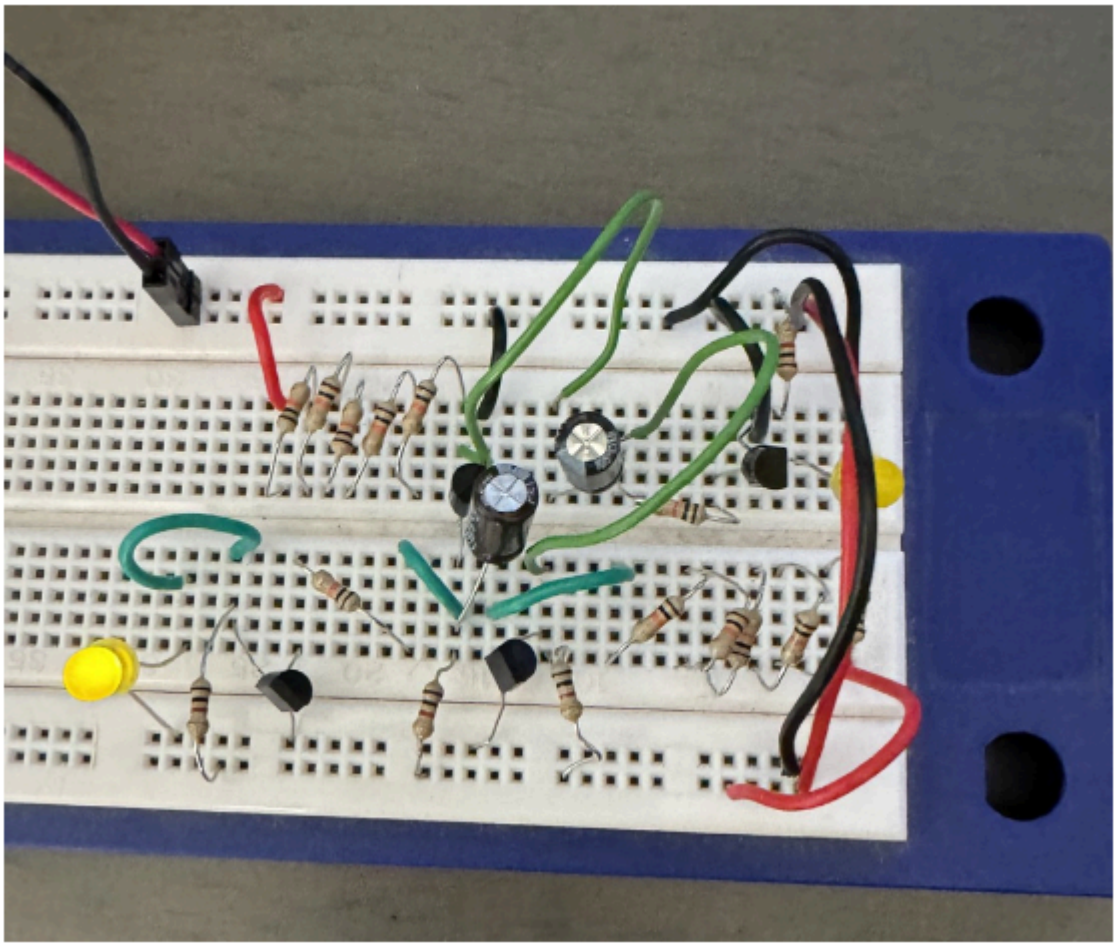
Astable Multivibrator (CPU oscillator/clock) circuit build documentation

This circuit was built from the following circuit diagram, courtesy of Global Science Network (How to Build a 4-Bit Computer on Breadboards Using Individual Transistors)



Since I didn't have 100k ohm resistors on hand, I just used 5x10k ohm in series. I also used 2x100uF capacitors, to slow the oscillation to an easily visible rate The voltage source used was a 5v output pin from an arduino ATmega 3860.



The LEDs oscillate approximately every 3 seconds. According to the time constant,

$$f = \frac{1}{1.4 \times RC}$$

$$RC = 10 \times 10^{3} \times 100 \times 10^{-6}$$

$$RC = 1$$

$$f = \frac{1}{1.4} = 0.71Hz$$

Meaning the clock should oscillate every 1.4 seconds. The discrepancy is likely due to the age and state of the capacitors. The insufficient resistance in the current-limiting resistor section of the circuit connected to the base of the time-loop capacitors would likely increase the oscillation speed, if anything.

The following diagram maps the components used to the circuit diagram: