

Megamark Python 2.7 Setup Guide

At its core, the Choitek Megamark has an Arduino Mega 2560 microcontroller, which can be controlled by issuing serial commands via USB cable connected to a Mac, Windows, or Linux laptop computer running Python scripts. This tutorial will show you how to set up core Python software and the Megamark Libraries to work with the Choitek Megamark Robot Platform.



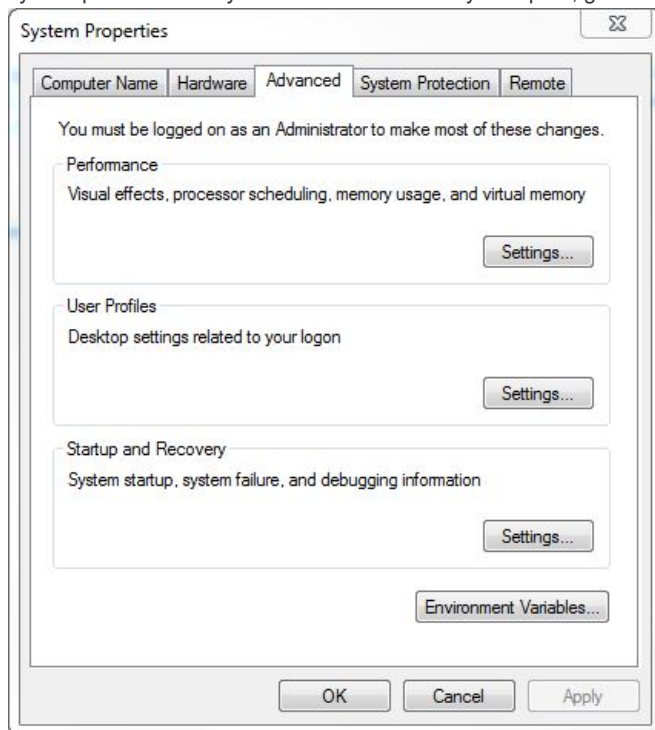
Downloading and Installing Python 2.7

Step 1: First, install Python 2.7 from the official Python website for your chosen operation system. If you are using Windows, we recommend you choose the x86 MSI files at the bottom. If you are using Mac, choose the **Mac OS X 64-bit/32-bit installer**.

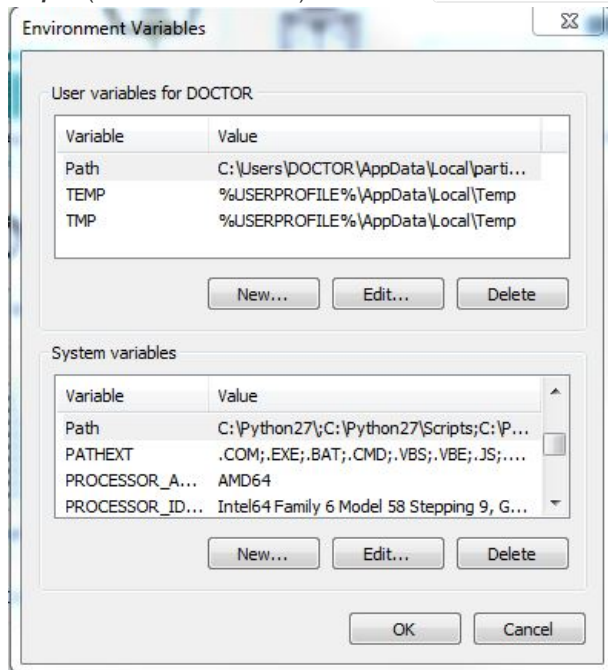
The screenshot shows the Python 2.7.14 download page. At the top, there is a navigation bar with links for About, Downloads, Documentation, Community, Success Stories, News, and Events. Below the navigation bar, the page title is "Python 2.7.14". The release date is listed as 2017-09-16. A brief description states that Python 2.7.14 is the latest bug fix release in the Python 2.7.x series. A link to the "Full Changelog" is provided. The "Files" section contains a table with columns for Version, Operating System, Description, MD5 Sum, File Size, and GPG. The table lists various download options, including source tarballs, Mac OS X installers (32-bit and 64-bit), and Windows installers (debug information files, help file, and MSI files for x86-64 and x86).

Version	Operating System	Description	MD5 Sum	File Size	GPG
Gzipped source tarball	Source release		cee2e4b33ad3750da77b2e85f2f8b724	17176758	SIG
XZ compressed source tarball	Source release		1f6db41ad91d9eb0a6f0c769b8613c5b	12576112	SIG
Mac OS X 32-bit i386/PPC Installer	Mac OS X	for Mac OS X 10.5 and later	67cf2aed974cd04fe96ddac29758b637	24468530	SIG
Mac OS X 64-bit/32-bit Installer	Mac OS X	for Mac OS X 10.6 and later	2c959c6ba4ffed23bd102c4e92095fa9	22604859	SIG
Windows debug Information files	Windows		85775bb18b460be79a25c0952b8121f9	24834214	SIG
Windows debug Information files for 64-bit binaries	Windows		cf73b28cb8b76ed2374f0b2c710d202a	25620646	SIG
Windows help file	Windows		0f742a733778565ab7ace9aea53c1709	6251855	SIG
Windows x86-64 MSI Installer	Windows	for AMD64/EM64T/x64	370014d73c3059f610c27365def62058	20168704	SIG
Windows x86 MSI Installer	Windows		fff688dc4968ec80bb0eedf45de82db	19238912	SIG

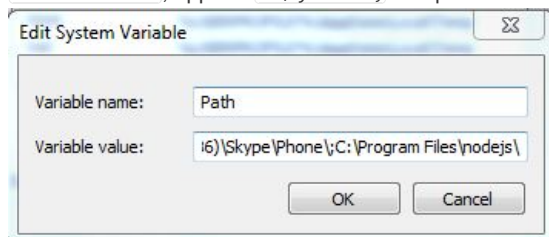
Step 2: (ONLY ON WINDOWS) Python 2.7 will install correctly through the MSI installer, but will not add the Python 2.7 directory to Windows's system path. To add Python 2.7 to Windows's system path, go to Windows Search and open up **Advanced System Settings**:



Step 3: (ONLY ON WINDOWS) Click on the `Environment Variables` button, and new window should pop up:



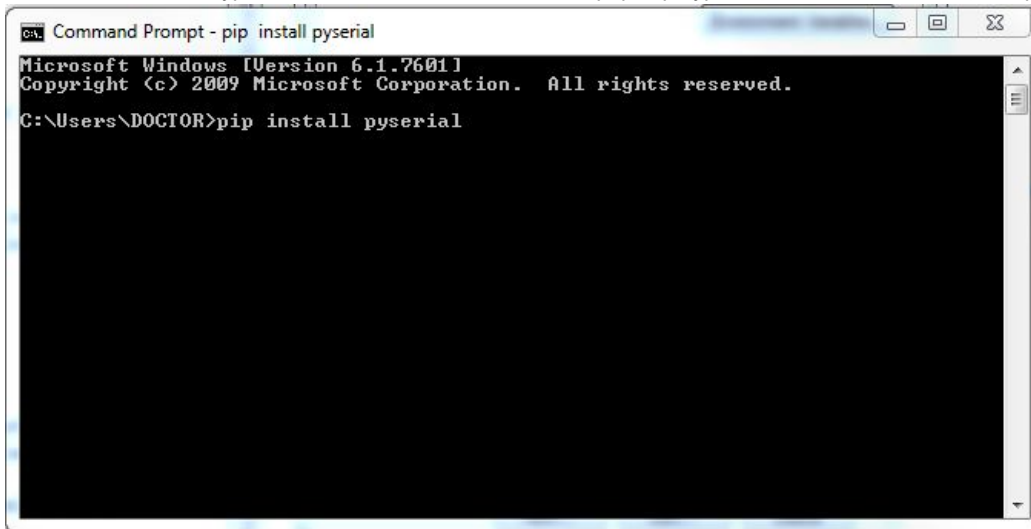
Step 4: (ONLY ON WINDOWS) Double click on the `Path` variable in the System Variables pane (not the user variables). At the end of the `Variable value`, append `C:\Python27;` and press **OK**. You can close out of `Environment Variables` and also `Advanced System Settings` now.



Downloading and Installing PySerial 2.7

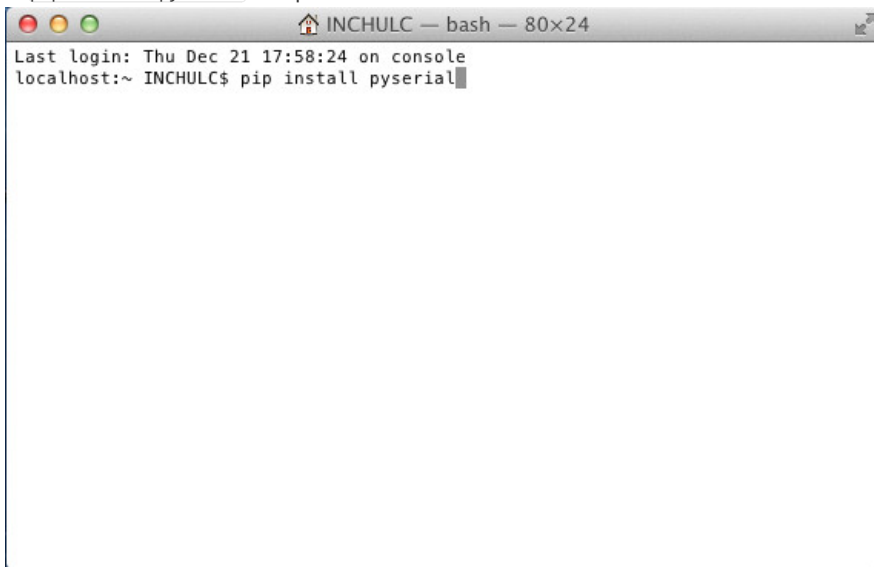
PySerial is a USB serial communication library for Python to allow your Mac, Windows, or Linux Laptop to communicate to attached USB Arduino devices. There are actually 2 methods to install PySerial, detailed below.

Method 1: Install PySerial through `pip` and either the Command Prompt (Windows) or the Terminal (Mac and Linux). To do this on Windows, open Windows Search and type in `cmd`. Inside the new window that pops up, type in `pip install pyserial` and press Enter.



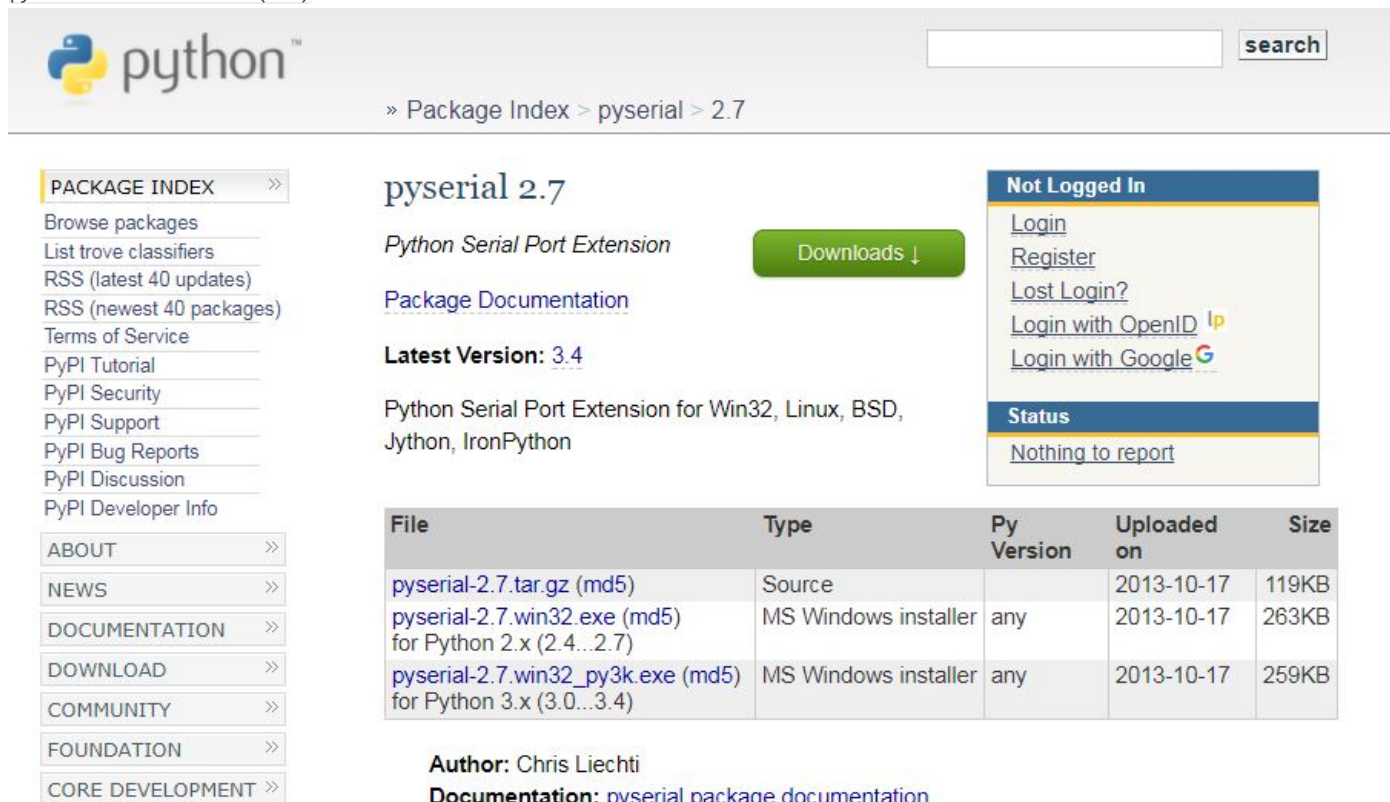
```
Command Prompt - pip install pyserial
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Users\DOCTOR>pip install pyserial
```

To do this on Mac, open the Terminal app (to find this app, hold `Command+Space` and type `Terminal`). Inside the new window that pops up, type in `pip install pyserial` and press Enter.



```
INCHULC — bash — 80x24
Last login: Thu Dec 21 17:58:24 on console
localhost:~ INCHULC$ pip install pyserial
```

Method 2: (WINDOWS ONLY) Install PySerial for Python 2.7 from the official Python website. If you are using Windows, download the pyserial-2.7.win32.exe (md5) executable MS Windows Installer and run it.



The screenshot shows the PyPI package page for pyserial 2.7. The page includes a search bar, a navigation menu, and a list of download links. The package is described as a Python Serial Port Extension for Win32, Linux, BSD, Jython, and IronPython. The latest version is 3.4. The page also features a table of download files and a list of links for documentation and support.

PACKAGE INDEX »

- Browse packages
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- RSS (newest 40 packages)
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- PyPI Security
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pyserial 2.7

Python Serial Port Extension

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[Package Documentation](#)

Latest Version: 3.4

Python Serial Port Extension for Win32, Linux, BSD, Jython, IronPython

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Status

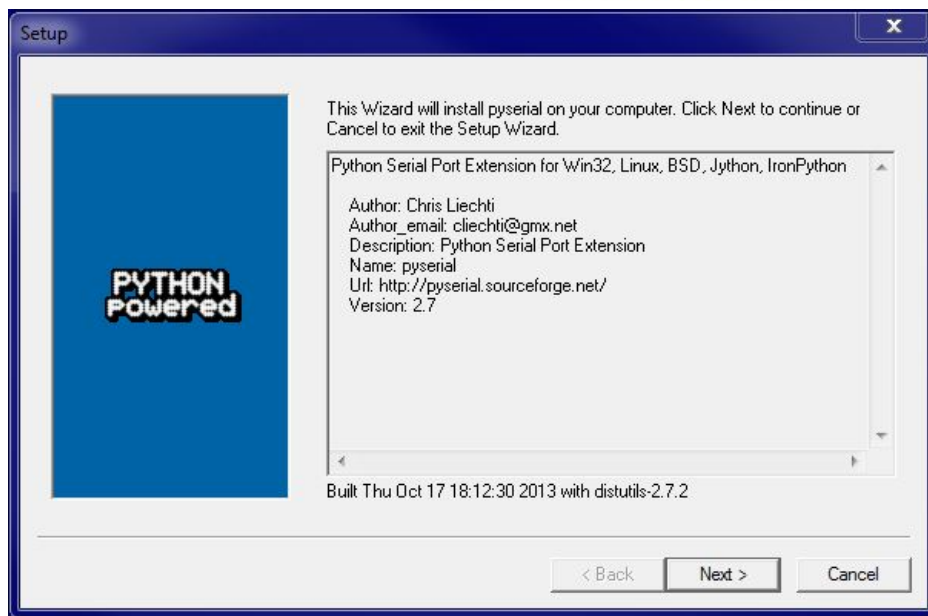
[Nothing to report](#)

File	Type	Py Version	Uploaded on	Size
pyserial-2.7.tar.gz (md5)	Source		2013-10-17	119KB
pyserial-2.7.win32.exe (md5) for Python 2.x (2.4...2.7)	MS Windows installer	any	2013-10-17	263KB
pyserial-2.7.win32_py3k.exe (md5) for Python 3.x (3.0...3.4)	MS Windows installer	any	2013-10-17	259KB

Author: Chris Liechti

Documentation: [pyserial package documentation](#)

Home Page: <http://pyserial.sourceforge.net/>

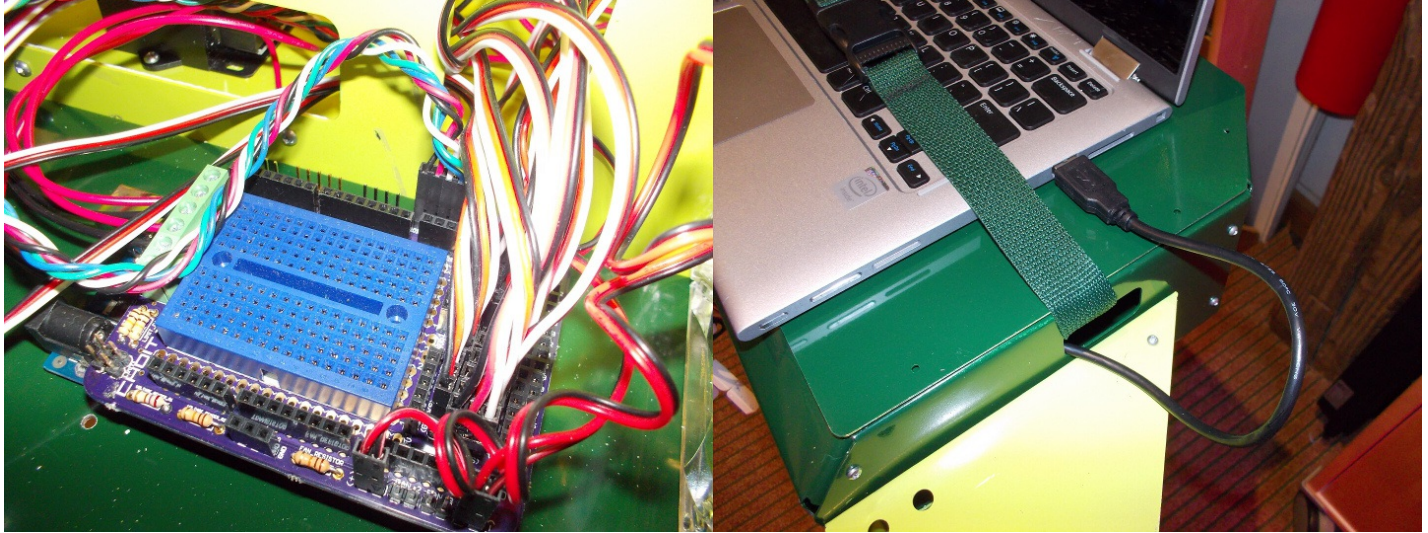


The `pyserial-2.7.win32.exe (md5)` MSI installer in action.

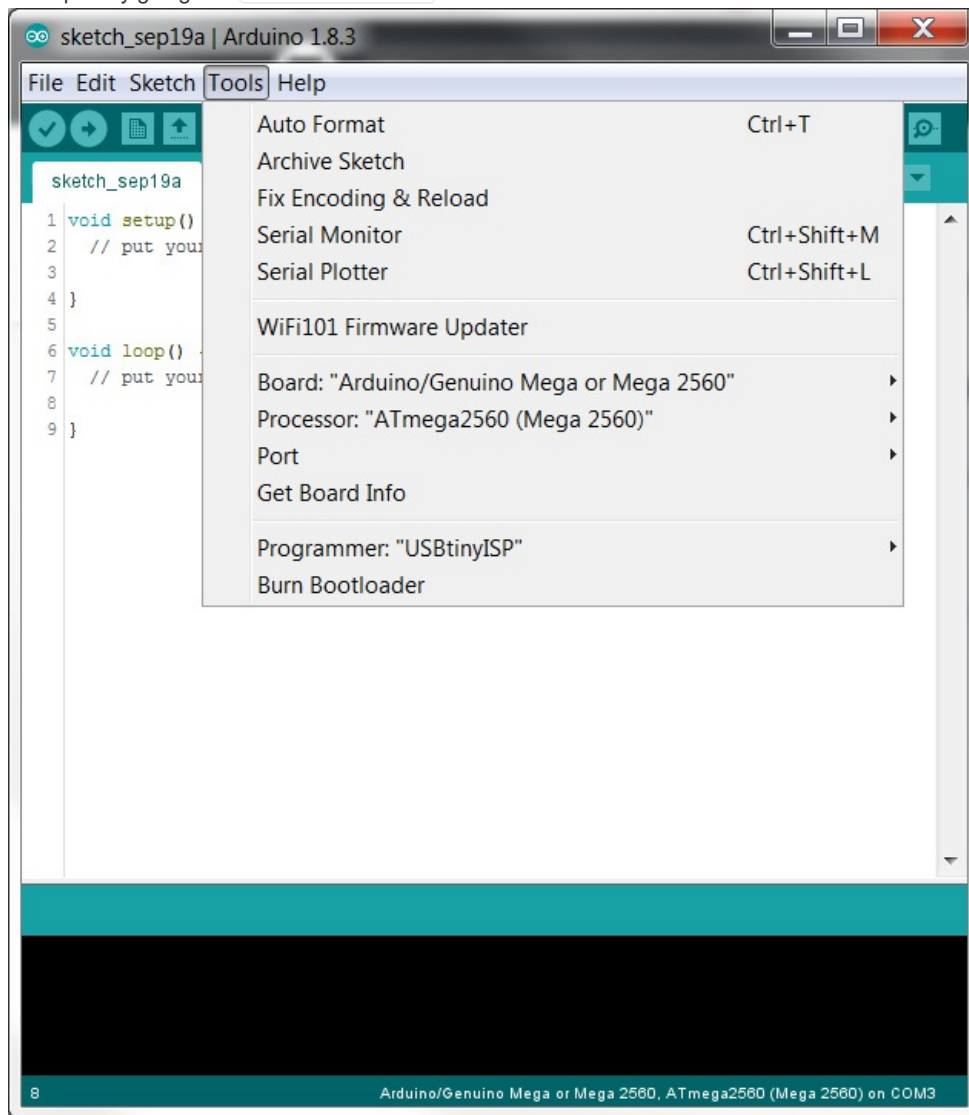
Downloading and Installing the Arduino Firmware

Once you have successfully installed the Python 2.7 programming language and the PySerial plugin for Python 2.7 in the above steps, we can now prepare the firmware on the Choitek's Megamark's Arduino Mega 2560 board.

Step 1: If you have not done so already, follow the steps in the *Megamark Arduino Setup Guide* and make sure you have the Arduino software and the Megamark Arduino Library installed and ready to go. Plug the robot's internal Arduino Mega 2560 onto your laptop via USB Serial.

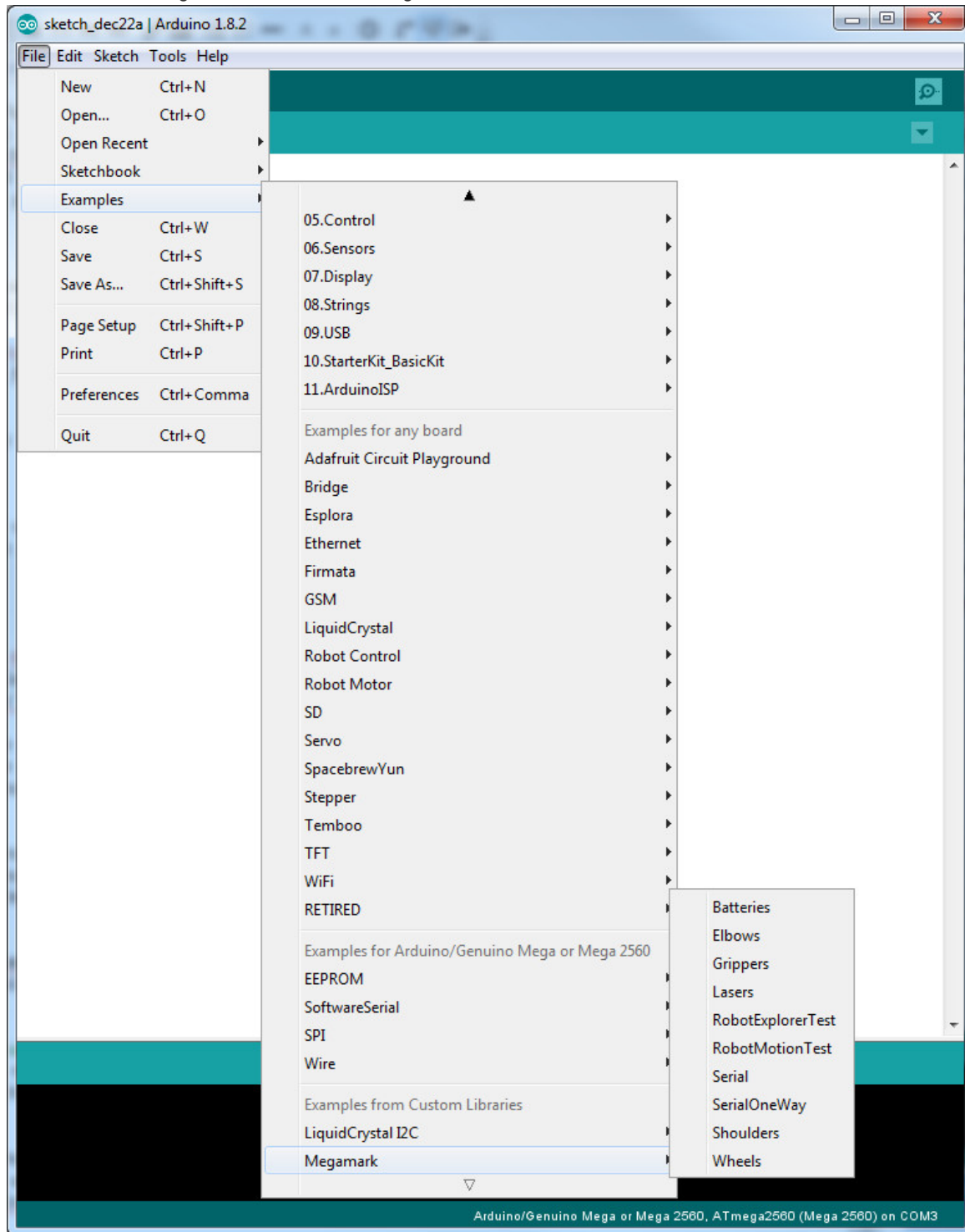


Step 2: Fire up the newly installed Arduino IDE. Set your board type by going into `Tools->Board->Arduino/Genuino Mega or Mega 2560`. Set your COM port by going into `Tools->Port->COM##`.



Some versions of the Choitek Megamark run on an Arduino Mega 1280 for legacy compatibility reasons. If this applies to your Megamark robot, you will also need to change `Tools->Processor->Board->ATmega1280`.

Step 3: Go over to `File->Examples->Megamark->Serial`. This allows the Megamark robot to communicate over USB serial to Python scripts running on a laptop. Once the example file has been loaded, press the `Upload` button (shaped liked an arrow in the upper left corner of the screen) to load the code onto the Megamark Robot's Arduino Mega.



Once the `Serial` example has been loaded, the robot should now be programmable using Python 2.7.

Running Example Python Scripts

Now that Python 2.7 has been installed with PySerial and the correct Arduino firmware has been loaded on the Megamark Robot, we can now test some actual Python scripts for the Megamark Robot.

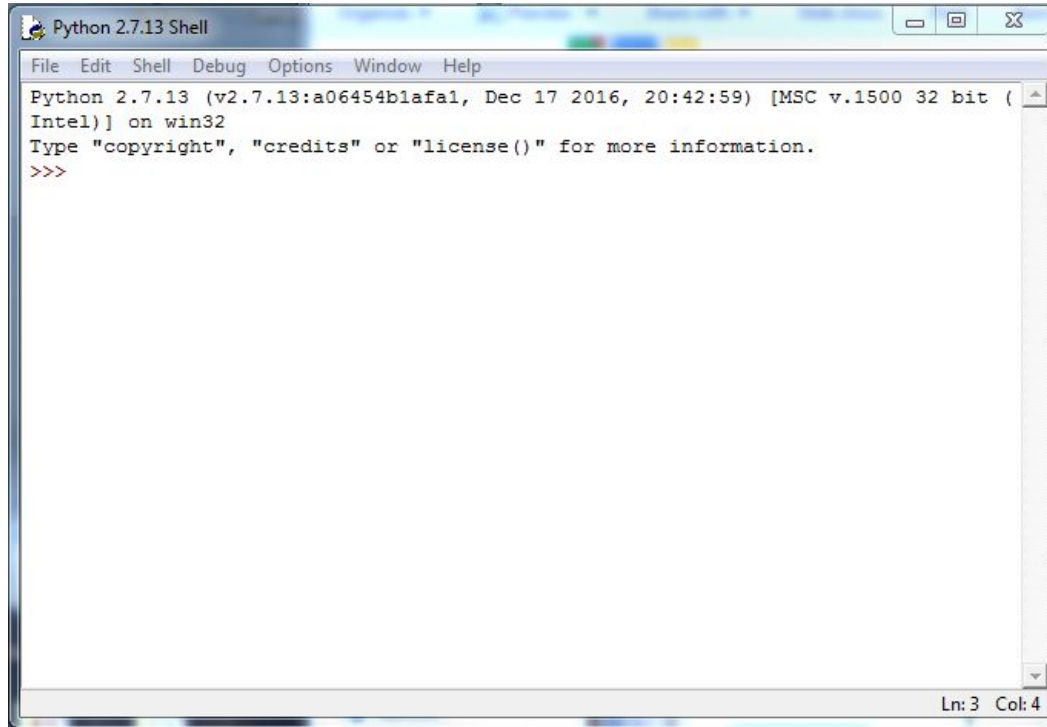
Step 1: Go ahead and download the *Megamark Library for Python*, which can be found on [Github](#) or the [main Choitek website](#). Extract it and place the examples in your desired location.

The screenshot shows the GitHub repository page for Choitek-Megamark. The repository is on the master branch. The commit history table is as follows:

Commit	Message	Time
johnchoi313	Added new libraries and updates!	Latest commit 770a4d9 on Aug 24
..
1	Shoulders.py	Added new libraries and updates! 4 months ago
2	Elbows.py	Added new libraries and updates! 4 months ago
3	Grippers.py	Added new libraries and updates! 4 months ago
4	Wheels.py	Added new libraries and updates! 4 months ago
5	Robot Motion Test.py	Added new libraries and updates! 4 months ago
6	Lasers.py	Added new libraries and updates! 4 months ago
7	Robot Explorer Test.py	Added new libraries and updates! 4 months ago
	Megamark.py	Added new libraries and updates! 4 months ago

Note: Every Python script that references the Choitek Megamark must have the `Megamark.py` file in the same folder! If you don't do this, you will be faced with a missing library error.

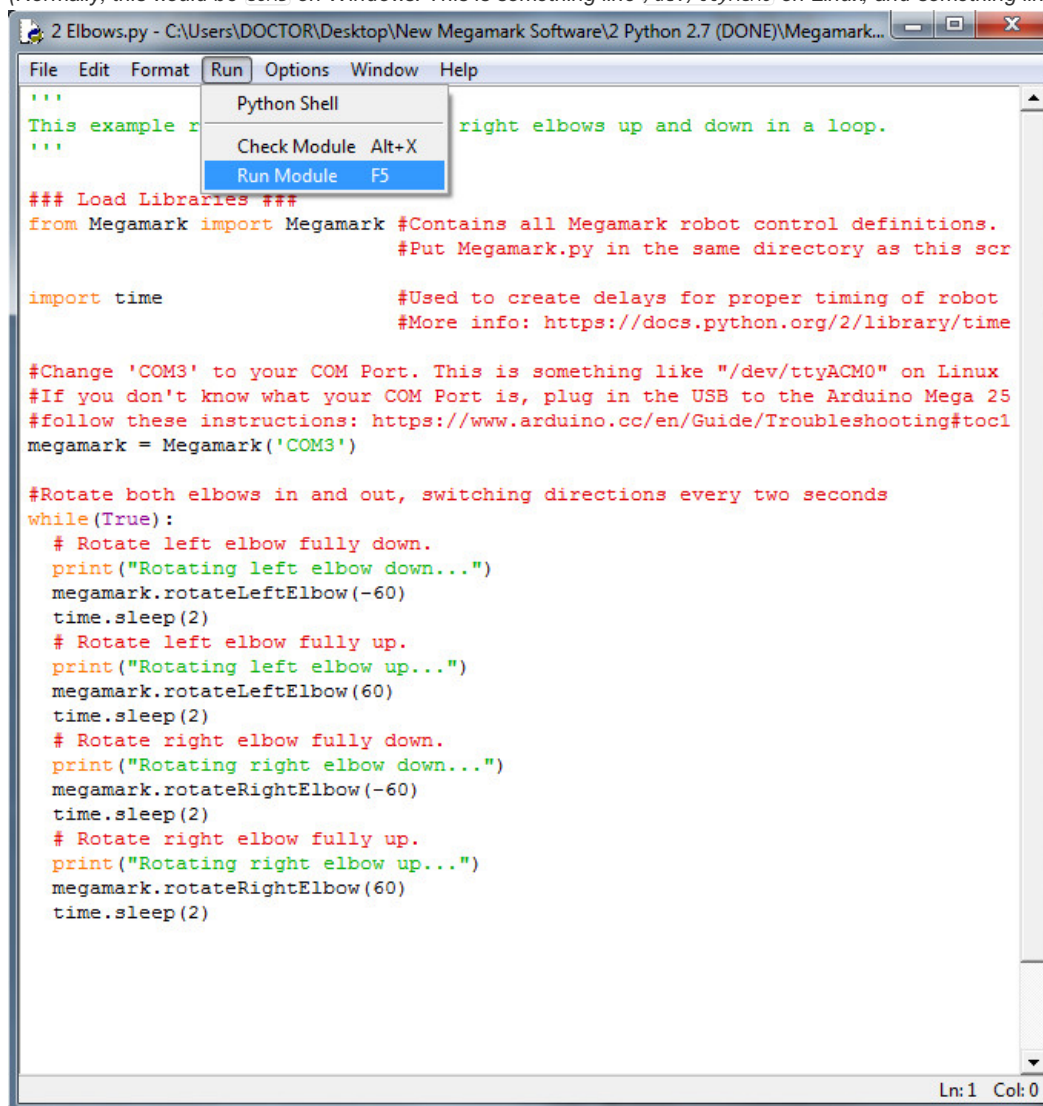
Step 2: Now, find the Python 2.7 IDLE application on your computer and run it.



```
Python 2.7.13 Shell
File Edit Shell Debug Options Window Help
Python 2.7.13 (v2.7.13:a06454b1afa1, Dec 17 2016, 20:42:59) [MSC v.1500 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
```

Ln: 3 Col: 4

Step 3: Go to File->Open and open elbows.py from the Megamark Python examples. Be sure to change the line referencing your COM Port. (Normally, this would be COM3 on Windows. This is something like /dev/ttyACM0 on Linux, and something like /dev/cu.usbmodem1411 for Mac.)



```
'''
This example r
'''
right elbows up and down in a loop.

### Load Libraries ###
from Megamark import Megamark #Contains all Megamark robot control definitions.
                                #Put Megamark.py in the same directory as this scr

import time                    #Used to create delays for proper timing of robot
                                #More info: https://docs.python.org/2/library/time

#Change 'COM3' to your COM Port. This is something like "/dev/ttyACM0" on Linux
#If you don't know what your COM Port is, plug in the USB to the Arduino Mega 25
#follow these instructions: https://www.arduino.cc/en/Guide/Troubleshooting#toc1
megamark = Megamark('COM3')

#Rotate both elbows in and out, switching directions every two seconds
while(True):
    # Rotate left elbow fully down.
    print("Rotating left elbow down...")
    megamark.rotateLeftElbow(-60)
    time.sleep(2)
    # Rotate left elbow fully up.
    print("Rotating left elbow up...")
    megamark.rotateLeftElbow(60)
    time.sleep(2)
    # Rotate right elbow fully down.
    print("Rotating right elbow down...")
    megamark.rotateRightElbow(-60)
    time.sleep(2)
    # Rotate right elbow fully up.
    print("Rotating right elbow up...")
    megamark.rotateRightElbow(60)
    time.sleep(2)
```

Ln: 1 Col: 0

Step 4: Your robot will now play the Python 2.7 script continuously until the script closes. If you were running the `eibows.py` script, the robot should now be happily moving its elbows in a continuous up and down motion! Be sure to try out the other examples to get a more comprehensive sense of how to program the Megamark robot using Python 2.7.



That was pretty easy wasn't it? Now go out there and make some code of your own like the awesome robotics engineer you know you are!