

Scratch for Arduino Troubleshooting Guide

Batteries, Multimeters, and Bug Finders*

Bug Finders will be omitted due to unrealistic expectations.

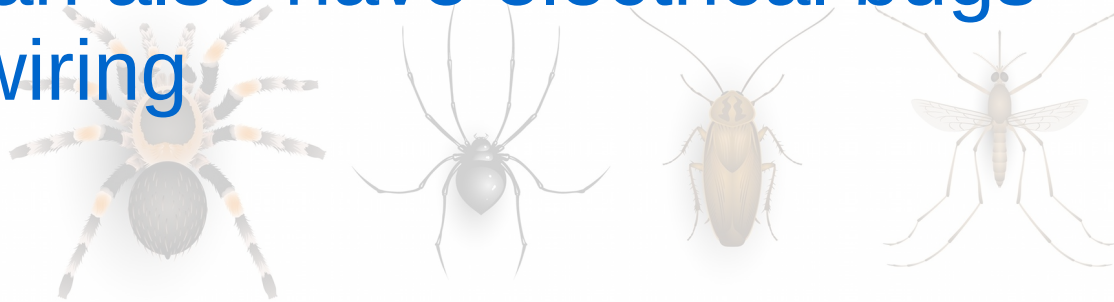
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Bugs

- Bugs are programming errors that lead to faults



- You can also have electrical bugs – mistakes in your wiring



- You can also have faulty components

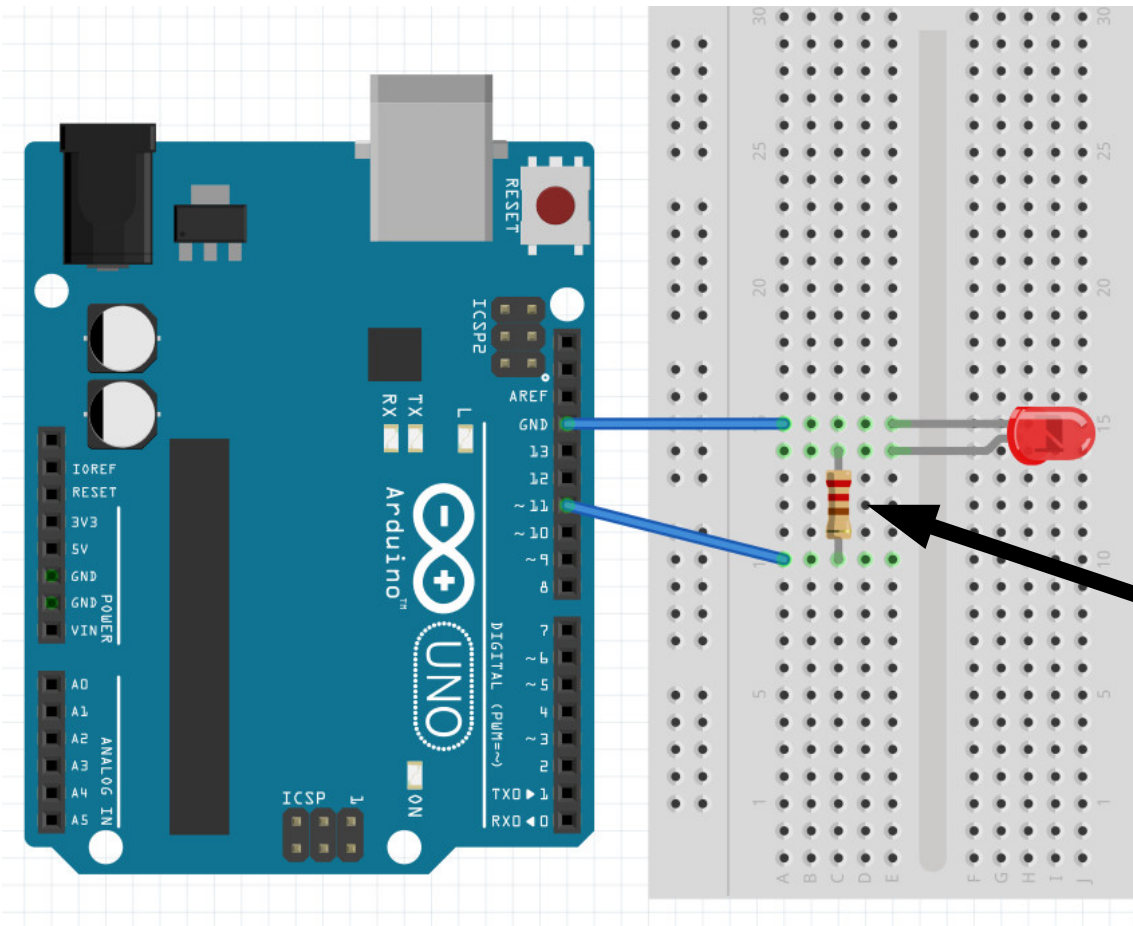


So how do you know what is making things **NOT WORK???**

Troubleshooting

- Learning to troubleshoot your work, and find problems on your own is one of the most important skill we can teach you!
- So, before you call us over to your desk, try to find the problem on your own.
- Perseverance is an important virtue. But, don't lose a whole lesson because you're afraid to ask for help!

Common Issues - Breadboard



Breadboard holes are very close, so hard to make sure where pins are going...

Try to **space things out**, and avoid any kinks in your component legs – especially the very thin resistors...

Resistor legs are very thin... hard to see where they go.

Double-check, triple-check...

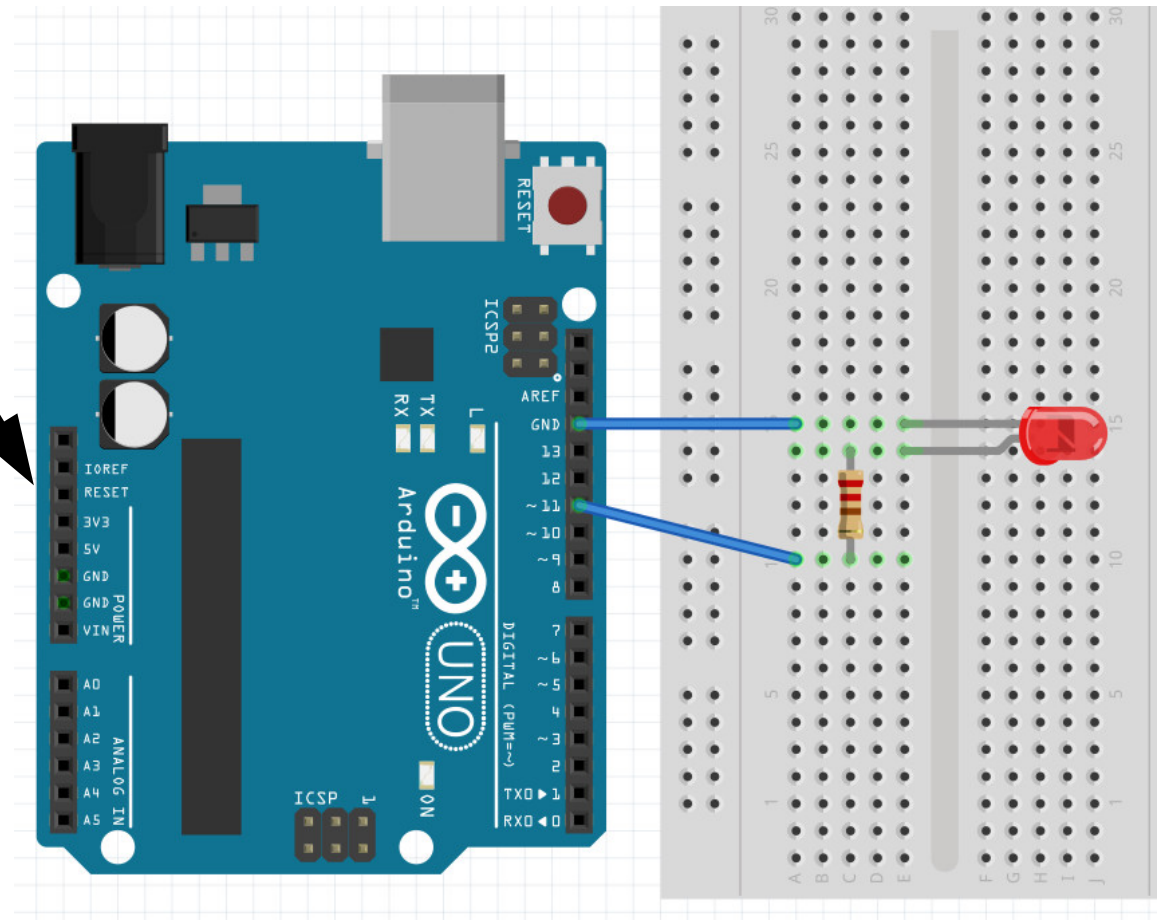
Arduino Connectors

Arduino connectors are also very close and sometimes you will get your pins inserted in the wrong connector...

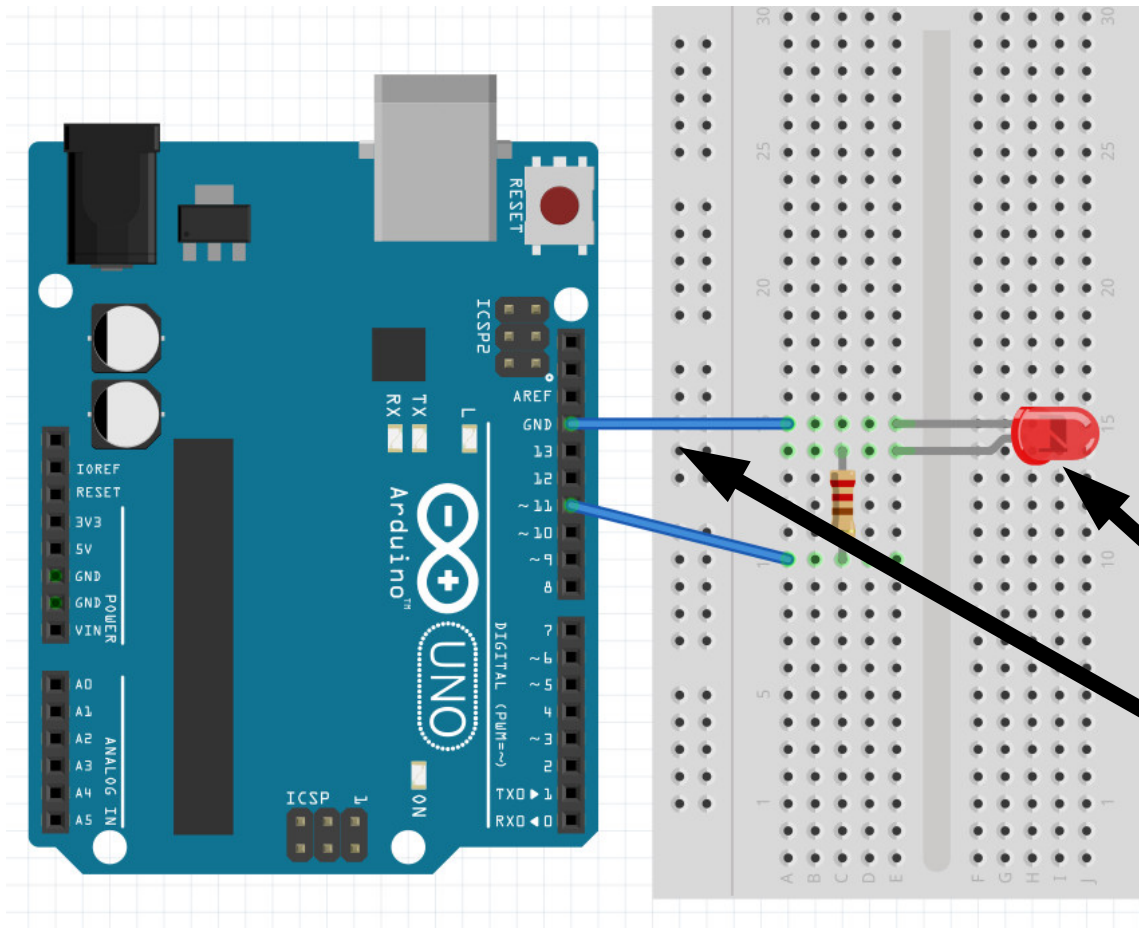
Double-check, triple-check!

If Arduino GND & 5V are short-circuited, the Arduino will stop working, and start getting very hot...

When you feel it's overheating remove all wires from Arduino connectors, and ask for help.



Faulty Wires & Burned LEDs



Wires and other components can become faulty. Different components can be tested in various ways.

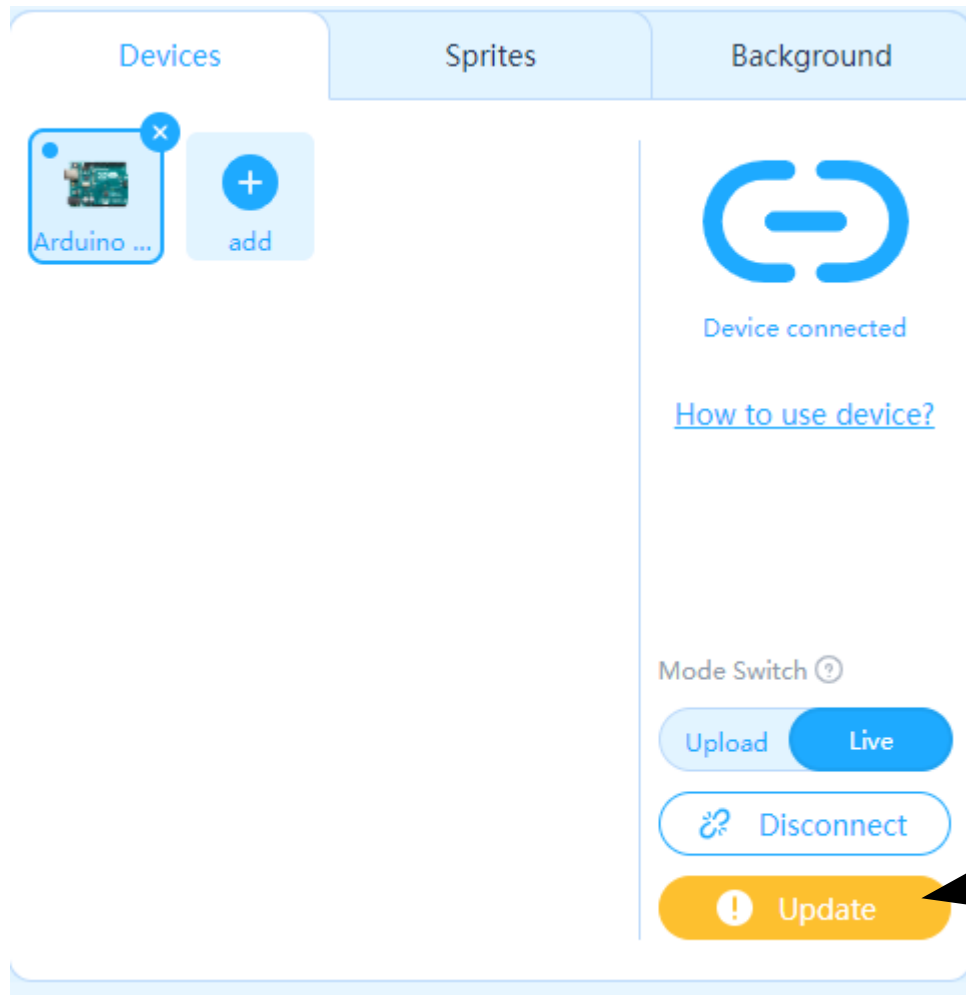
Wires – check continuity with multimeter

LEDs – test with coin cell battery or GND/3.3V on Arduino

LEDs can burn out.

Wires can become faulty and stop conducting electricity...

Arduino Firmware

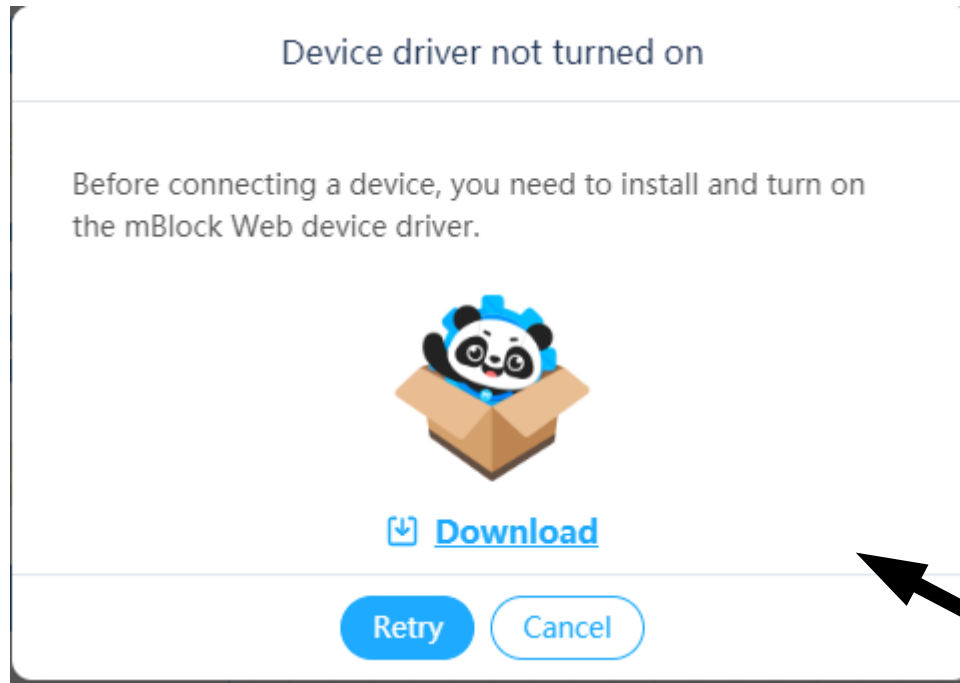


In-between use, or after using **Upload** mode, you may need to re-flash the mBlock communication firmware back to the Arduino...

Other than the “! **Update**” button showing up, there’s very little indication that anything is wrong...

Make sure to always click and update firmware when you see this warning...

mLink

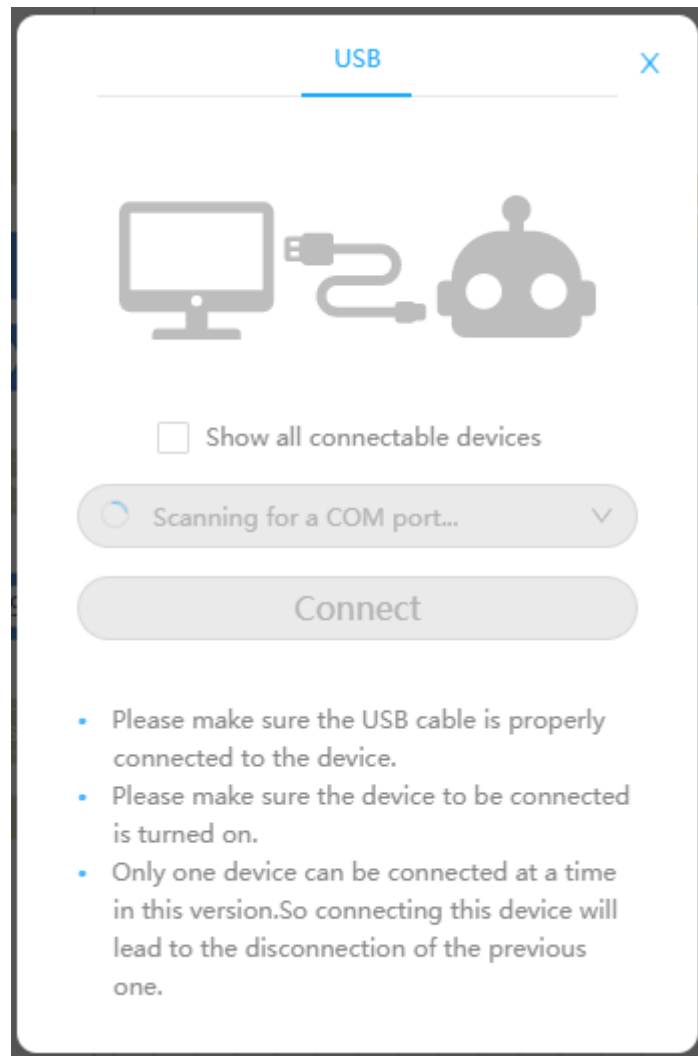


You may forget to start mLink in the background... This allows the web browser to communicate with Arduino through the serial port.

Without it, you cannot connect between mBlock and Arduino.

Make sure mLink is running in the background...

Device Connected

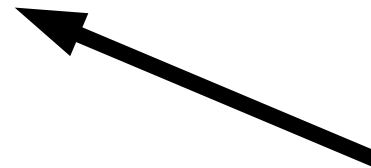


You may have disconnected Arduino by mistake, or the cable is bad, or the USB port is not playing nice with the device manager...

Try to reconnect to another USB slot, with another cable, or to another Arduino...

Make sure Arduino is plugged in, lights are on, and no overheating...

Try another USB connection.



Using a Multimeter



Testing wires and circuit for continuity can identify faults in your wiring, or in the electrical components themselves.

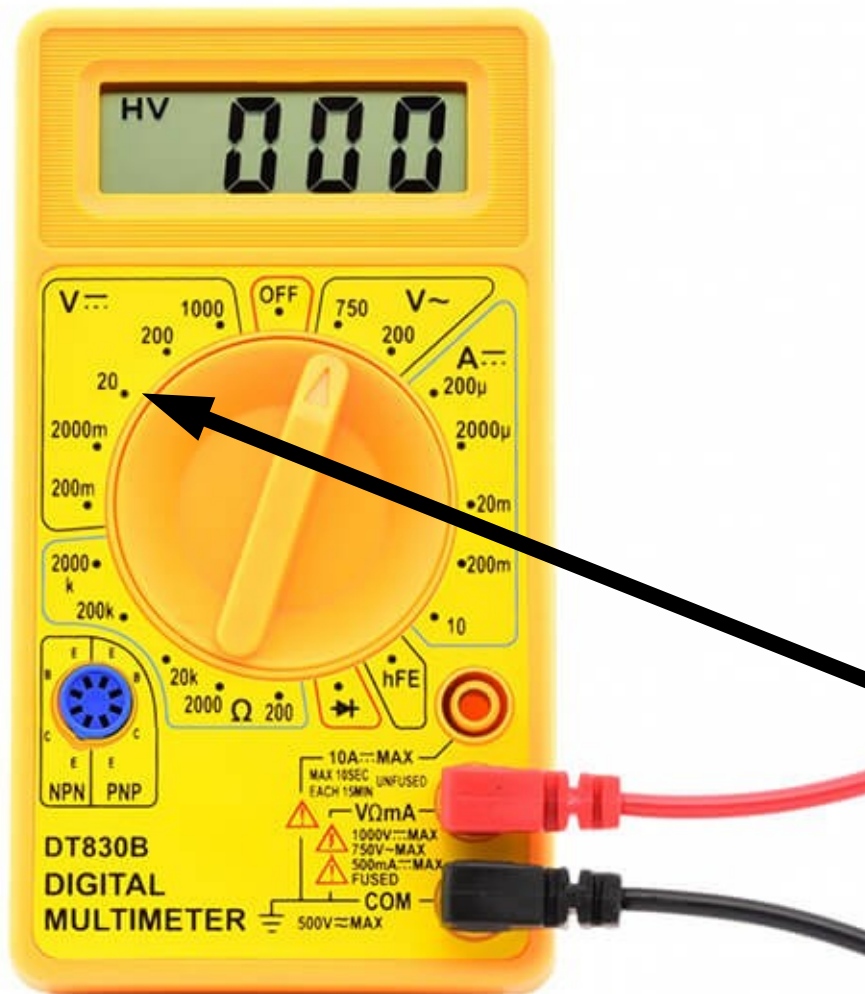
Point the multimeter to the Continuity icon \rightarrow

When the leads close a circuit you will either hear a beep, or see the display change to 0, or both...

Touch the two lead ends to test...

Learn to test for continuity.

Using a Multimeter

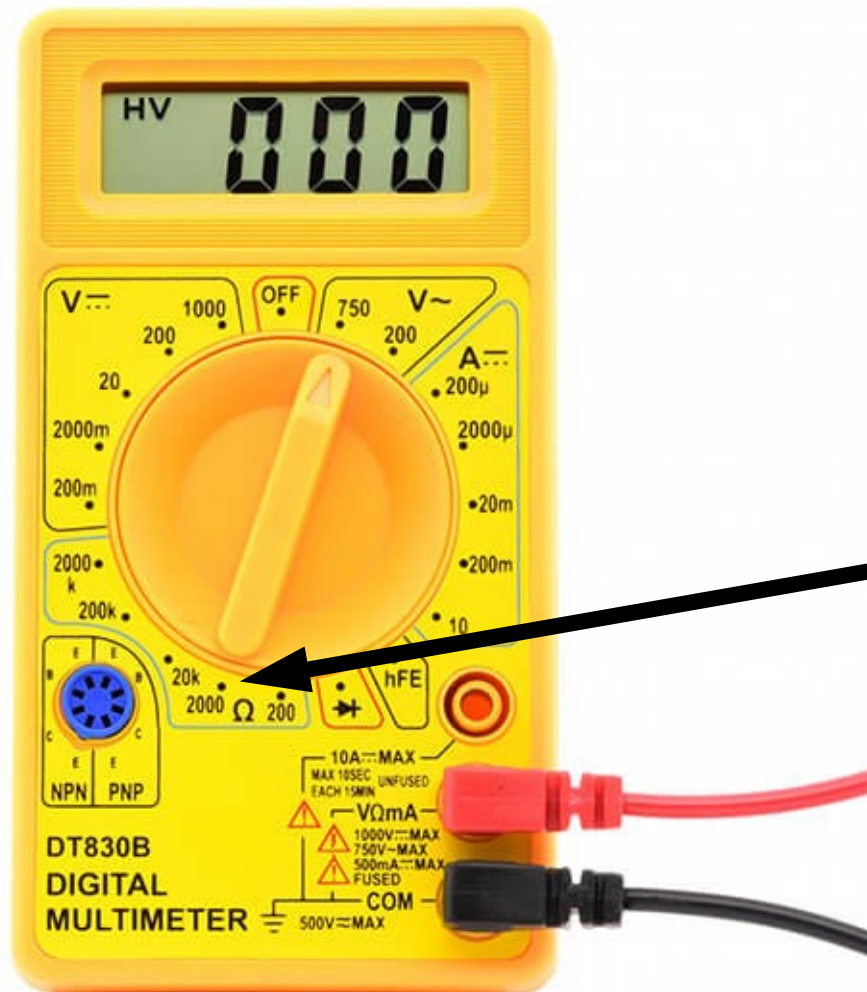


You may also wish to test voltage across parts of your circuit.

If you expect a 5V potential difference between two points in your circuit, you can turn the multimeter to the 20 VDC selection, and test for the voltage drop.

Learn to test for voltage.

Using a Multimeter






We will be using fixed and variable resistors, so now and then it may be useful to test for resistance.

Depending on your expected range of resistances, you will use the ohm (Ω)-meter selections.

Learn to test for resistance.

e.g. if you expect resistances in the range of several hundreds, use the 2000 selection.

Programming Bugs

- Too many things can go wrong to describe here...
- Make sure your pins are set correctly
- Explain the code to your partner. Sometimes just explaining the code to someone leads to an identification of a problem.
- Trace the issue – try to triangulate where the problem could be.

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