

# PPL - Lab 1

# 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

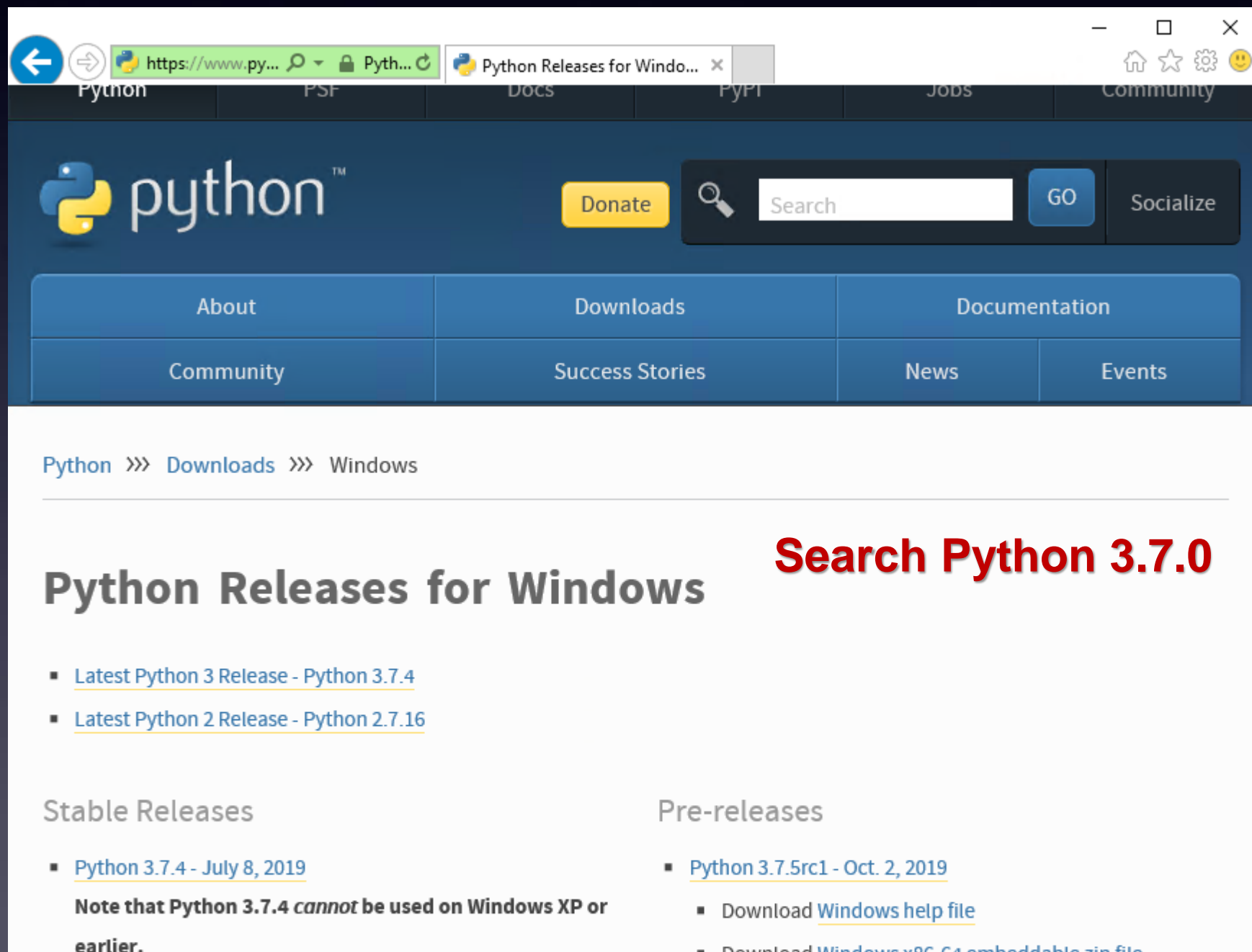
# Python

- 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 navigation links. The main content area is titled "Python Releases for Windows" and includes a red text overlay "Search Python 3.7.0". Below the title, there are links for the latest Python 3 and 2 releases. The page is divided into "Stable Releases" and "Pre-releases" sections, each with a list of available versions and download links.

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](#)

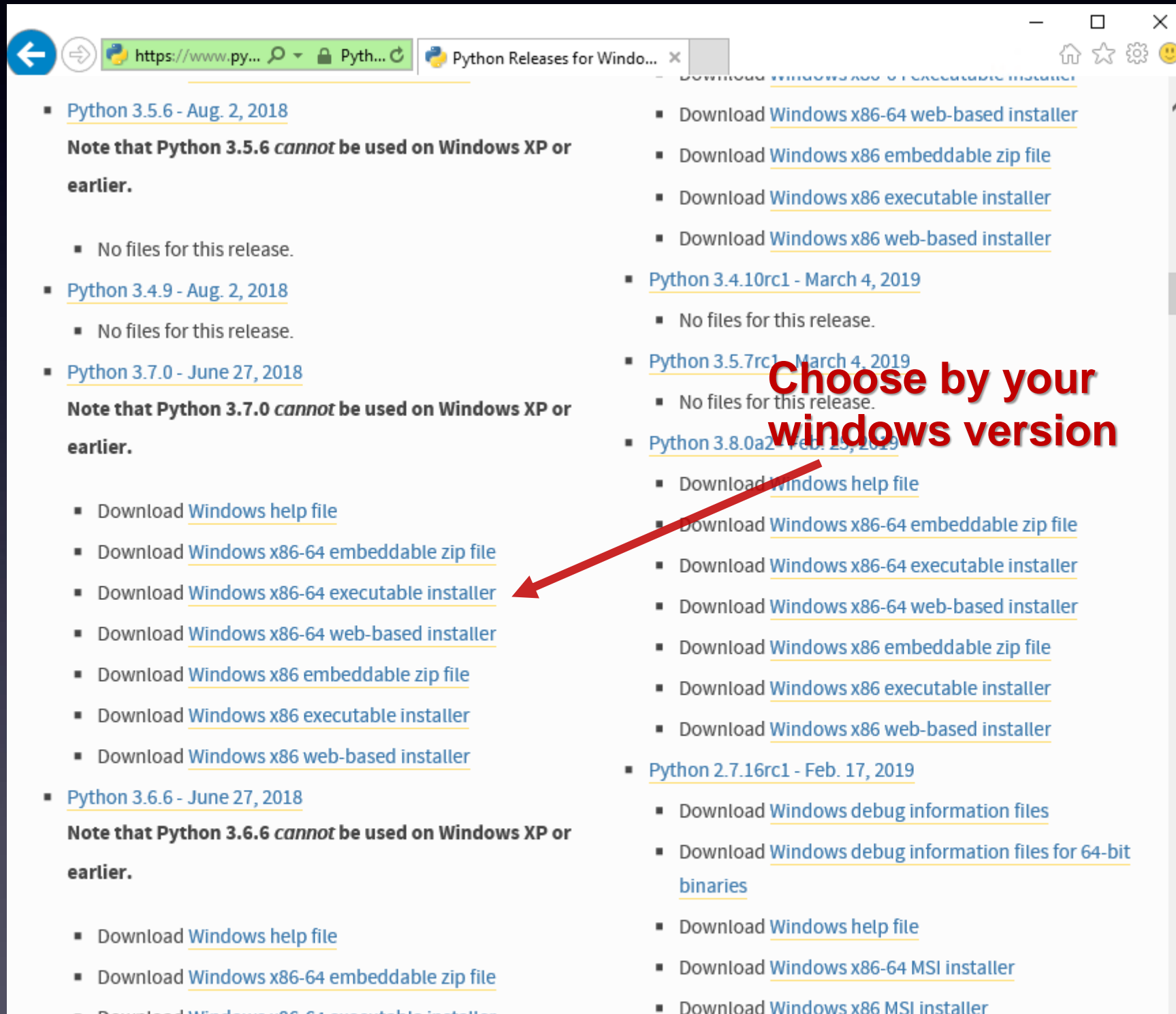
### Stable Releases

- [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. The browser address bar displays <https://www.python.org/downloads/windows/>. The page lists several Python versions with their release dates and download links. A red arrow points to the link for the Windows x86-64 executable installer under the Python 3.6.6 release.

**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](#)
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**Python 3.6.6 - June 27, 2018**  
**Note that Python 3.6.6 cannot be used on Windows XP or earlier.**

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- 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**

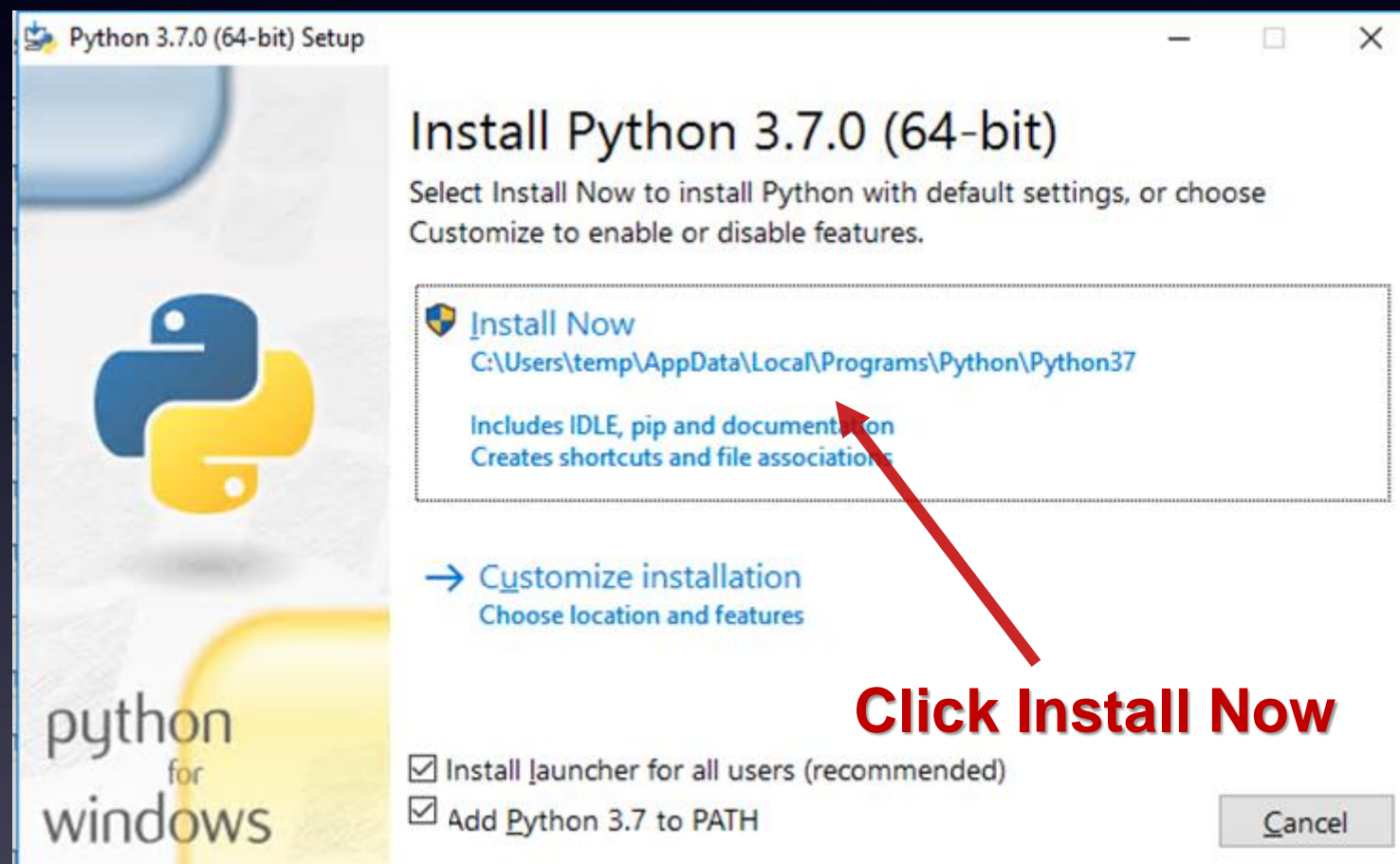
- Download [Windows help file](#)
- Download [Windows x86-64 embeddable zip file](#)
- Download [Windows x86-64 executable installer](#)
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**Python 2.7.16rc1 - Feb. 17, 2019**

- 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](#)

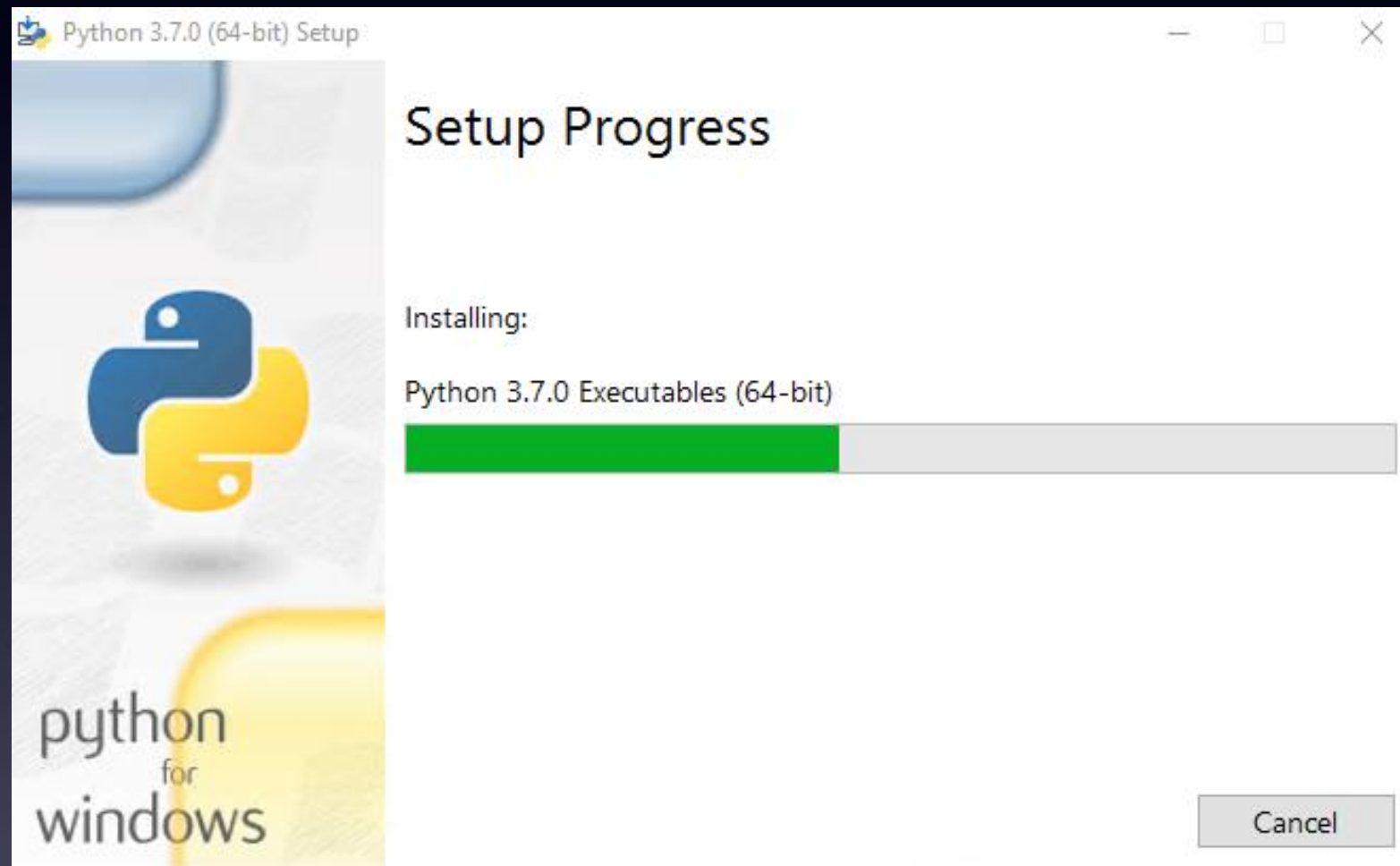
**Choose by your windows version**

# Installing Python

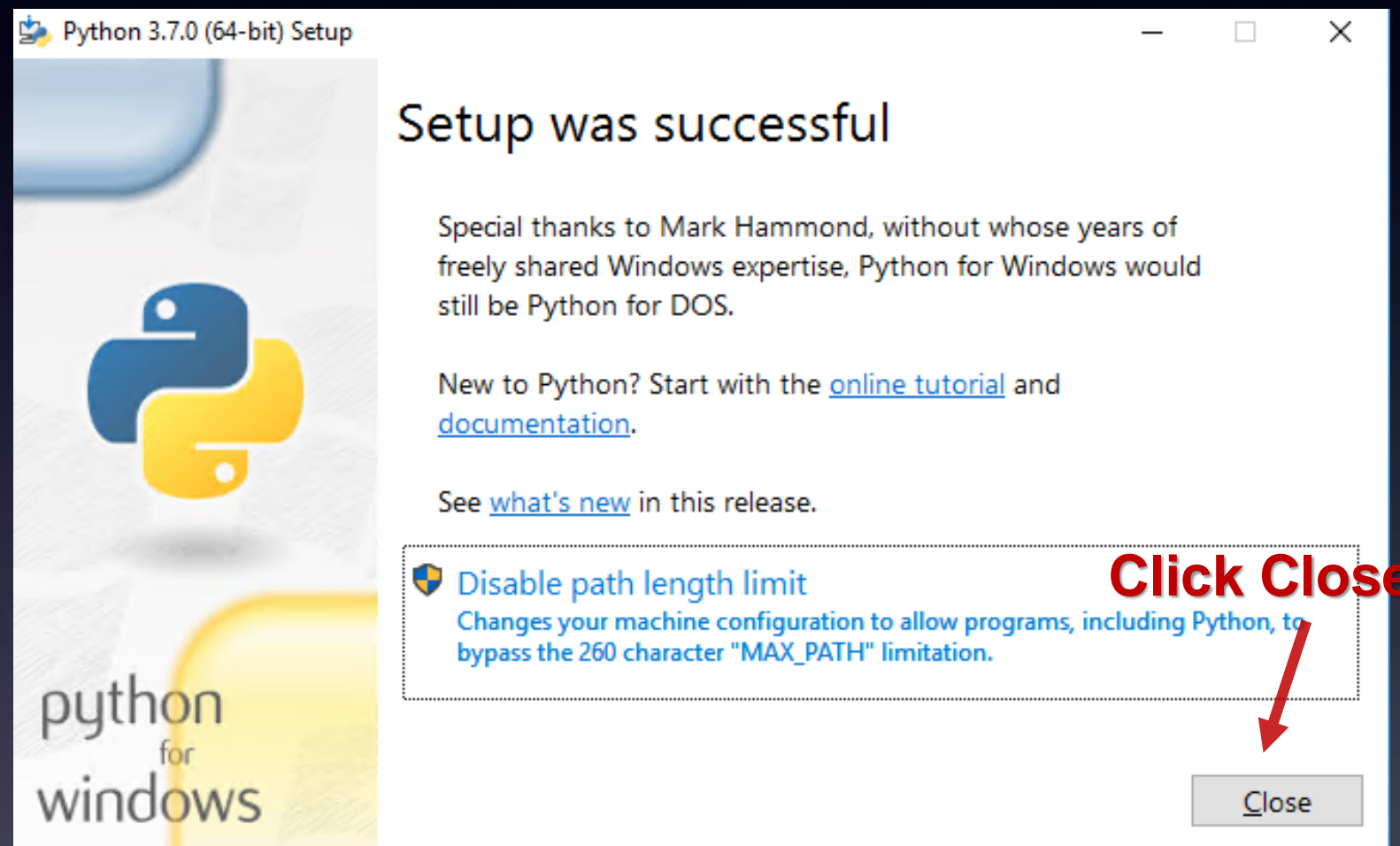


Current version: 3.9.0 (Oct 2020)

# Installing Python

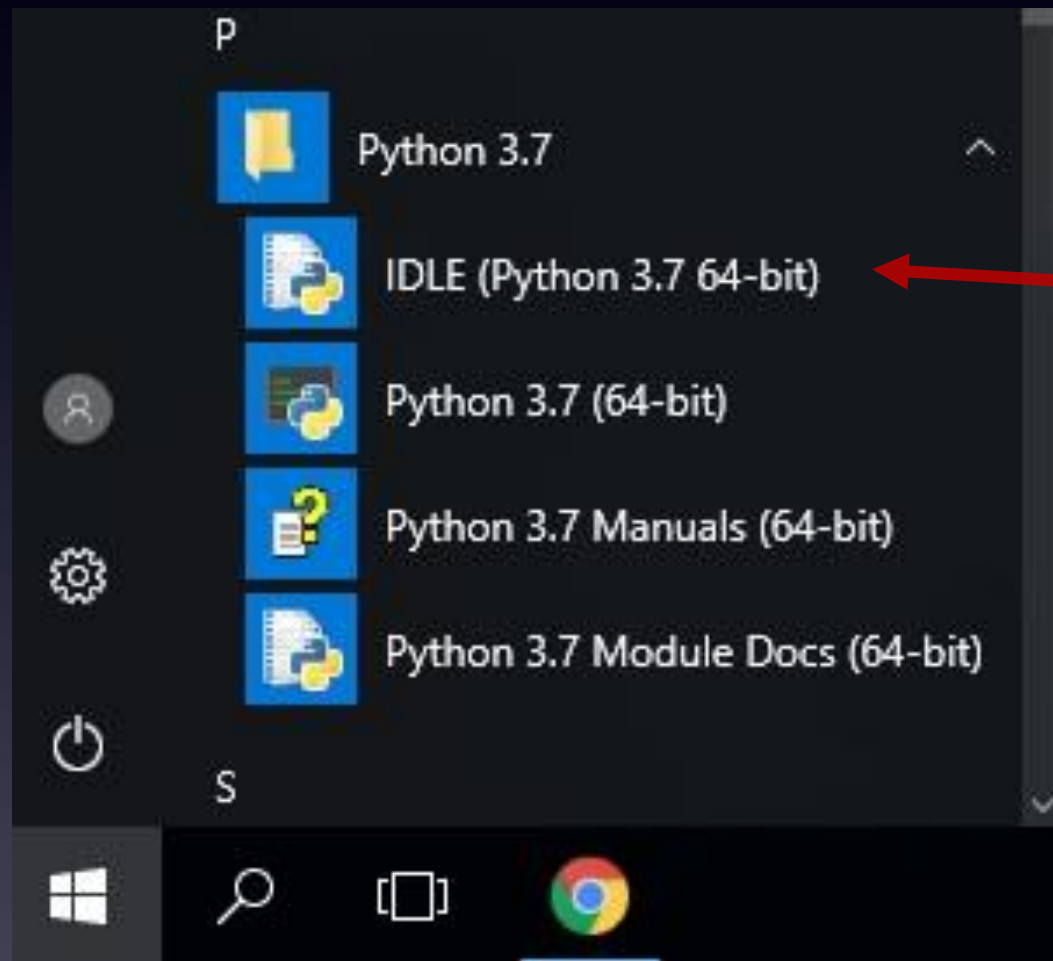


# Installing Python





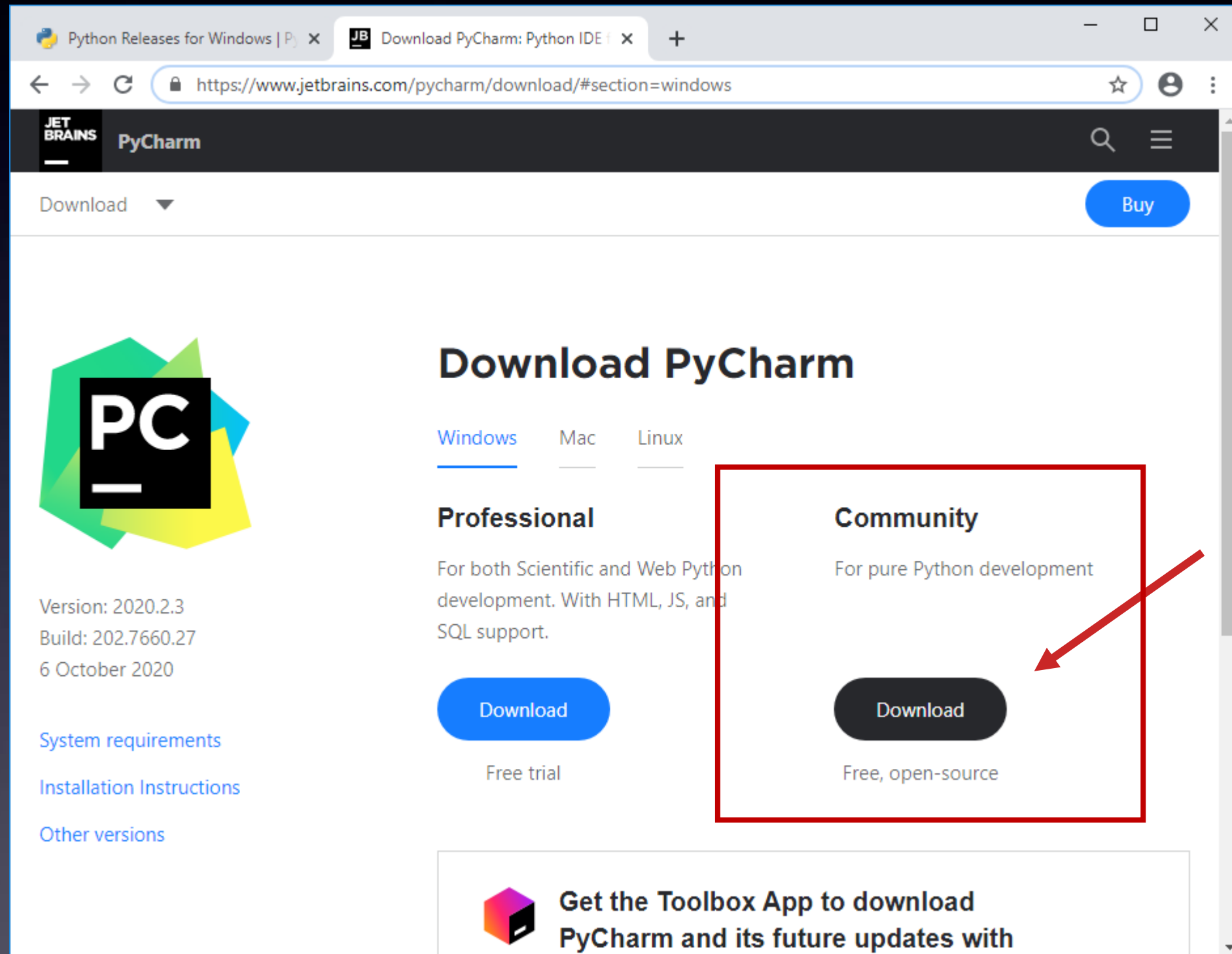
# Installing Python



**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

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## 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

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20 years

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

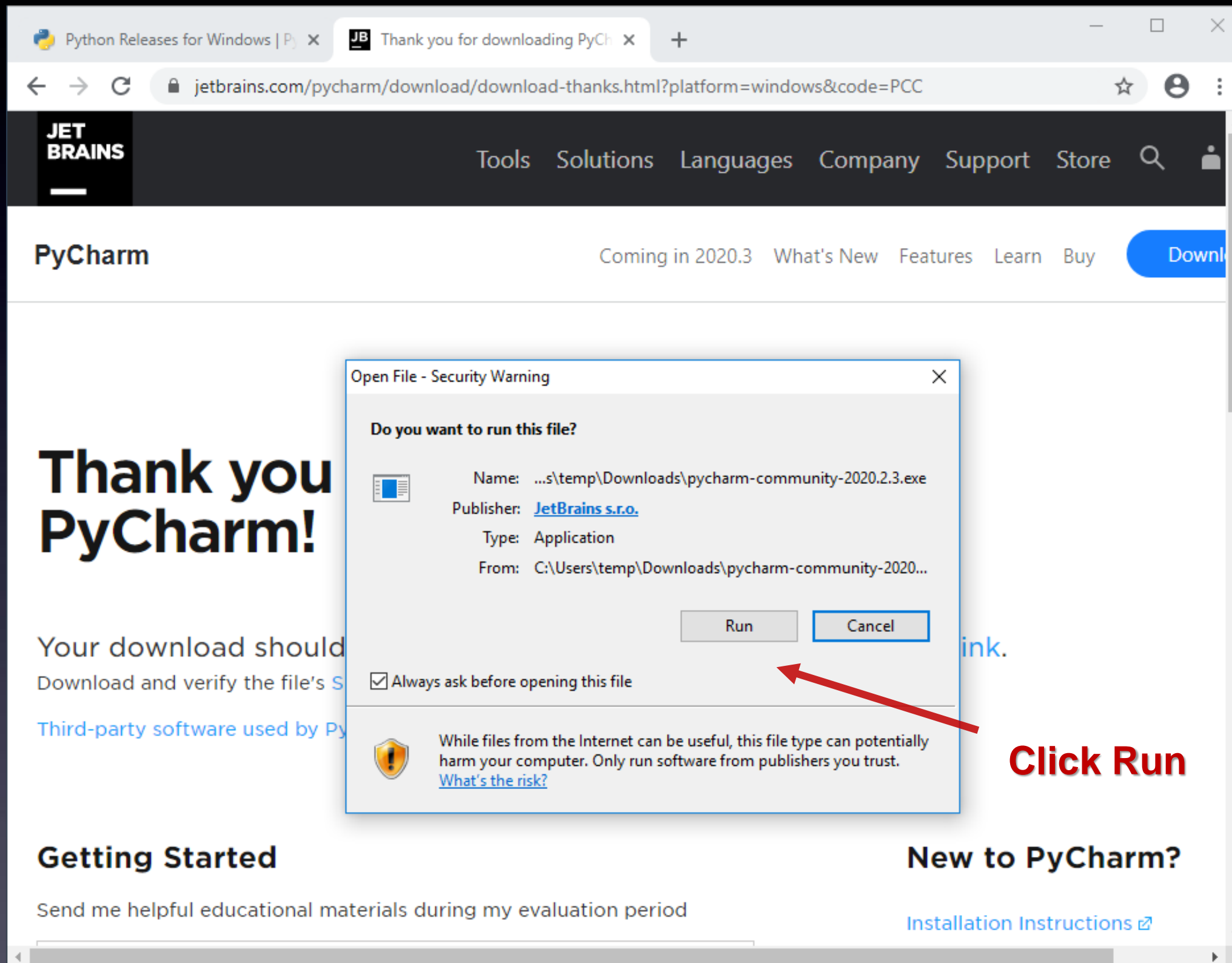
**Choose Open / Run**

**Getting Started** New to PyCharm?

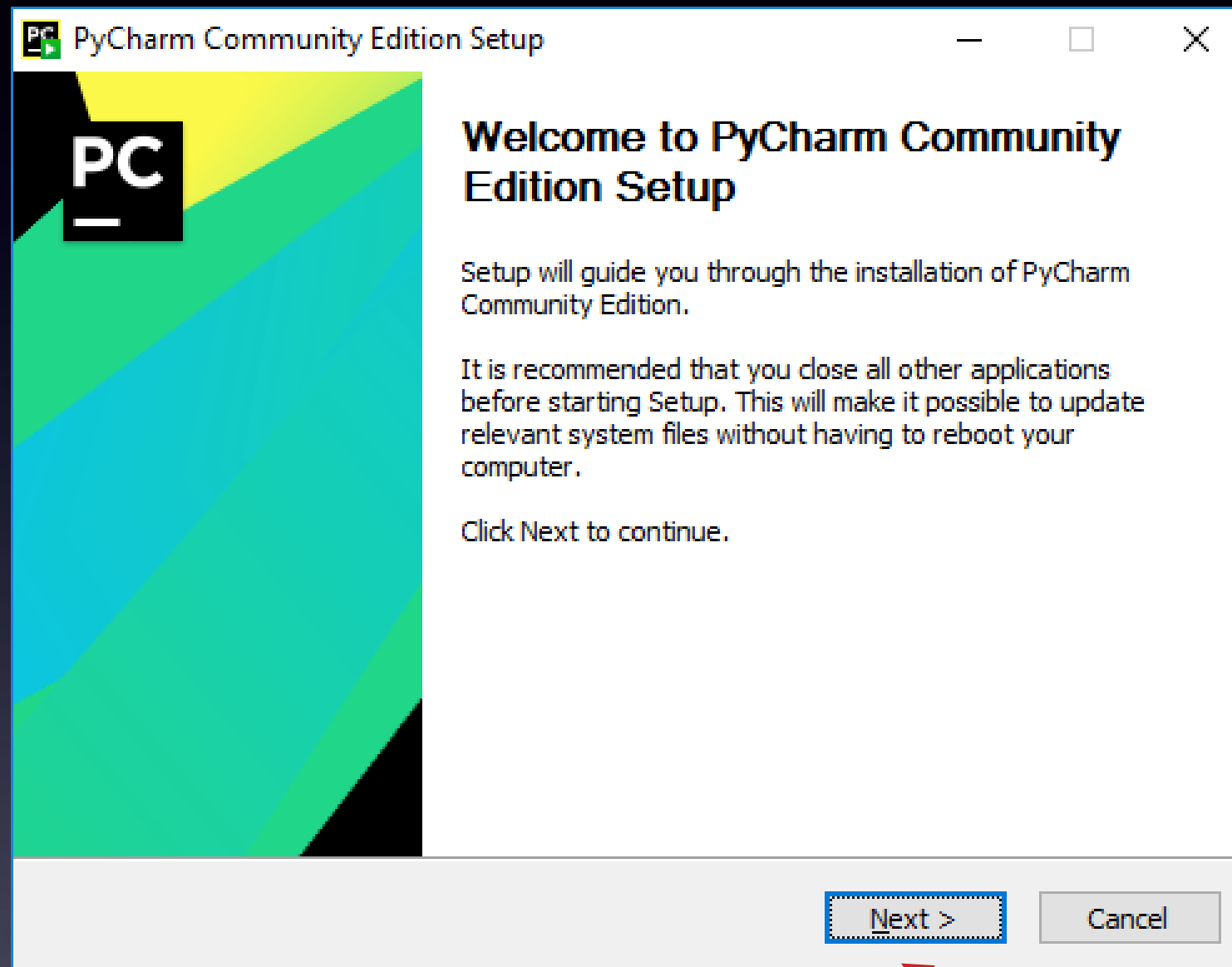
pycharm-commun....exe ^

Show all x

# Installing PyCharm

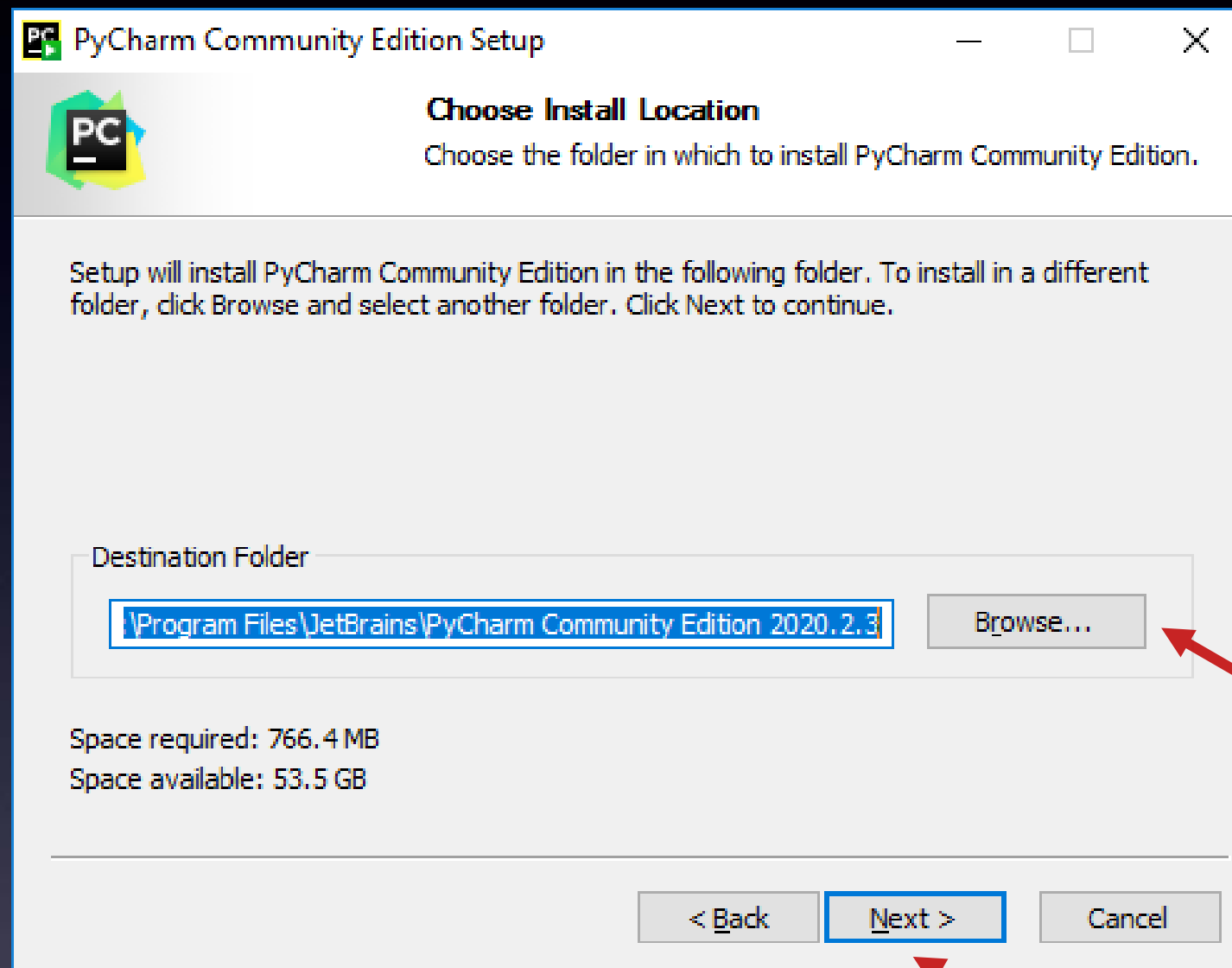


# Installing PyCharm



Click Next

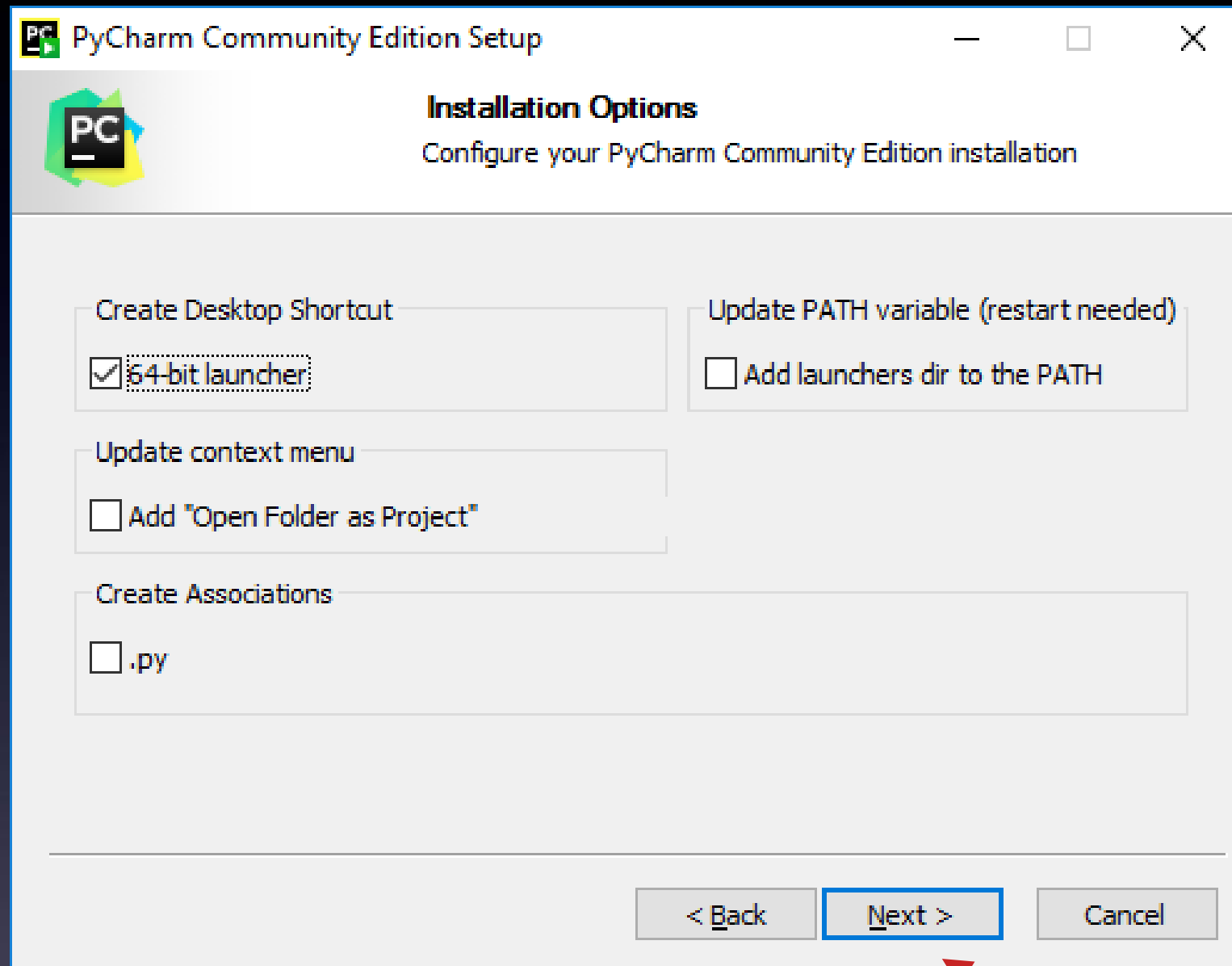
# Installing PyCharm



**Choose install  
Location**

**Click Next**

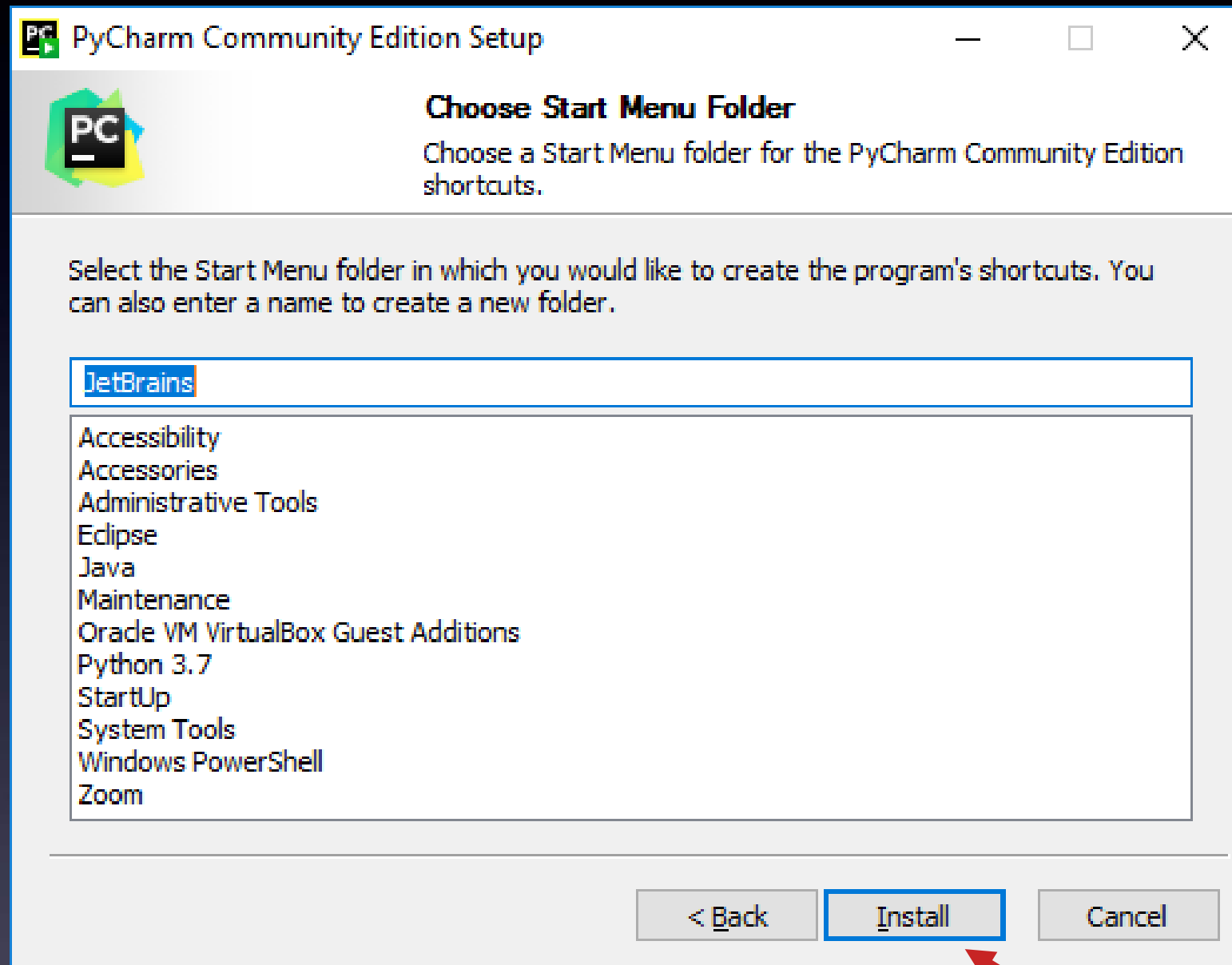
# Installing PyCharm



Click Next

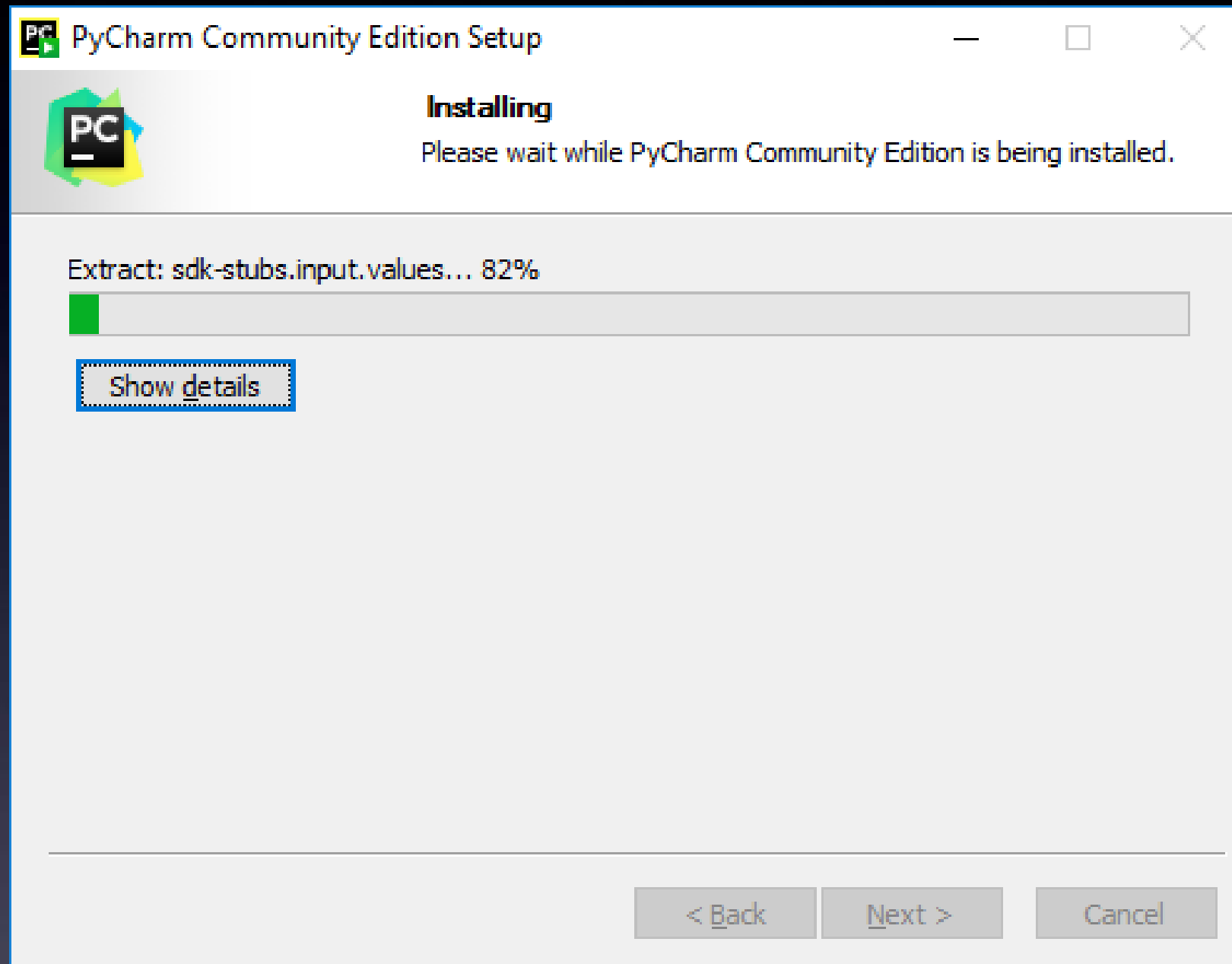


# Installing PyCharm

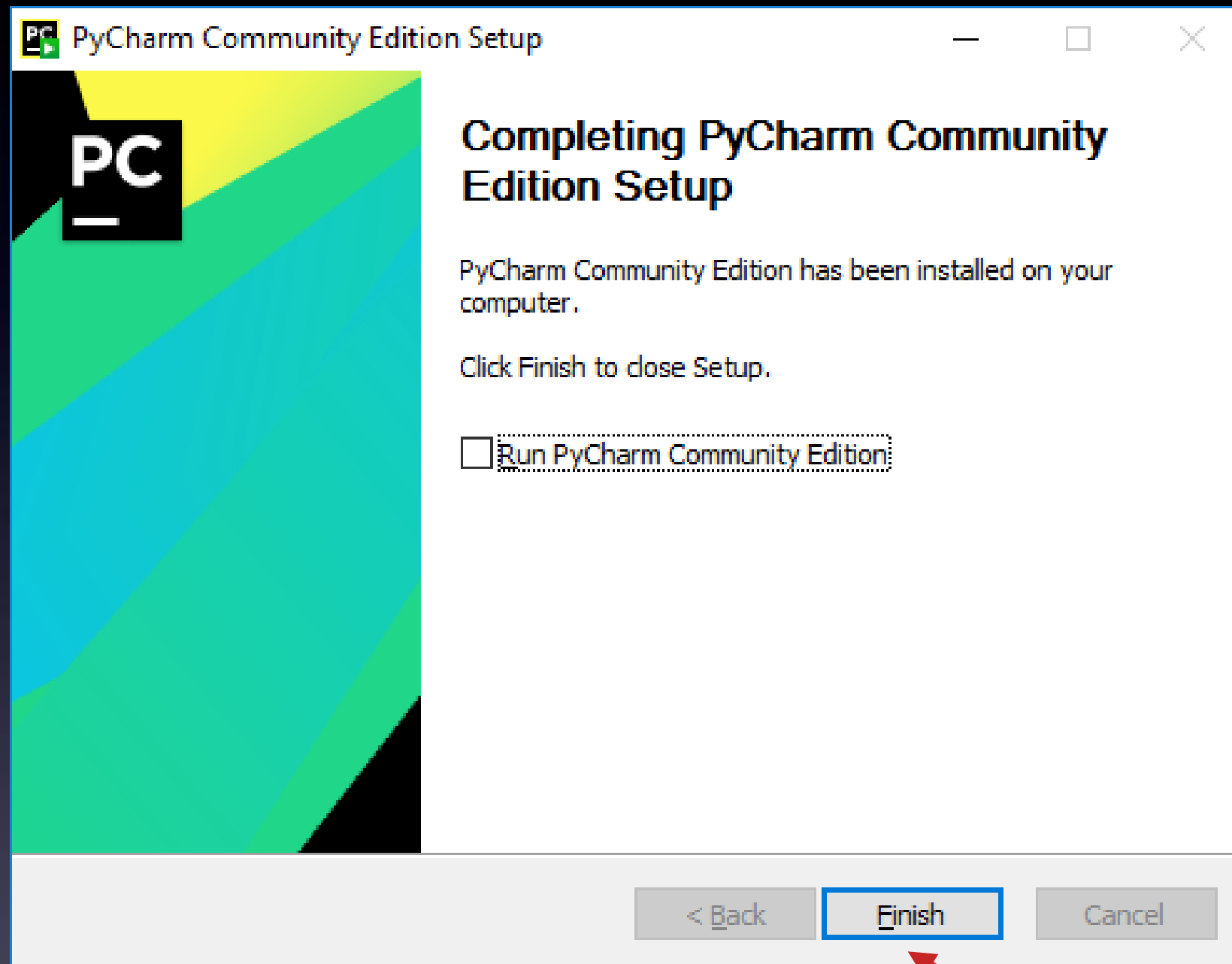


Click Install

# Installing PyCharm

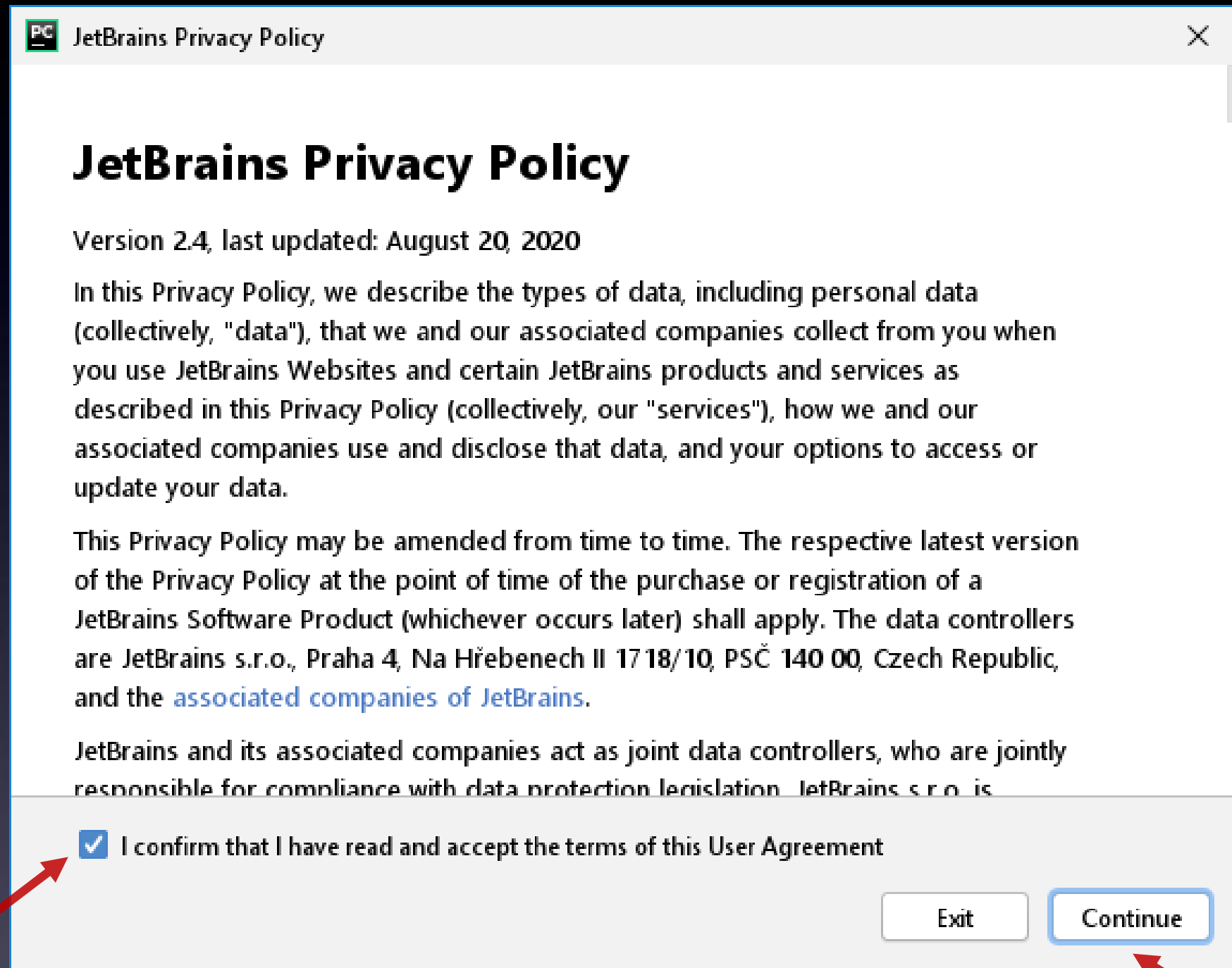


# Installing PyCharm



Click Finish

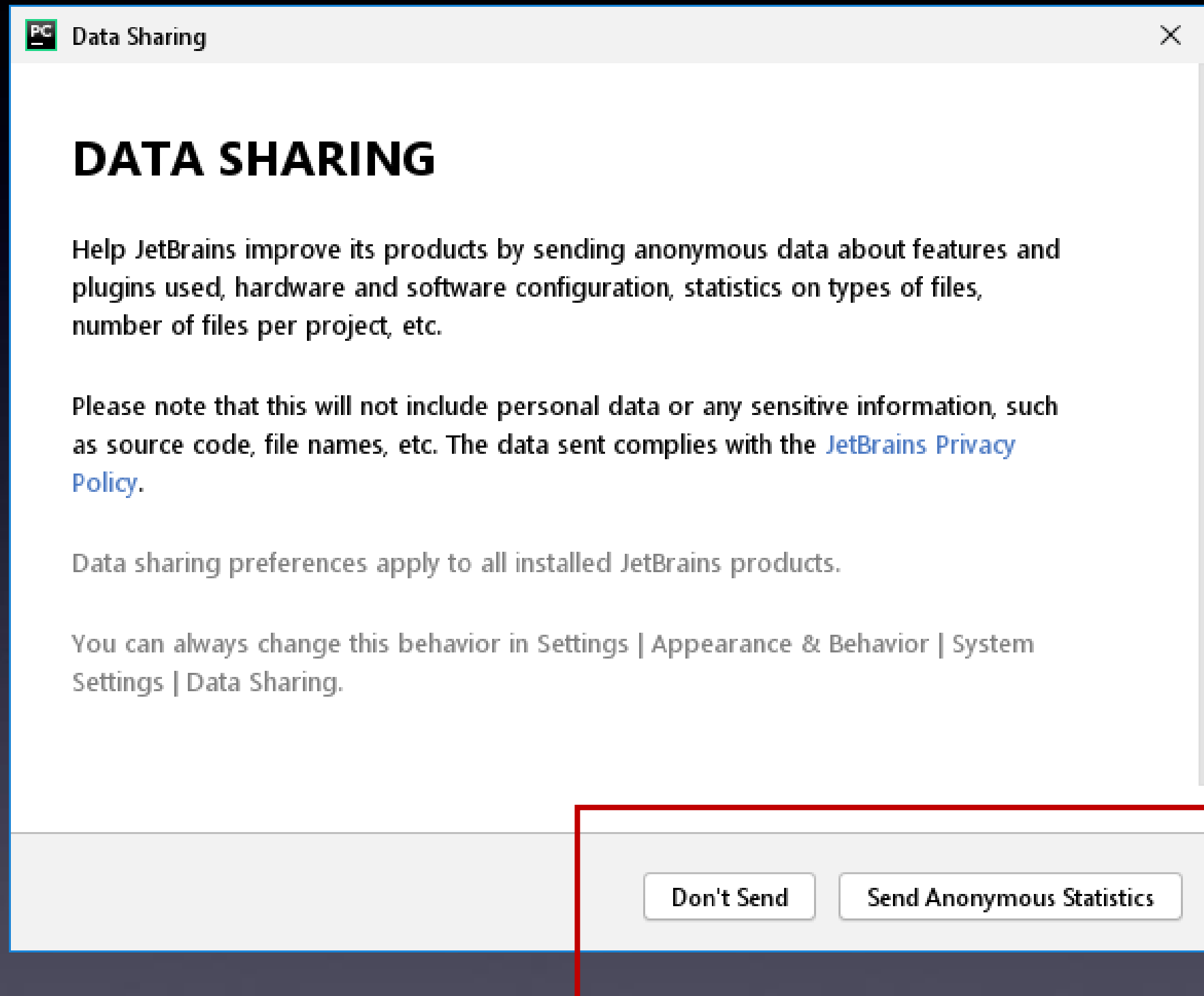
# First start PyCharm



Select

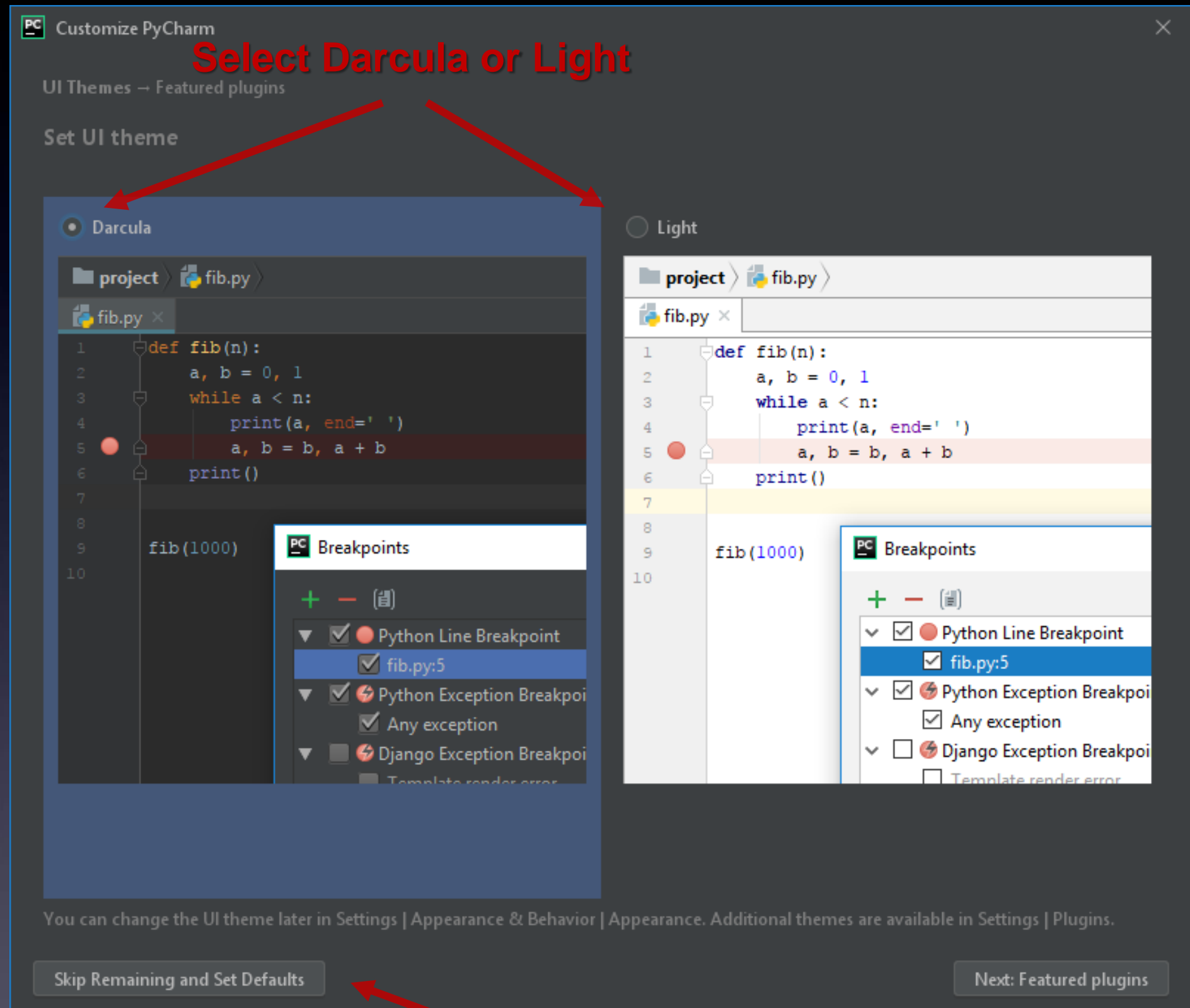
Click Continue

# First start PyCharm

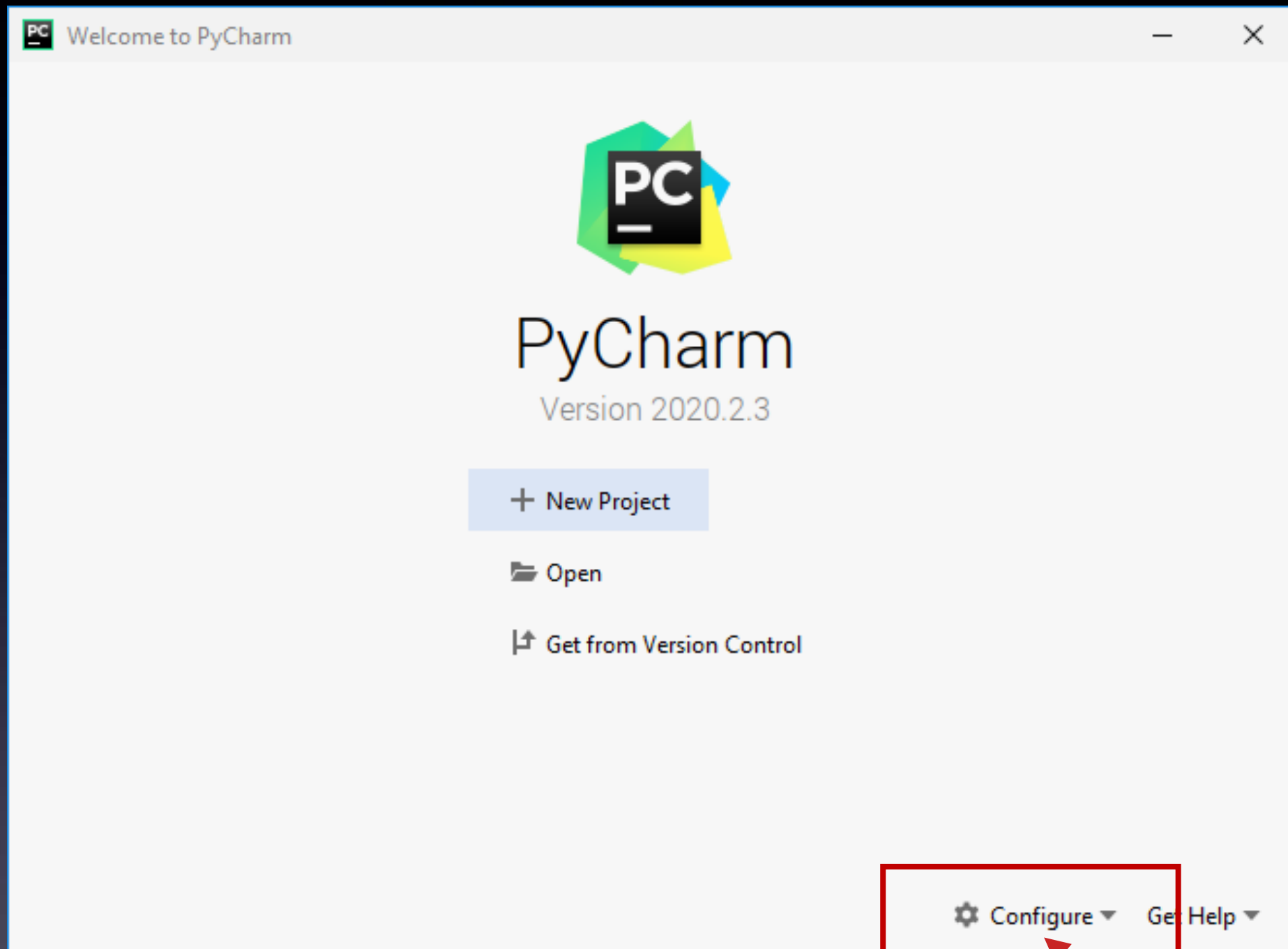


Choose Send or Don't Send

# First start PyCharm

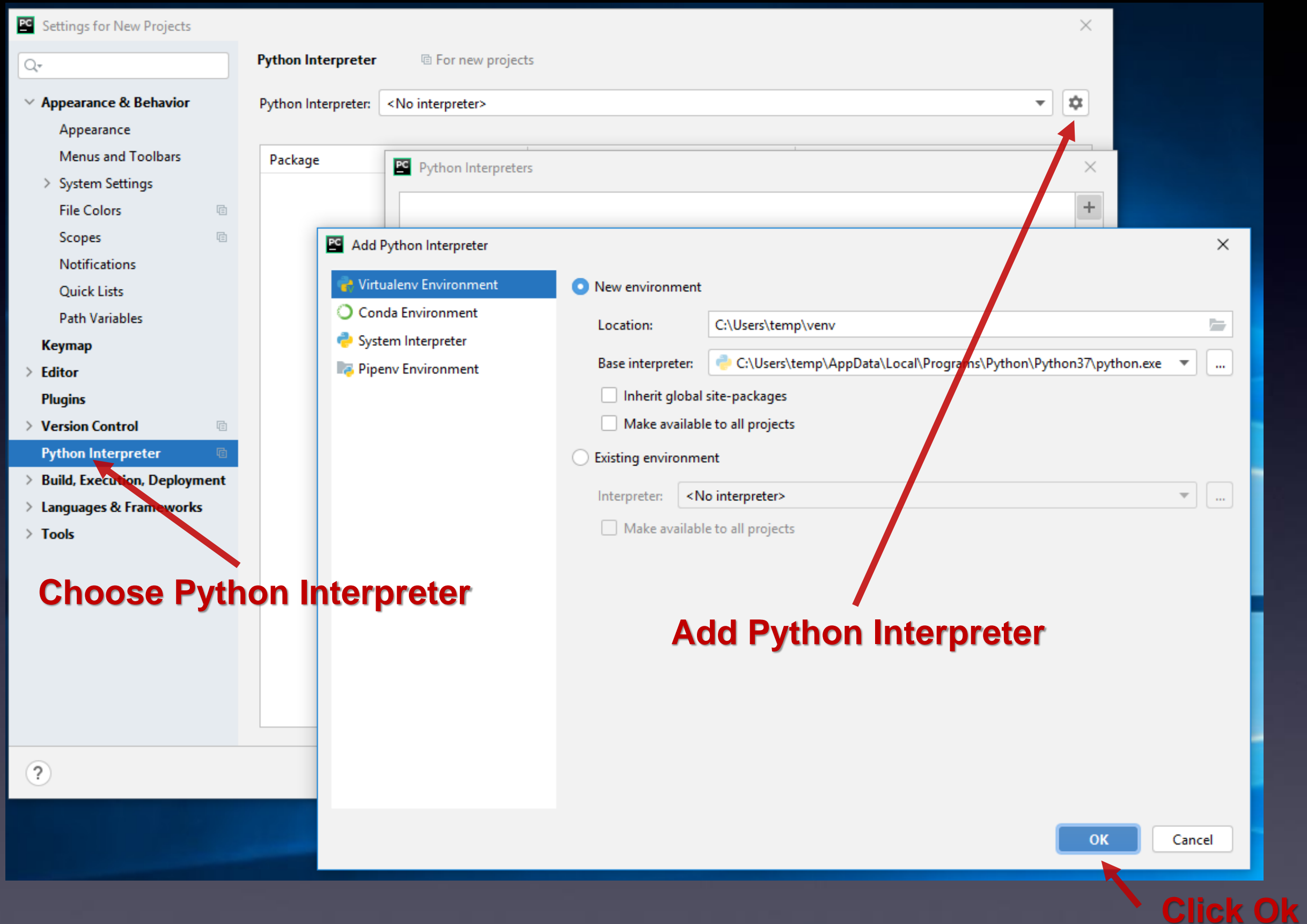


# First start PyCharm



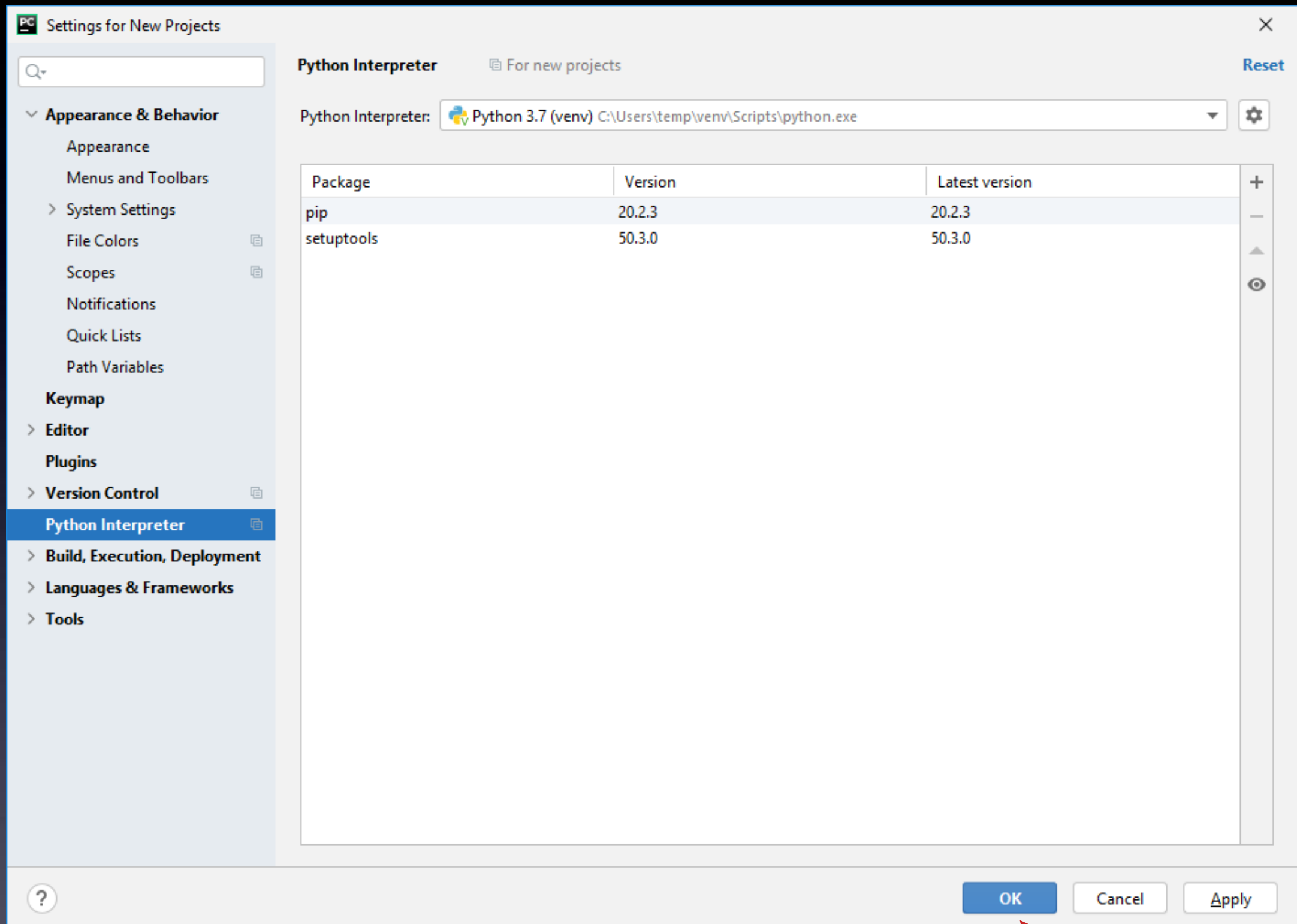
**Choose Configure, than Settings**

# First start PyCharm



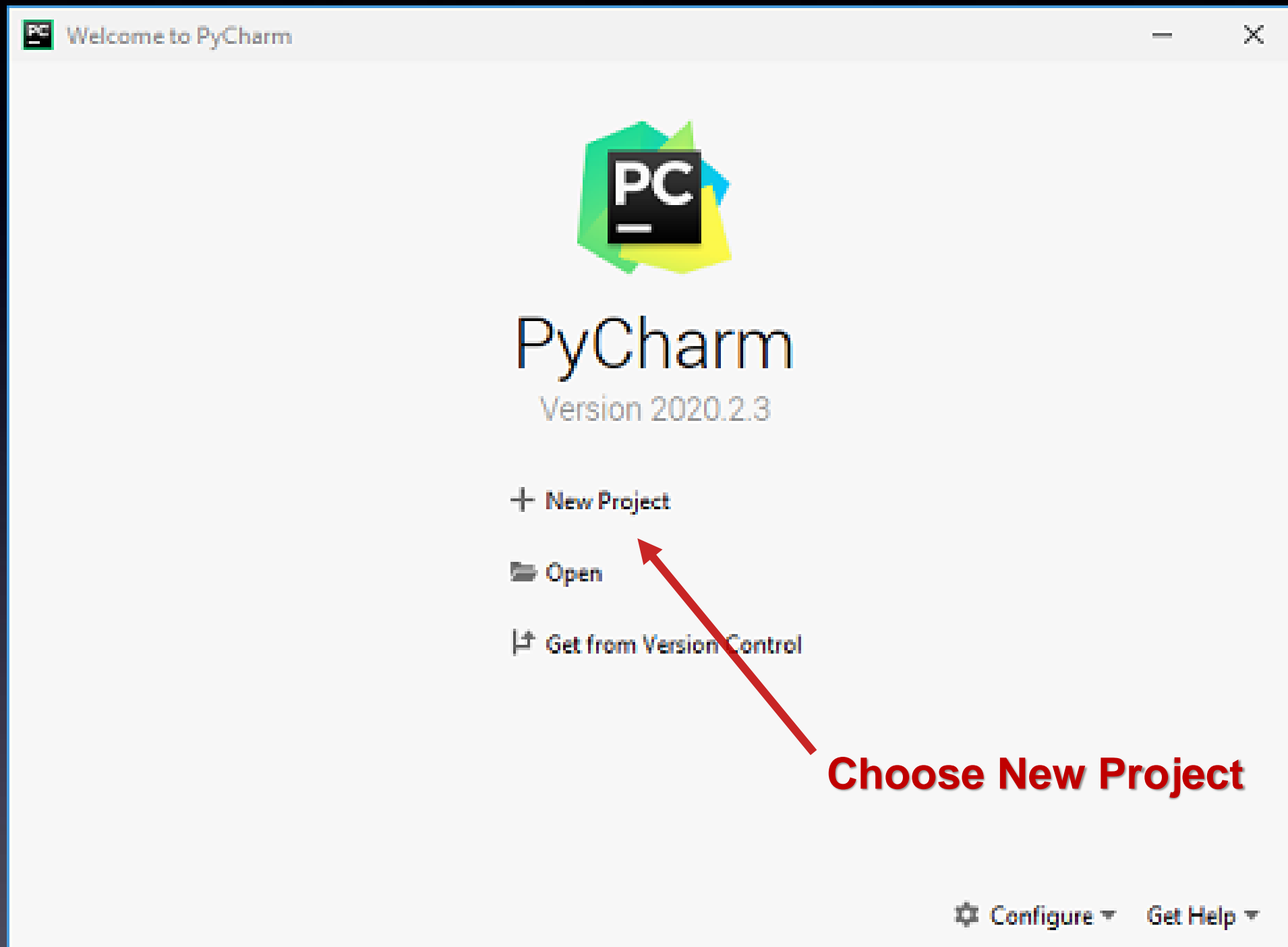


# First start PyCharm

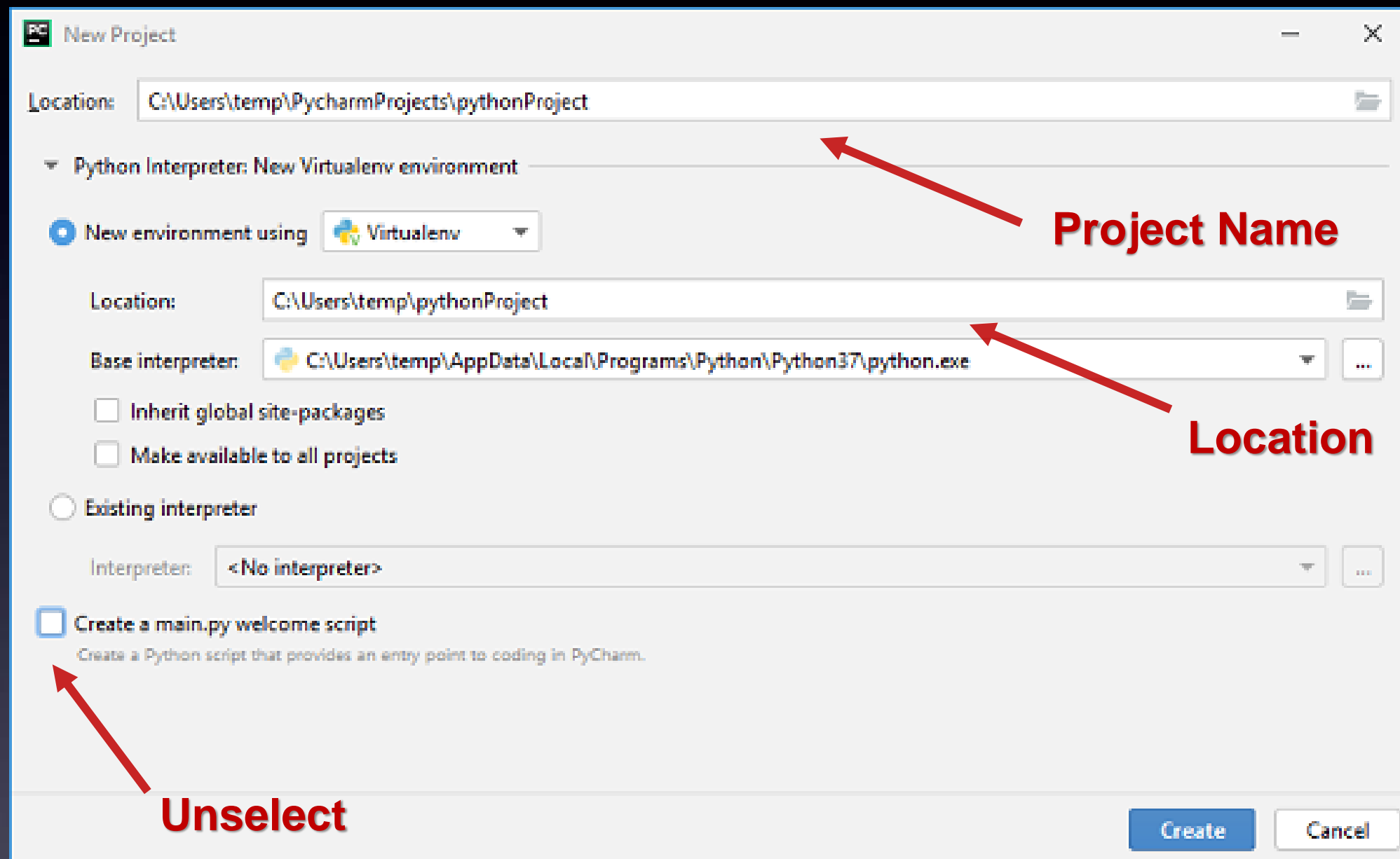


Click Ok

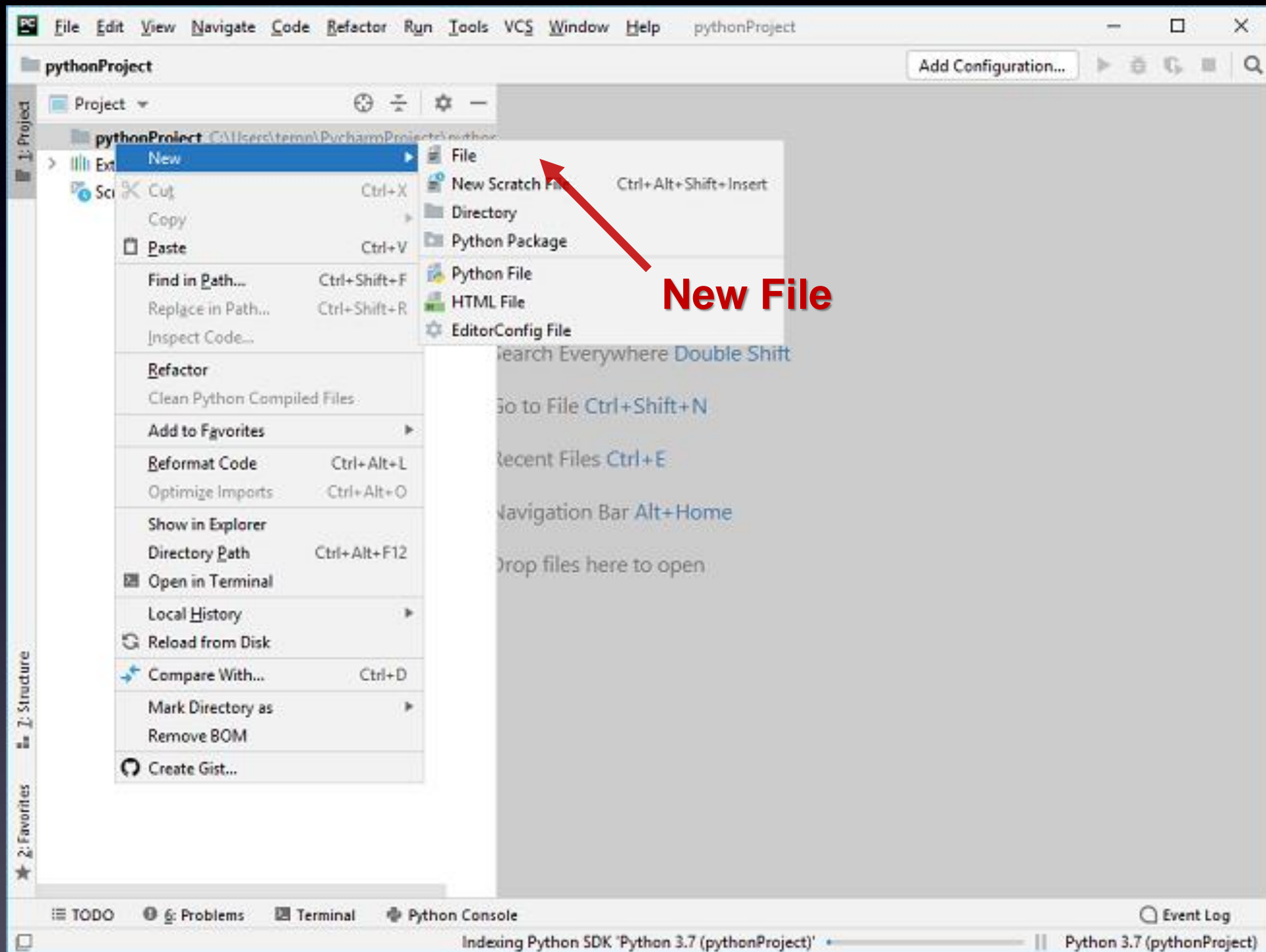
# First Program



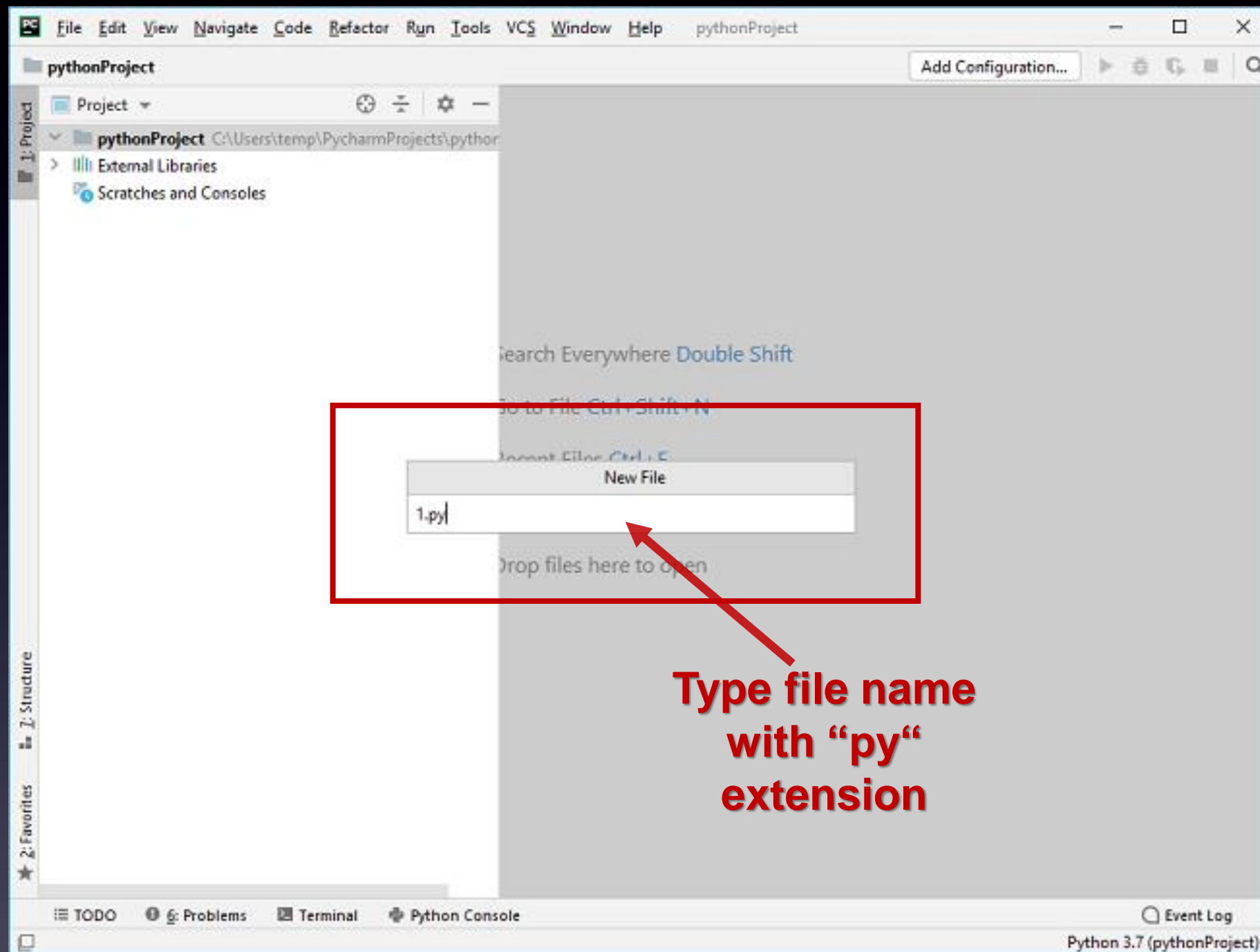
# First Program



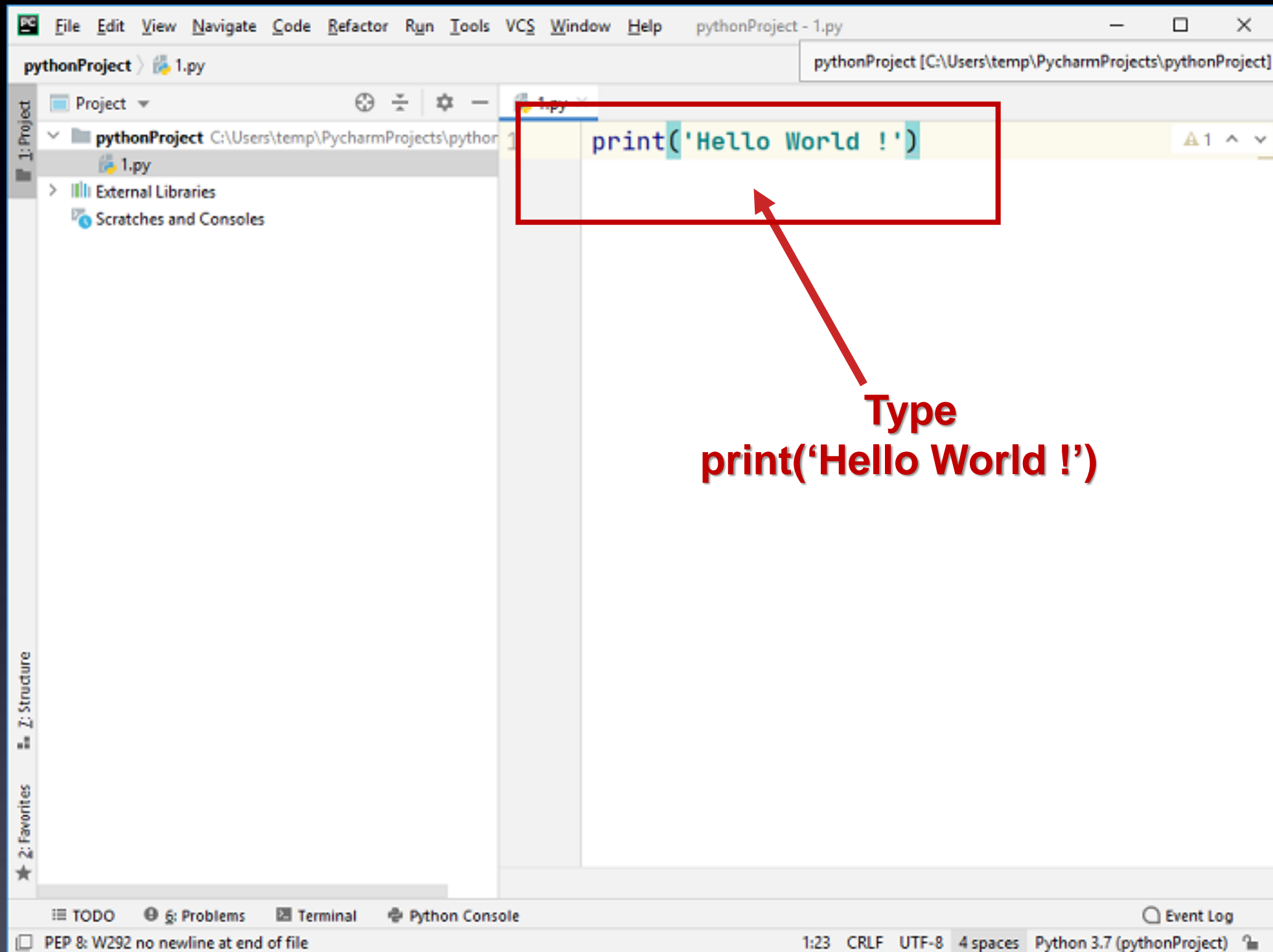
# First Program



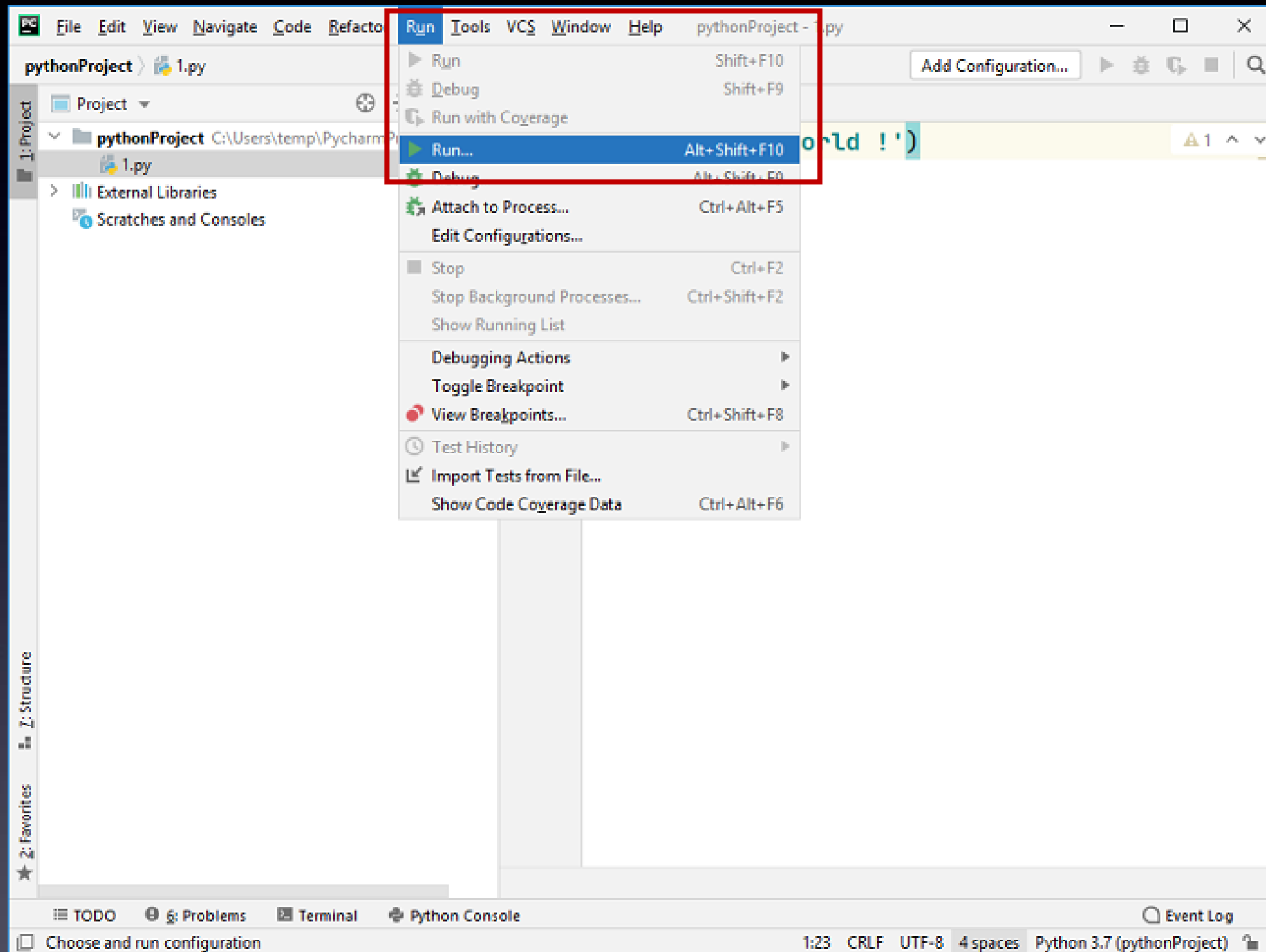
# First Program



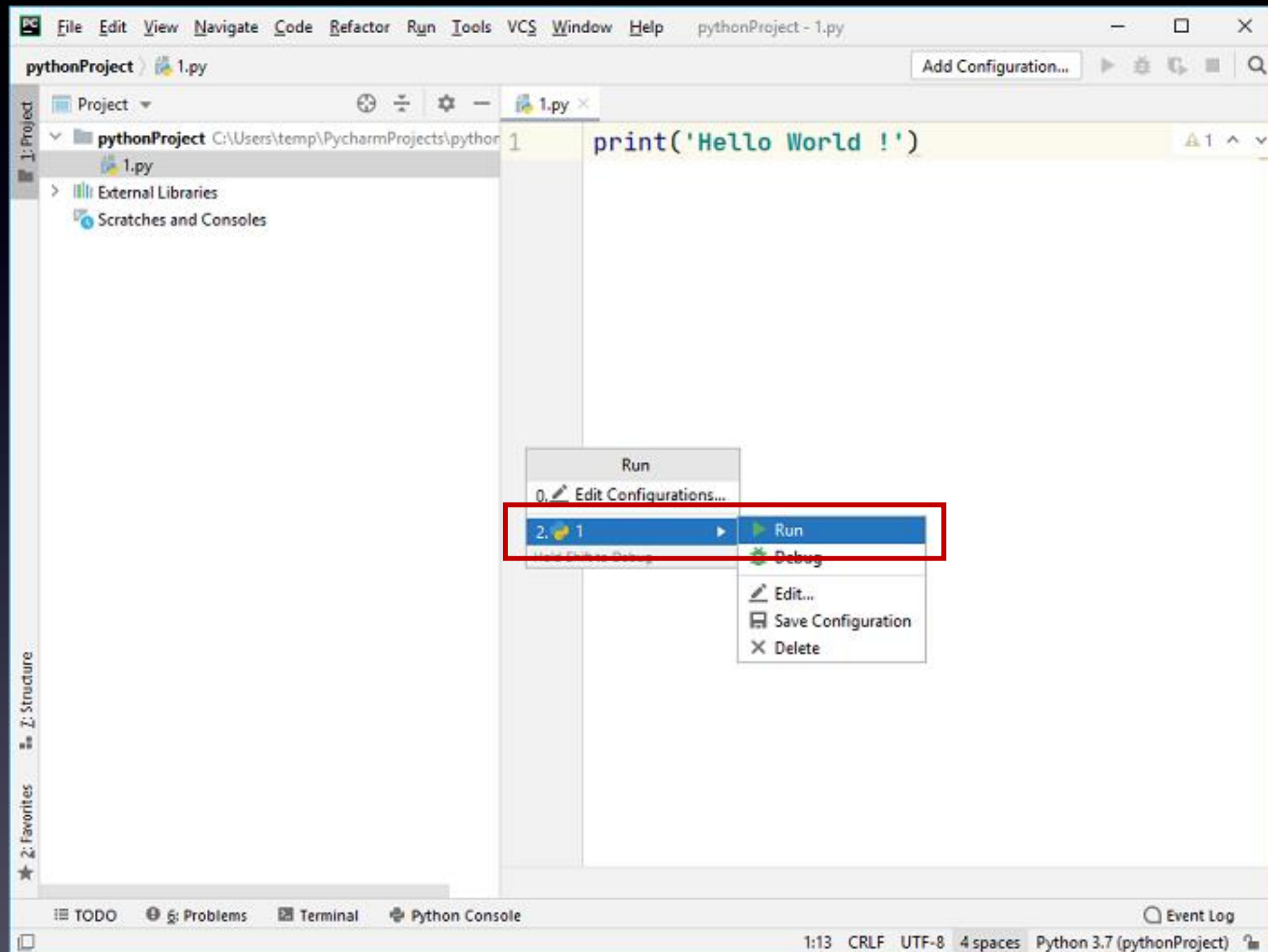
# First Program



# First Program

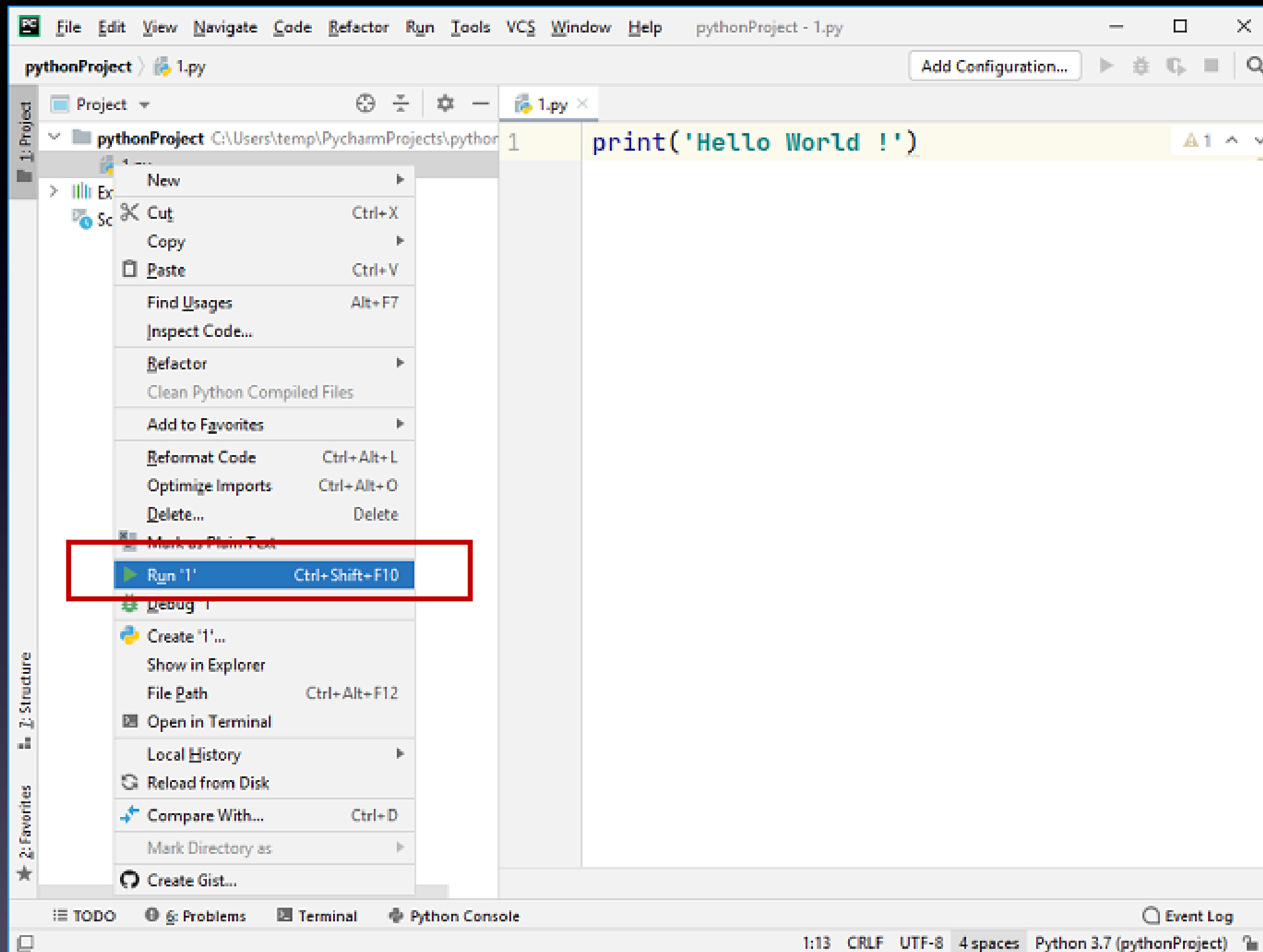


# First Program

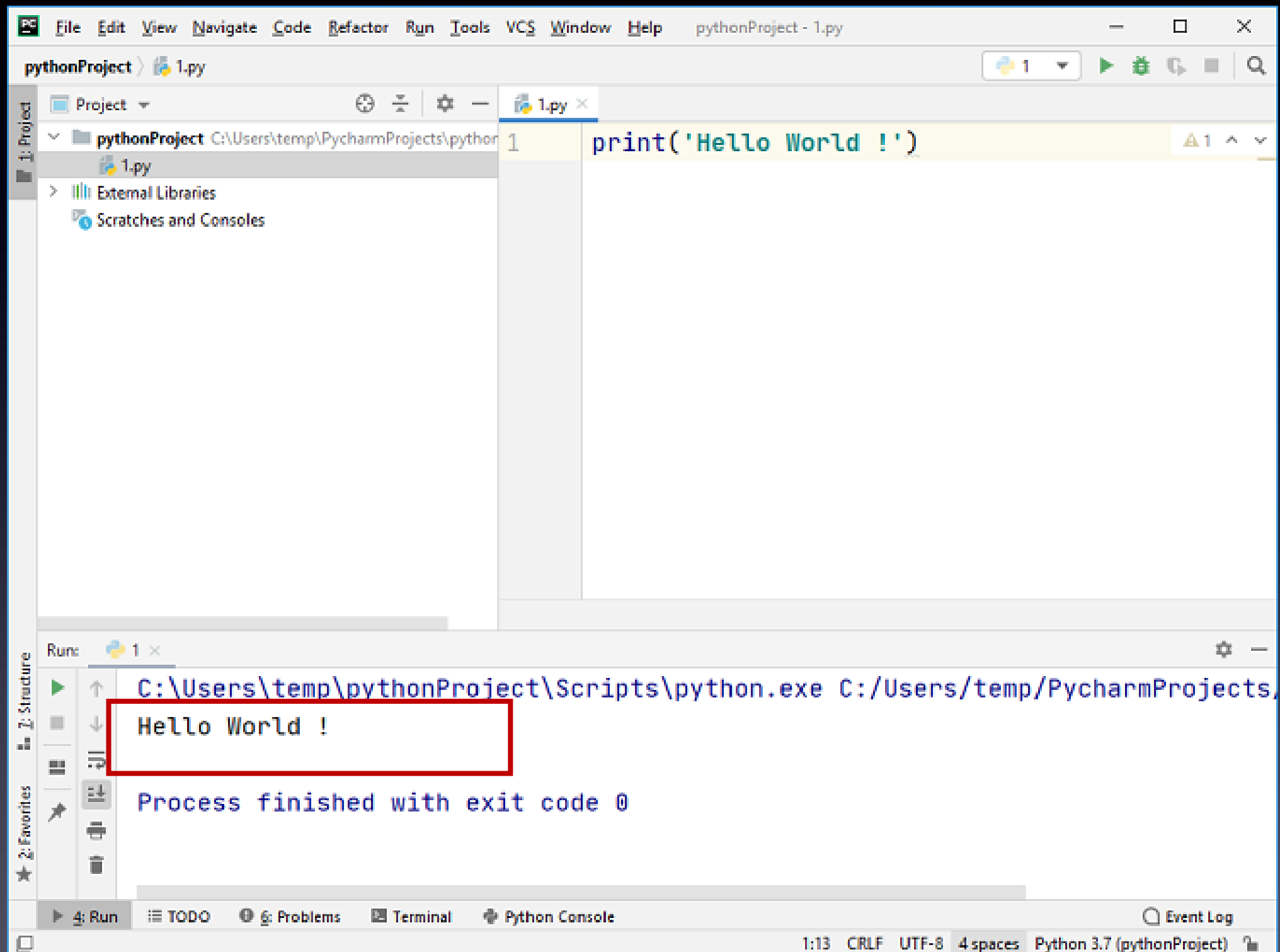




# First Program



# First Program



# 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`