ARDUINO: LESSON: Simple breadboard!

Materials needed: a laptop, an Arduino and a USB cable. One LED (of any size or color) and one small breadboard -- use the smallest size if available, about 4x5 cm.

Part A: RUN THE BLINK PROGRAM AGAIN

Start up the Blink program just as in lesson 1.   _____

Part B: NOW USE AN EXTERNAL LED INSTEAD OF THE BUILT-IN ONE

Look at the Arduino board. Along one edge, next to the pin connectors, find the printed names "0", "1", "2", "3", ..., up to "13". These are the Arduino data pins. We are going to use one of them in the next few steps. Note that the board has a tiny LED built into it next to pin 13 (that's the one you've observed blink in the previous lesson). All of these pins have nearly identical functions, but only pin 13 has it's own LED.   _____

Take a big LED from the bag of LEDs. Note that it has two "leads" or wires coming out of it, and in particular note that one lead is slightly longer than the other. The longer lead is always + and the shorter -.   _____

Pick a number from 0 to 12. Any number will do. Stick the longer lead of the LED directly into ***that*** pin.   _____

Find the "GND" (ground) pin on the Arduino just above pin 13. Stick the shorter lead of the LED directly into that pin (GND). Note: connecting the LED backwards may fry it!   _____

Change the "pinMode(13,OUTPUT)" command in the "setup" portion of the program to have your chosen number (0 to 12) instead of 13. Just change the number and leave the rest of the program command the same. (Be careful -- if you accidentally erase a comma or parenthesis or semicolon the entire program won't upload! If you do mess it up you can simply close the window (don't "save") and re-start with a fresh copy of Blink).   _____

Change both the "digitalWrite(13,HIGH)" and "digitalWrite(13,LOW)" commands in the "loop" portion of your program in a similar manner: just change the number 13 to your chosen pin number.   _____

Upload the new program. ***Your*** LED should start blinking immediately! Congratulations! You have successfully modified a program and added an external device!   _____

Part C: Extend the LED to a breadboard

Get a breadboard. (Preferably one of the smallest ones). Also get two jumper wires of medium length and any color (but use two different colors so you can tell them apart!).   _____

Remove your LED from the Arduino. Instead, stick the two jumpers into the Arduino in the same two pins (holes) the LED had been in--that is, one in GND and one in your chosen pin.   _____

Stick the other ends of the two jumpers into two different rows on the breadboard. (See the picture below).   _____

Insert the two leads of the LED into the breadboard. The short lead must be stuck in the same row as the jumper that goes to GND and the longer lead must be stuck in the same row as the jumper that comes from your chosen data pin.   _____

Here is a picture of what the final setup should look like: (I choose to use pin 6)
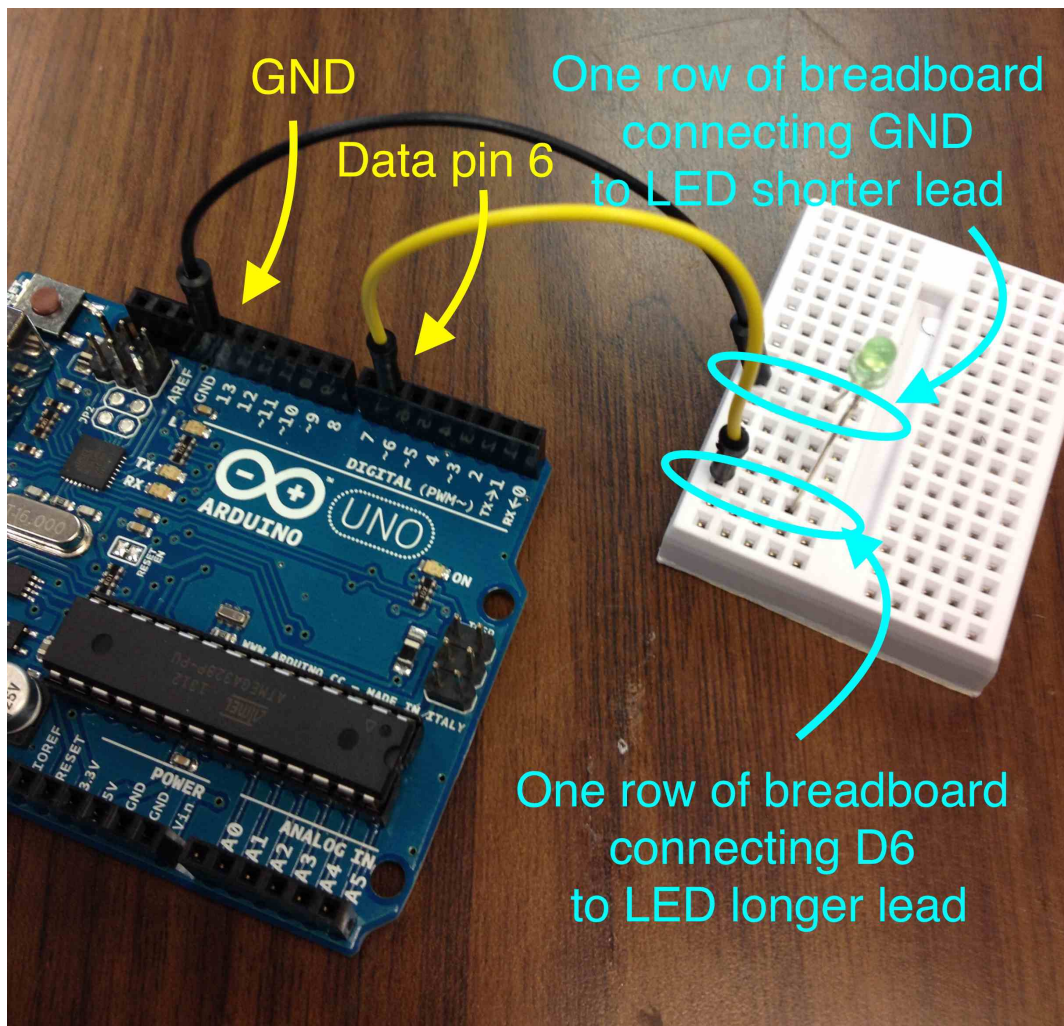
If you have done this correctly your LED shoud be blinking again! Show it to your supervisor!   _____

Part D: Understanding the breadboard

Get the "demonstration breadboard" from the supply cabinet. It has had its back removed so that you can examine it more closely. Take a look at it to gain a bit more mass on the breadboard. Pull out one of the small metal clips (you may need some sharp fingernails or the tip of a needle or knife to pry one out). Examine this clip closely. This piece of metal will connect together up to five wires or pins stuck into its holes.   _____

When you are done put the metal piece back into the demonstration breadboard and put it away!   _____

THE END