

Sight, Sound, and Motion: Interacting with the World

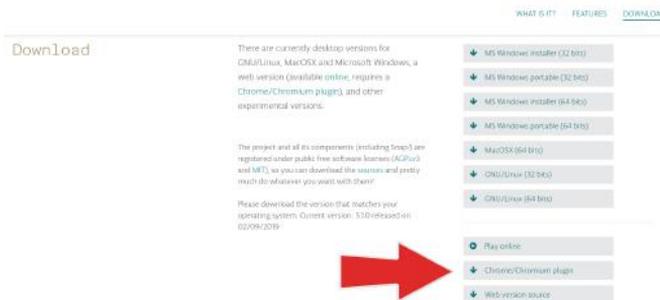
The Arduino microcontroller is one of the most popular devices for controlling physical objects in the real world. The Arduino can control lights, motors, and actuators. It also can receive inputs from sensors connected to its input ports.

Installing Snap4Arduino Chrome Extension

Download and install the *Snap4Arduino* program. It can be downloaded from the following web address:

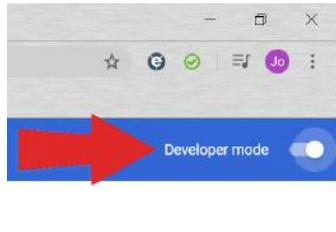
<http://snap4arduino.rocks/>

From the “Download” tab, select and download the “Chrome/Chromium plugin.”



For the plugin to work, developer mode must be enabled in the Chrome browser.

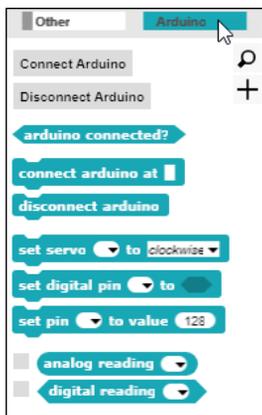
Enter “chrome://extensions” into your browser’s address bar, and when the page loads, enable developer mode in the top right corner of the window.



Drag the unzipped install file onto this page, and the extension will install itself.

Going back to the “Snap4Arduino” page, you should now see a button that says “Play Online.” Clicking that button will launch the program inside your web browser.

A new section labeled *Arduino* will appear on the *Commands Palette*.



Connecting to the Arduino

A program for the Arduino called *Firmata* enables the Arduino to communicate with another computer. The standard version of this program, called *StandardFirmata*, must be installed on the Arduino to enable *Snap4Arduino* to communicate with the Arduino. Directions for installing the *StandardFirmata* communications program on the Arduino are provided in the *Appendix* titled “Establishing Communications with the Arduino.”

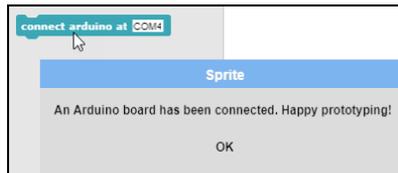
After completing steps in the *Appendix*, launch *Snap4Arduino*. Then click the *Connect Arduino* block to connect to the Arduino.



A dropdown menu will appear that offers a selection of communications ports. Select the same communications port that was previously selected from the Arduino IDE (when implementing the steps in the Appendix.) In this example, the Arduino was connected to COM4.



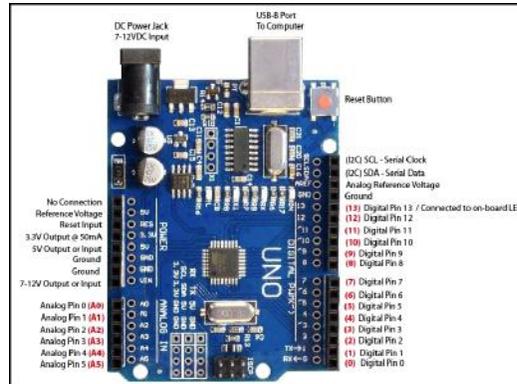
If the correct communications port is selected, the program will report, “An Arduino has been connected. Happy prototyping!”



Controlling the Arduino

The Arduino can control lights, motors, and actuators and can receive inputs from sensors connected to its input ports. External actuators and sensors are connected to the Arduino via sockets called *pins* on the sides of the Arduino board.

The reference diagram labels the functions of the various pins. The board includes a USB port that can be used to connect the Arduino to a computer. The USB port also supplies power from the host computer to the Arduino. A separate power jack is available for times when the Arduino is operated in a stand-alone mode (i.e., is not connected to another computer).



This diagram describing the various pins and other functions of the Arduino board will be useful as a reference as you progress through the directions that follow.

Page Break

Controlling an LED

The top of the Arduino has a series of *Digital Pins* labeled 1 through 13. Each of these pins can be used to supply power to turn on an LED. The pin labeled “13” has a LED on the board of the Arduino.



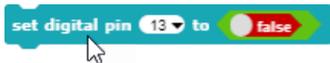
This LED can be used to test *Snap4Arduino* programs. Drag the Arduino code block Set Digital Pin ___ to ___ into the *Snap4Arduino* script area. Then drag the True / False code block (found under the *Operators* command palette) into the hexagonal slot at the end of the Set Digital Pin command.



Set the pin number to 13 and click the code block. The yellow LED beside *Digital Pin 13* should turn on.



Then change the True / False flag to *False* and click Set Digital Pin command again. This time the yellow LED beside *Digital Pin 13* should turn off.



Next examine an LED. Note that one of the two legs of the LEDs is longer than the other one. The shorter leg is inserted into a ground pin. The longer leg can be inserted into any of Digital Pins 1 through 13.



Insert the longer leg of the LED into *Digital Pin 13* and insert the shorter leg of the LED into the ground pin (labeled GND) that is located beside Pin 13.



When Digital Pin 13 is turned on, both the onboard (yellow) LED and the external LED inserted into the pin socket will light up.

