Music 250A Electronics Tutorials Quiz

Voltage, Current, Resistance and Ohmsn Law
https://learn.sparkfun.com/tutorials/what-is-a-circuit
https://learn.sparkfun.com/tutorials/voltage-current-resistance-and-ohms-law

1) Define the following:

Voltage: The difference in charge between two points.
Current: The rate at which charge is flowing.
Resistance: A material's tendency to resist the flow of charge (current).

2) What is the equation that relates voltage, current and resistance?

V = IR

3) Does the Arduino use AC or DC voltage?

DC

Series vs Parallel
https://learn.sparkfun.com/tutorials/series-and-parallel-circuits

Read the following sections:
- Series and Parallel Circuits
- Series Circuits
- Parallel Circuits
- Calculating Equivalent Resistance in Series Circuits
- Calculating Equivalent Resistance in Parallel Circuits

4) What is the equation for resistors in series?

$$R_{tot} = R_1 + R_2 + ... + R_{N-1} + R_N$$

5) What is the equation for resistors in Parallel

$$R_{tot} = \frac{R_1 \cdot R_2}{R_1 + R_2}$$

Multimeters and Continuity

https://learn.sparkfun.com/tutorials/how-to-use-a-multimeter?

Read the following sections:

- Introduction
- Parts of a Multimeter
- Measuring Voltage
- Measuring Resistance
- Measuring Current
- Continuity

6) What is continuity?

A solid connection between two conductive points.

7) What is a typical symbol on a multimeter for continuity?

8) What is an example of when you might test for continuity?

Making sure a solder point is well attached.
Making sure that adjacent wires are not touching
Making sure that there is not a short circuit.
Figuring out what wires are connected to eachother.

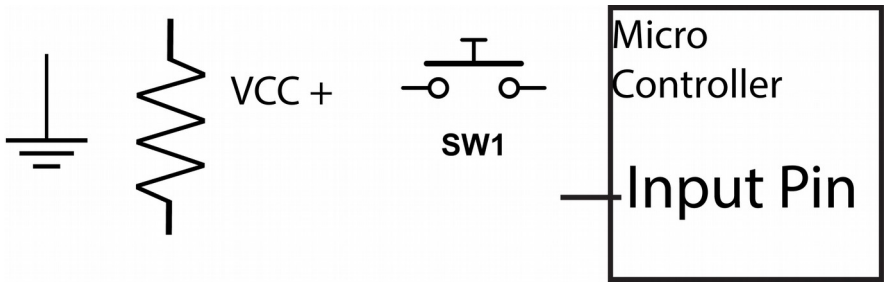
Pull-up Resistors

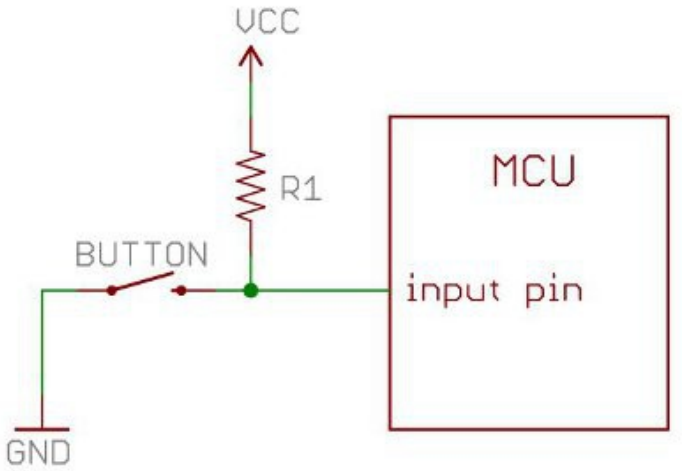
https://learn.sparkfun.com/tutorials/pull-up-resistors

9) What is a pull-up resistor?

A pull-up or pull-down resistor is a resistor connected to an input pin on a micro-controller to ensure that the voltage is read as either high or low and not floating.

10) Draw a circuit for a pull-up resistor on a button input going into and input pin. Use the following symbols





Voltage Divider
https://learn.sparkfun.com/tutorials/voltage-dividers

What is the equation that determines the relationship between voltage and resistance in a voltage divider?

$$V_{out} = V_{in} \cdot \frac{R_2}{R_1 + R_2}$$

Draw a diagram of a voltage divider:

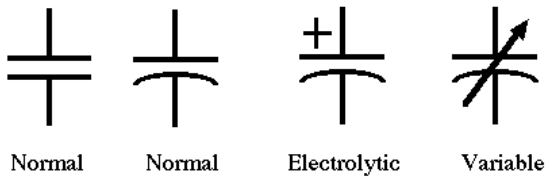
Schematics
https://learn.sparkfun.com/tutorials/how-to-read-a-schematic

Draw the symbol for a resistor

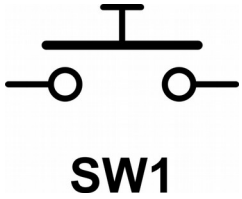
Draw a symbol for a variable resistor

Draw a symbol for a capacitor

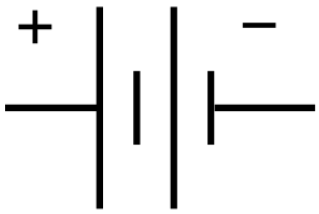
Any of these:



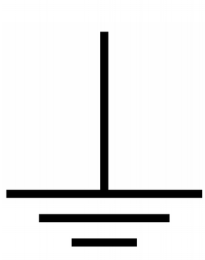
Draw a symbol for a switch



Draw a symbol for a battery



Draw a symbol for ground



Topics that Maybe should have been included
https://learn.sparkfun.com/tutorials/electric-power

Further Reading
https://ccrma.stanford.edu/courses/192a/Lecture1&2-Electronics.pdf
http://www.amazon.com/Make-Electronics-Discovery-Charles-Platt/dp/0596153740
http://www.allaboutcircuits.com/textbook/direct-current/
https://learn.sparkfun.com/tutorials/how-to-read-a-schematic

Other Interesting Things
https://learn.sparkfun.com/tutorials/e-textile-basics

If you want to learn about electronics:
1) Get ahold of something like this and go through it: http://www.amazon.com/Elenco-Electronic-Playground-Learning-Center/dp/B0035XSZDI/ref=sr_1_1?ie=UTF8&qid=1443035493&sr=8-1&keywords=electronics+learning

We have 2 in the Max Lab

2) Get a kit and put it together: http://www.instructables.com/community/Best-Electronics-Kits-For-Adults/

3) Check out the various tutorials posted under Electronics Learning here: https://ccrma.stanford.edu/wp/250a/resources/