

Electronics



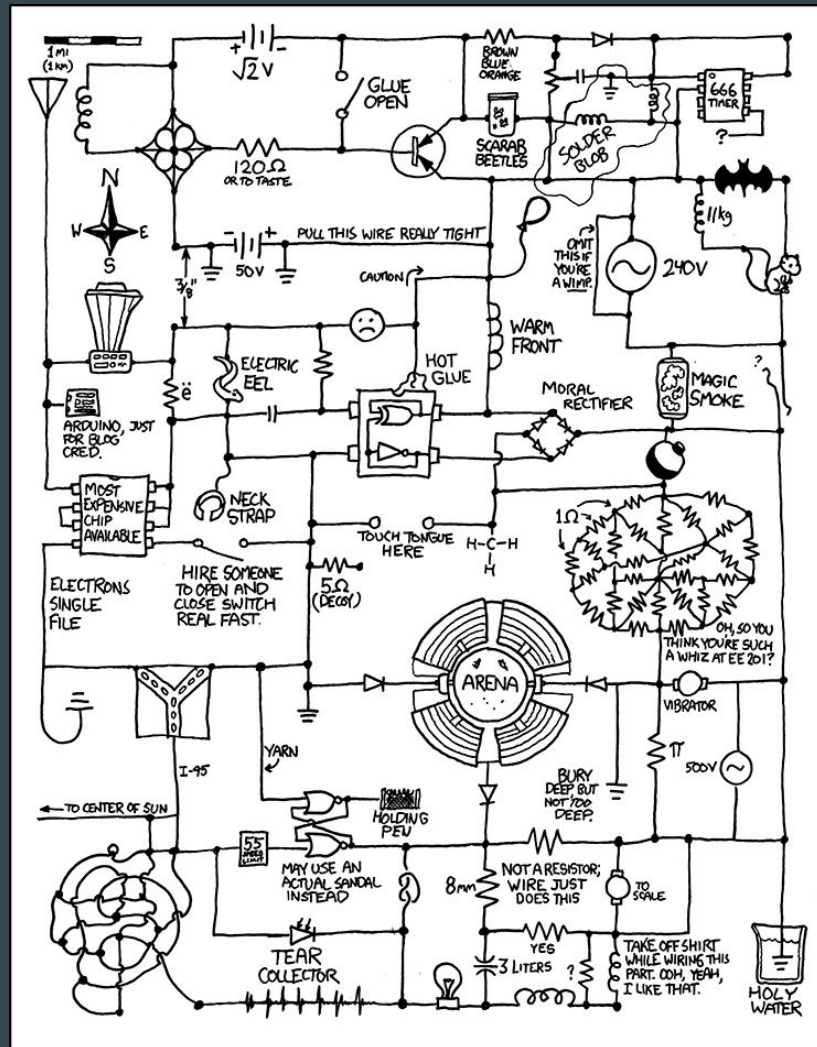
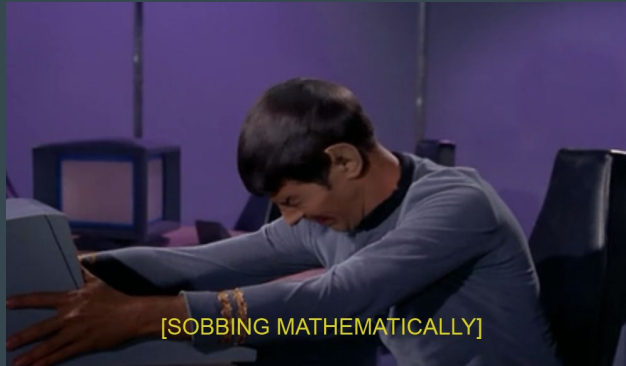
Shantanu Kanvinde and Zach Pope

What is Electricity?

No, seriously.

Electricity is the movement of electrons through wires. Controlling and measuring the flow of those electrons allows us to generate and interpret signals.

Welcome to EE 302!!



Basic Circuits

Power: Other Formulae

Using $V = IR$ power can be written in two other ways:

$$P = IV = I(IR) = I^2 R$$

or

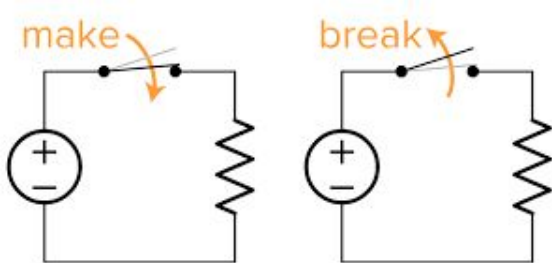
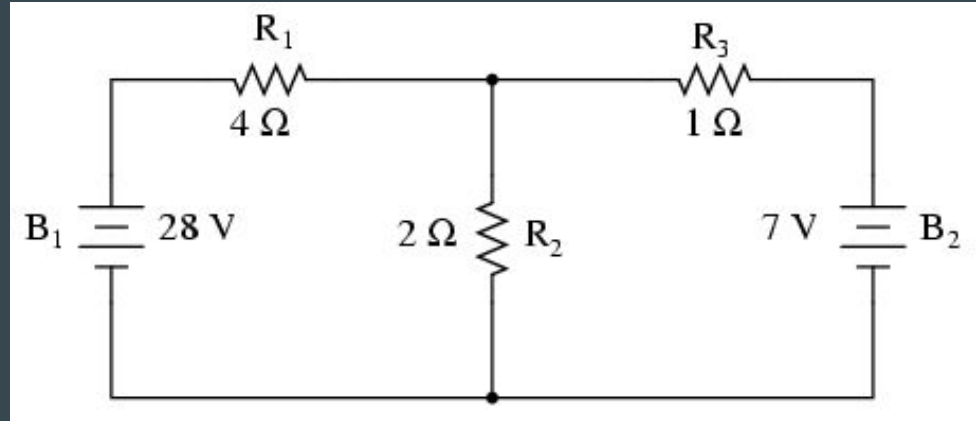
$$P = IV = (V/R)V = V^2/R$$

In summary,

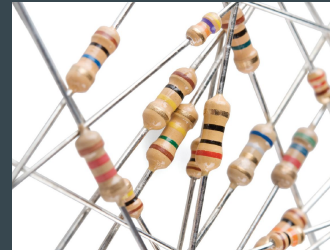
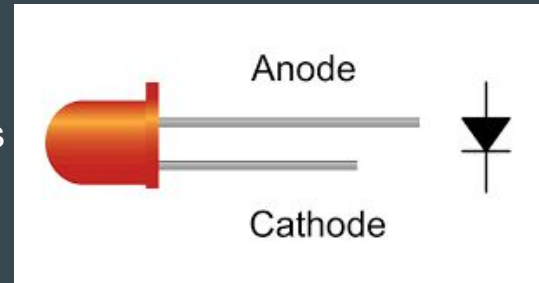
$$P = IV, \quad P = I^2 R, \quad P = V^2/R$$

$$V = IR$$

Download a
resistor color
code app.



Voltage: Volts
Current: Amps
Resistance: Ohms
Power: Watts

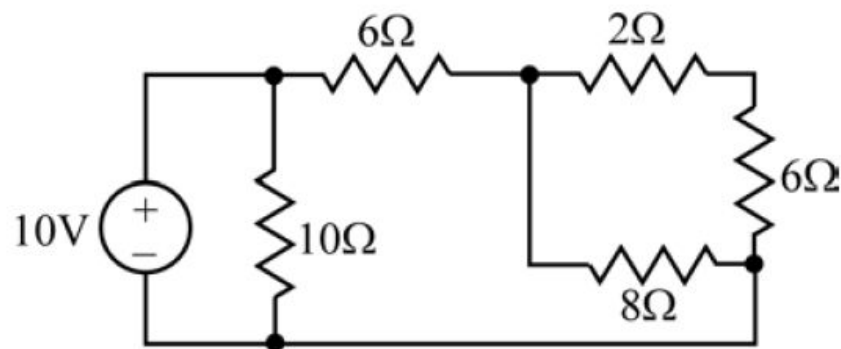


Y'all are about to hate us so much...

2. [20 points total]

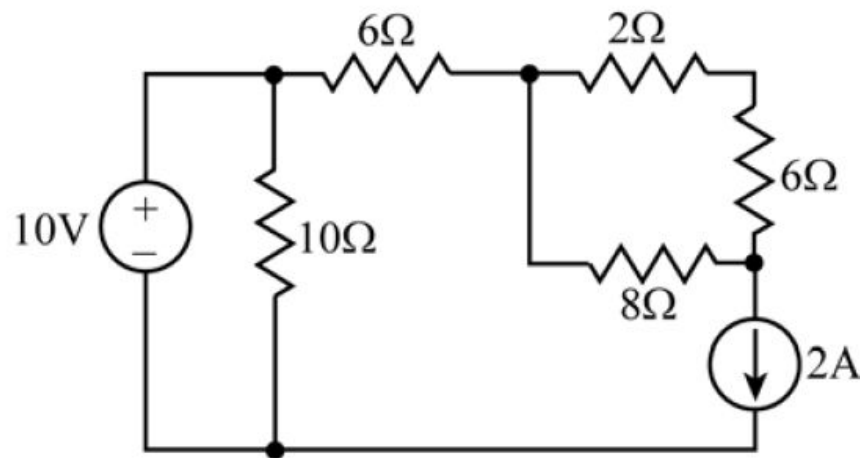
- (a) Calculate the power dissipated in the 2Ω resistor in the circuit at right:

0.5 W



- (b) Calculate the power dissipated in the 2Ω resistor in the circuit at right:

2 W

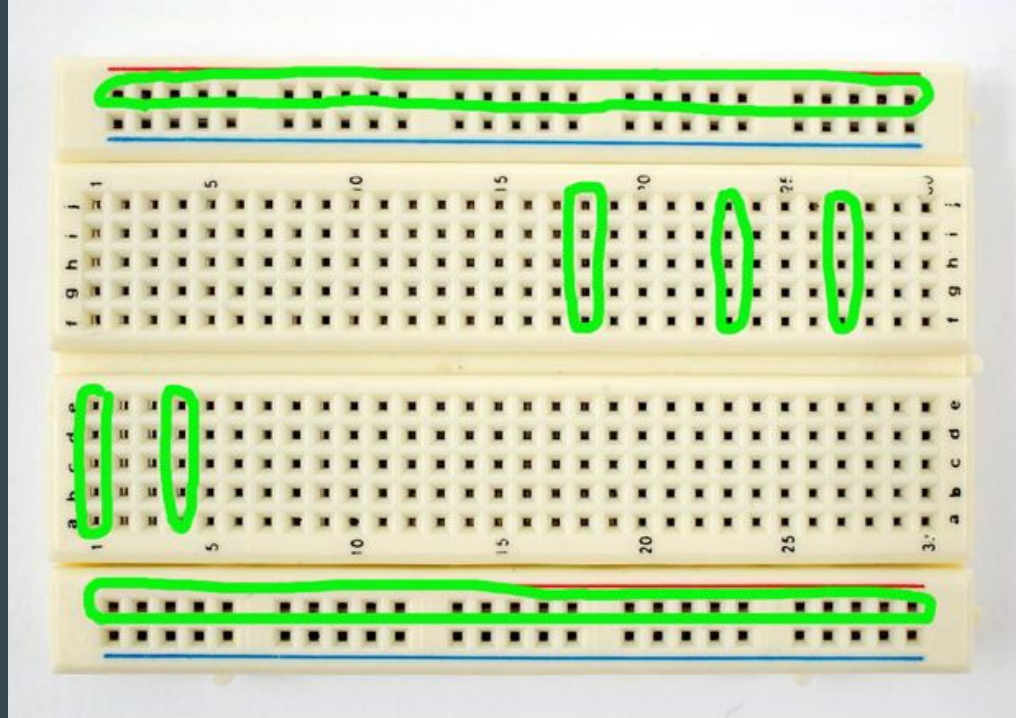


Step 1: Consider the circuit.
Step 2: Draw the circuit.
Step 3: ???
Step 4: Profit.



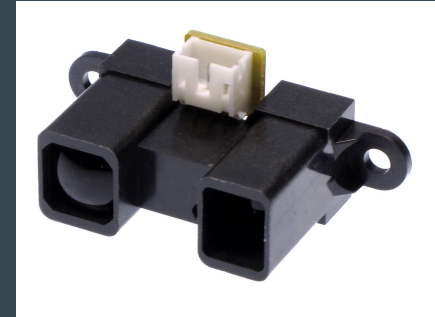
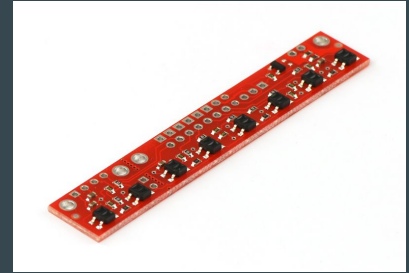
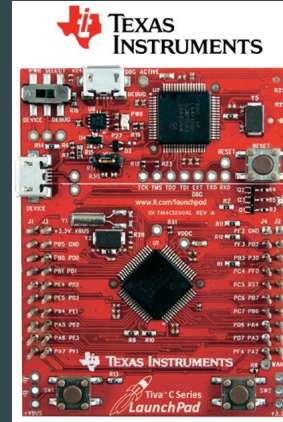
This question was actually on the Fall 2014 EE 302 final.

What's a breadboard?



What exactly is all this stuff?

- TI TM4C123 board
- Line Sensor Array
- IR Distance Sensor
- Continuous servo motors
- Normal servo motor
- 5V Regulator
- Battery



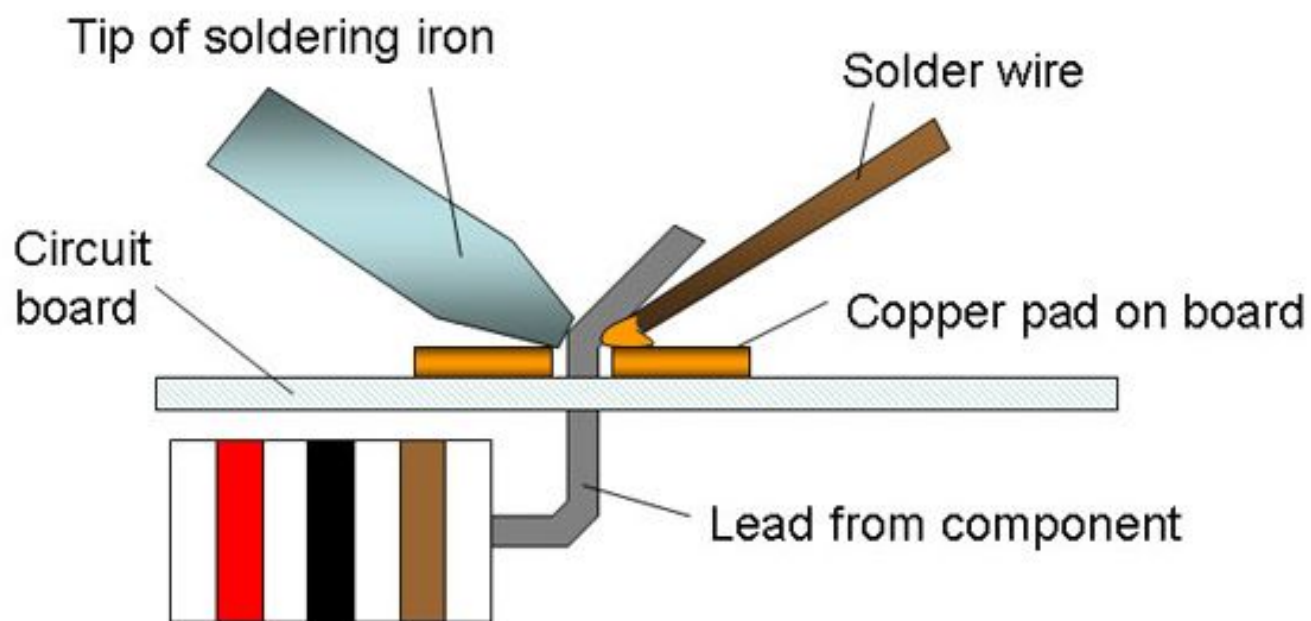
Why use a CR servo over a DC motor?

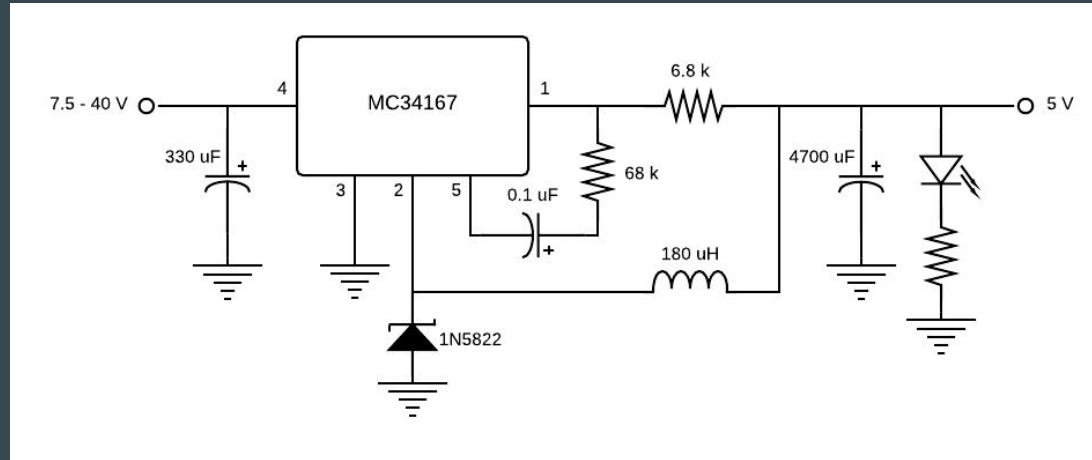
What is the most important component?



Soldering Demo!

- Soldering: Melting metal to be used to stick metal to other metal
 - Remember that thing about electron flow?
- Each team will need to solder at the very least their 5V regulator's header.
 - You NEED to have a working regulator on your power line or PARTS WILL BLOW UP!
- PLEASE PLEASE PLEASE attend office hours if you're not comfortable soldering, we're here to help!
- TIE YOUR HAIR BACK! Catching your hair on fire is not fun. I've done it twice.
- Secure all loose clothing and jewelry.
- Wear closed-toed shoes
 - Liquid solder is usually about 400 degrees C and can splash!
- Wash your hands after soldering - most is lead free, but still.

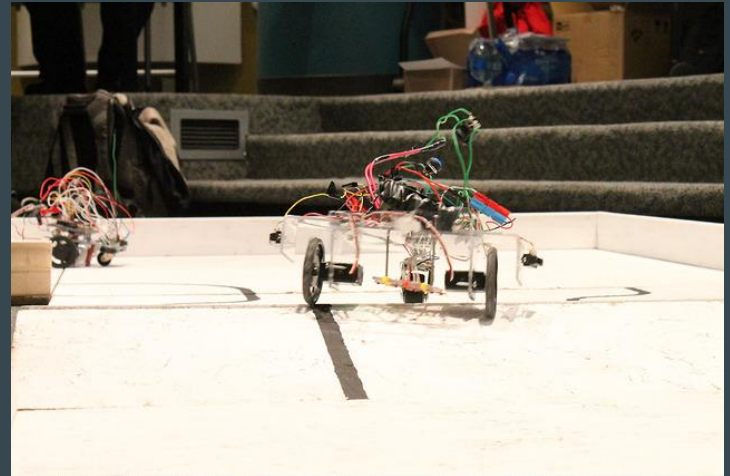




Back in my day, we had to solder our own regulators...

Life Lessons

- When in doubt, charge your batteries.
- Never trust a switch. Always trust your multimeter.
- Measure twice, cut once.
- Think about where your wires are going before you place them.
- If you don't know, ASK QUESTIONS!



Attendance!

Everyone please sign the attendance list so we can keep track of team points!

<https://tinyurl.com/ShanZach>

