

PPL - Lab 1

מעבדה בקורס: **Principals of Programming Languages**

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שעות קבלה: ימי רביעי 16:00 ב-Zoom בתיאום מראש

PPL: Principals of Programming Languages

Topics	Subject
1	Intro: Installing Python, PyCharm, variables, operators, help
2	First-order functions, docstrings
3	Recursive functions
4	Environment model
5	High-order functions, lambda
6	Immutable data, native types, sequences: tuples, strings, pairs, rlist, dictionary
7	Conventional Interface
8	חזרה
9	Class and object; OOP system
10	Shmython
11	Generic Functions
12	Memoization, Recursive DS, Exceptions
13	Interpreter

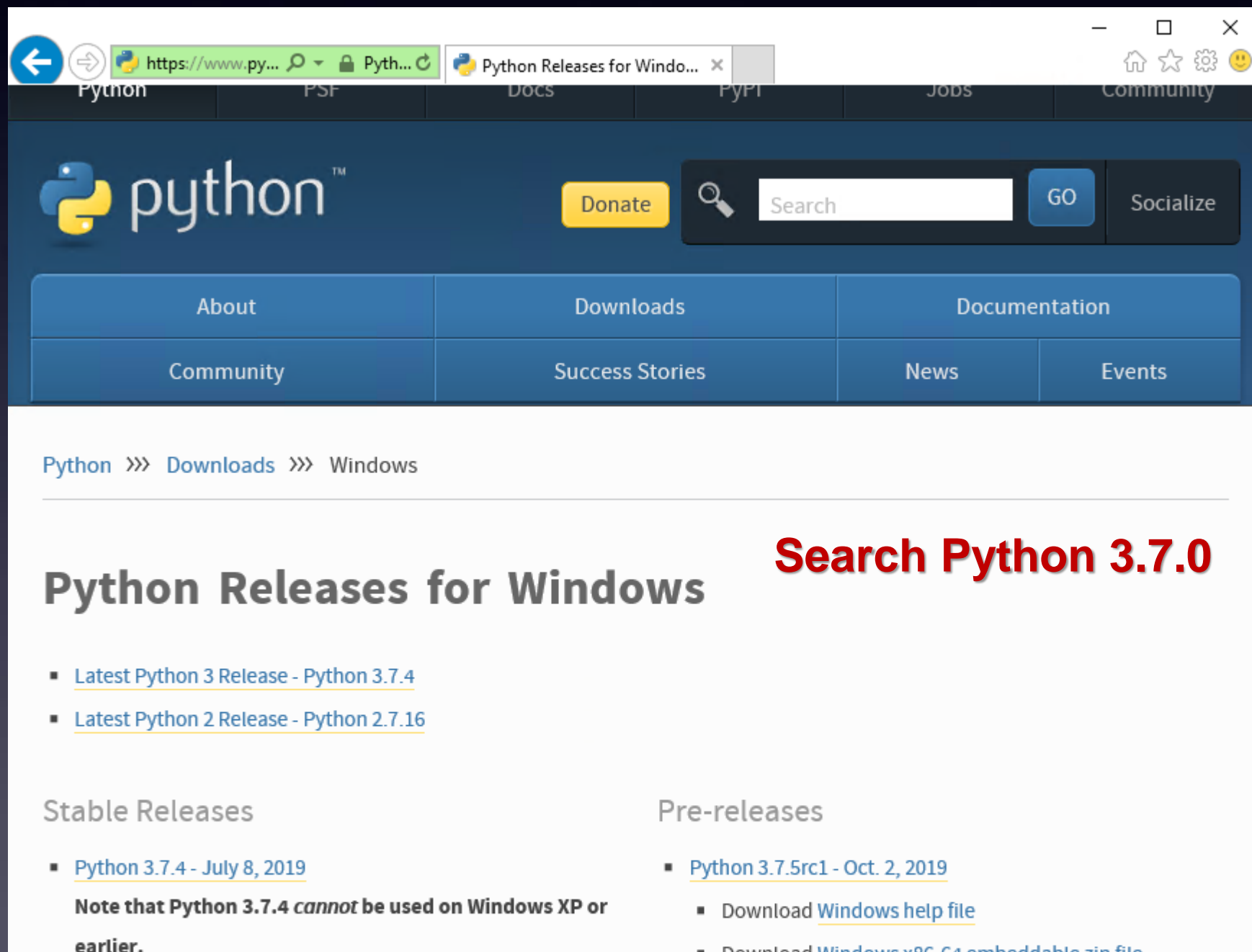
Python

- An interpreted object oriented language
- Not very efficient (For comparison there is a factor of 1000 in access to variables)
- Very convenient for developers
- Different versions have slightly different syntax (2.x vs 3.x)

Installing Python

- Go to:

<https://www.python.org/downloads/windows/>



The screenshot shows a web browser window with the URL <https://www.python.org/downloads/windows/>. The page features the Python logo, a search bar, and a navigation menu with links to About, Downloads, Documentation, Community, Success Stories, News, and Events. The main content area is titled "Python Releases for Windows" and includes a red text overlay that says "Search Python 3.7.0". Below the title, there are two sections: "Stable Releases" and "Pre-releases". The "Stable Releases" section lists "Python 3.7.4 - July 8, 2019" and includes a note that Python 3.7.4 cannot be used on Windows XP or earlier. The "Pre-releases" section lists "Python 3.7.5rc1 - Oct. 2, 2019" and includes links to download Windows help files and Windows x86_64 embeddable zip files.

Python >>> Downloads >>> Windows

Python Releases for Windows

Search Python 3.7.0

- [Latest Python 3 Release - Python 3.7.4](#)
- [Latest Python 2 Release - Python 2.7.16](#)

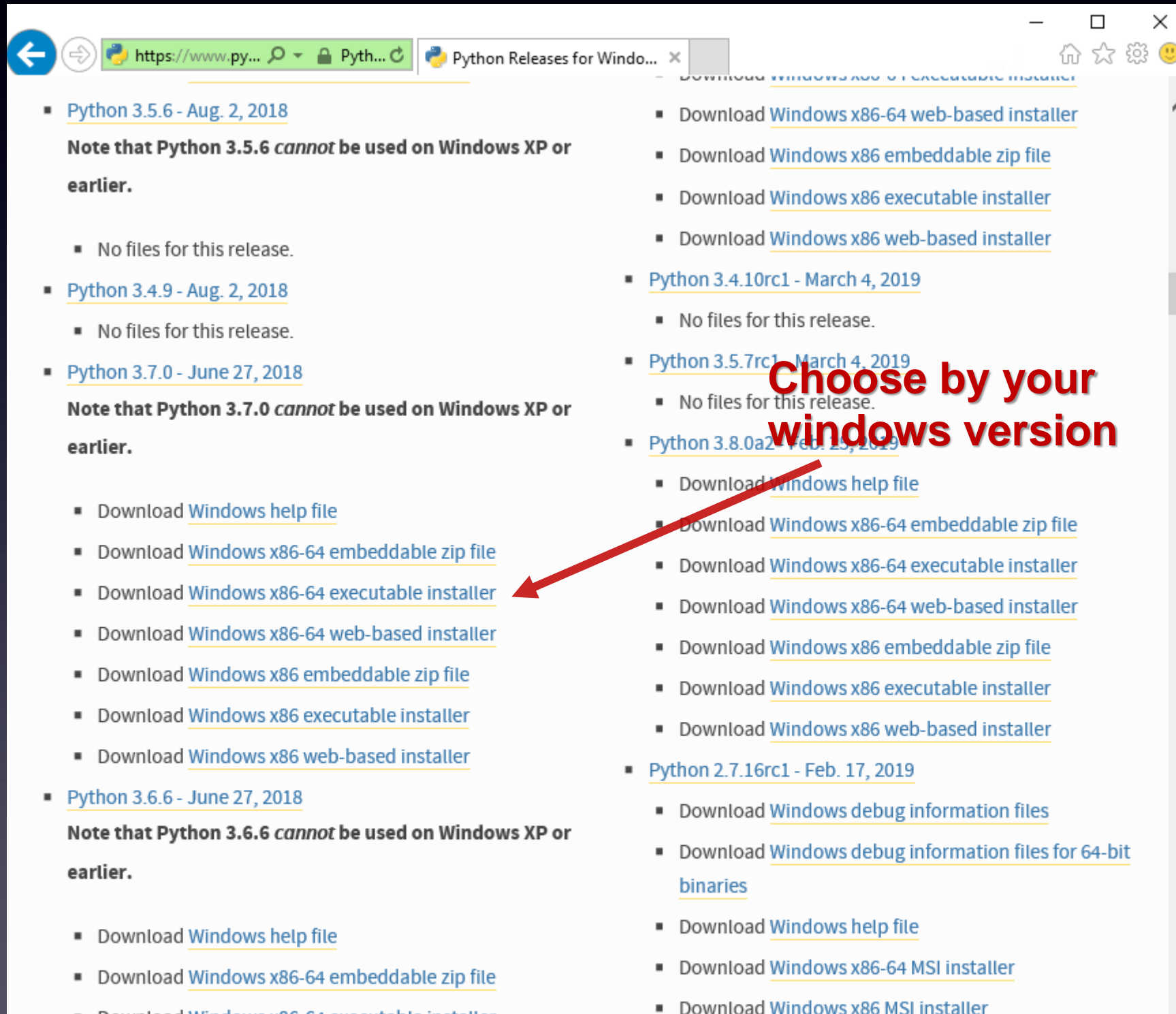
Stable Releases

- [Python 3.7.4 - July 8, 2019](#)
Note that Python 3.7.4 cannot be used on Windows XP or earlier.

Pre-releases

- [Python 3.7.5rc1 - Oct. 2, 2019](#)
 - Download [Windows help file](#)
 - Download [Windows x86_64 embeddable zip file](#)

Installing Python

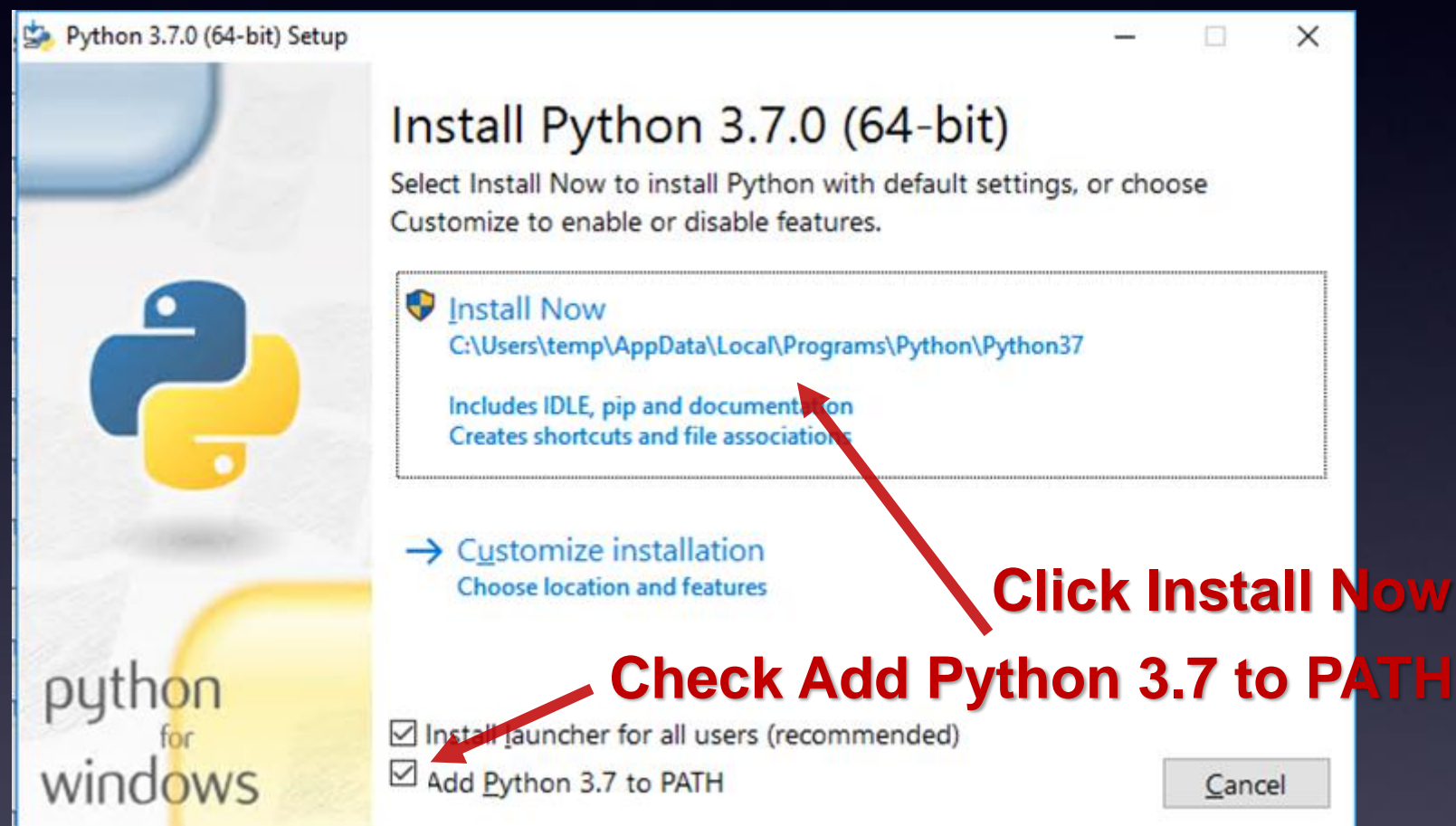


The screenshot shows the Python Releases for Windows page. A red arrow points from the text "Choose by your windows version" to the link "Download Windows x86-64 executable installer" under the Python 3.6.6 section.

Choose by your windows version

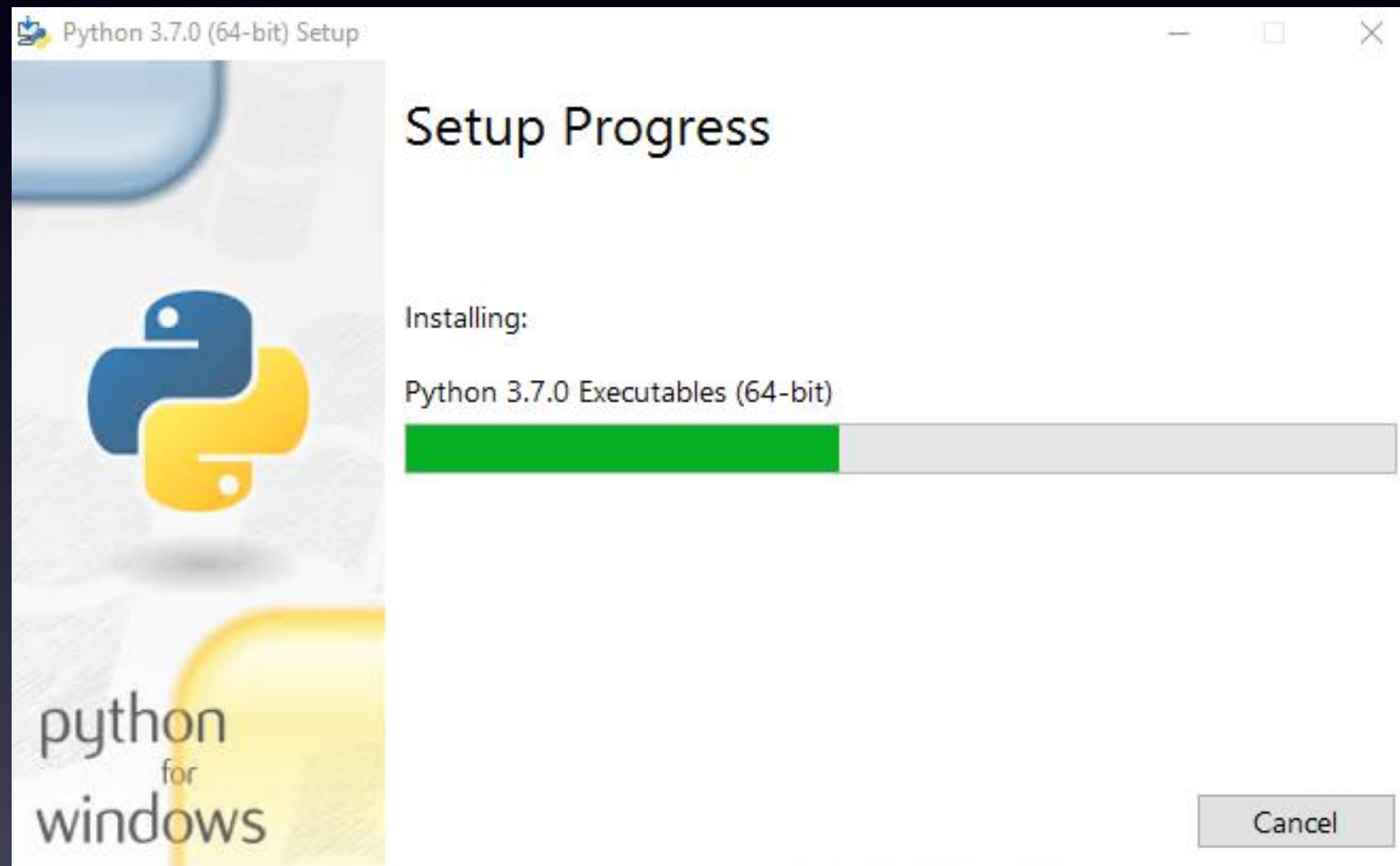
- Python 3.5.6 - Aug. 2, 2018
 - Note that Python 3.5.6 *cannot* be used on Windows XP or earlier.
 - No files for this release.
- Python 3.4.9 - Aug. 2, 2018
 - No files for this release.
- Python 3.7.0 - June 27, 2018
 - Note that Python 3.7.0 *cannot* be used on Windows XP or earlier.
 - Download [Windows help file](#)
 - Download [Windows x86-64 embeddable zip file](#)
 - Download [Windows x86-64 executable installer](#)
 - Download [Windows x86-64 web-based installer](#)
 - Download [Windows x86 embeddable zip file](#)
 - Download [Windows x86 executable installer](#)
 - Download [Windows x86 web-based installer](#)
- Python 3.6.6 - June 27, 2018
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 - Download [Windows x86-64 web-based installer](#)
 - Download [Windows x86 embeddable zip file](#)
 - Download [Windows x86 executable installer](#)
 - Download [Windows x86 web-based installer](#)
- Python 3.5.7rc1 - March 4, 2019
 - No files for this release.
- Python 3.4.10rc1 - March 4, 2019
 - No files for this release.
- Python 3.8.0a2 - Feb. 27, 2019
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 - Download [Windows x86 executable installer](#)
 - Download [Windows x86 web-based installer](#)
- Python 2.7.16rc1 - Feb. 17, 2019
 - Download [Windows debug information files](#)
 - Download [Windows debug information files for 64-bit binaries](#)
 - Download [Windows help file](#)
 - Download [Windows x86-64 MSI installer](#)
 - Download [Windows x86 MSI installer](#)

Installing Python

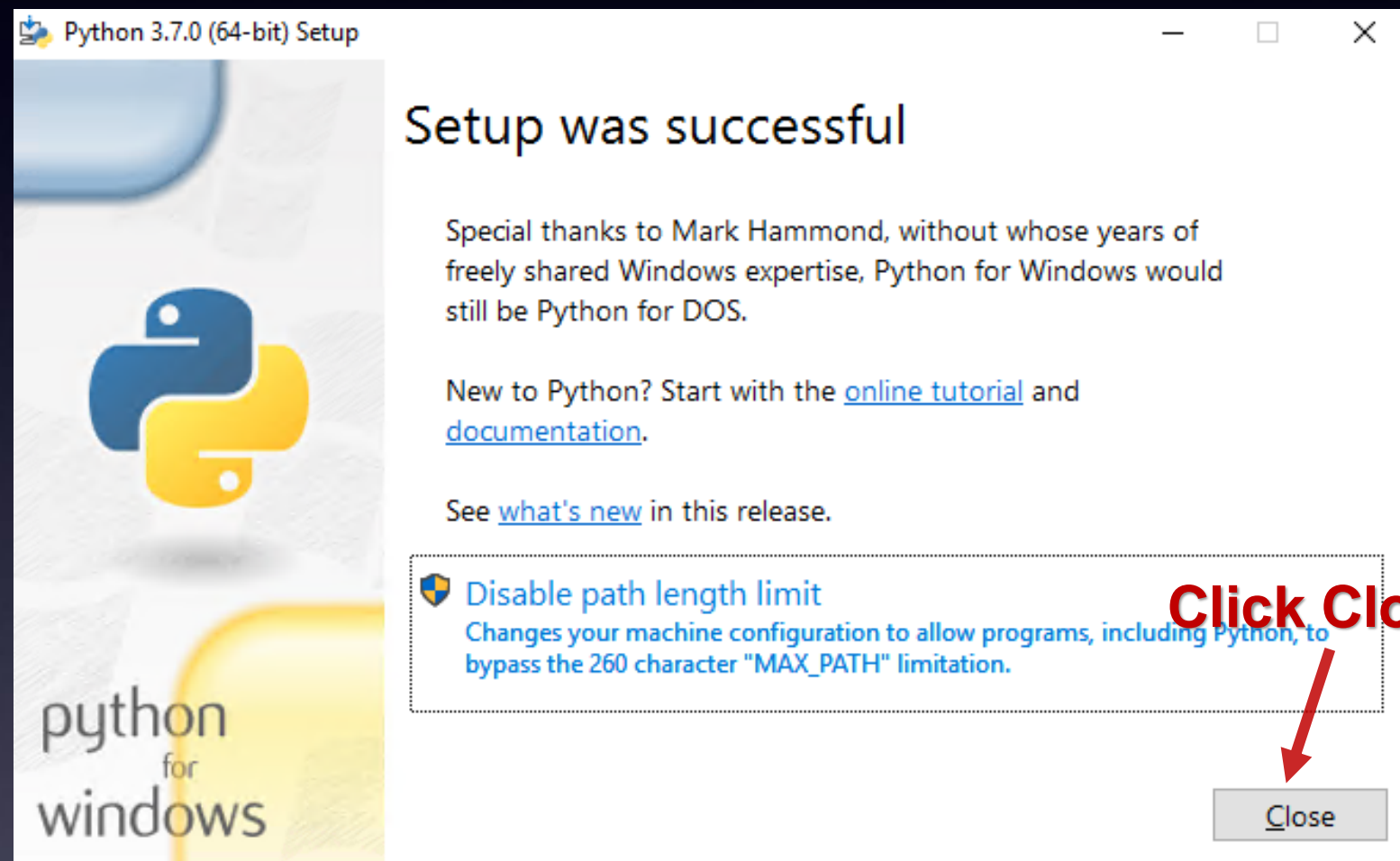


Current version: 3.9.7 (Oct 2021)

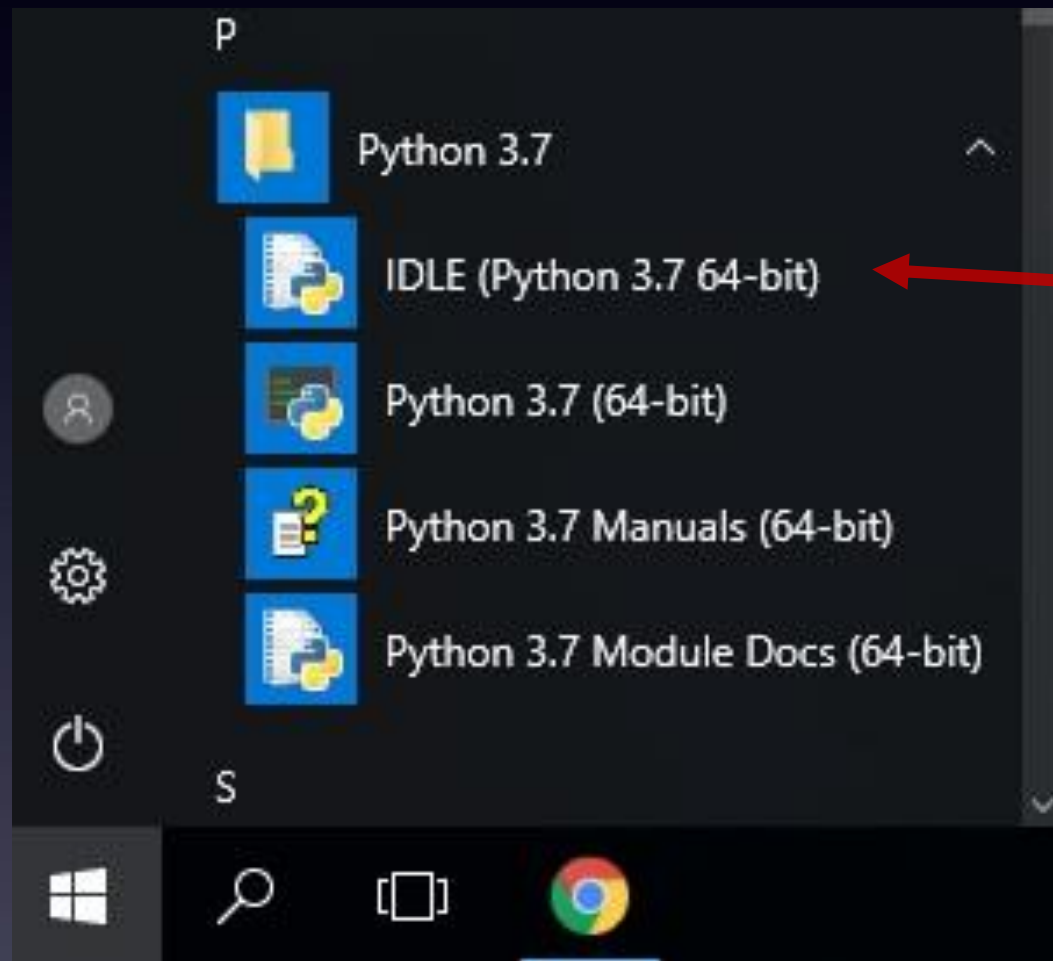
Installing Python



Installing Python



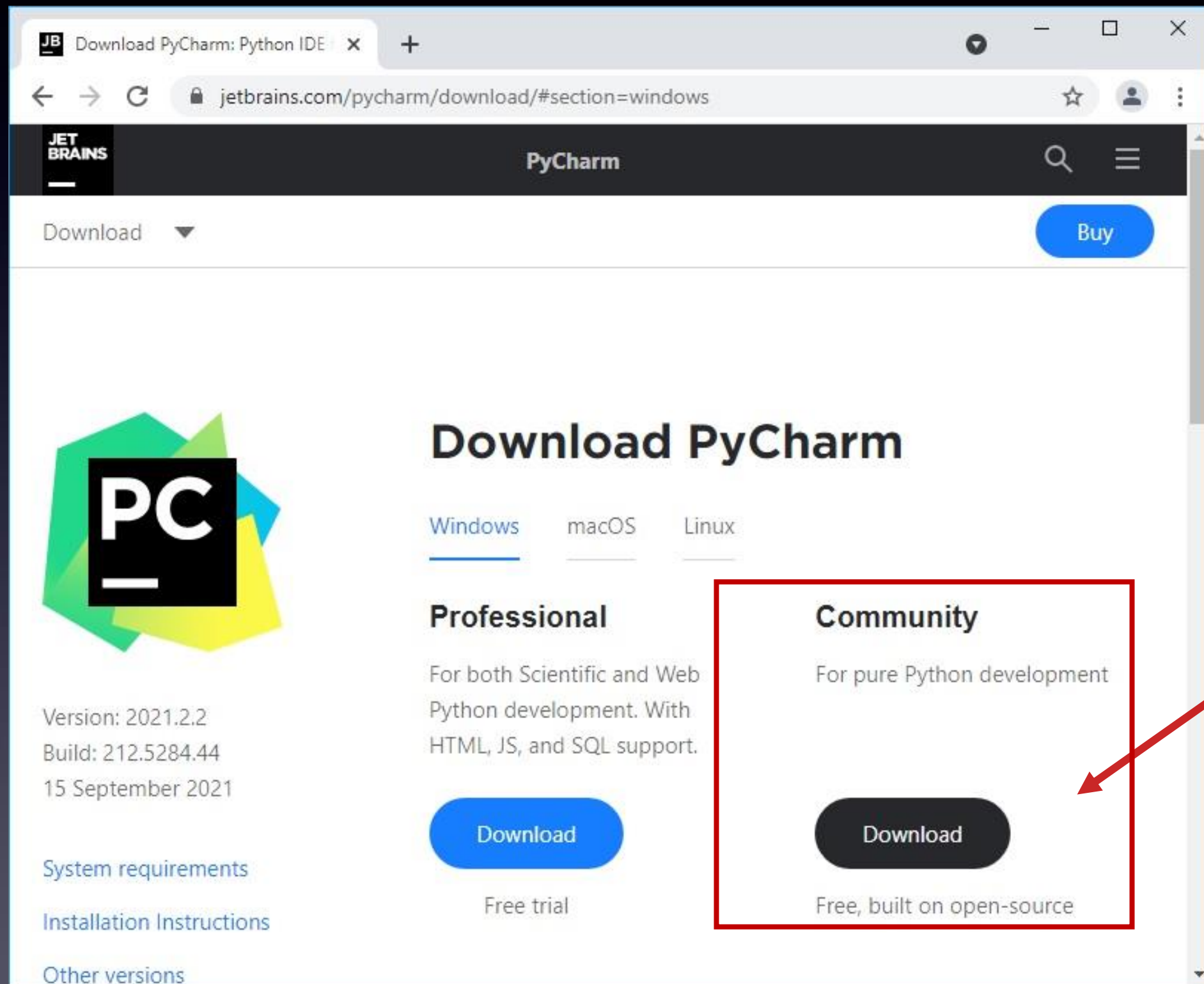
Installing Python



**Create/Copy Desktop
Shortcut**

Installing PyCharm

- Go to: <https://www.jetbrains.com/pycharm/download/>



Download
Community
version

Installing PyCharm

The screenshot shows a web browser window with two tabs. The active tab is titled "Thank you for downloading PyCharm" and shows the JetBrains website. The URL in the address bar is `jetbrains.com/pycharm/download/download-thanks.html?platform=windows&code=PCC`. The page features the JetBrains logo and a navigation menu with links for Tools, Solutions, Languages, Company, Support, and Store. Below the navigation bar, the word "PyCharm" is displayed, followed by links for "Coming in 2020.3", "What's New", "Features", "Learn", and "Buy", and a blue "Download" button. The main content area has a large heading "Thank you for downloading PyCharm!" and a message: "Your download should start shortly. If it doesn't, please use [direct link](#). Download and verify the file's [SHA-256 checksum](#)." Below this is a link for "Third-party software used by PyCharm Community Edition". At the bottom, there is a "Getting Started" link and a "New to PyCharm?" link. A download progress bar is visible at the bottom left, showing the file "pycharm-commun....exe" with a size of 40.2/297 MB and 31 seconds left. A red rectangle highlights the "Getting Started" link and the download progress bar.

Python Releases for Windows | Py x JB Thank you for downloading PyCh x +

jetbrains.com/pycharm/download/download-thanks.html?platform=windows&code=PCC

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PyCharm

Coming in 2020.3 What's New Features Learn Buy Download

Thank you for downloading PyCharm!

Your download should start shortly. If it doesn't, please use [direct link](#).
Download and verify the file's [SHA-256 checksum](#).

[Third-party software used by PyCharm Community Edition](#)

Getting Started

New to PyCharm?

pycharm-commun....exe
40.2/297 MB, 31 secs left

Show all x

Installing PyCharm

Python Releases for Windows | P x JB Thank you for downloading PyCh x +

jetbrains.com/pycharm/download/download-thanks.html?platform=windows&code=PCC

20 years

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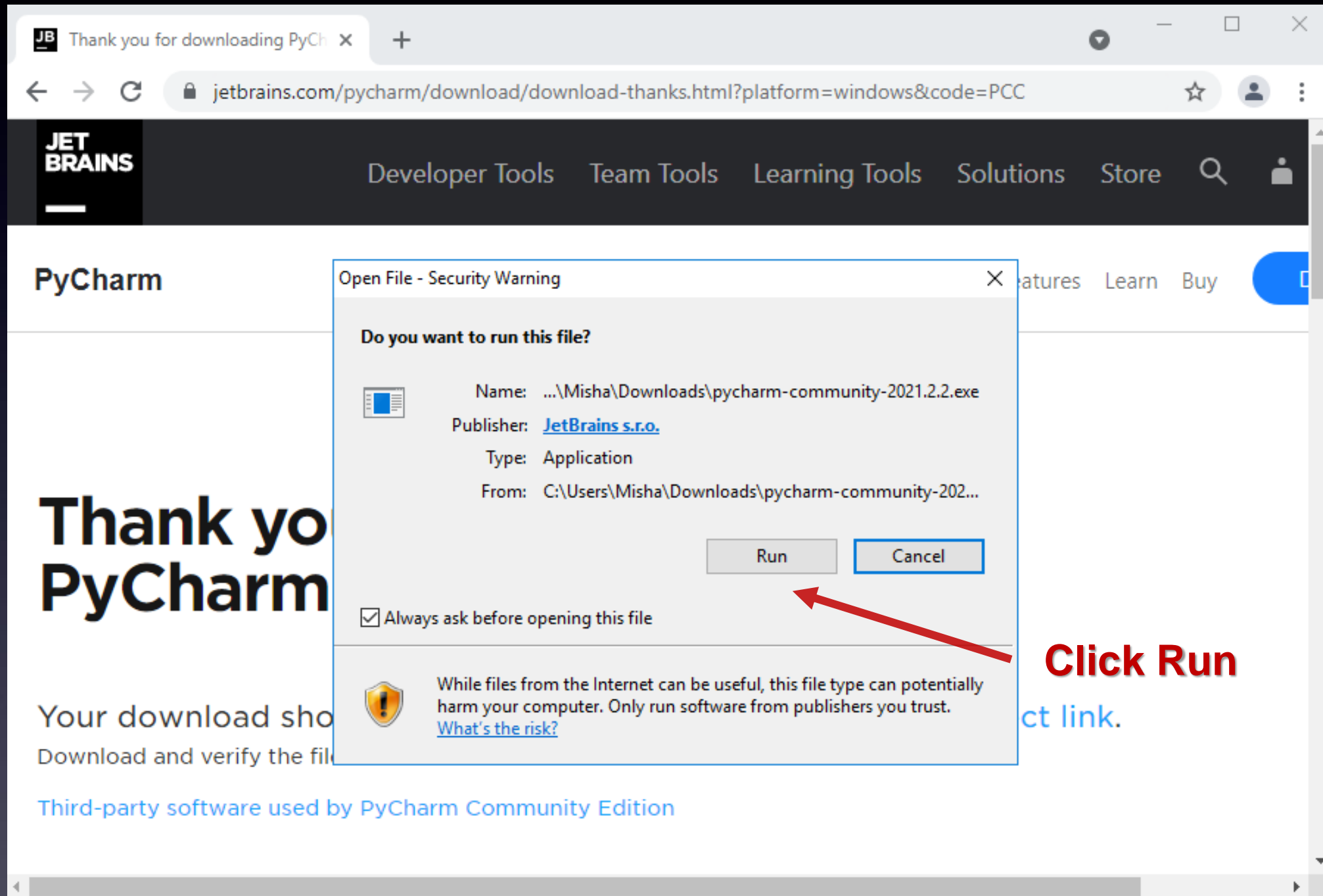
[Third-party software used by PyCharm Community Edition](#)

Choose Open / Run

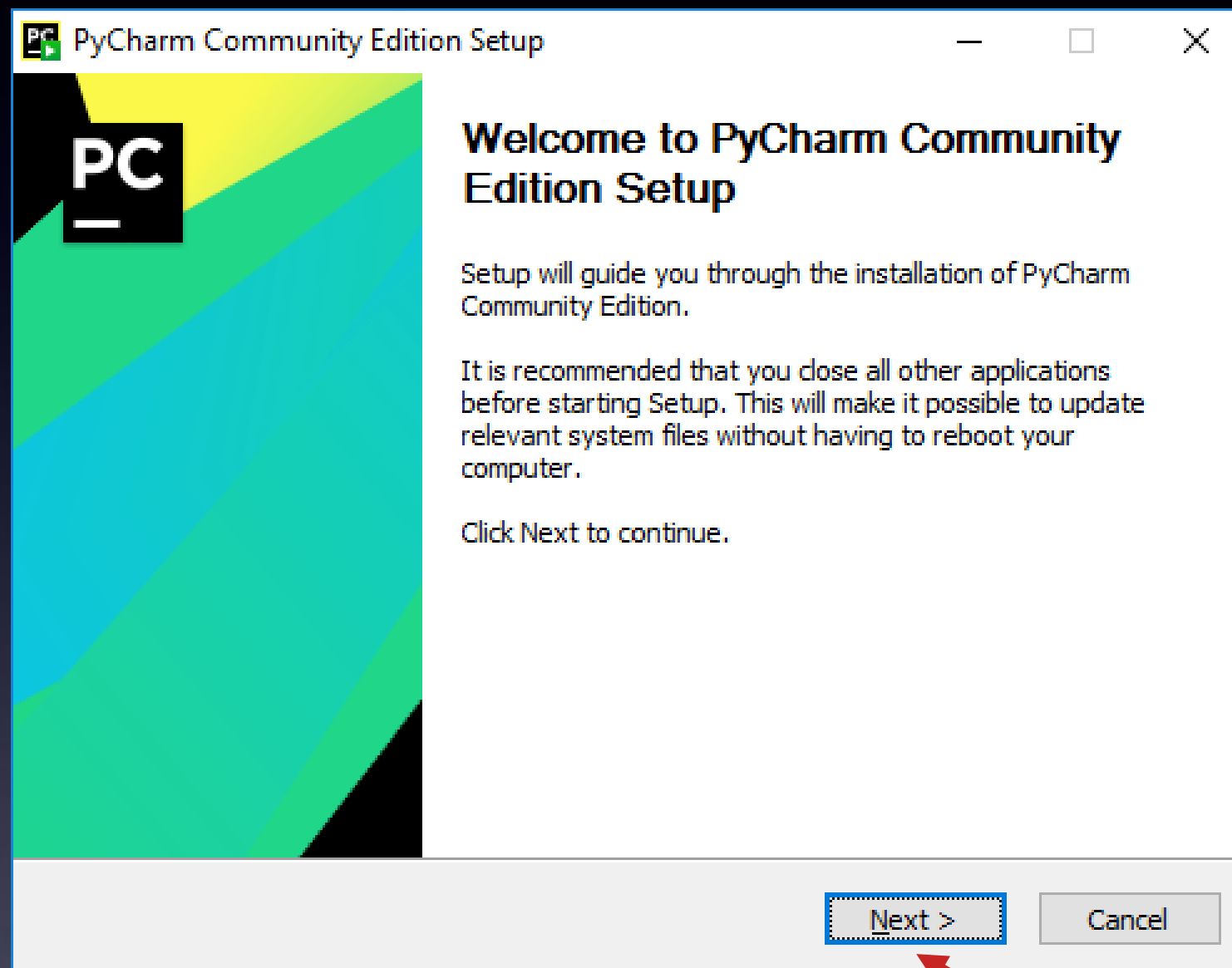
Getting Started New to PyCharm?

pycharm-commun....exe ^ Show all x

Installing PyCharm

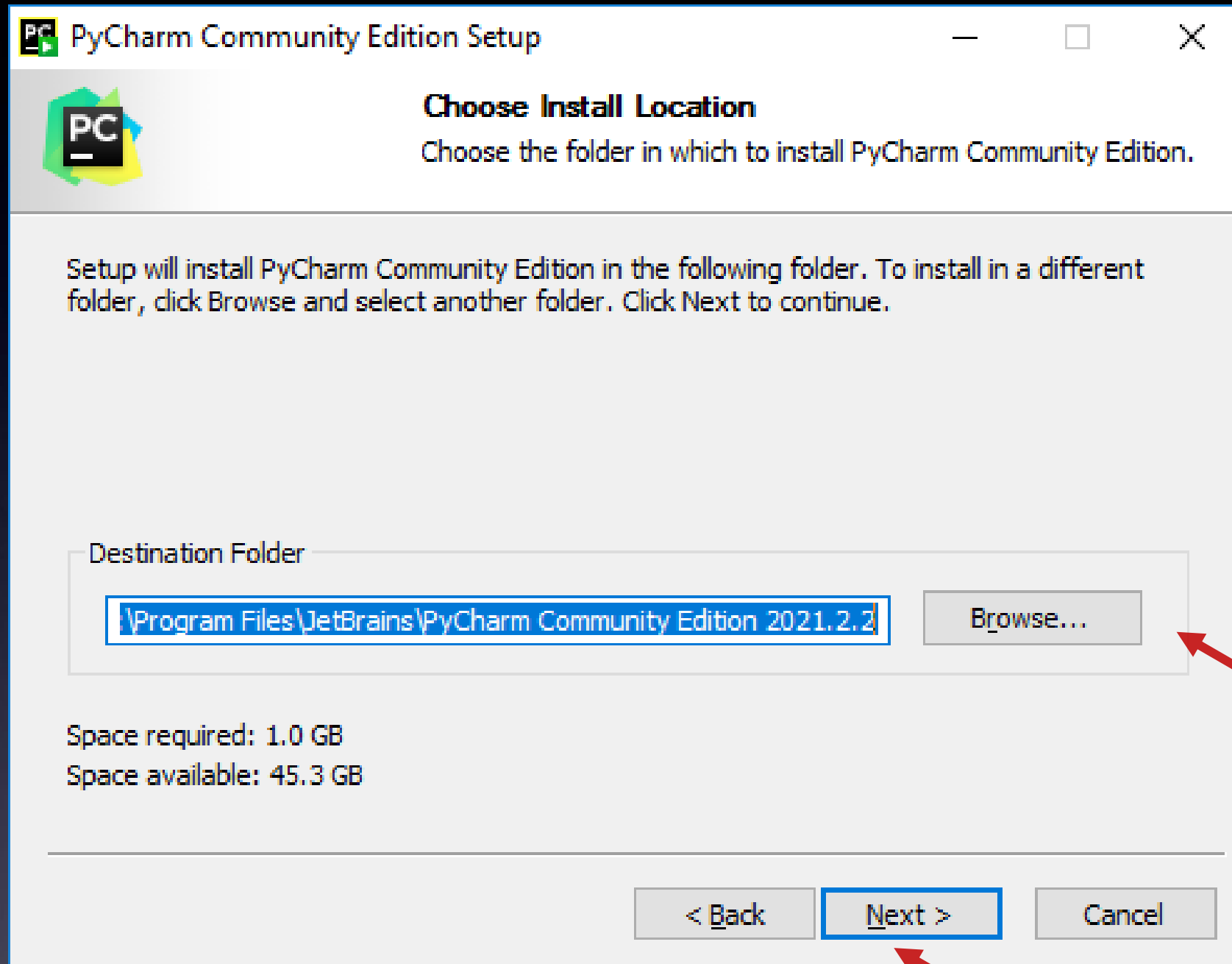


Installing PyCharm



Click Next

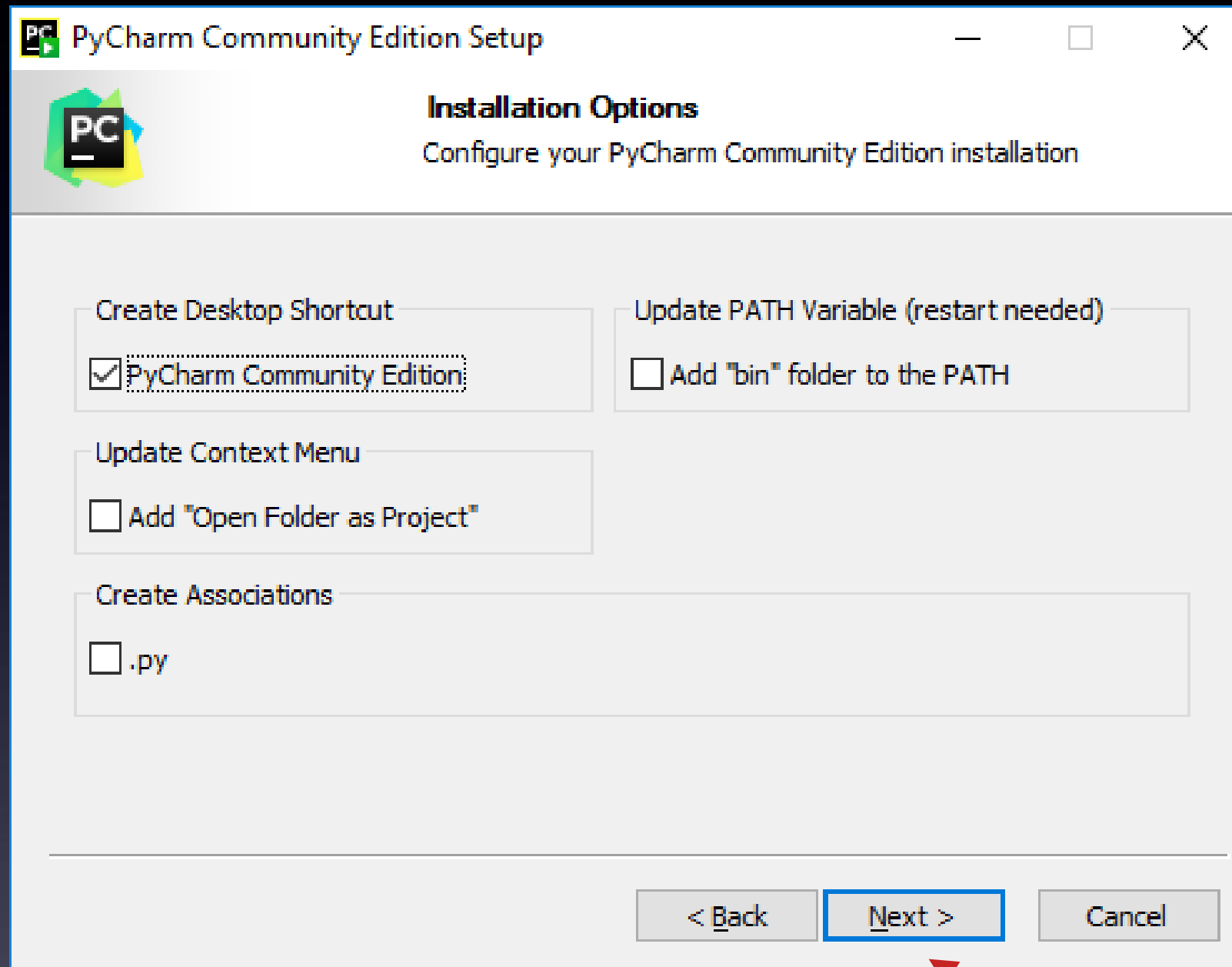
Installing PyCharm



Choose install
Location

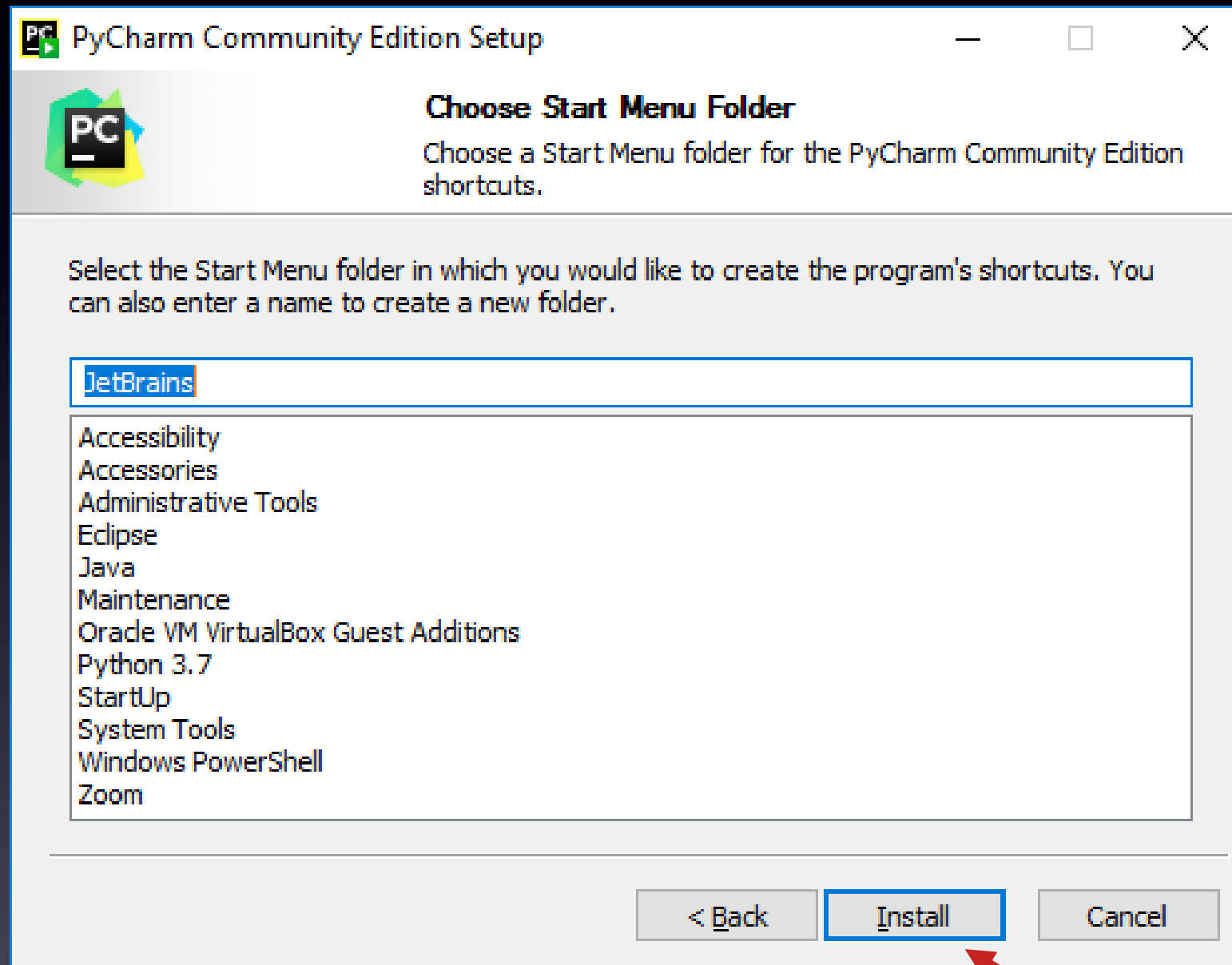
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Installing PyCharm



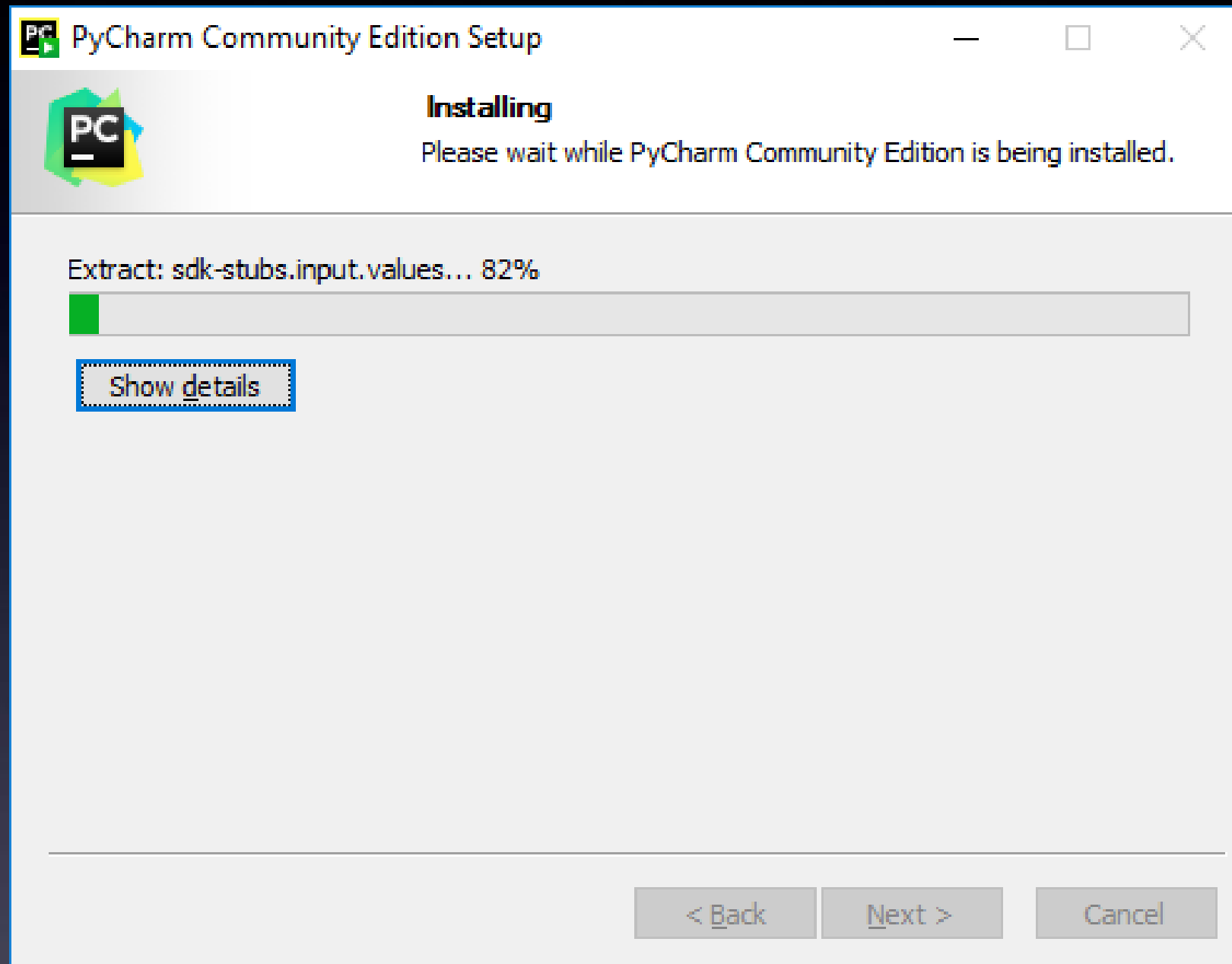
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Installing PyCharm

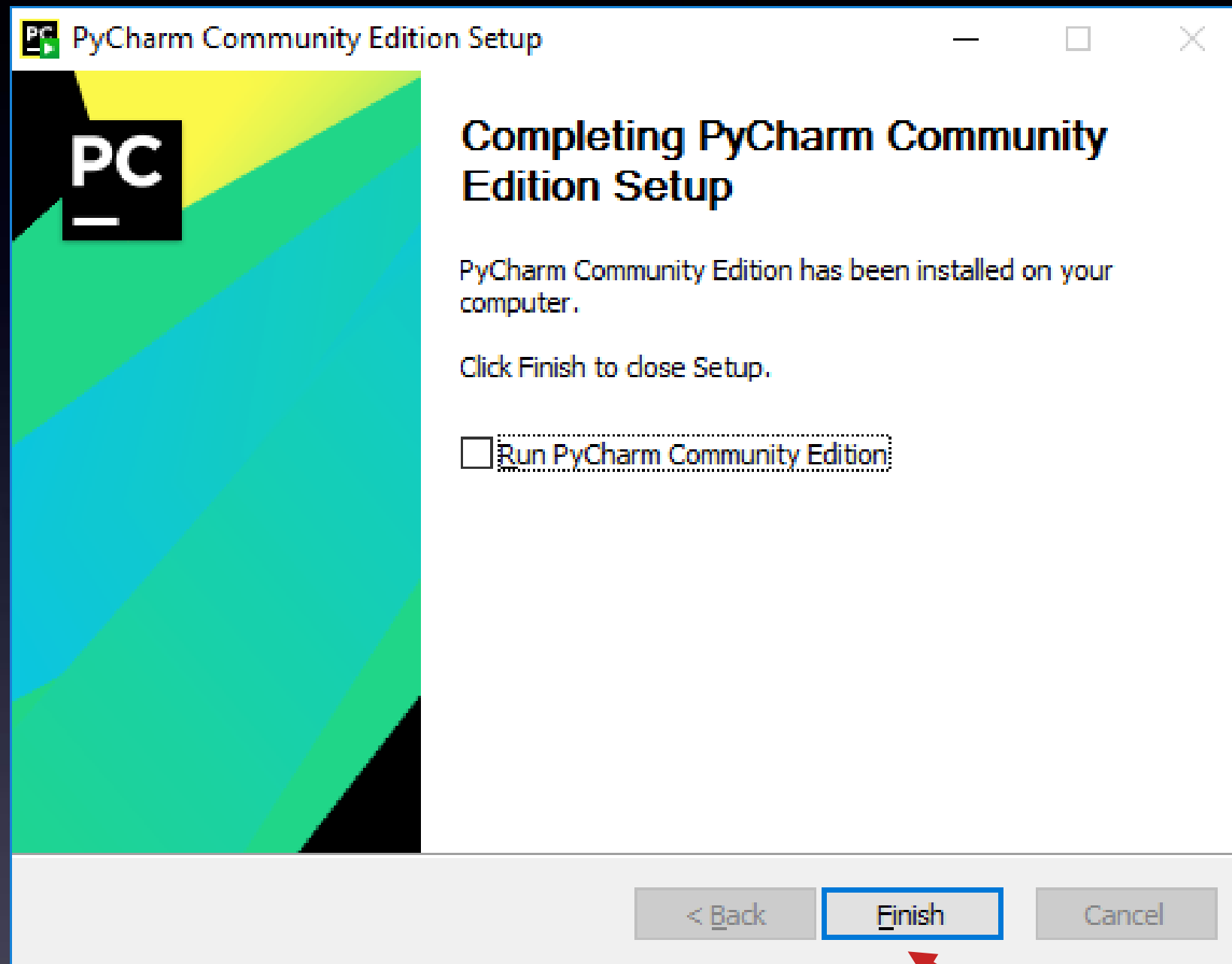


Click Install

Installing PyCharm

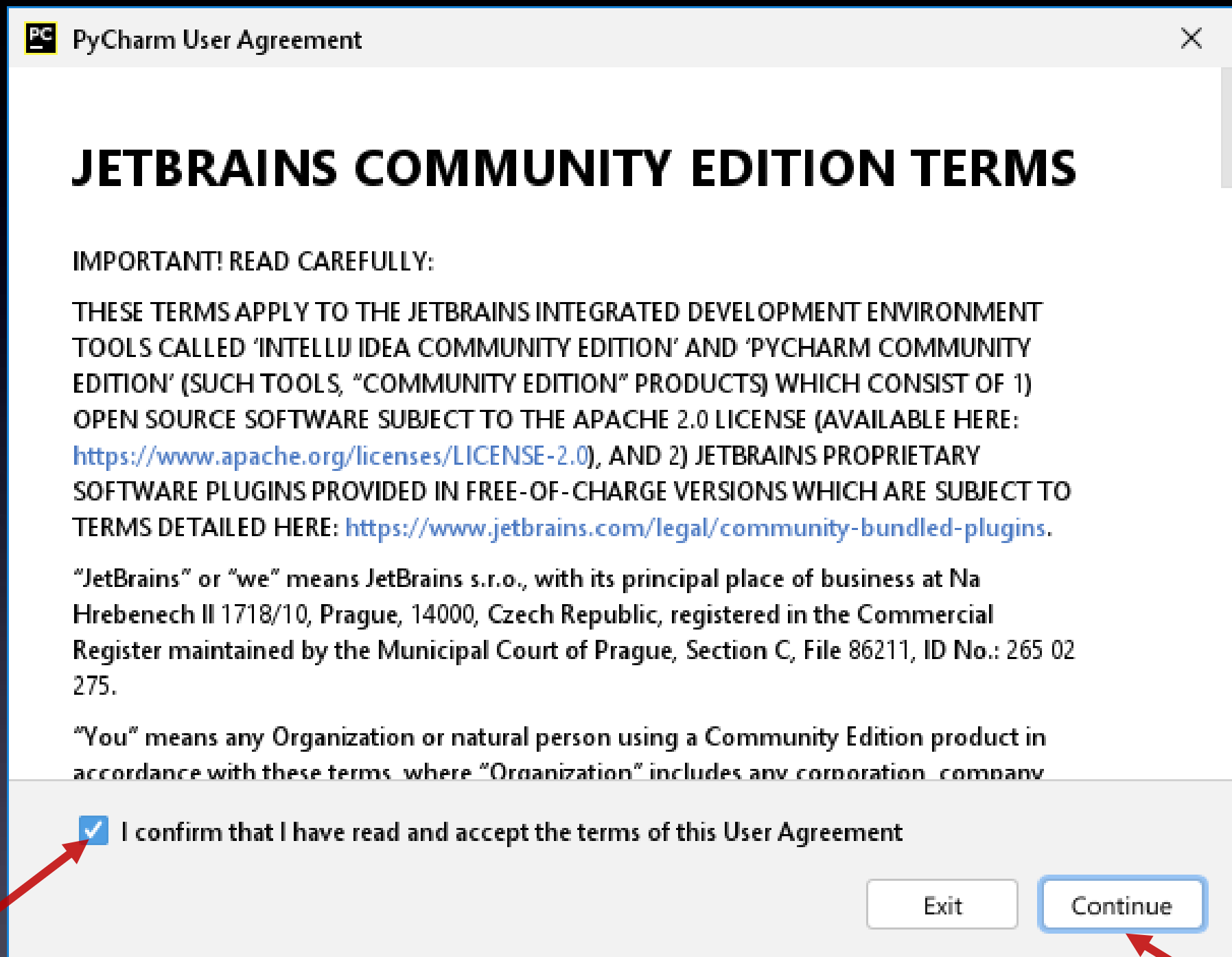


Installing PyCharm



Click Finish

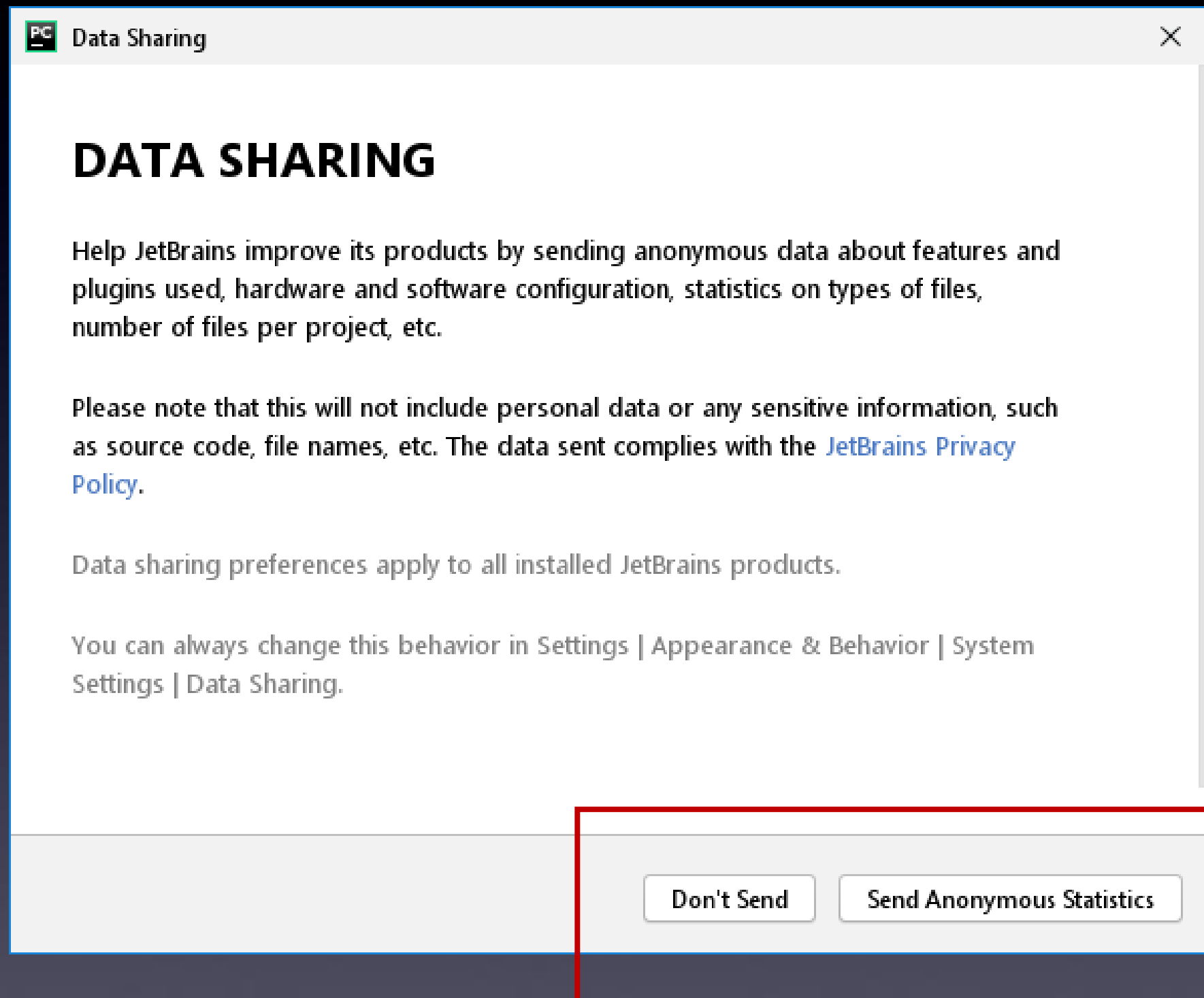
First start PyCharm



Select

Click Continue

First start PyCharm

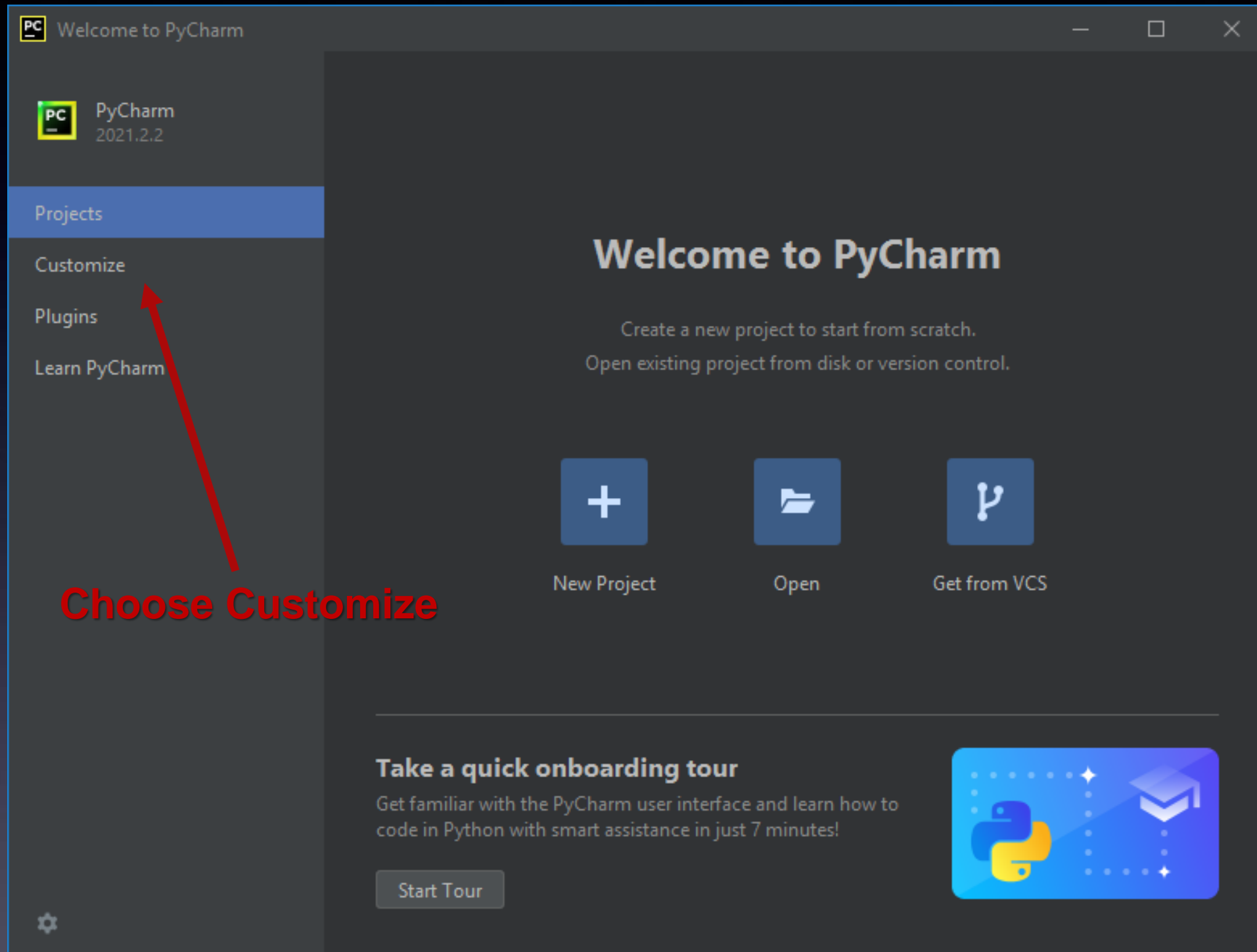


Choose Send or Don't Send

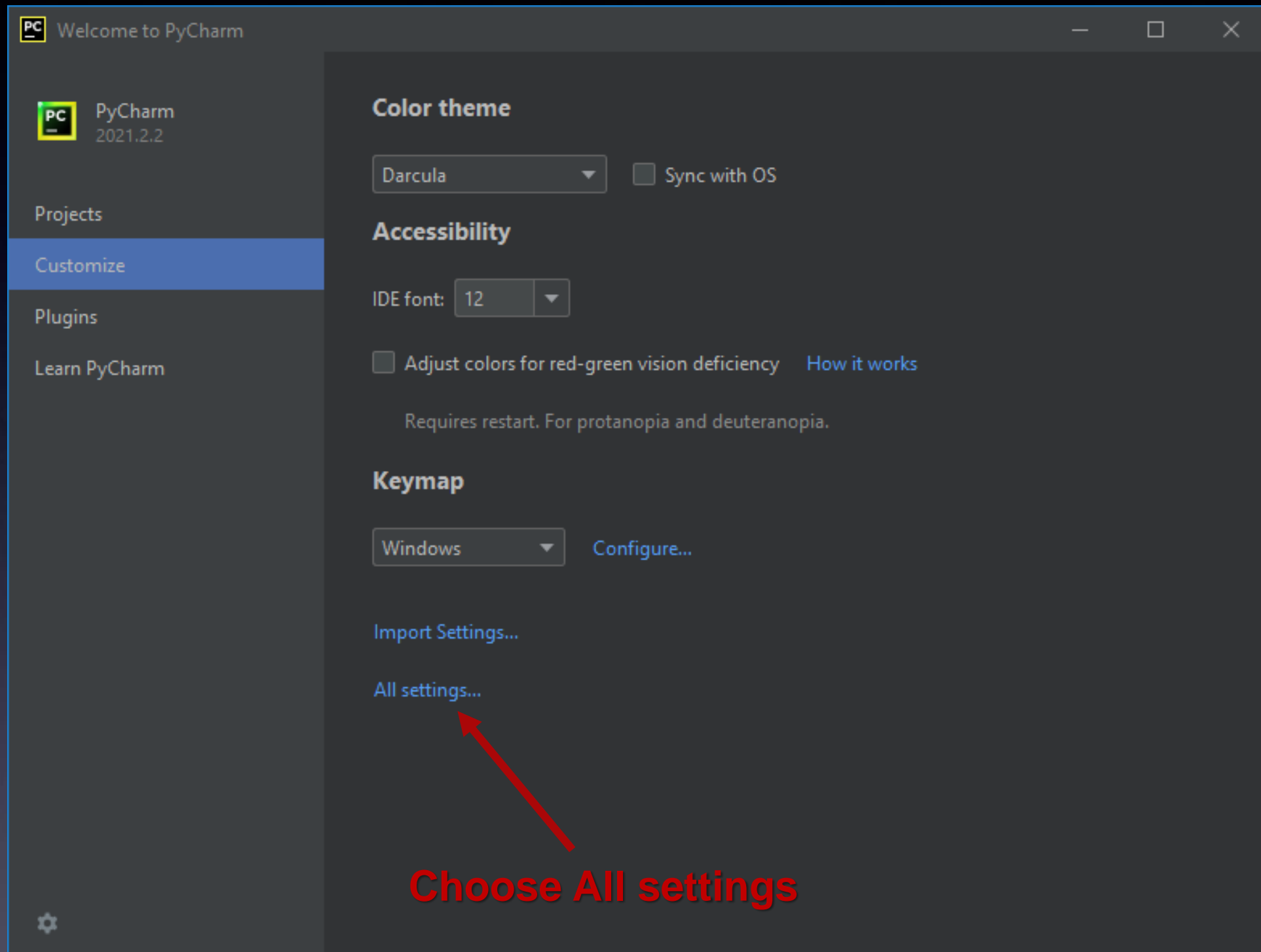
First start PyCharm



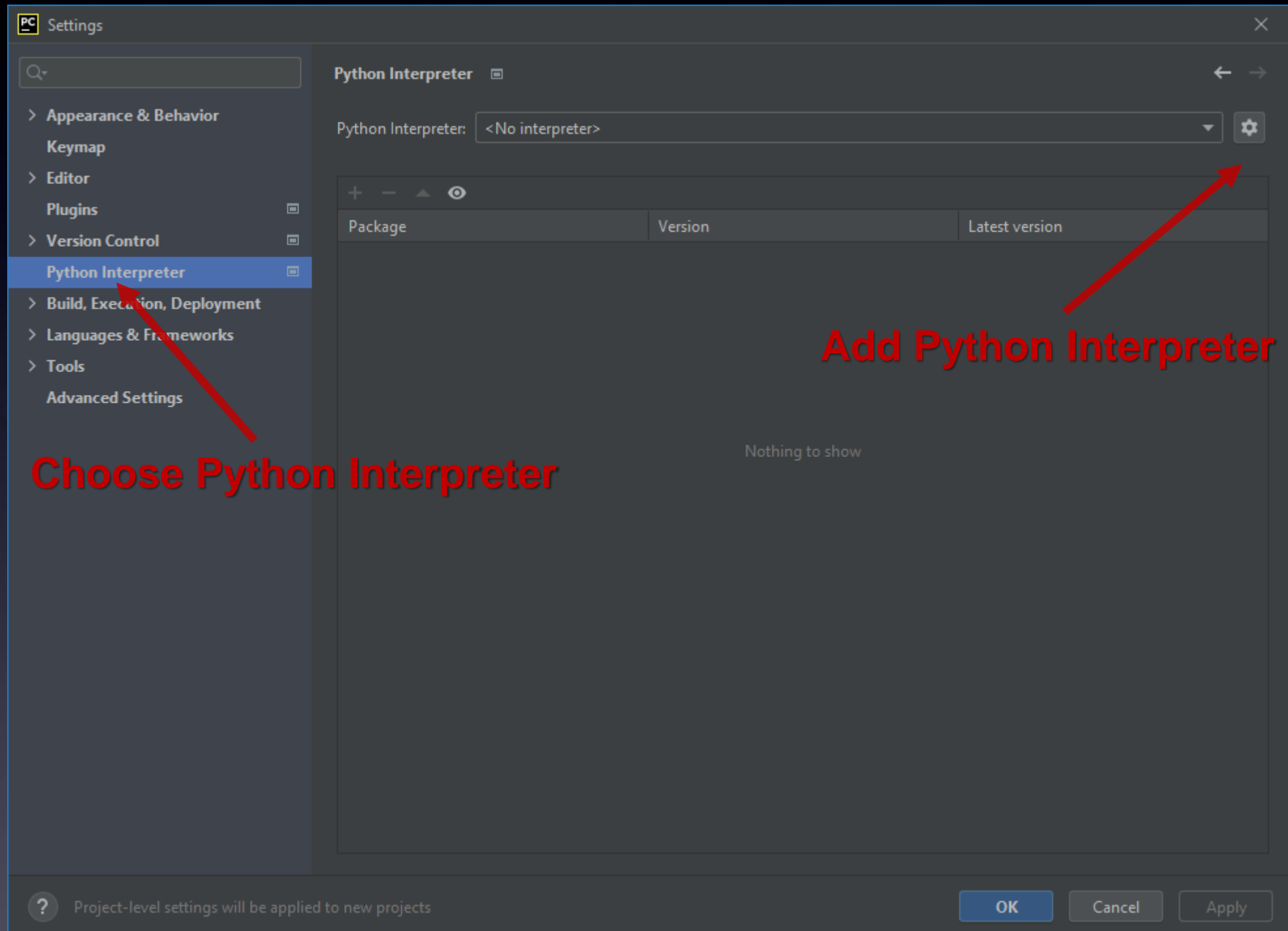
First start PyCharm



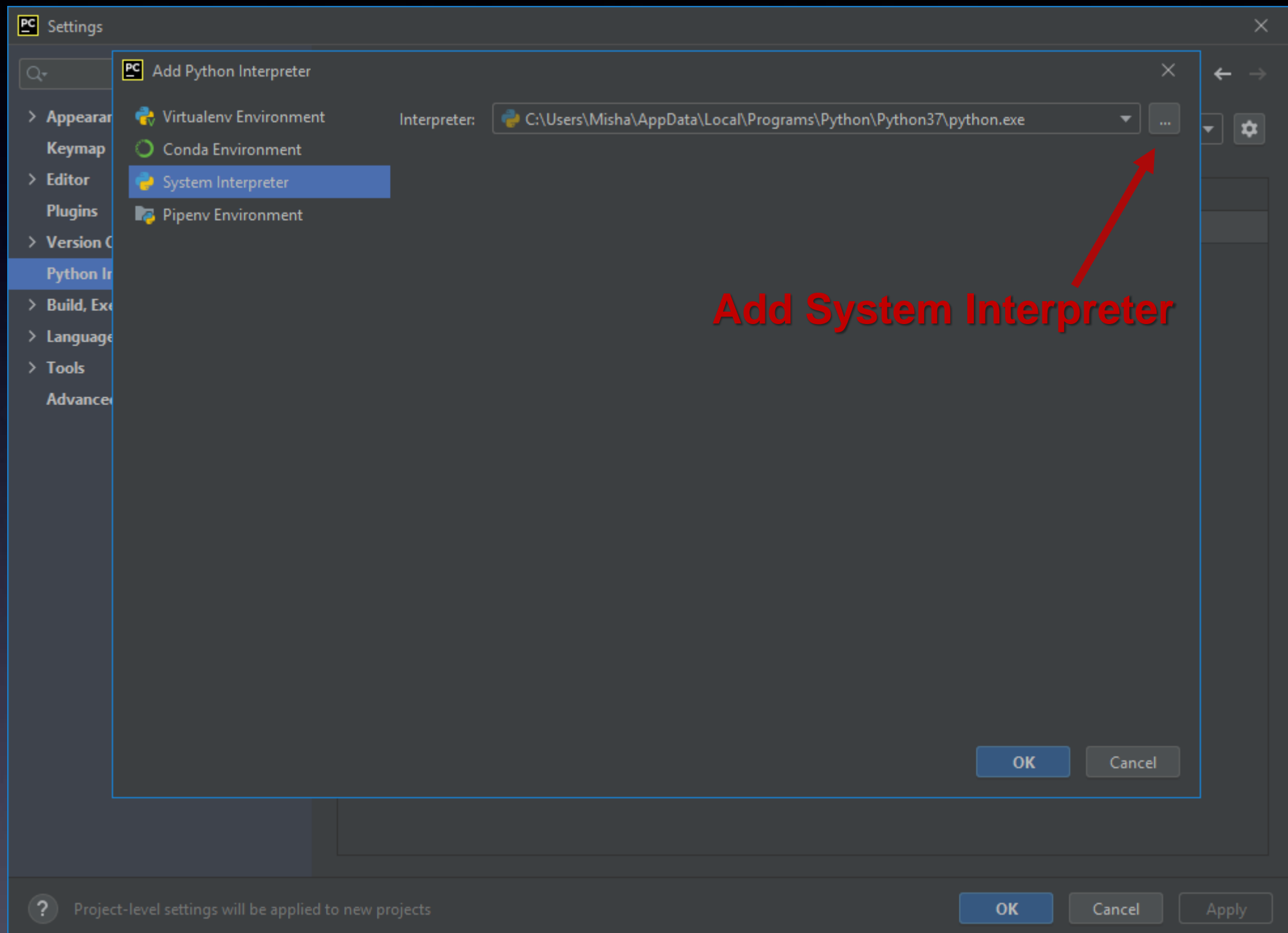
First start PyCharm



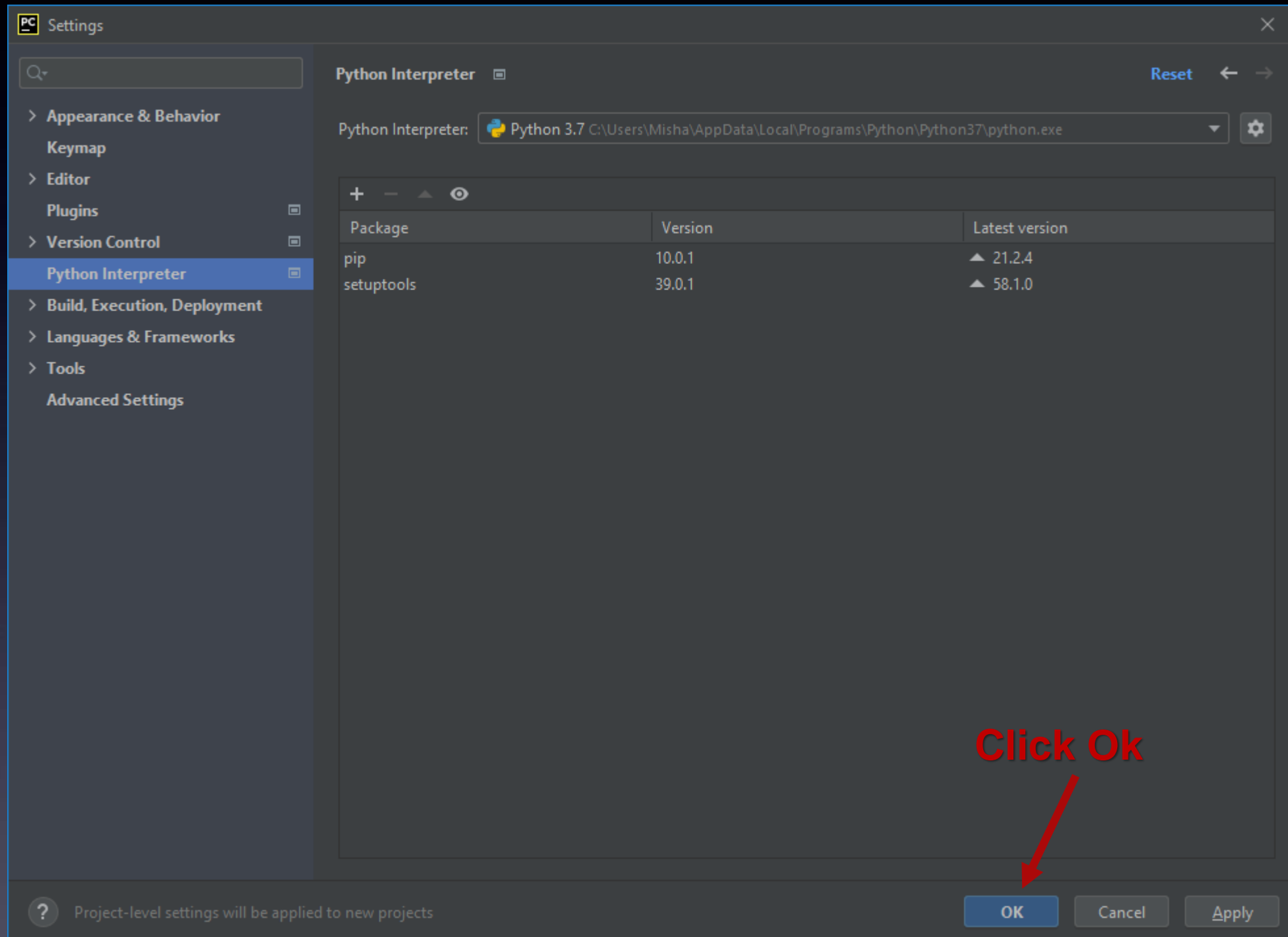
First start PyCharm



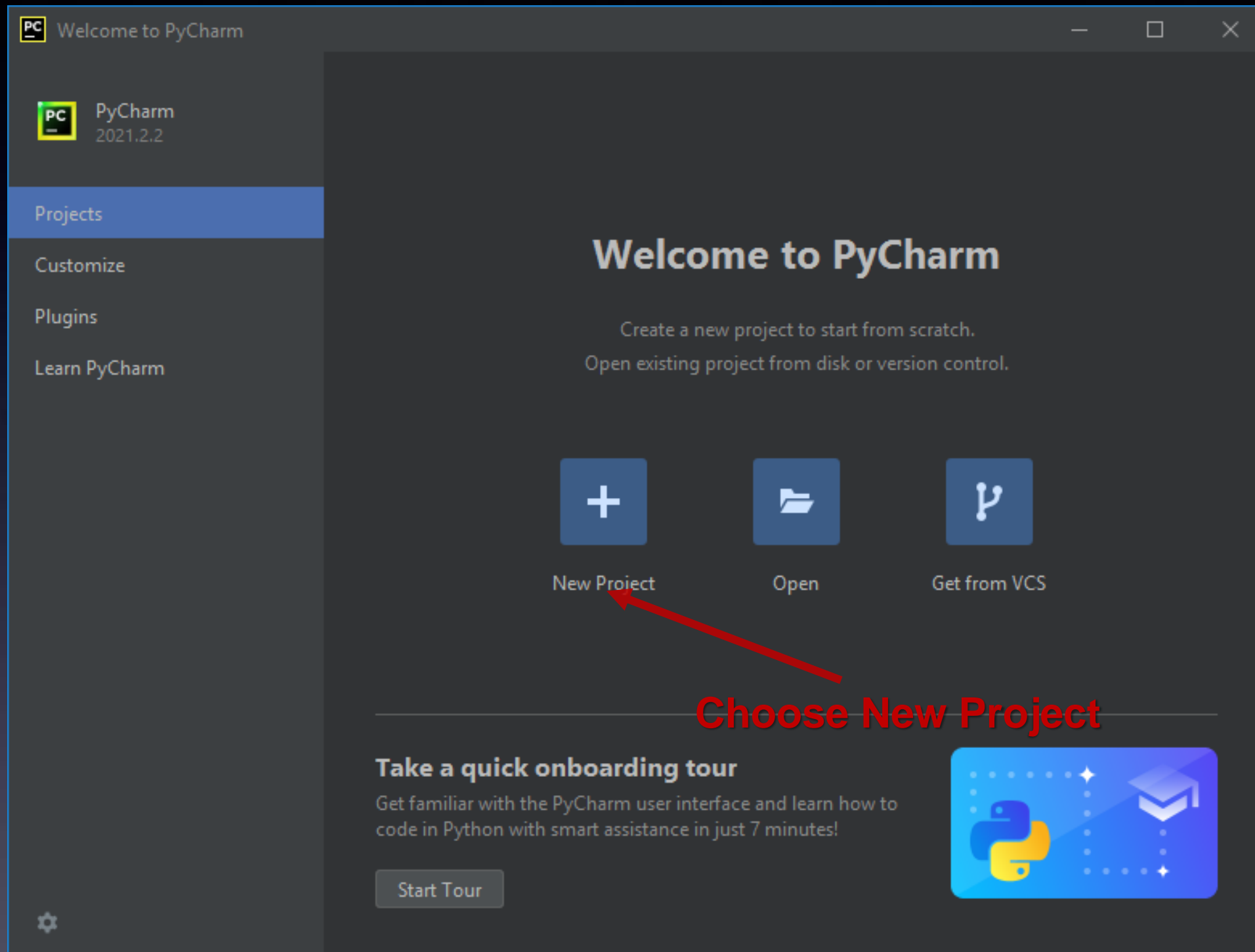
First start PyCharm



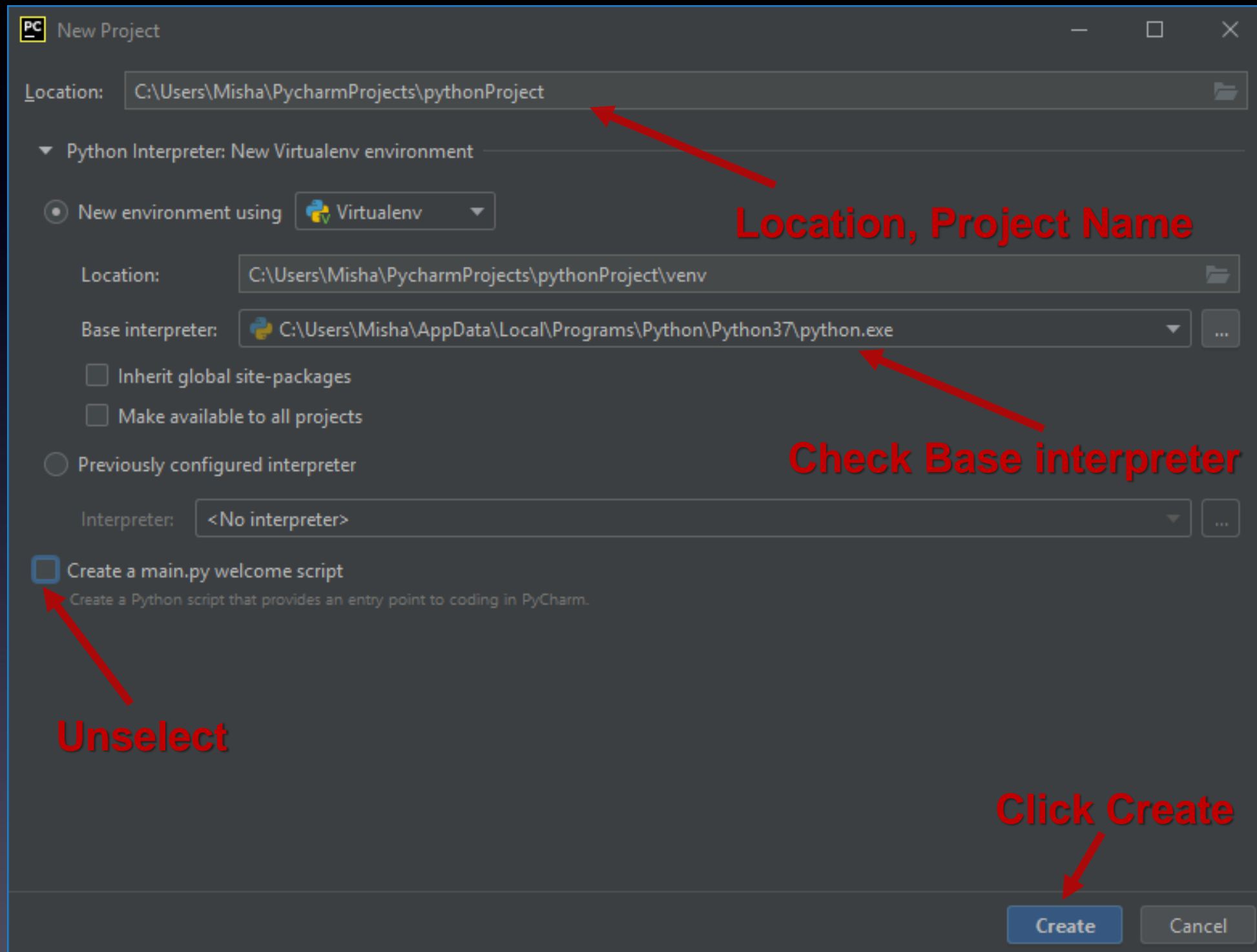
First start PyCharm



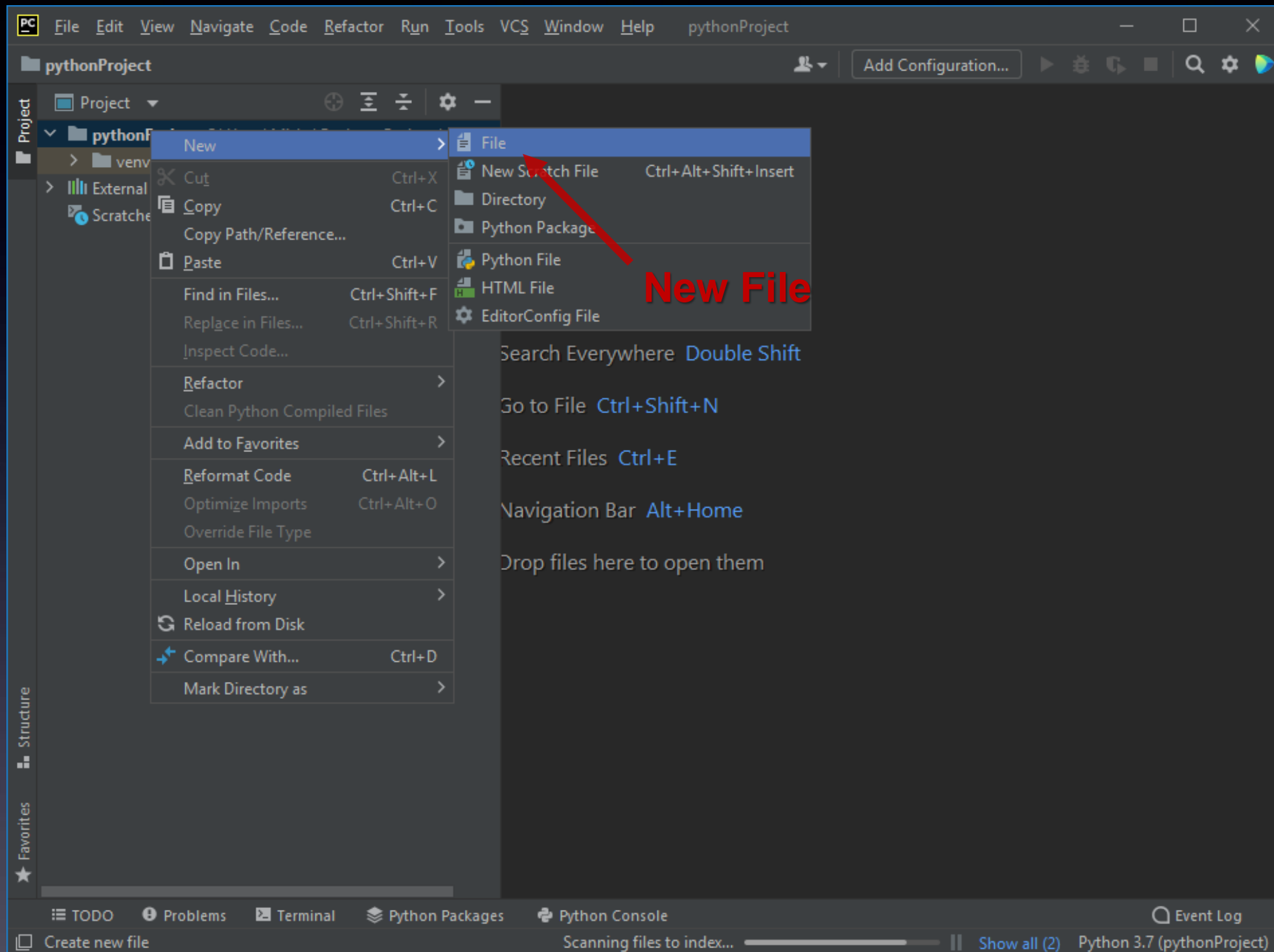
First Program(PyCharm)



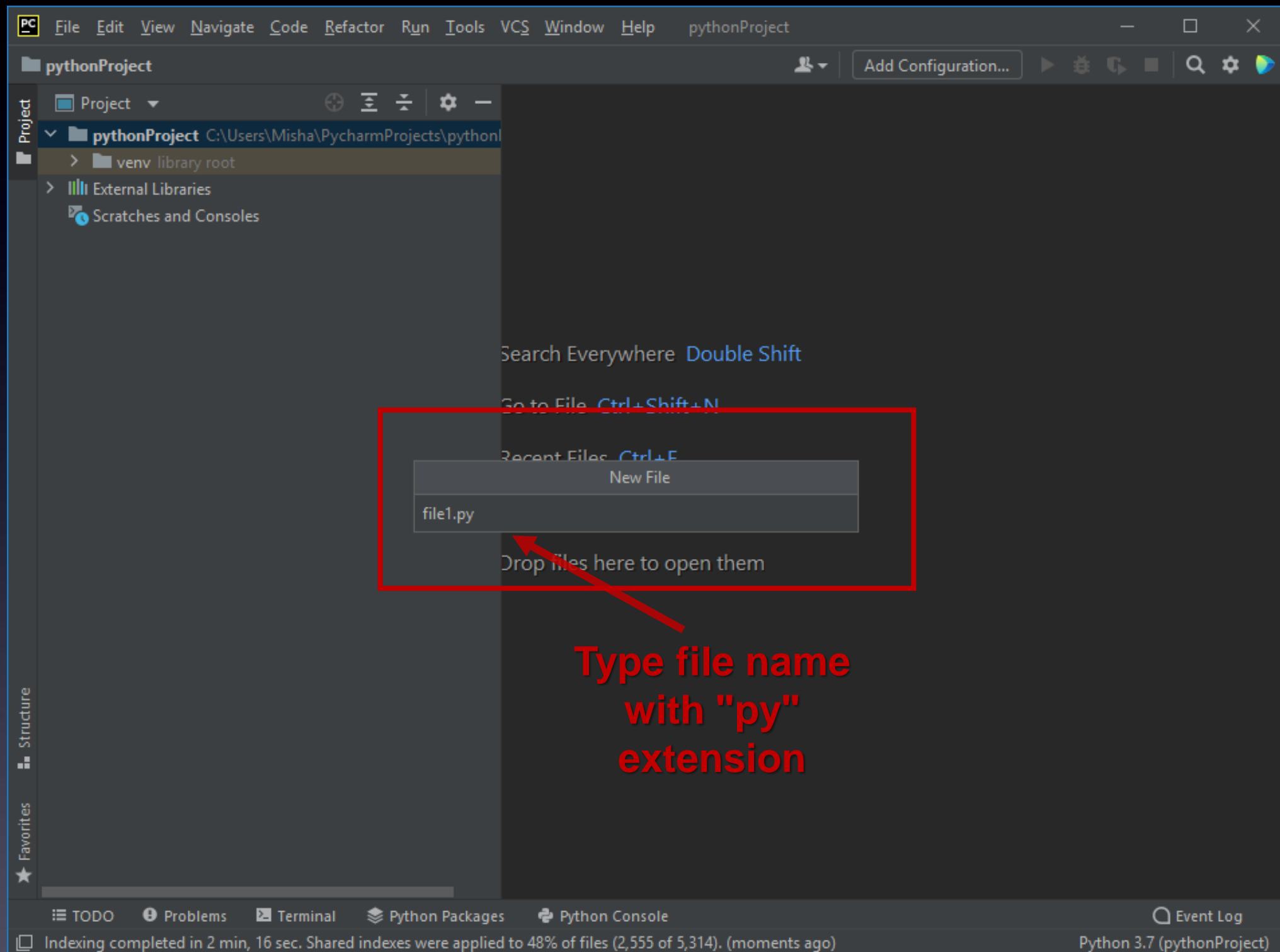
First Program(PyCharm)



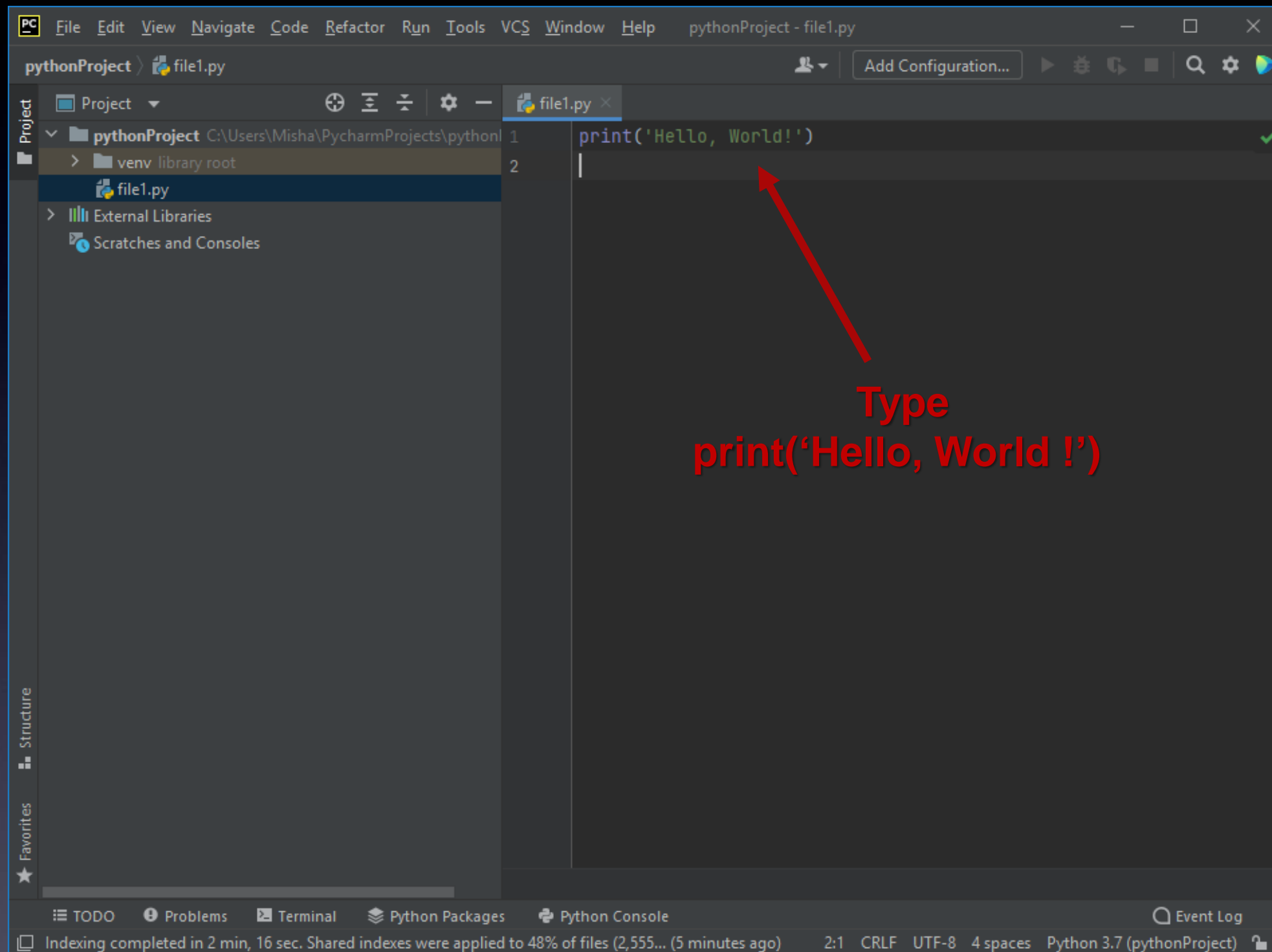
First Program(PyCharm)



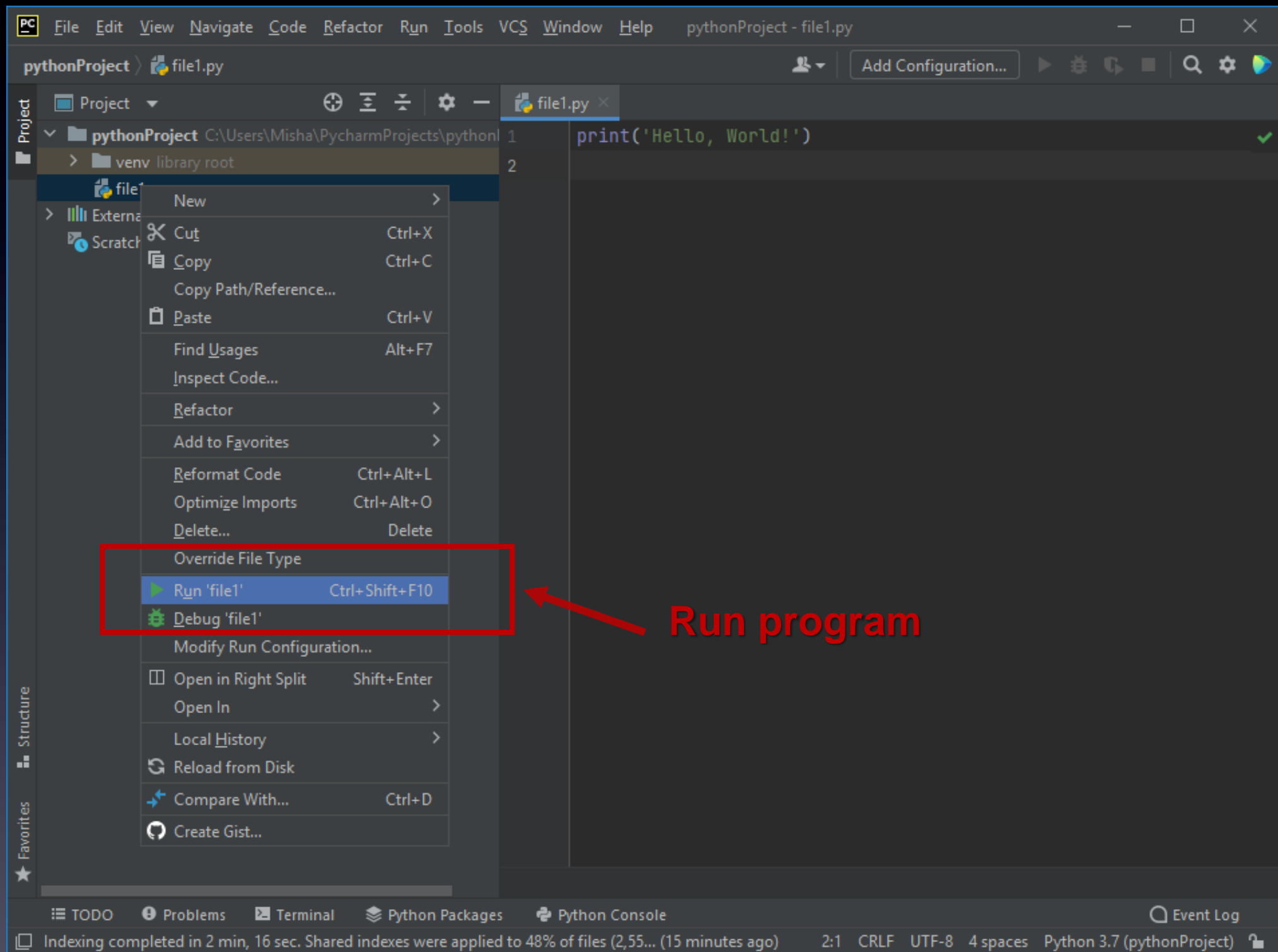
First Program(PyCharm)



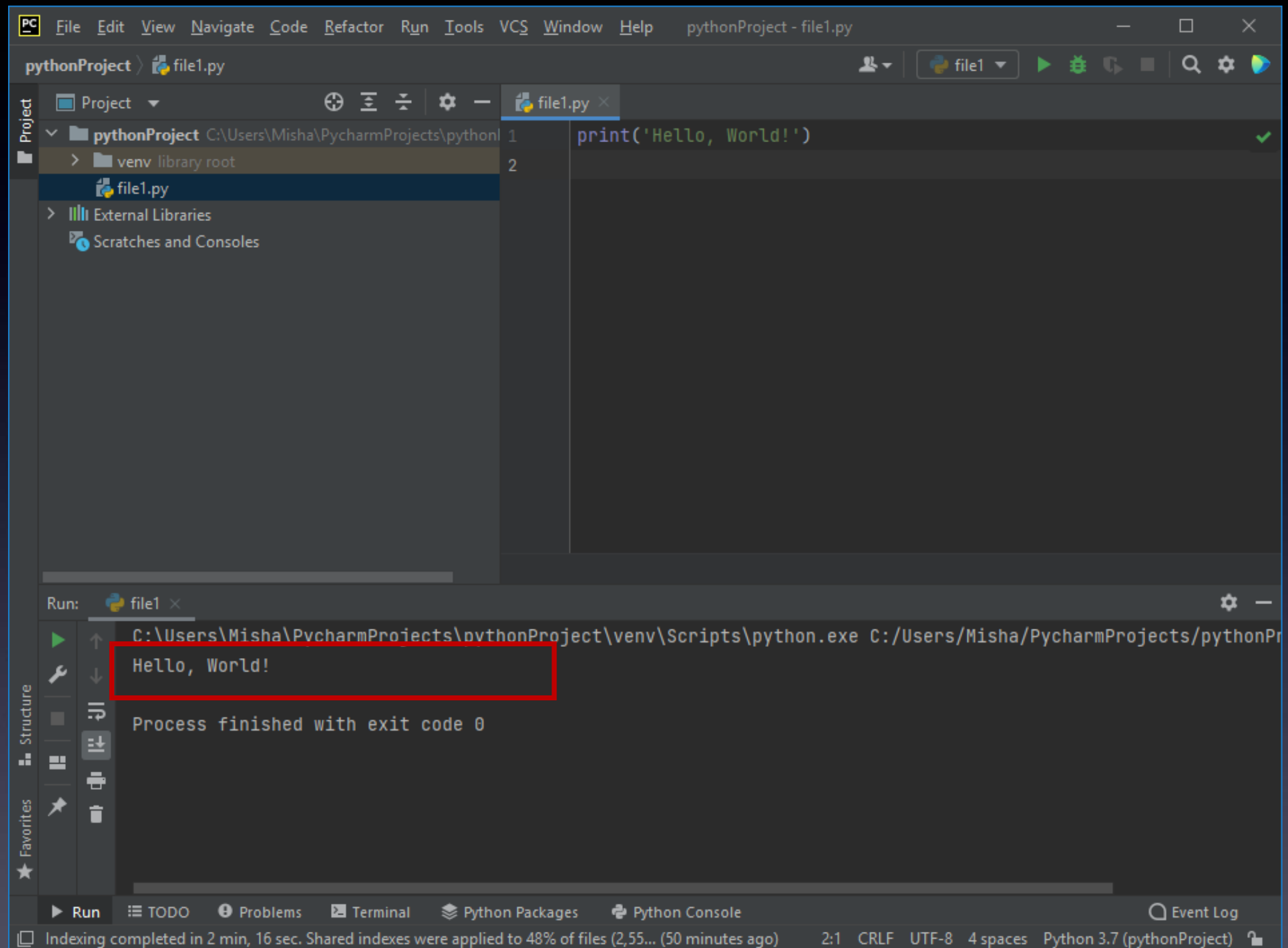
First Program(PyCharm)



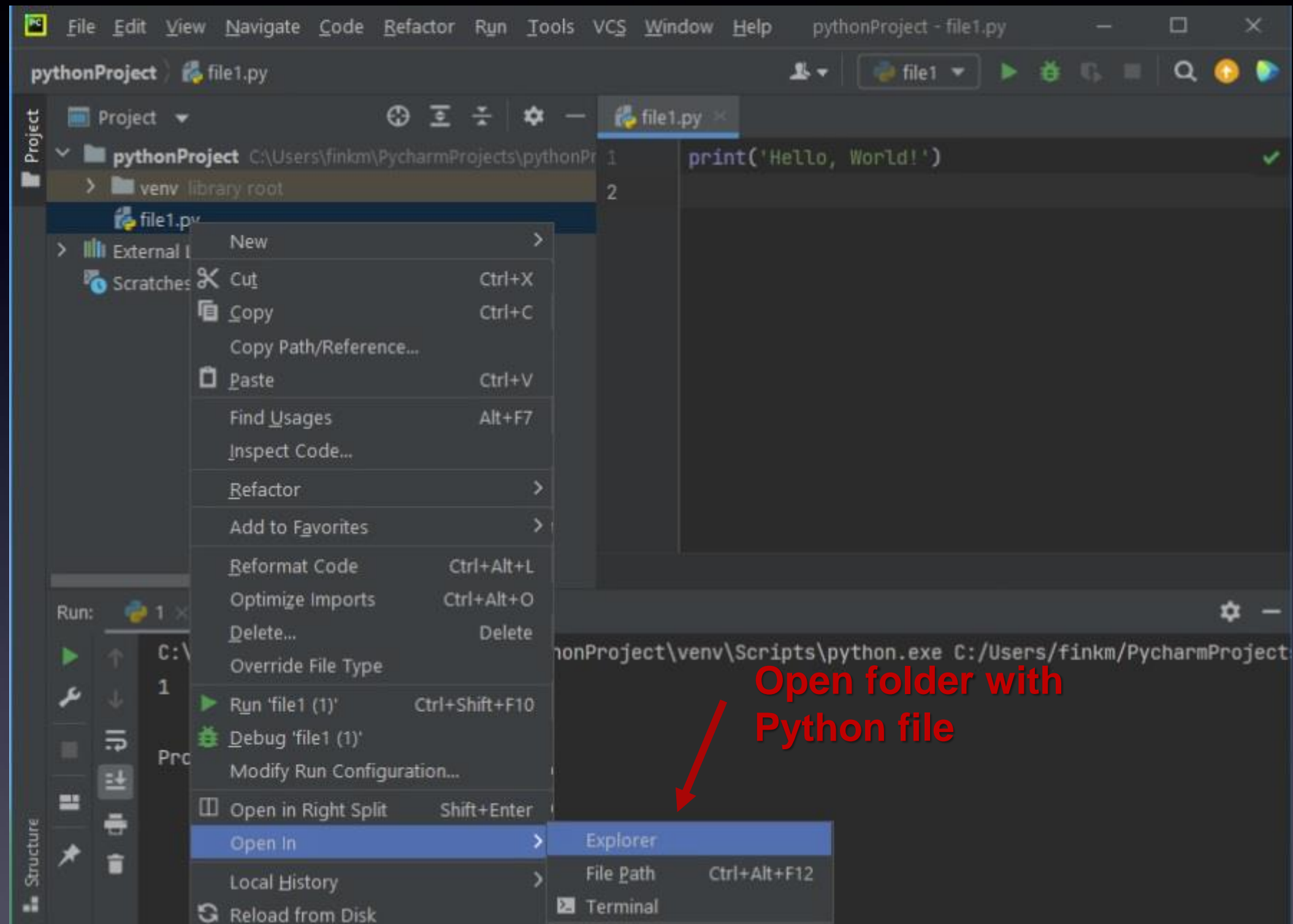
First Program(PyCharm)



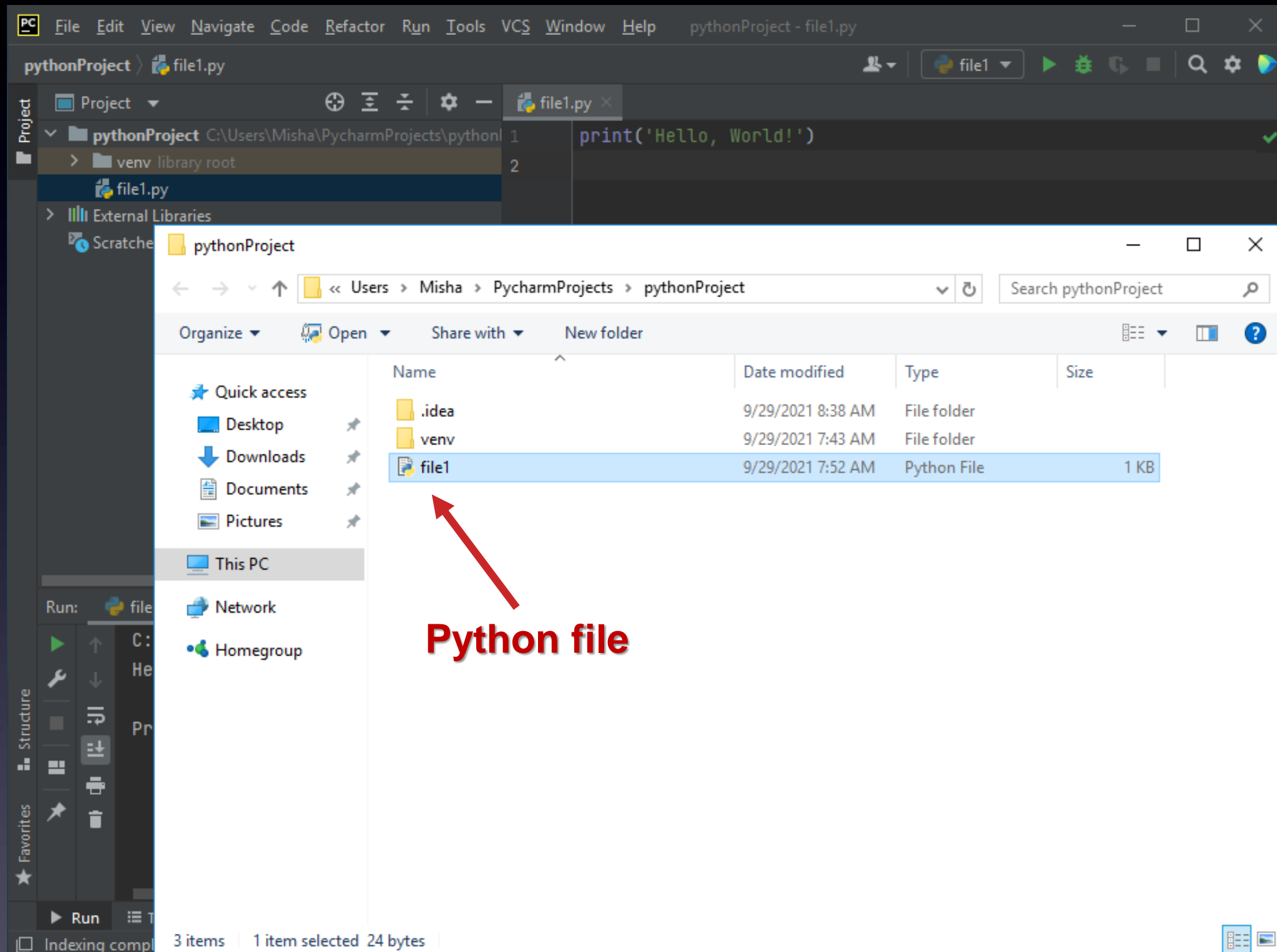
First Program(PyCharm)



First Program(PyCharm)



First Program(PyCharm)



First Program(IDLE)

הפעלה

Indentations (හඳුන)

- In python we use indentations to define code blocks.
- A code block is a part of the code that should work together, like in if or for statements.
- In C/Java we use {}
- Indentation is either a tab character, a fixed number of space characters. Please **use 4 spaces** to make an indentation. Most IDEs use 4 spaces.
- You can not combine different number of spaces and tabs in the same block!

If statements

- Logical operators in python are “==”, “<”, “>”, “<=”, “>=”, “not”
- If we want to use “else if” use the keyword “elif”
- If statements have the following syntax:

```
if <cond>:  
    <then statement>  
elif <cond>:  
    <else if statement>  
else:  
    <else statement>
```


For loops

- For loops work on iterable objects.
- To run on numbers we use the range function that returns a list of the numbers from 0 to n.
- Usage: “for n in range(20):”
Will give us 20 iterations

While loops

`while test_expression:`

 Body of while.

- In while loop, test expression is checked first. The body of the loop is entered only if the test expression evaluates to True

`i=0`

`while i < 20:`

`i += 1`