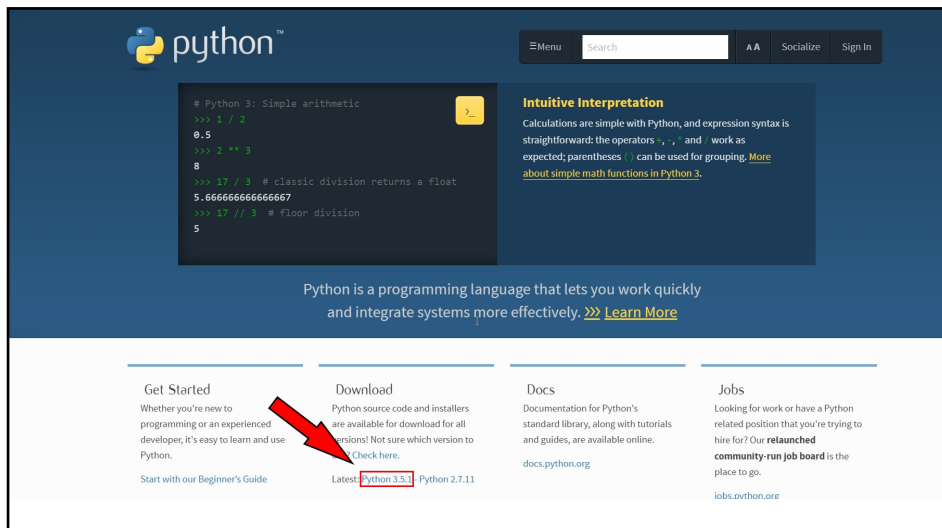


# **3402 Programming Manual 2016**

# Installing Python



To install python to your computer you will need to install it at <http://python.org/downloads/>.

Documentation regarding Windows installers for more information:

- OS X users: The OS X installers are now distributed as signed installer package files compatible with the OS X Gatekeeper security feature.
- OS X users: There is [important information](#) about IDLE, Tkinter, and Tcl/Tk on Mac OS X [here](#).

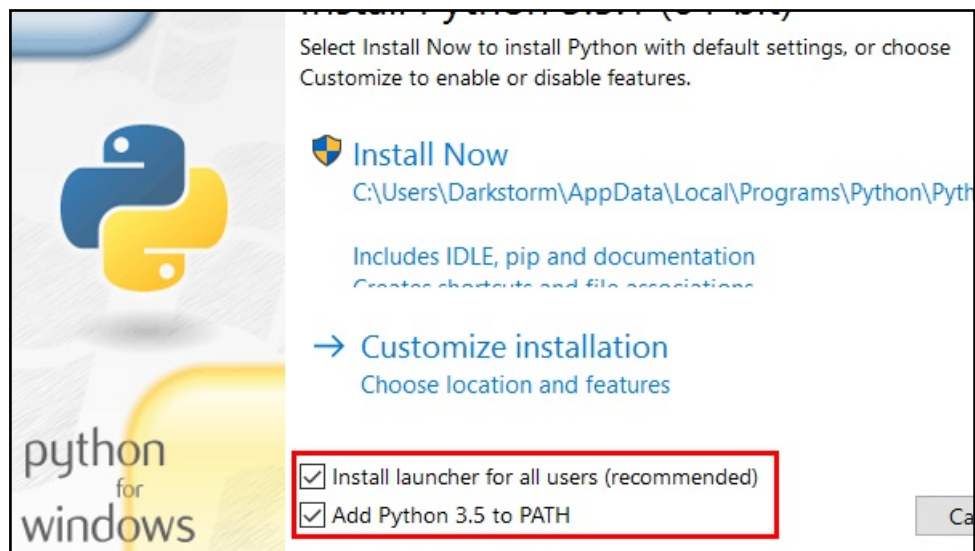
[Full Changelog](#)

[Detailed Release Information](#)

### Files

Version	Operating System	Description	MD5 Sum	File Size	GPG
Git-pipped source tarball	Source release		be78e48cdfc1a7ad90efff146dce6cfe	20143759	<a href="#">SIG</a>
XZ compressed source tarball	Source release		e9ea6f2623ffcd871b7b19113fde80	14830408	<a href="#">SIG</a>
Mac OS X 32-bit (386)/PPC installer	Mac OS X	for Mac OS X 10.5 and later	c66bddc2a4a560496e68b16600143a7	25709672	<a href="#">SIG</a>
Mac OS X 64-bit/32-bit installer	Mac OS X	for Mac OS X 10.6 and later	1c41a4bd7e6644b8680fc2508ceb1ed	24038487	<a href="#">SIG</a>
Windows help file	Windows		cc3e73cbe2d71920483923b731710391	7719456	<a href="#">SIG</a>
Windows x86-64 embeddable zip file	Windows	for AMD64/EM64T/x64, not Itanium processors	b07d15f515882452684e0551decad242	6832590	<a href="#">SIG</a>
Windows x86-64 <u>executable installer</u>	Windows	for AMD64/EM64T/x64, not Itanium processors	863782d22a521d8ea9f3c41db1e484d	29627072	<a href="#">SIG</a>
Windows x86-64 web-based installer	Windows	for AMD64/EM64T/x64, not Itanium processors	6a14ac8db70017c07b8f6cb622daa1a	963360	<a href="#">SIG</a>
Windows x86 embeddable zip file	Windows		6e783d8d44570315d488b9a9881f10	6023182	<a href="#">SIG</a>
Windows x86 executable installer	Windows		4d6fdb5c3630cf60d457c9825f69b4d7	28743504	<a href="#">SIG</a>
Windows x86 web-based installer	Windows		6dfcc4012c96d84f0a83d00cfd8bb8	937680	<a href="#">SIG</a>

Make sure you download version 3.5.2 and not version 2. After selecting version 3.5.2 you will go down until you see Files and will be asked the OS of your computer (Windows, Mac etc.) as well as the 32 or 64 bit version. If you are not sure which to download, then download 32 bit. If you are downloading for windows then make sure you click on executable installer.

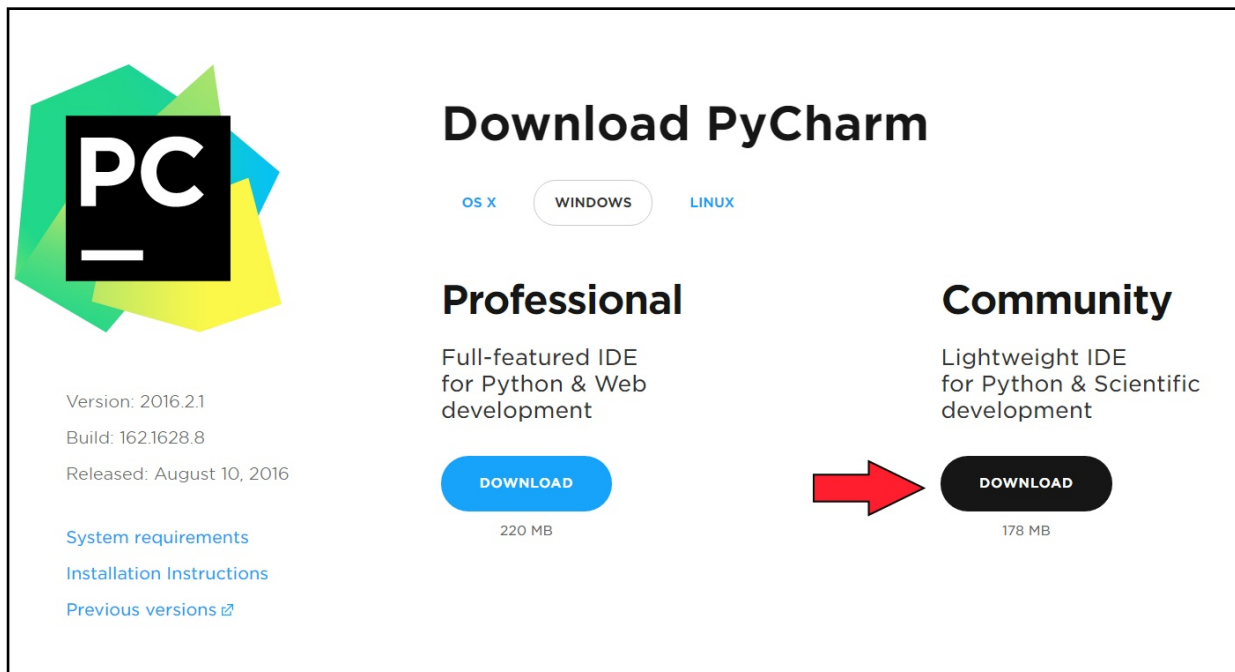


After downloading it make sure you click on the installer to install it on your computer and go through the steps. Make sure to check the box to have the installer add Python to your PATH. To make sure that you have python installed on your open of cmd(command prompt) and python.exe. If you get "Python 3.5.2" then python is properly installed on your computer.

# Installing PyCharm

## INFO

An integrated development environment (IDE) is a software application that is used by programmers to write and test code easily. The IDE we are using for python is PyCharm as it has a friendly interface and is easy to understand.



The screenshot shows the PyCharm download page. On the left is the PyCharm logo (a green and blue hexagon with 'PC' and a minus sign). Below it, version information is listed: Version: 2016.2.1, Build: 162.1628.8, Released: August 10, 2016. There are links for 'System requirements', 'Installation Instructions', and 'Previous versions'. In the center, under the heading 'Download PyCharm', there are tabs for 'OS X', 'WINDOWS', and 'LINUX'. Below these, the 'Professional' version is described as a 'Full-featured IDE for Python & Web development' with a blue 'DOWNLOAD' button and a size of 220 MB. To the right, the 'Community' version is described as a 'Lightweight IDE for Python & Scientific development' with a black 'DOWNLOAD' button and a size of 178 MB. A red arrow points from the Professional download button to the Community download button.

**Download PyCharm**

OS X WINDOWS LINUX

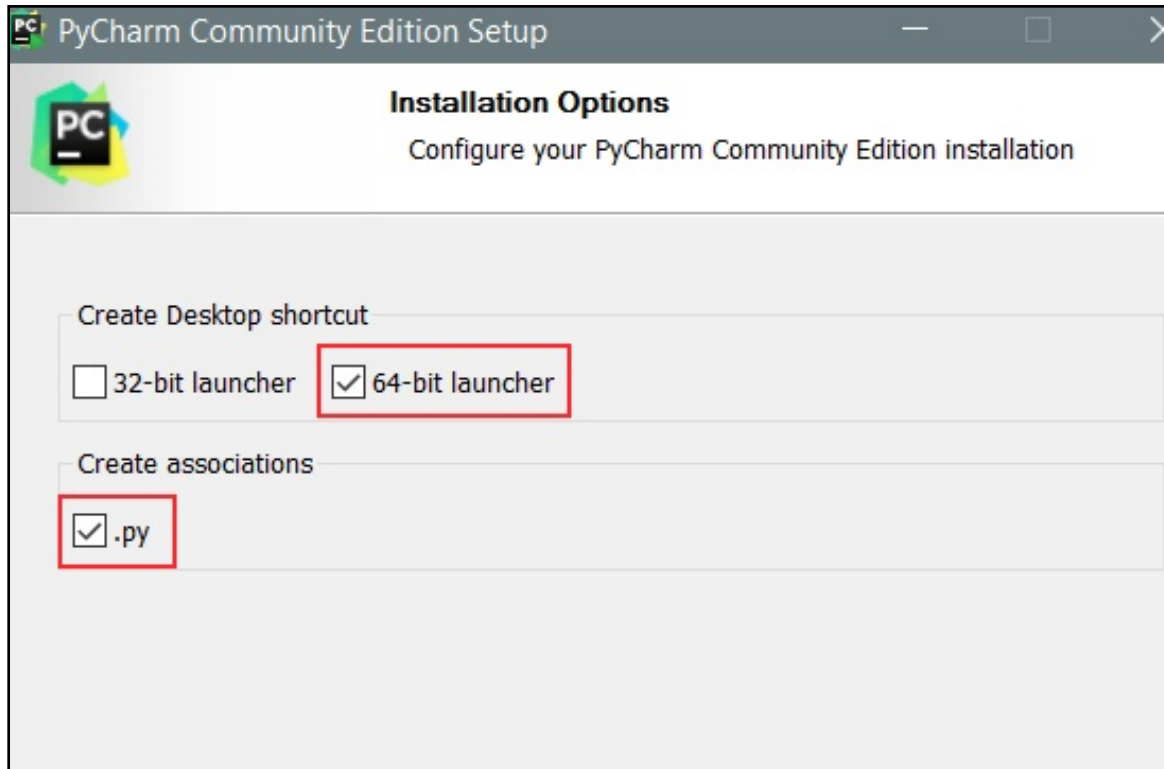
**Professional**  
Full-featured IDE for Python & Web development  
220 MB  
DOWNLOAD

**Community**  
Lightweight IDE for Python & Scientific development  
178 MB  
DOWNLOAD

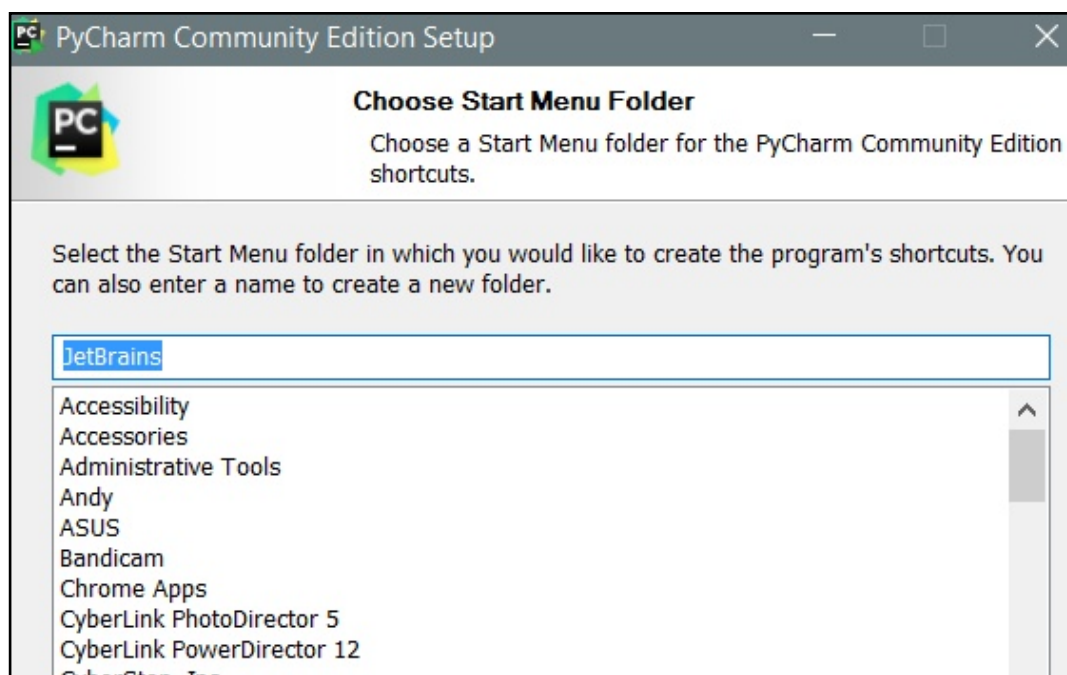
Version: 2016.2.1  
Build: 162.1628.8  
Released: August 10, 2016

[System requirements](#)  
[Installation Instructions](#)  
[Previous versions](#)

You can install PyCharm at <http://www.jetbrains.com/pycharm/> and click on download. First select the OS (Windows, Mac, etc.) you are using and click on the download under community.



After the installer is finished downloading, click on it and click next until you get to installation options. Click on .py and 32 or 64 bit depending on what your computer has.



Make sure the folder is called JetBrain and click install.

# Learning Python

For the first few weeks learn python at codecademy

<https://www.codecademy.com/learn/python>

Here are the Units you should complete before working on robot code.

-UNIT 1: PYTHON SYNTAX

-UNIT 2: STRINGS AND CONSOLE OUTPUT

-UNIT 3: CONDITIONALS AND CONTROL FLOW

-UNIT 4: FUNCTIONS

-UNIT 5: LISTS & DICTIONARIES

-UNIT 7: LISTS AND FUNCTIONS

-UNIT 8: LOOPS

After getting a feel of python go here and read about the RobotPy library:

<https://robotpy.readthedocs.org/en/latest/guide/index.html>

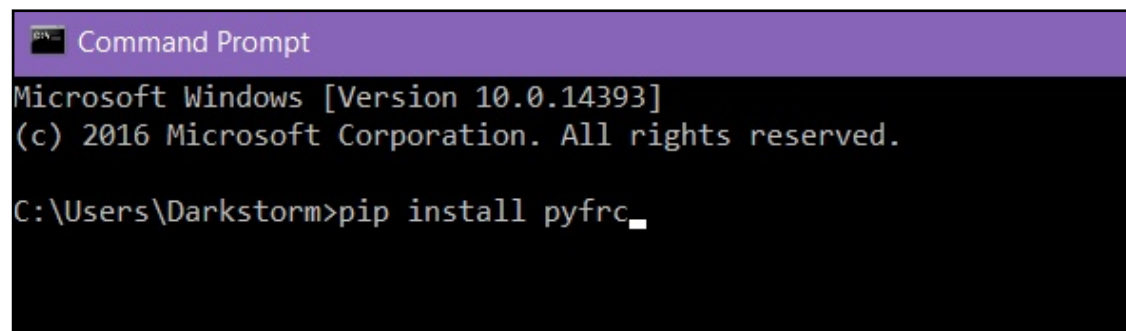
## INFO

pip is the python package installer. It pulls packages from the web and installs them on your system.

# PyFRC

## INFO

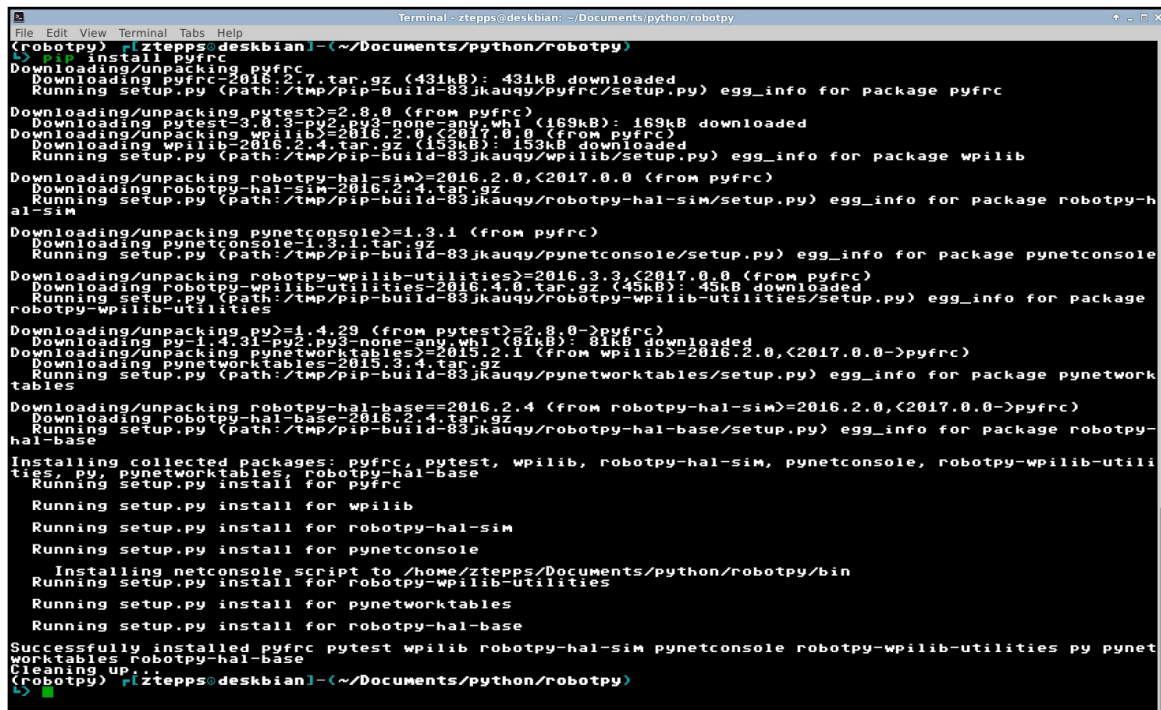
PyFRC is a python port of the Java API for FRC Robotics  
Installing this package will install all necessary classes and functions for basic robot control, e.g. driving, using motors, firing pistons, etc.



```
Command Prompt
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Users\Darkstorm>pip install pyfrc_
```

To install PyFRC open up command prompt (cmd). Next you type in "pip install pyfrc" if you are on windows or "pip3 install pyfrc" if you are on linux and press enter.



```
Terminal - ztepps@deskbian: ~/Documents/python/robotpy
(zrobotpy) [ztepps@deskbian]~(~/Documents/python/robotpy)
$ pip install pyfrc
Downloading/unpacking pyfrc
Downloading pyfrc-2016.2.7.tar.gz (431kB): 431kB downloaded
Running setup.py (path:/tmp/pip-build-83jkauqy/pyfrc/setup.py) egg_info for package pyfrc
Downloading/unpacking pytest=2.8.0 (from pyfrc)
Downloading pytest-3.0.3-py2.py3-none-any.whl (169kB): 169kB downloaded
Downloading/unpacking wpilib=2016.2.0 (from pyfrc)
Downloading wpilib-2016.2.4.tar.gz (153kB): 153kB downloaded
Running setup.py (path:/tmp/pip-build-83jkauqy/wpilib/setup.py) egg_info for package wpilib
Downloading/unpacking robotpy-hal-sim=2016.2.0 (from pyfrc)
Downloading robotpy-hal-sim-2016.2.4.tar.gz
Running setup.py (path:/tmp/pip-build-83jkauqy/robotpy-hal-sim/setup.py) egg_info for package robotpy-hal-sim
Downloading/unpacking pynetconsole=1.3.1 (from pyfrc)
Downloading pynetconsole-1.3.1.tar.gz
Running setup.py (path:/tmp/pip-build-83jkauqy/pynetconsole/setup.py) egg_info for package pynetconsole
Downloading/unpacking robotpy-wpilib-utilities=2016.3.3 (from pyfrc)
Downloading robotpy-wpilib-utilities-2016.4.0.tar.gz (45kB): 45kB downloaded
Running setup.py (path:/tmp/pip-build-83jkauqy/robotpy-wpilib-utilities/setup.py) egg_info for package robotpy-wpilib-utilities
Downloading/unpacking py=1.4.29 (from pytest)=2.8.0->pyfrc)
Downloading py-1.4.31-py2.py3-none-any.whl (81kB): 81kB downloaded
Downloading/unpacking pynetworktables=2015.2.1 (from wpilib)=2016.2.0 (from pyfrc)
Downloading pynetworktables-2015.3.4.tar.gz
Running setup.py (path:/tmp/pip-build-83jkauqy/pynetworktables/setup.py) egg_info for package pynetworktables
Downloading/unpacking robotpy-hal-base=2016.2.4 (from robotpy-hal-sim)=2016.2.0 (from pyfrc)
Downloading robotpy-hal-base-2016.2.4.tar.gz
Running setup.py (path:/tmp/pip-build-83jkauqy/robotpy-hal-base/setup.py) egg_info for package robotpy-hal-base
Installing collected packages: pyfrc, pytest, wpilib, robotpy-hal-sim, pynetconsole, robotpy-wpilib-utilities, py, pynetworktables, robotpy-hal-base
Running setup.py install for pyfrc
Running setup.py install for wpilib
Running setup.py install for robotpy-hal-sim
Running setup.py install for pynetconsole
Installing netconsole script to /home/ztepps/Documents/python/robotpy/bin
Running setup.py install for robotpy-wpilib-utilities
Running setup.py install for pynetworktables
Running setup.py install for robotpy-hal-base
Successfully installed pyfrc pytest wpilib robotpy-hal-sim pynetconsole robotpy-wpilib-utilities py pynetworktables robotpy-hal-base
Cleaning up...
(zrobotpy) [ztepps@deskbian]~(~/Documents/python/robotpy)
```

Just wait for it to install and after it's done you close command prompt and you are good to go.

# Misc Info

We currently use the IterativeRobot class for our robot, so learning and coding based off of those examples will be the most helpful.

We usually use Solenoids, Talons, and RobotDrive classes so looking into those classes would be the most helpful and productive.

We have custom made classes for using Xbox controllers for our controllers, so learning how to use that would also be helpful:  
<http://www.github.com/ROBOMonkeys/enums/>