

Introduction to Programming in Python

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GYEONGGI SCIENCE HIGH SCHOOL

Alan Perlis 1961

- Every scientist and engineer must know some programming. It is part of basic education, like calculus, linear algebra, introductory physics and chemistry, or English.



- https://en.wikipedia.org/wiki/Alan_Perlis

What Most Schools Don't Teach



- <https://youtu.be/nKlu9yen5nc>

Why? Computational Thinking !!

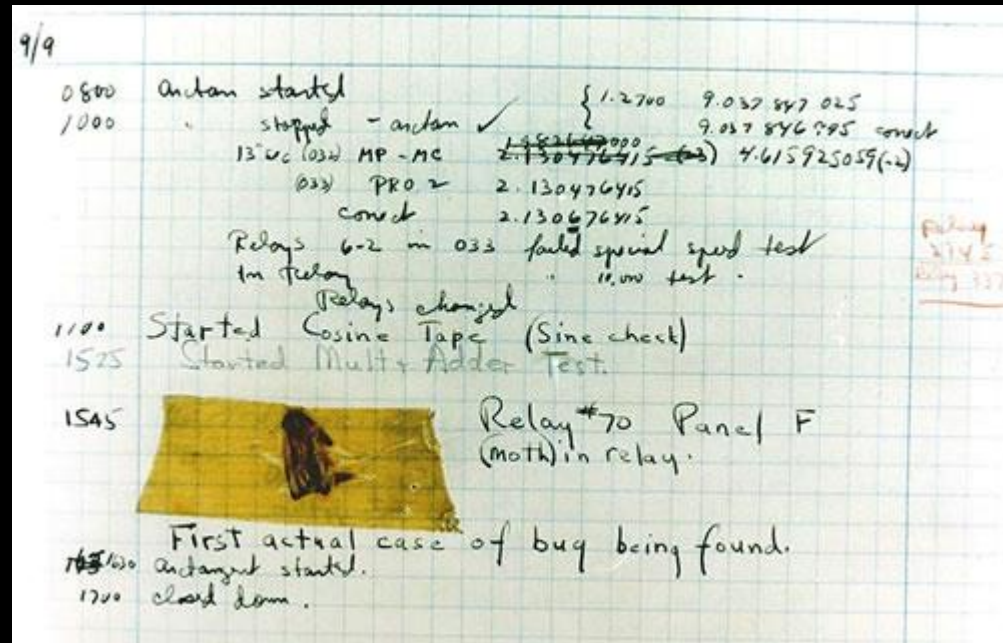
- 컴퓨터를 사용한 문제 해결
- 여러 단계의 추상화에 대한 이해.
문제를 여러 문제로 나눠서 푸는 방법.
- 사람의 체계적인 사고 방법 (\neq 컴퓨터처럼 생각하기)
- 문제 해결 방법에 대한 생각 (알고리즘)

What is Program?

- 프로그램이란 문제를 해결하거나, 목표를 달성하기 위한 순차적인 명령.
- 명령(Instruction)이란 컴퓨터가 수행할 수 있는 일 하나하나.
- 명령들을 결합하여 보다 추상적인 새로운 명령을 정의.
- 프로그램은 알고리즘을 사용. (문제를 풀기 위한 방법)

Debugging

- 버그(Bug)란 프로그램의 잘못된 부분



Grace Hopper

<https://ko.wikipedia.org/wiki/그레이스 호퍼>

Debugging

- Syntax error
 - 문법에러(발견하기 쉬움)
- Runtime error
 - 실행 중 갑자기 종료(해결하기 어려움)
- Semantic error
 - 기대하지 않는 결과 발생(해결하기 어려움)

Why is programming useful?

- Programming gives you freedom.
 - 수학
 - 물리
 - 화학
 - 생명과학
 - 지구과학
 - 영어
 - 체육
 - 정보
- Programming is Fun.

Python

- 파이썬은 1991년 프로그래머인 귀도 반 로섬이 발표한 고급 프로그래밍 언어로, 플랫폼에 독립적이며 인터프리터식, 객체지향적, 동적 타이핑 (dynamically typed) 대화형 언어이다.
- 파이썬이라는 이름은 귀도가 좋아하는 코미디 <Monty Python's Flying Circus>에서 따온 것이다.



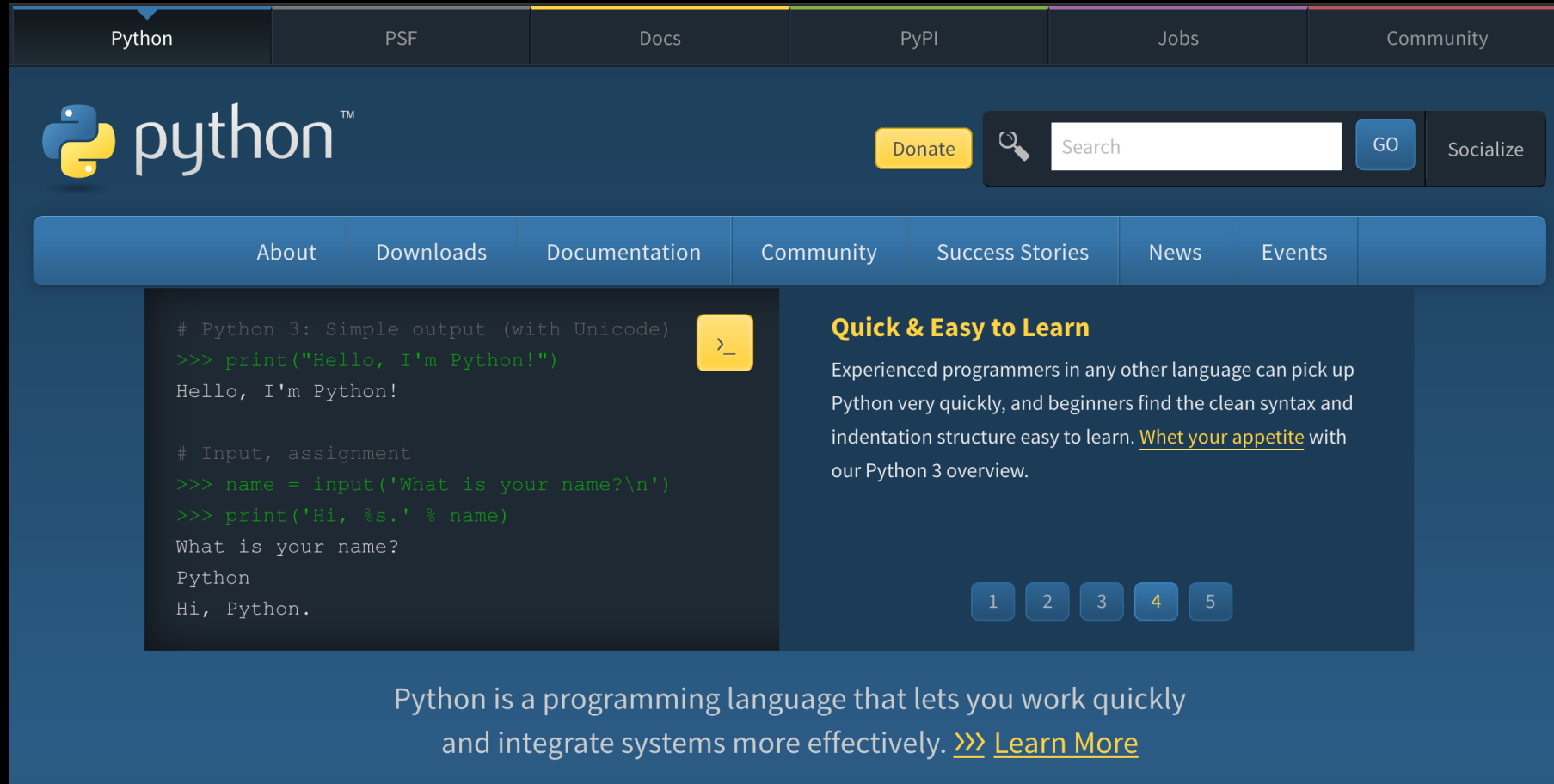
TIOBE Index

Mar 2021	Mar 2020	Change	Programming Language	Ratings	Change
1	2	⬆	C	15.33%	-1.00%
2	1	⬇	Java	10.45%	-7.33%
3	3		Python	10.31%	+0.20%
4	4		C++	6.52%	-0.27%
5	5		C#	4.97%	-0.35%
6	6		Visual Basic	4.85%	-0.40%
7	7		JavaScript	2.11%	+0.06%
8	8		PHP	2.07%	+0.05%
9	12	⬆	Assembly language	1.97%	+0.72%
10	9	⬇	SQL	1.87%	+0.03%
11	10	⬇	Go	1.31%	+0.03%
12	18	⬆	Classic Visual Basic	1.26%	+0.49%
13	11	⬇	R	1.25%	-0.01%
14	20	⬆	Delphi/Object Pascal	1.20%	+0.48%
15	36	⬆	Groovy	1.19%	+0.94%
16	14	⬇	Ruby	1.18%	+0.13%
17	17		Perl	1.15%	+0.24%
18	15	⬇	MATLAB	1.04%	+0.05%
19	13	⬇	Swift	0.95%	-0.28%
20	19	⬇	Objective-C	0.91%	+0.17%

Python

- 인공지능 프로그램
- 수학자나 물리학자들이 과학적 계산을 위해 널리 사용.
- 웹 프로그래밍에서도 사용 가능
- 임베디드 환경에서도 사용 가능
- 많은 대학 및 중고등학교의 프로그래밍 입문 언어

Python Install(python.org)



The image is a screenshot of the Python.org homepage. At the top, there is a navigation bar with links to Python, PSF, Docs, PyPI, Jobs, and Community. Below this is a header section featuring the Python logo, a 'Donate' button, a search bar with a 'GO' button, and a 'Socialize' button. A secondary navigation bar contains links to About, Downloads, Documentation, Community, Success Stories, News, and Events. The main content area is divided into two columns. The left column displays a code snippet for a simple Python program that prints 'Hello, I'm Python!' and a program that takes user input and prints a greeting. The right column has a section titled 'Quick & Easy to Learn' with a paragraph about Python's ease of learning and a link to 'Whet your appetite' with our Python 3 overview. Below this paragraph is a row of five numbered buttons (1-5). At the bottom of the page, a large blue banner contains the text: 'Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)'.

Python

PSF

Docs

PyPI

Jobs

Community

python™

Donate

Search

GO

Socialize

About

Downloads

Documentation

Community

Success Stories

News

Events

```
# Python 3: Simple output (with Unicode)
>>> print("Hello, I'm Python!")
Hello, I'm Python!

# Input, assignment
>>> name = input('What is your name?\n')
>>> print('Hi, %s.' % name)
What is your name?
Python
Hi, Python.
```

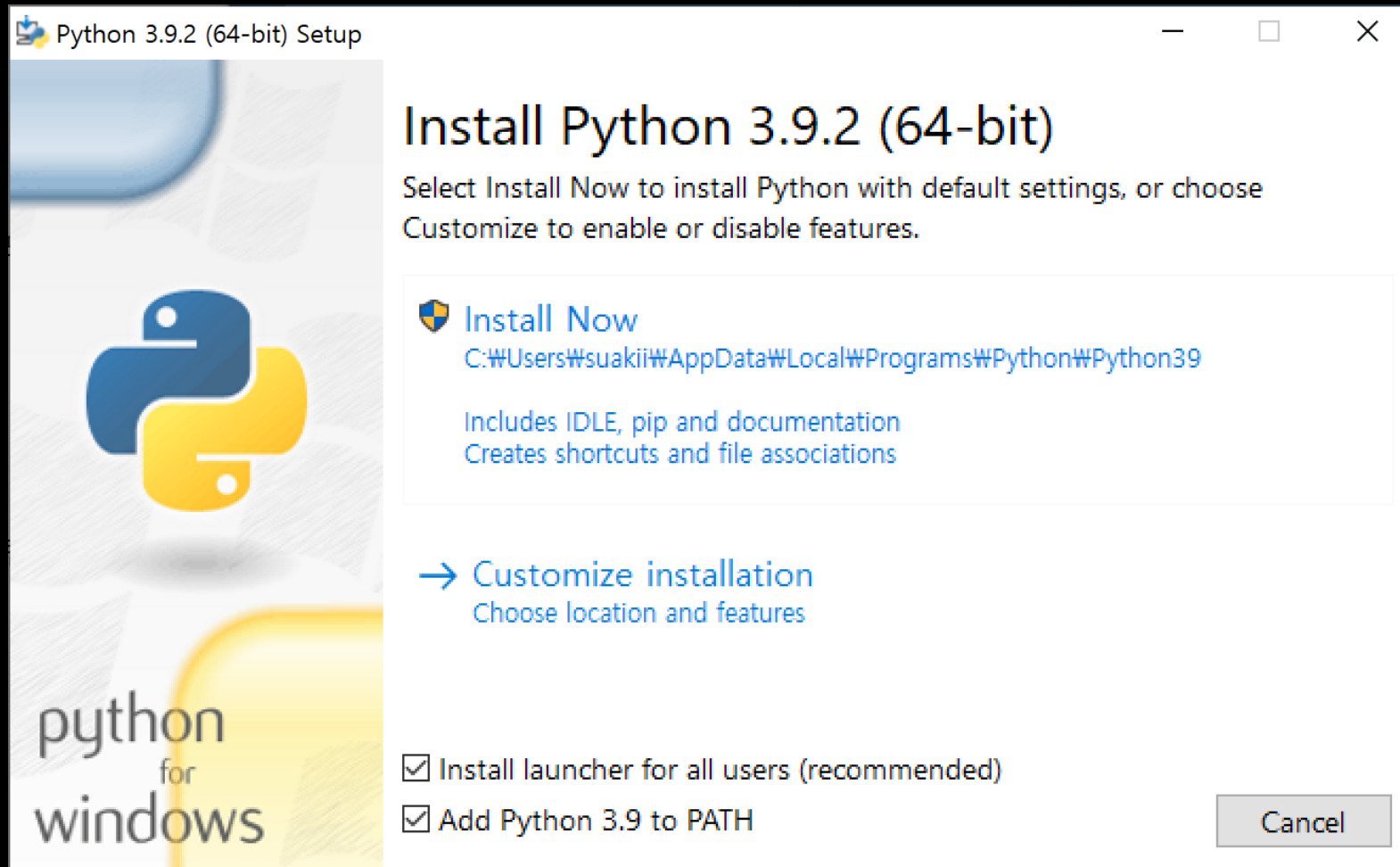
Quick & Easy to Learn

Experienced programmers in any other language can pick up Python very quickly, and beginners find the clean syntax and indentation structure easy to learn. [Whet your appetite](#) with our Python 3 overview.

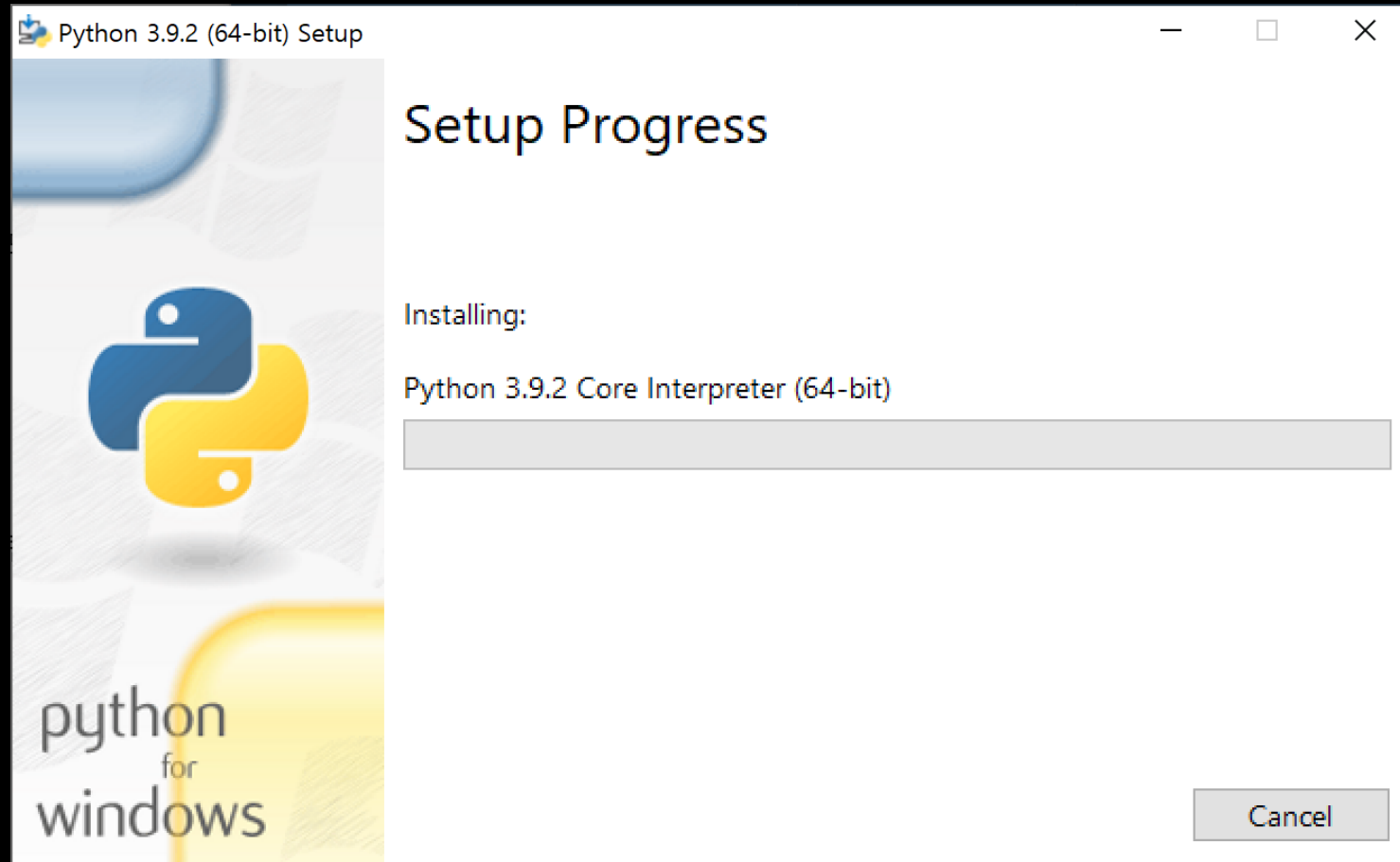
1 2 3 4 5

Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)

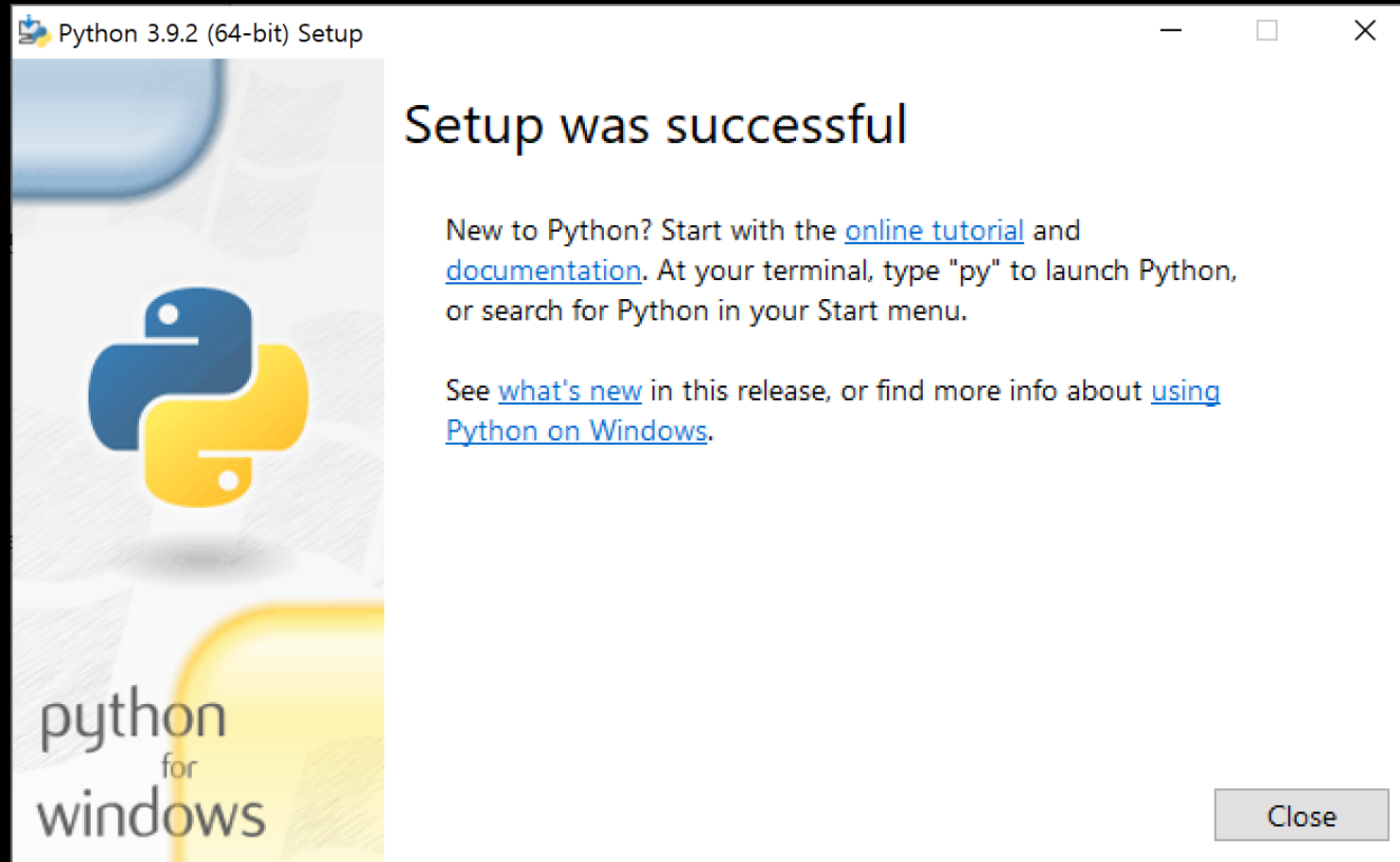
Install



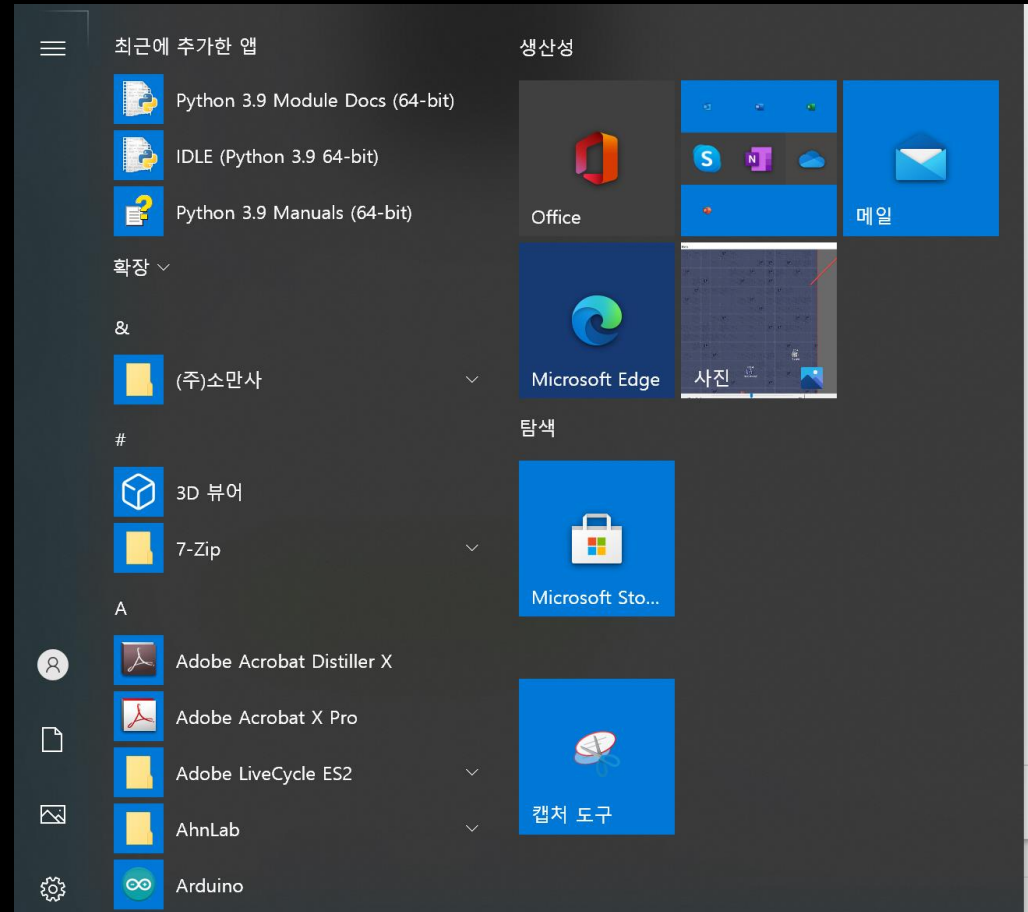
Install - Wait



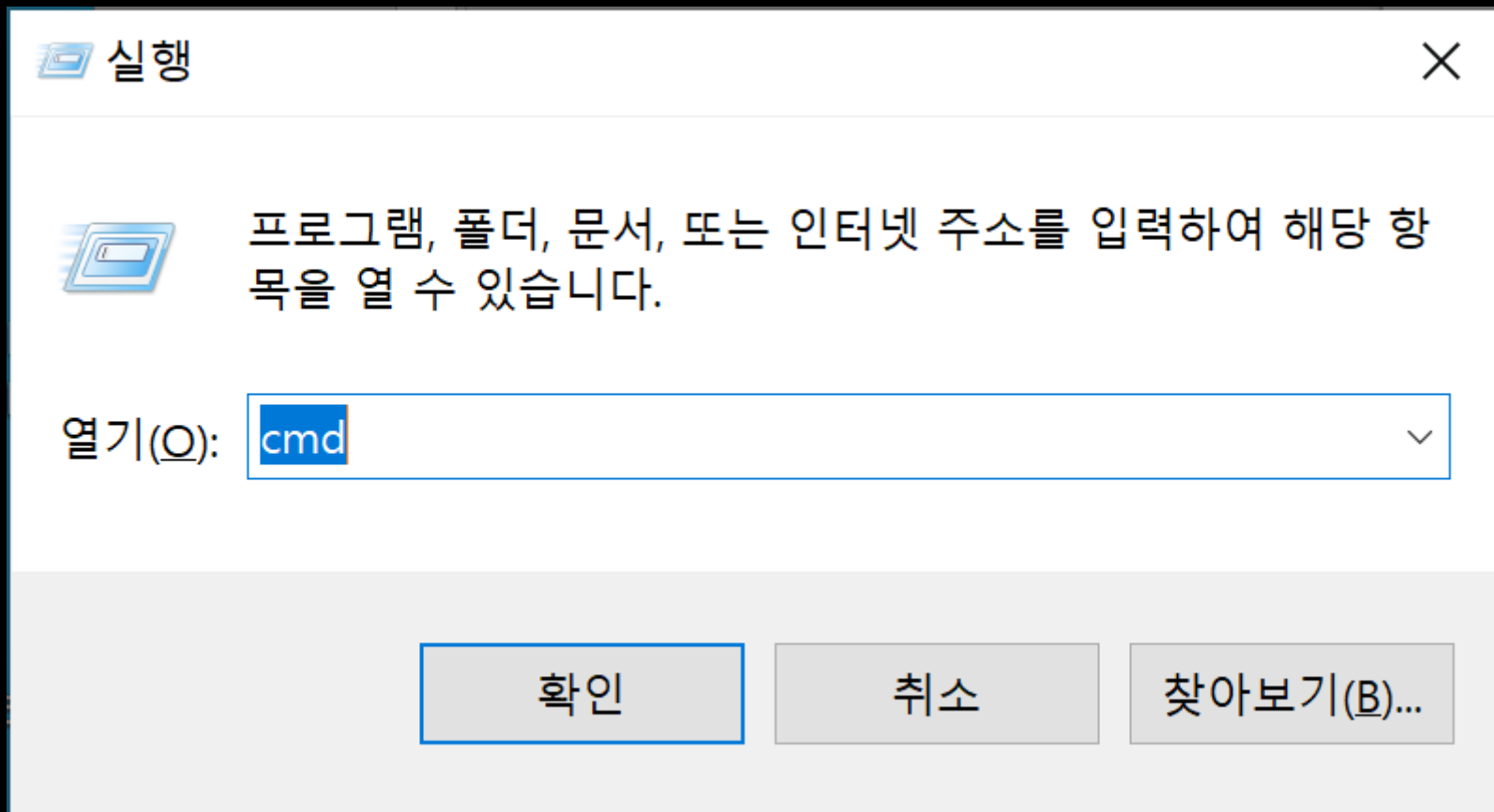
Install



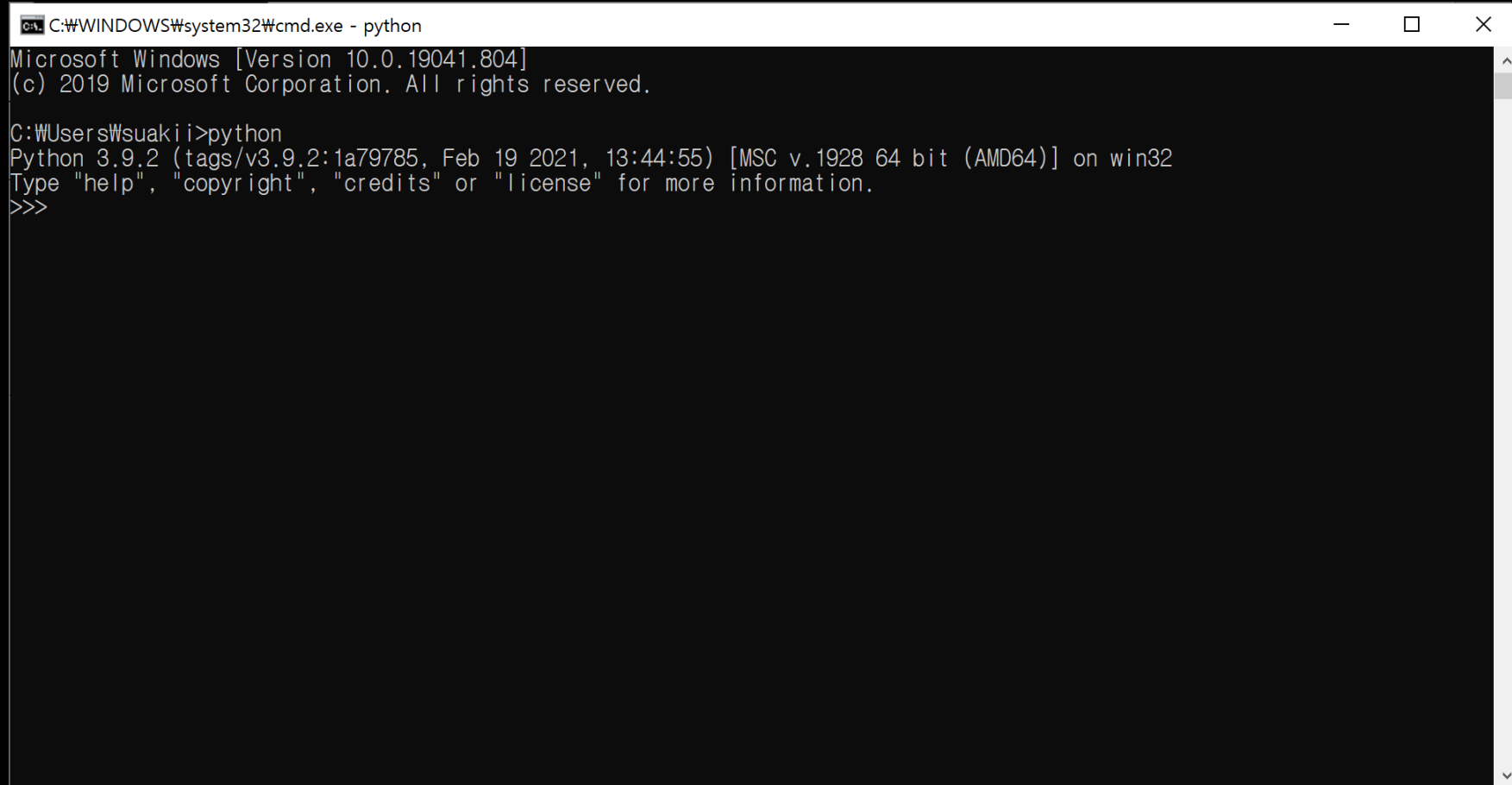
Install



Win+R



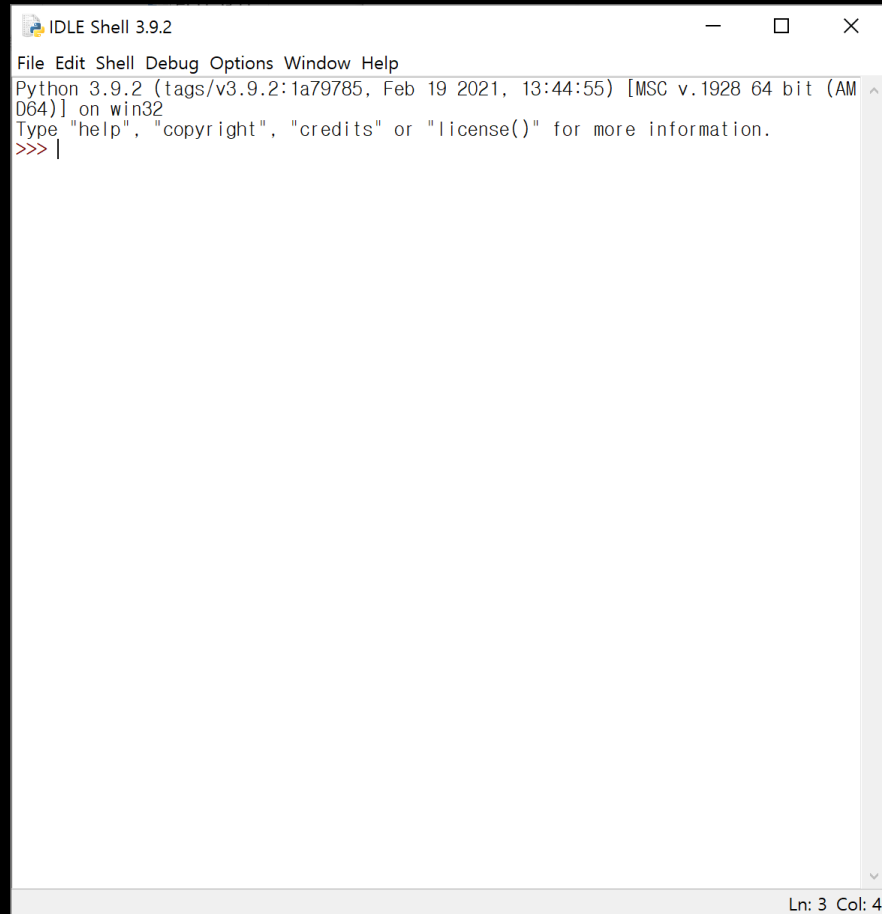
Just python



```
C:\WINDOWS\system32\cmd.exe - python
Microsoft Windows [Version 10.0.19041.804]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\suakii>python
Python 3.9.2 (tags/v3.9.2:1a79785, Feb 19 2021, 13:44:55) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

Idle

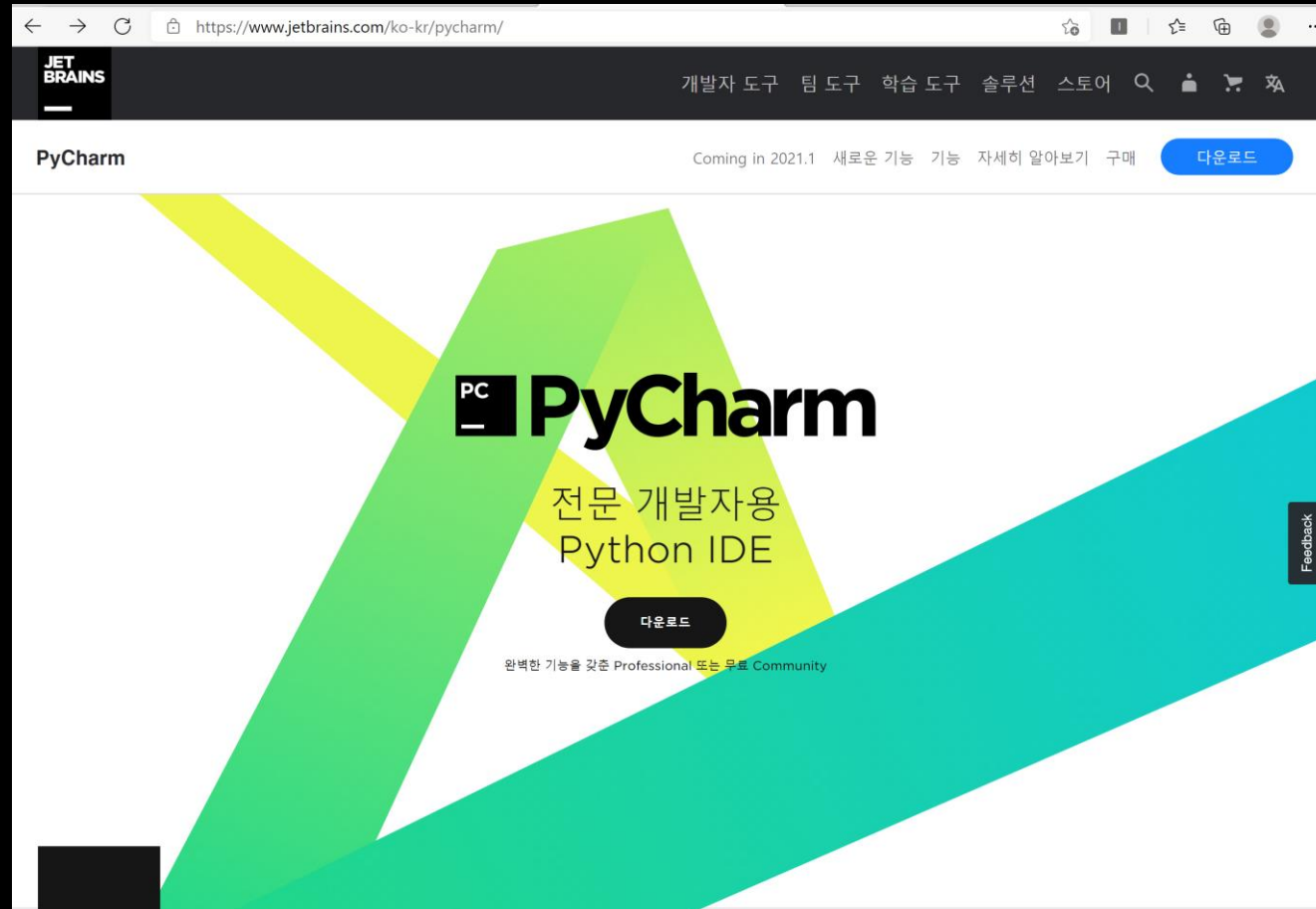


The screenshot shows the IDLE Shell 3.9.2 window. The title bar reads "IDLE Shell 3.9.2". The menu bar includes "File", "Edit", "Shell", "Debug", "Options", "Window", and "Help". The main text area displays the following text: "Python 3.9.2 (tags/v3.9.2:1a79785, Feb 19 2021, 13:44:55) [MSC v.1928 64 bit (AMD64)] on win32", "Type 'help', 'copyright', 'credits' or 'license()' for more information.", and the prompt ">>> |". The status bar at the bottom right shows "Ln: 3 Col: 4".

```
Python 3.9.2 (tags/v3.9.2:1a79785, Feb 19 2021, 13:44:55) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> |
```

Ln: 3 Col: 4


PyCharm Install



PyCharm Download

PyCharm

Coming in 2021.1 새로운 기능 기능 자세히 알아보기 구매 **다운로드**



버전: 2020.3.3
빌드: 203.7148.72
2021년 1월 27일

[시스템 요구 사항](#)
[설치 안내](#)
[기타 버전](#)

다운로드 PyCharm

[Windows](#) [macOS](#) [Linux](#)

Professional

과학 및 웹 Python 개발용. HTML, JS, SQL 지원.

다운로드


무료 평가판

Community

순수 Python 개발용

다운로드

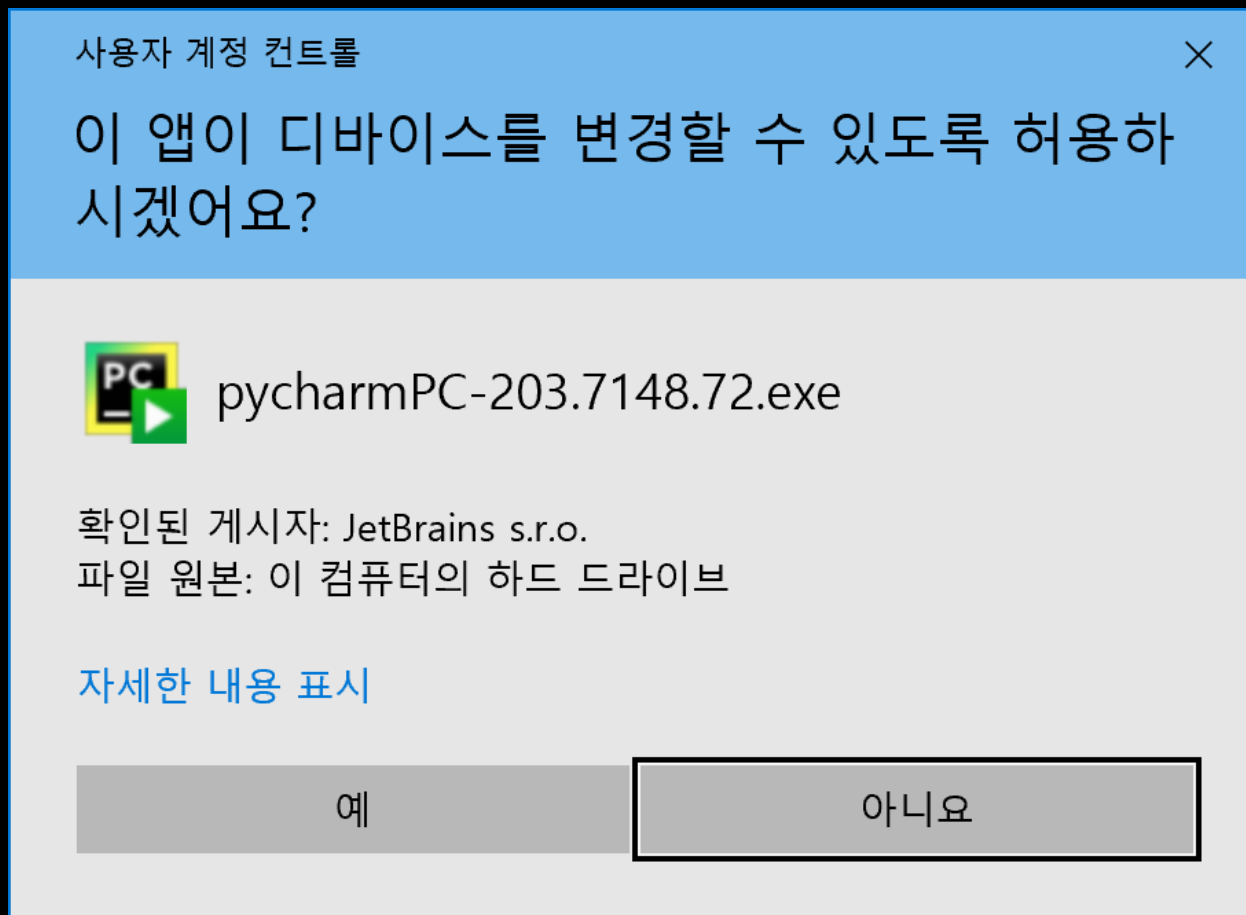
무료, 오픈 소스



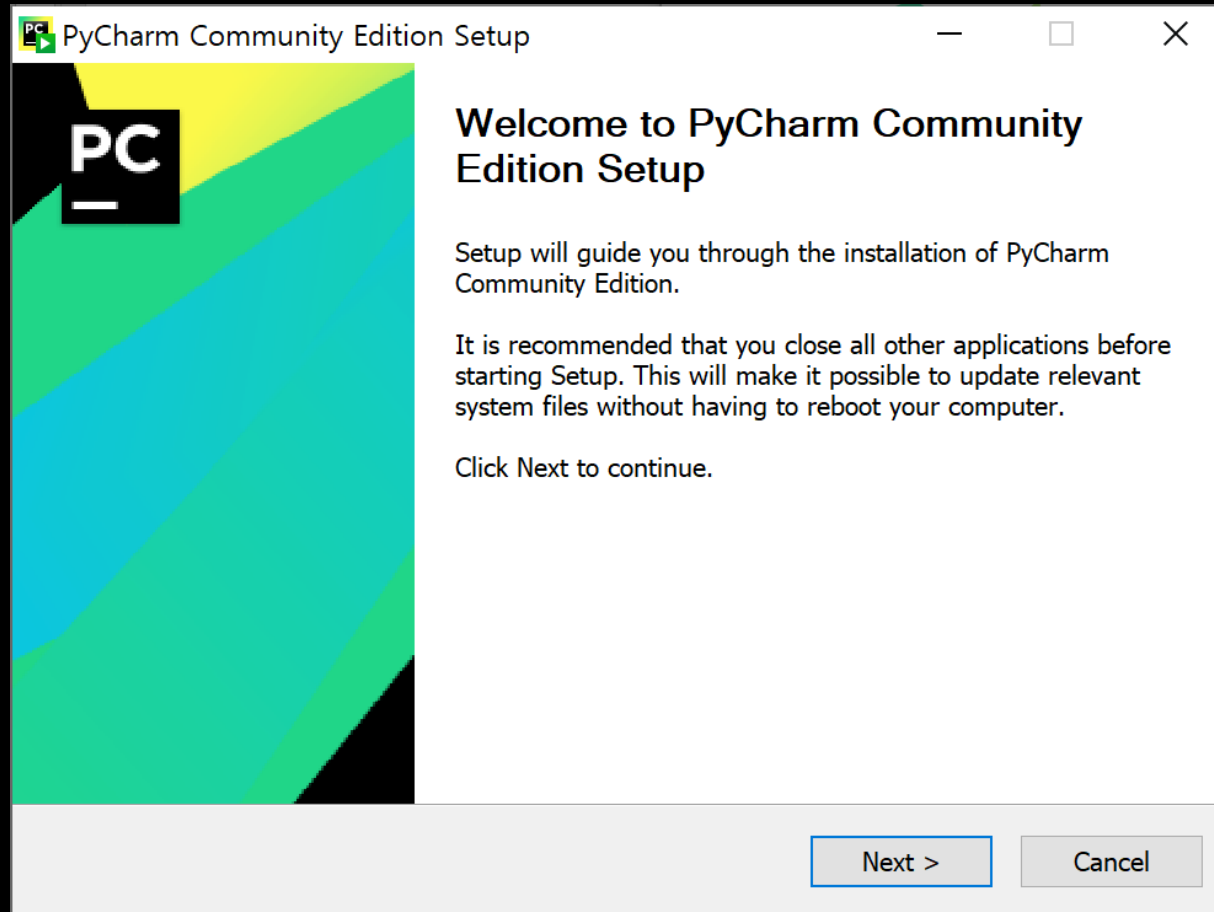
Toolbox App을 설치하여 PyCharm 및 향후 업데이트를 간편하게 다운로드하세요

Feedback

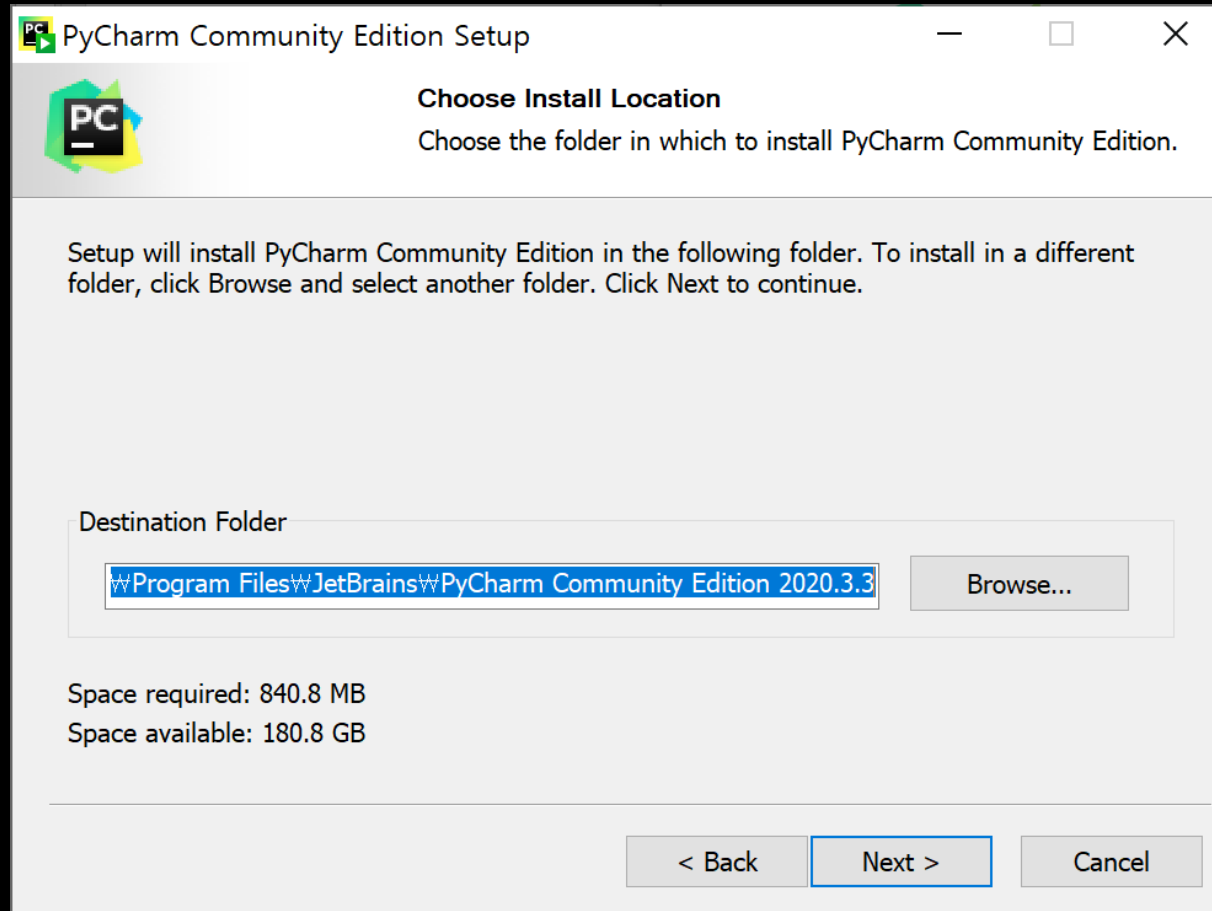
PyCharm Install



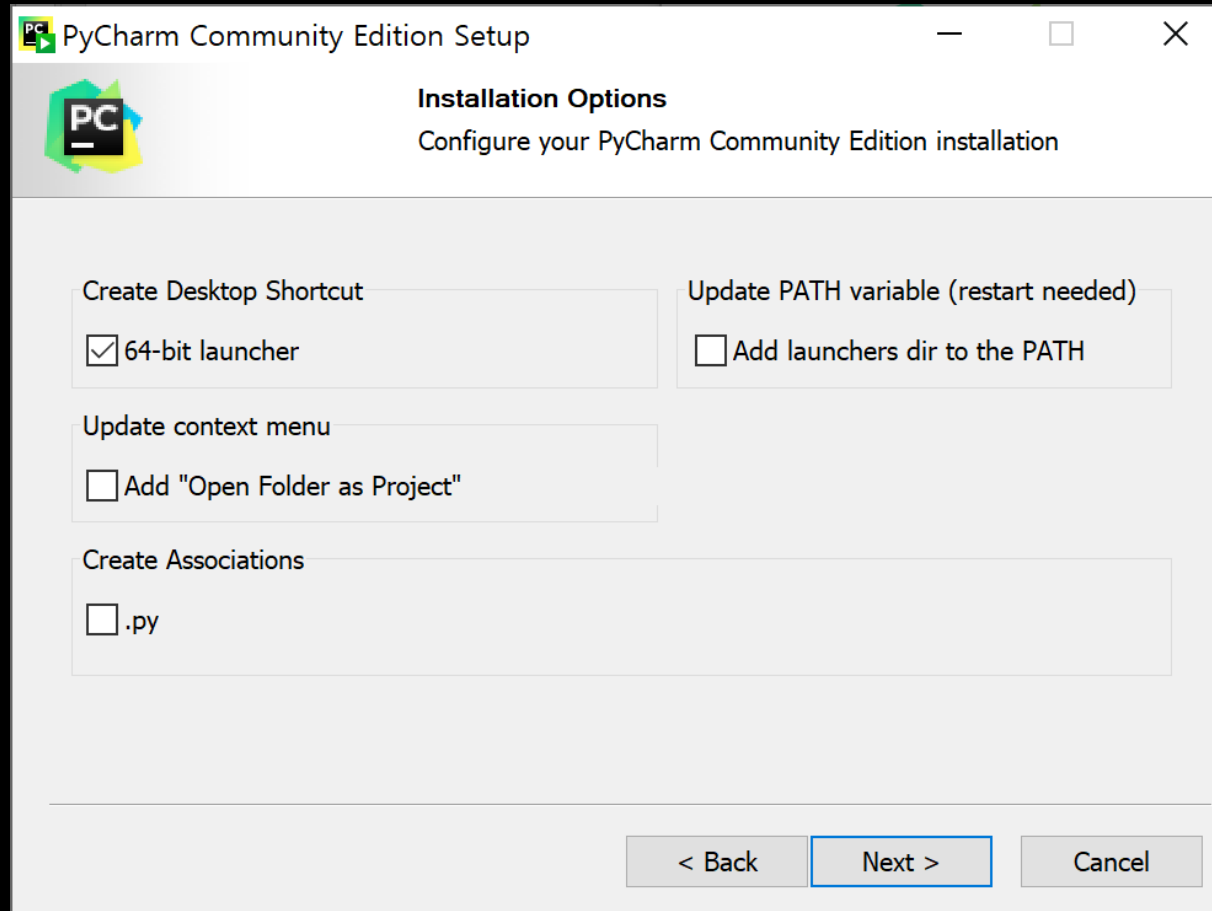
PyCharm Install



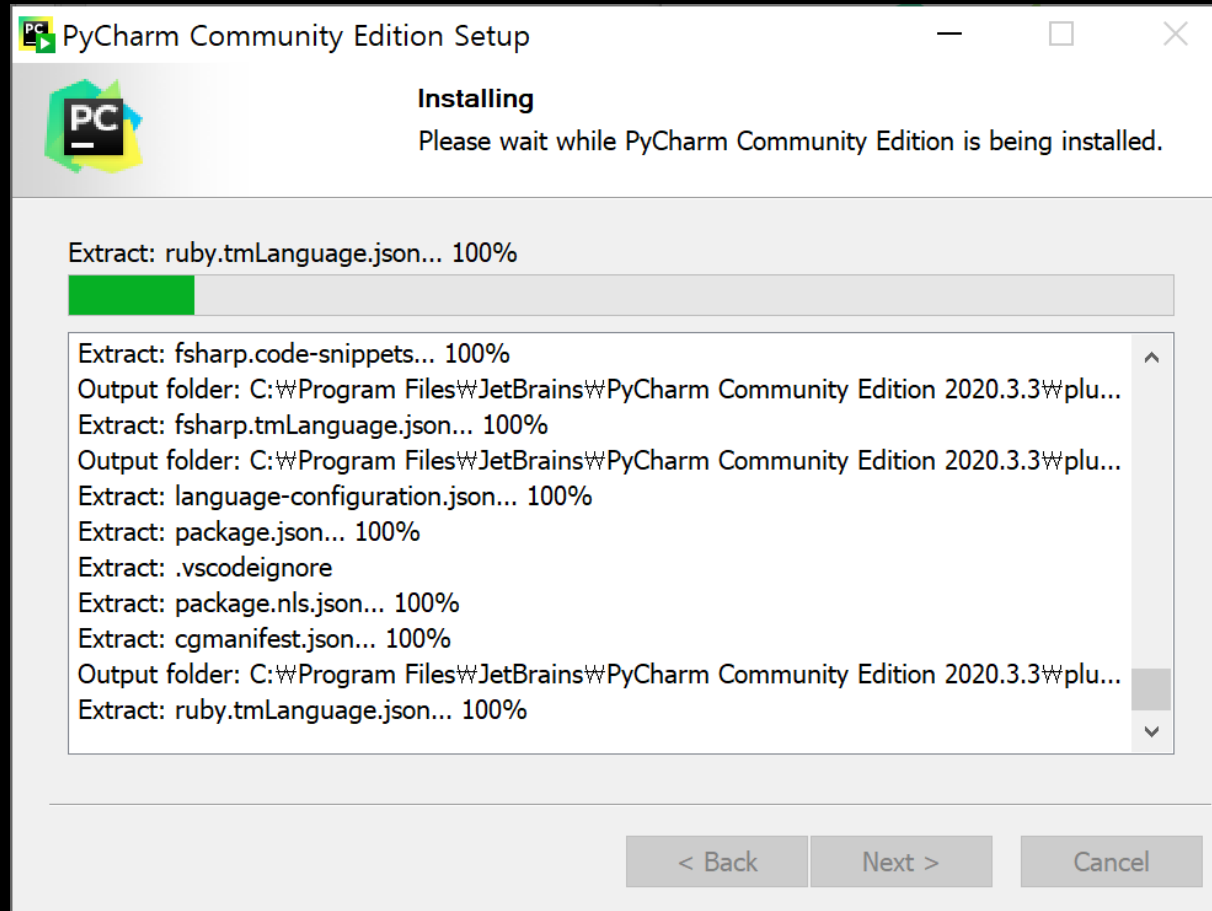
PyCharm Install



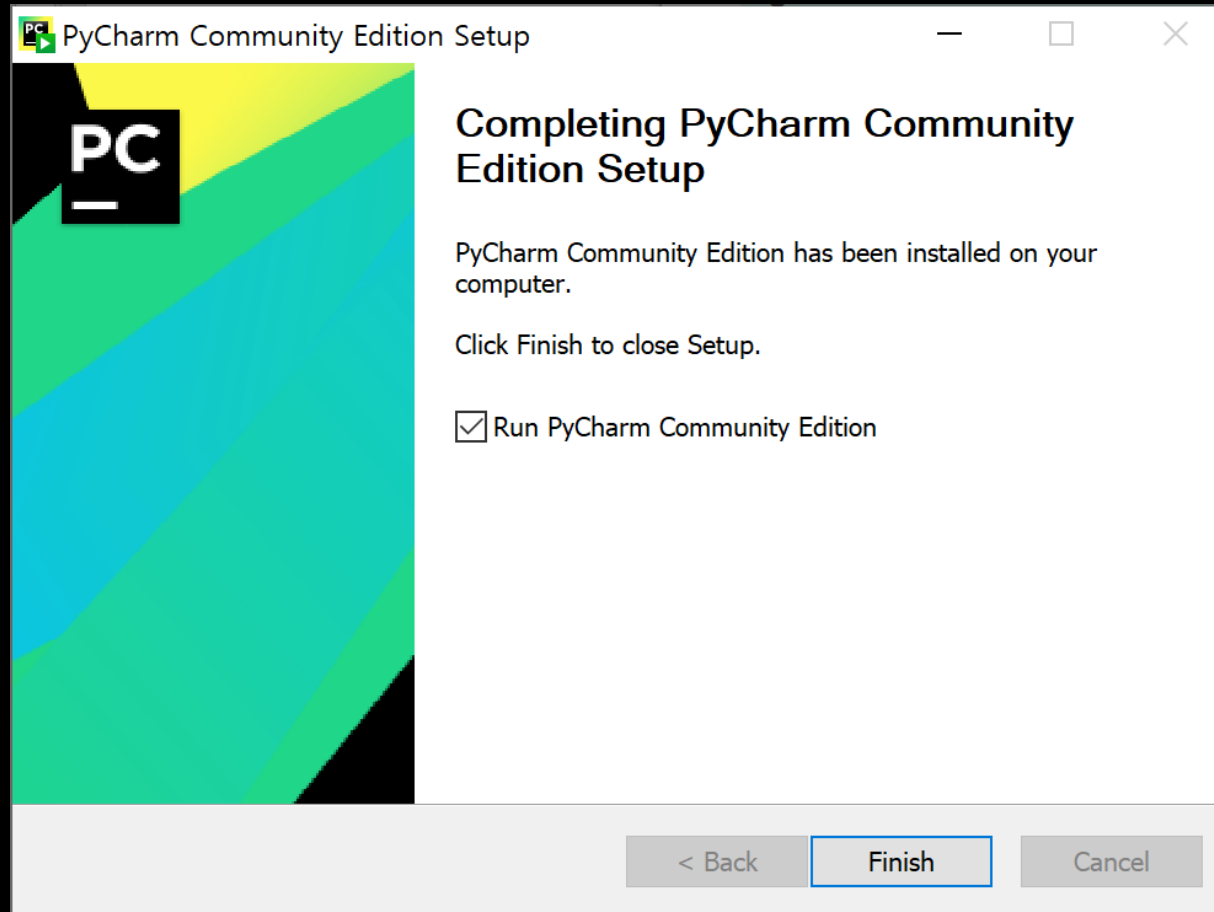
PyCharm Install



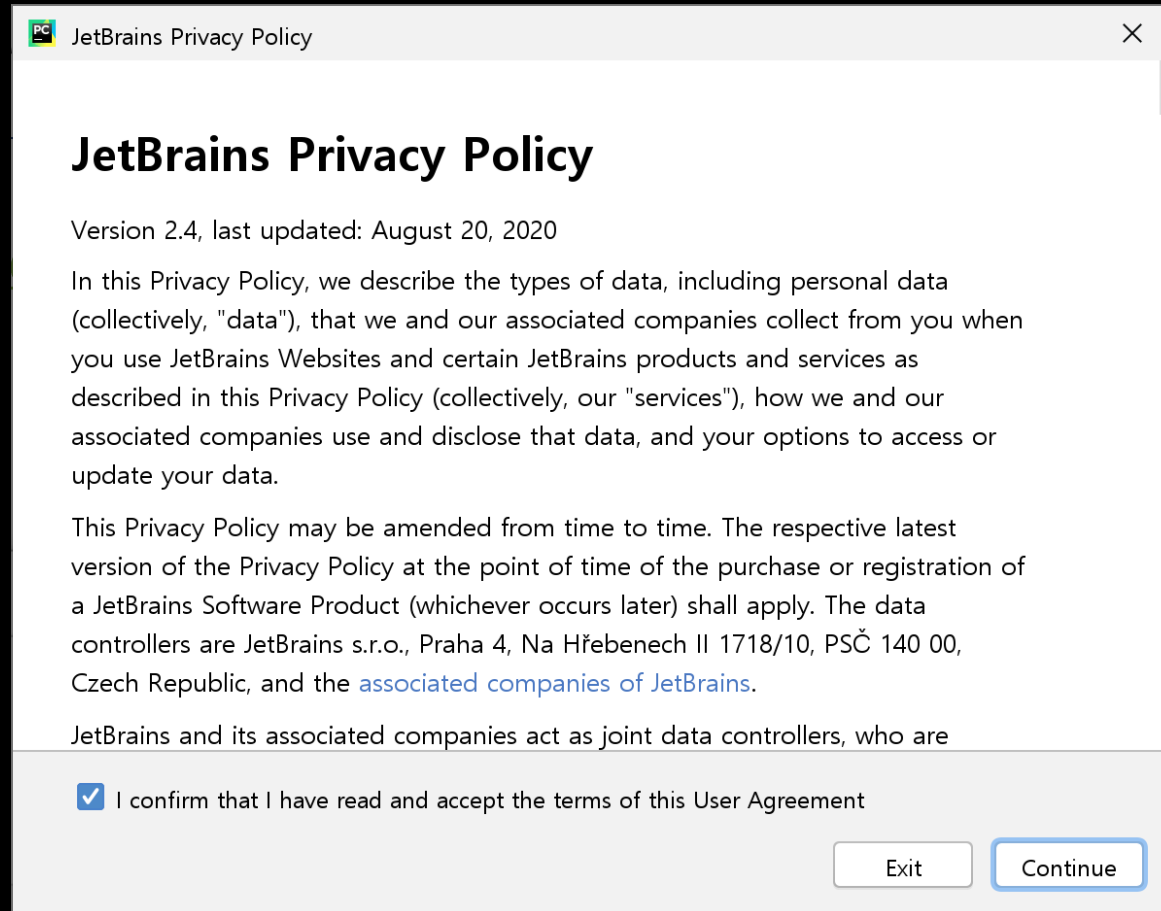
PyCharm Install



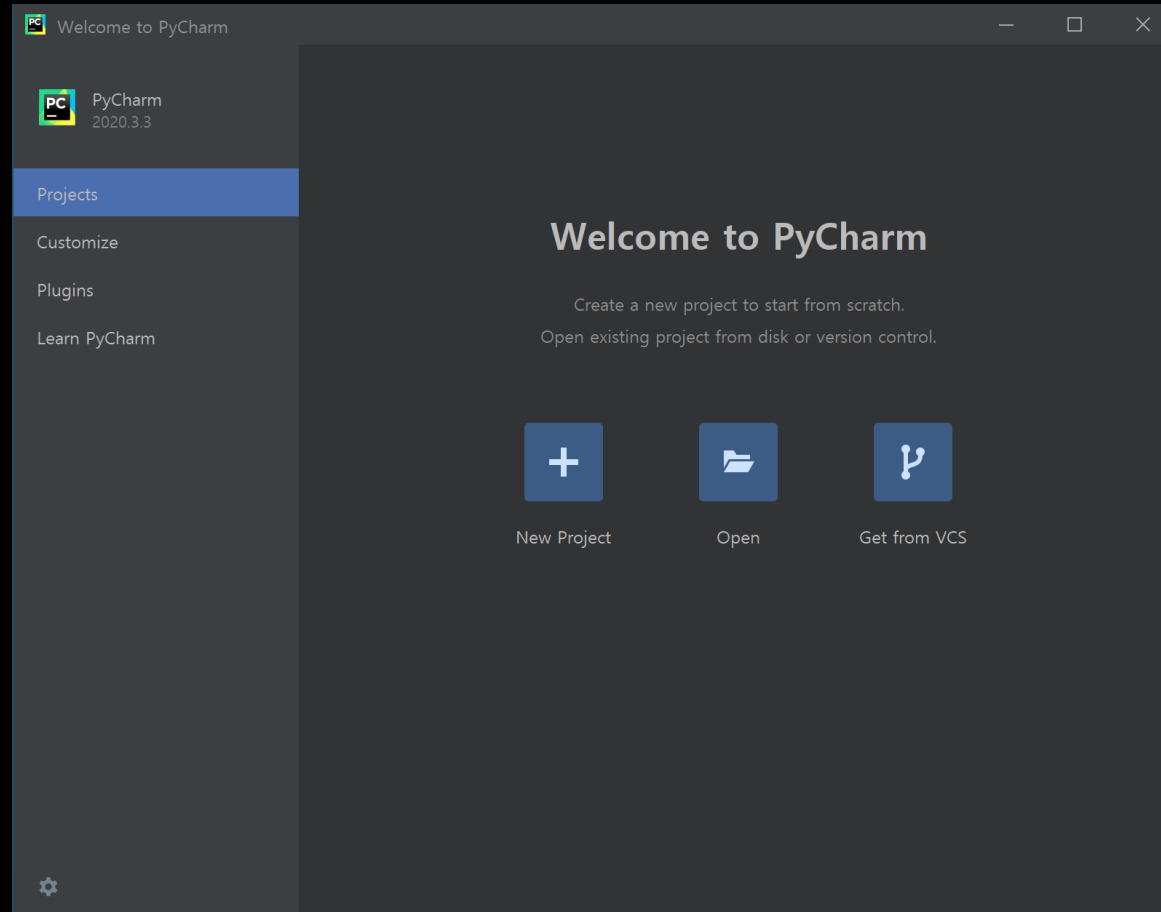
Run



PyCharm

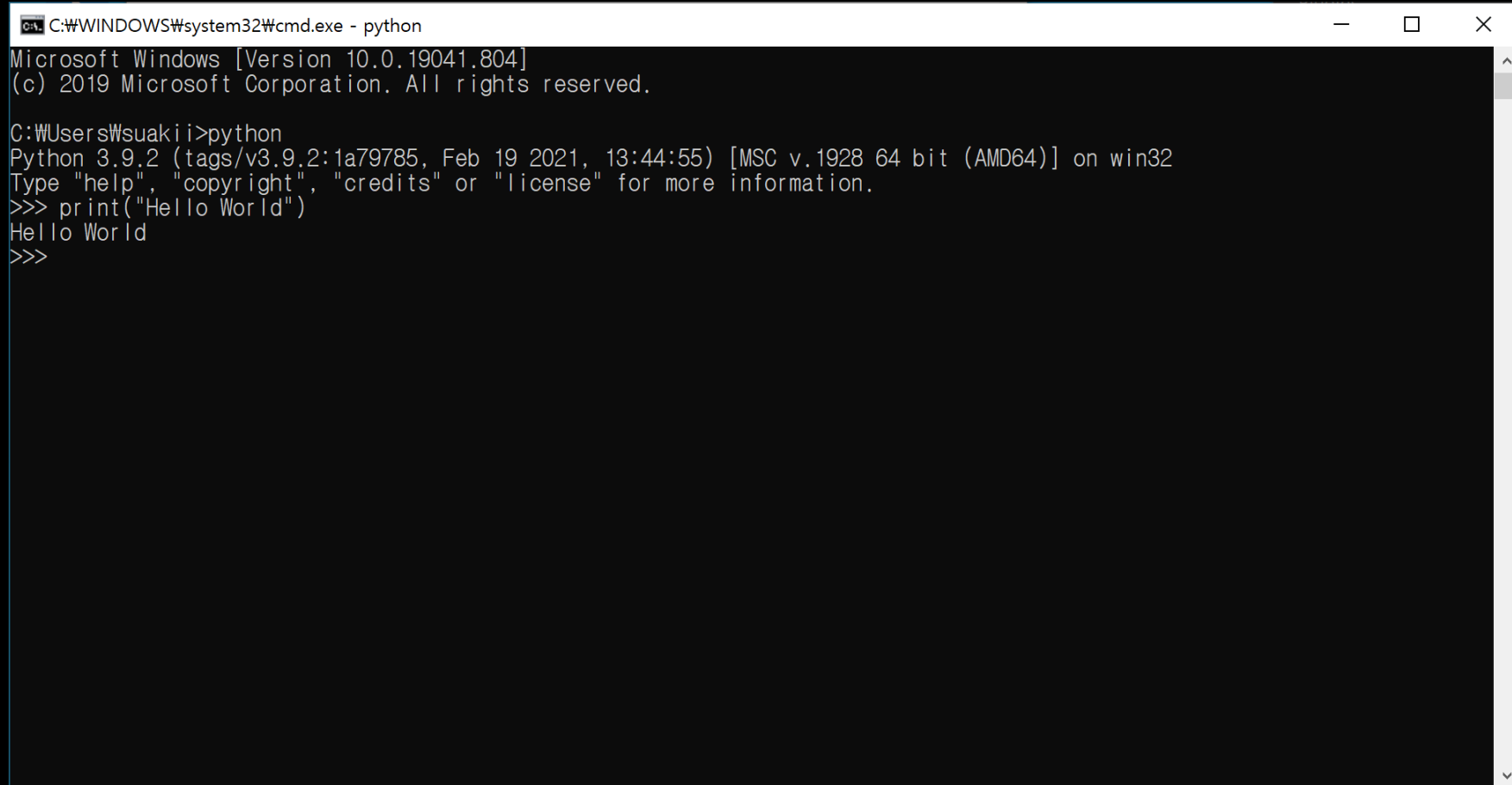


PyCharm



Hello World

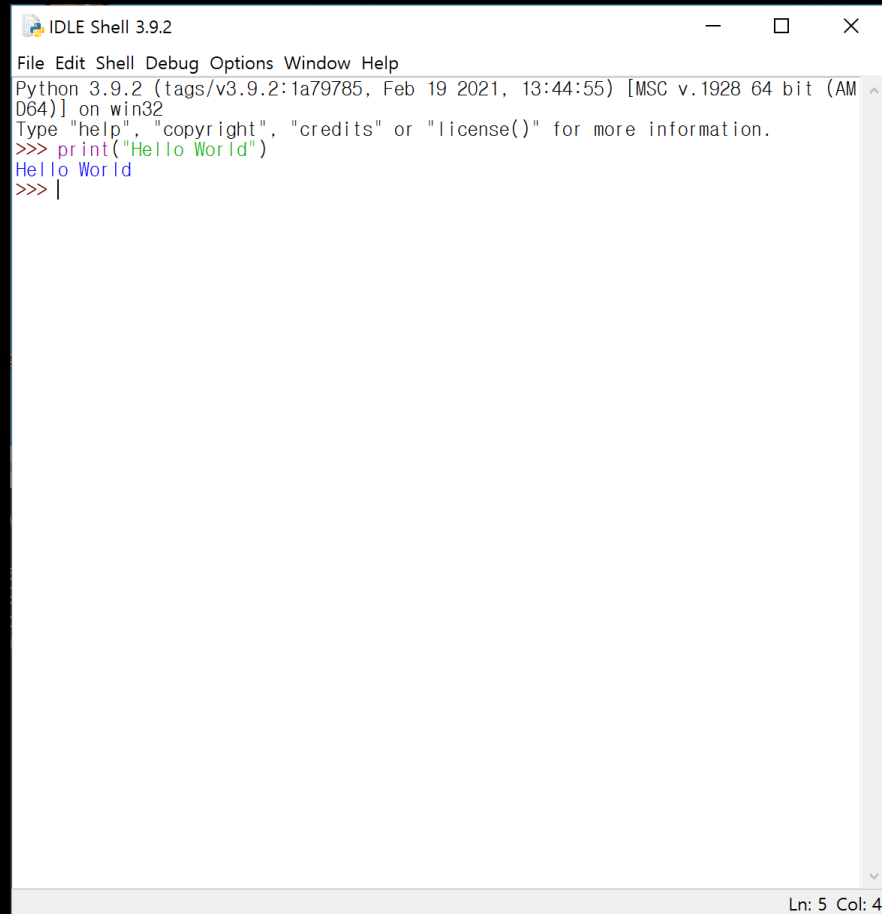
Hello World - Console



```
C:\WINDOWS\system32\cmd.exe - python
Microsoft Windows [Version 10.0.19041.804]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\Wsuakii>python
Python 3.9.2 (tags/v3.9.2:1a79785, Feb 19 2021, 13:44:55) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> print("Hello World")
Hello World
>>>
```

Hello World – IDLE shell

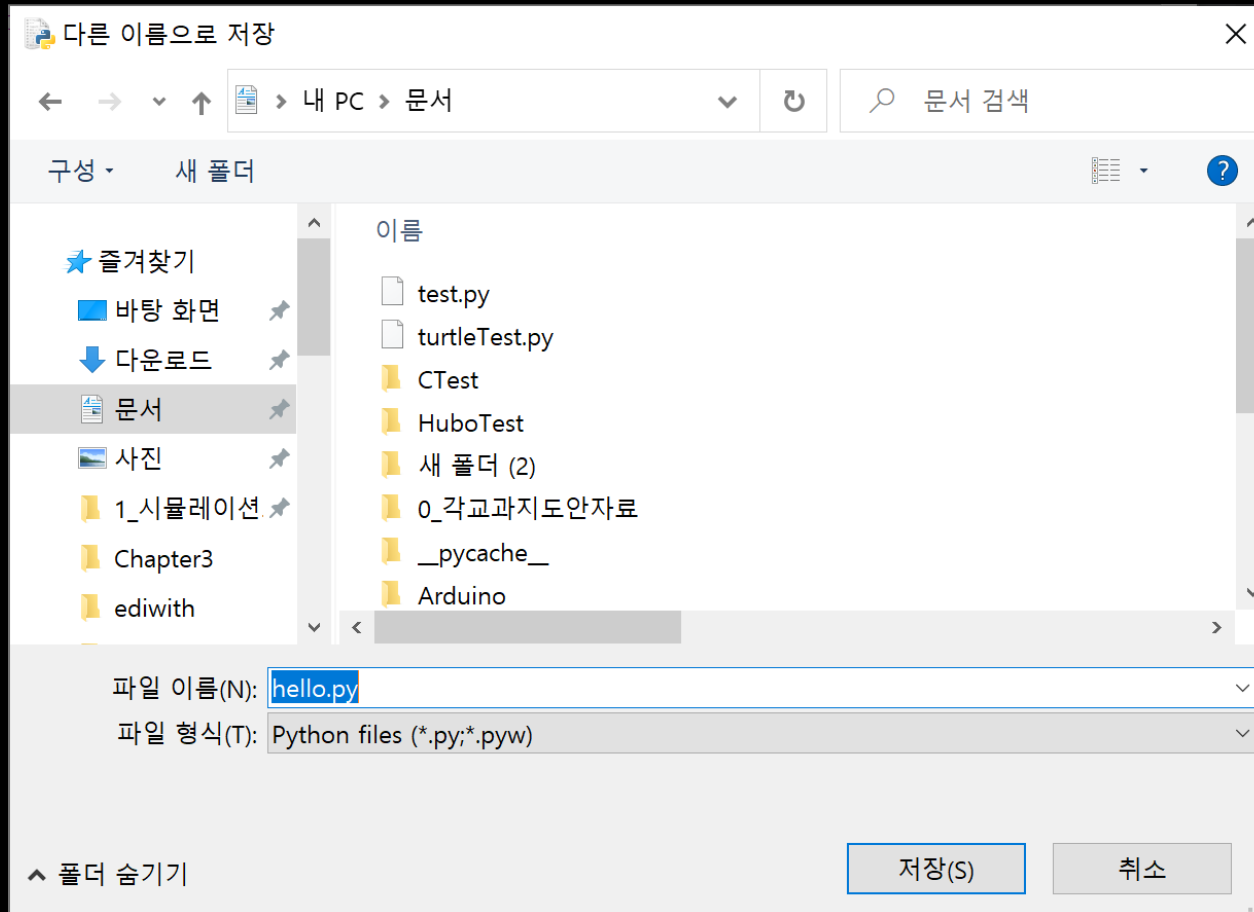


The screenshot shows the IDLE Shell 3.9.2 window. The title bar reads 'IDLE Shell 3.9.2'. The menu bar includes 'File', 'Edit', 'Shell', 'Debug', 'Options', 'Window', and 'Help'. The main text area displays the following content:

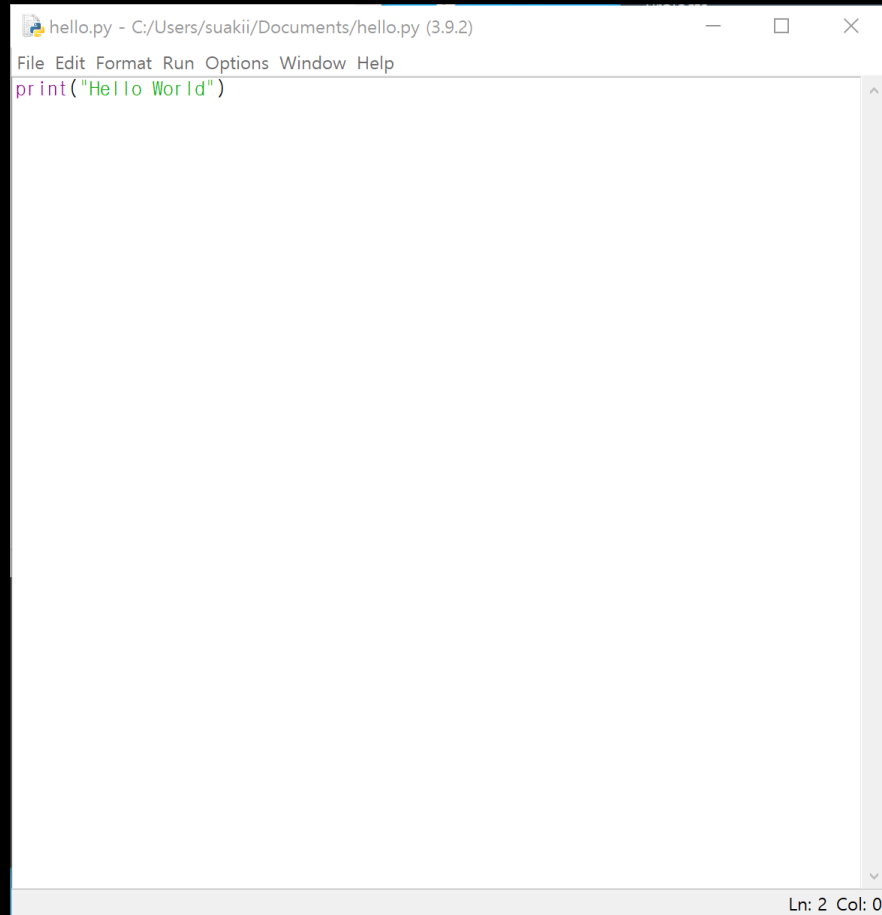
```
Python 3.9.2 (tags/v3.9.2:1a79785, Feb 19 2021, 13:44:55) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> print("Hello World")
Hello World
>>> |
```

The output 'Hello World' is displayed on a new line. The status bar at the bottom right indicates 'Ln: 5 Col: 4'.

Hello World from File - IDLE



Hello World from File - IDLE



The image shows a screenshot of the Python IDLE (Integrated Development and Learning Environment) window. The title bar at the top reads "hello.py - C:/Users/suakii/Documents/hello.py (3.9.2)". Below the title bar is a menu bar with the following options: File, Edit, Format, Run, Options, Window, and Help. The main text area contains a single line of Python code: `print("Hello World")`. The code is color-coded, with `print` in purple, the opening parenthesis in green, and the string `"Hello World"` in green. The bottom status bar indicates the current cursor position: "Ln: 2 Col: 0".

```
hello.py - C:/Users/suakii/Documents/hello.py (3.9.2)
File Edit Format Run Options Window Help
print("Hello World")
Ln: 2 Col: 0
```

Run – F5

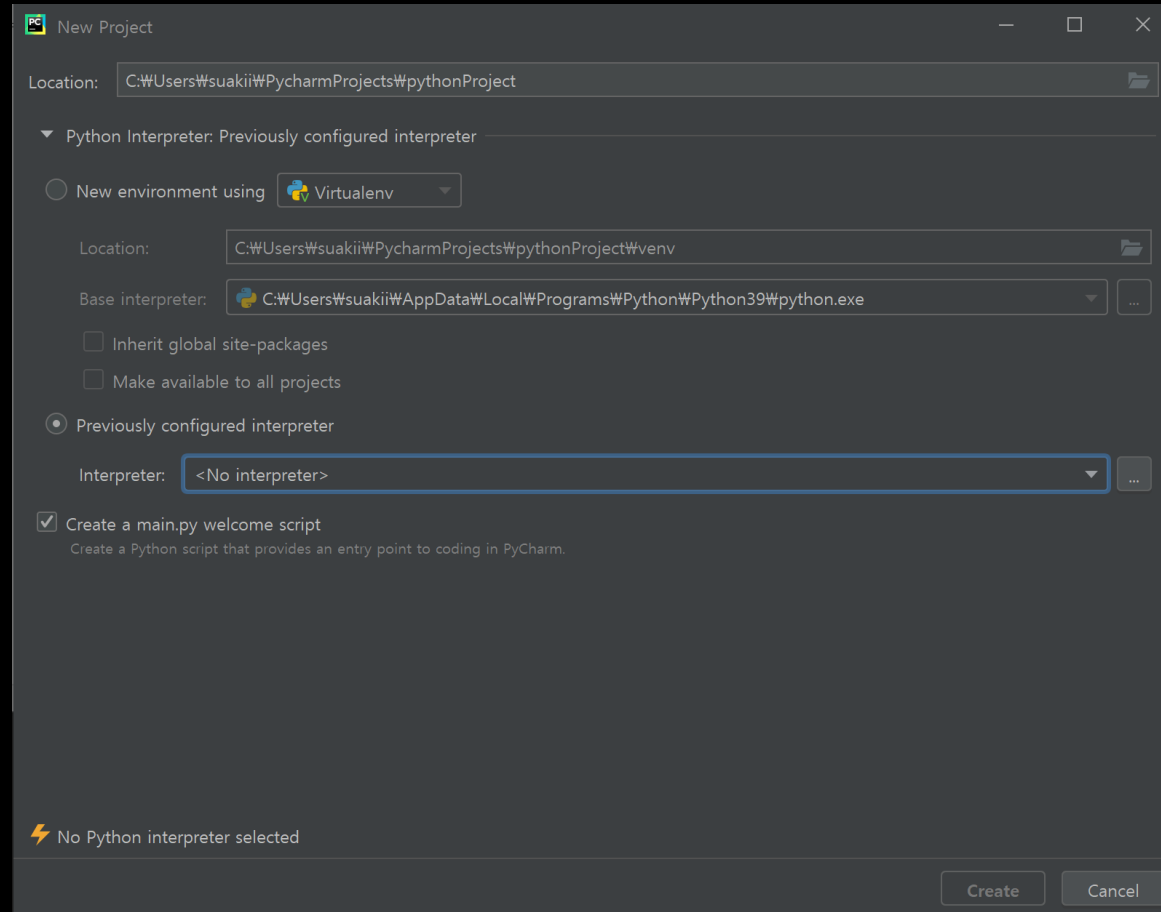


The screenshot shows the IDLE Shell 3.9.2 window. The title bar reads "IDLE Shell 3.9.2". The menu bar includes "File", "Edit", "Shell", "Debug", "Options", "Window", and "Help". The main text area displays the following content:

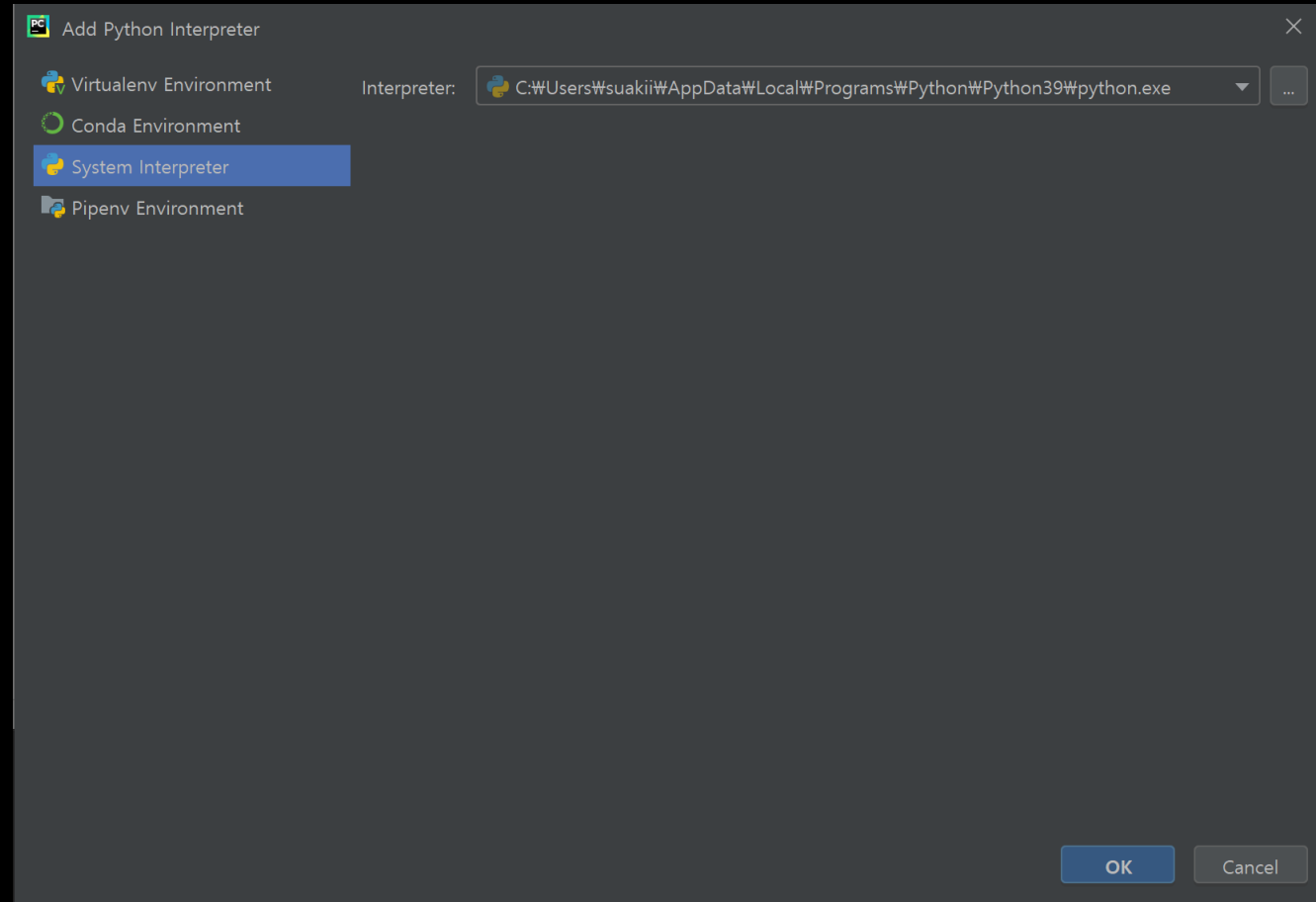
```
Python 3.9.2 (tags/v3.9.2:1a79785, Feb 19 2021, 13:44:55) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> print("Hello World")
Hello World
>>>
===== RESTART: C:/Users/suakii/Documents/hello.py =====
Hello World
>>> |
```

The status bar at the bottom right indicates "Ln: 8 Col: 4".

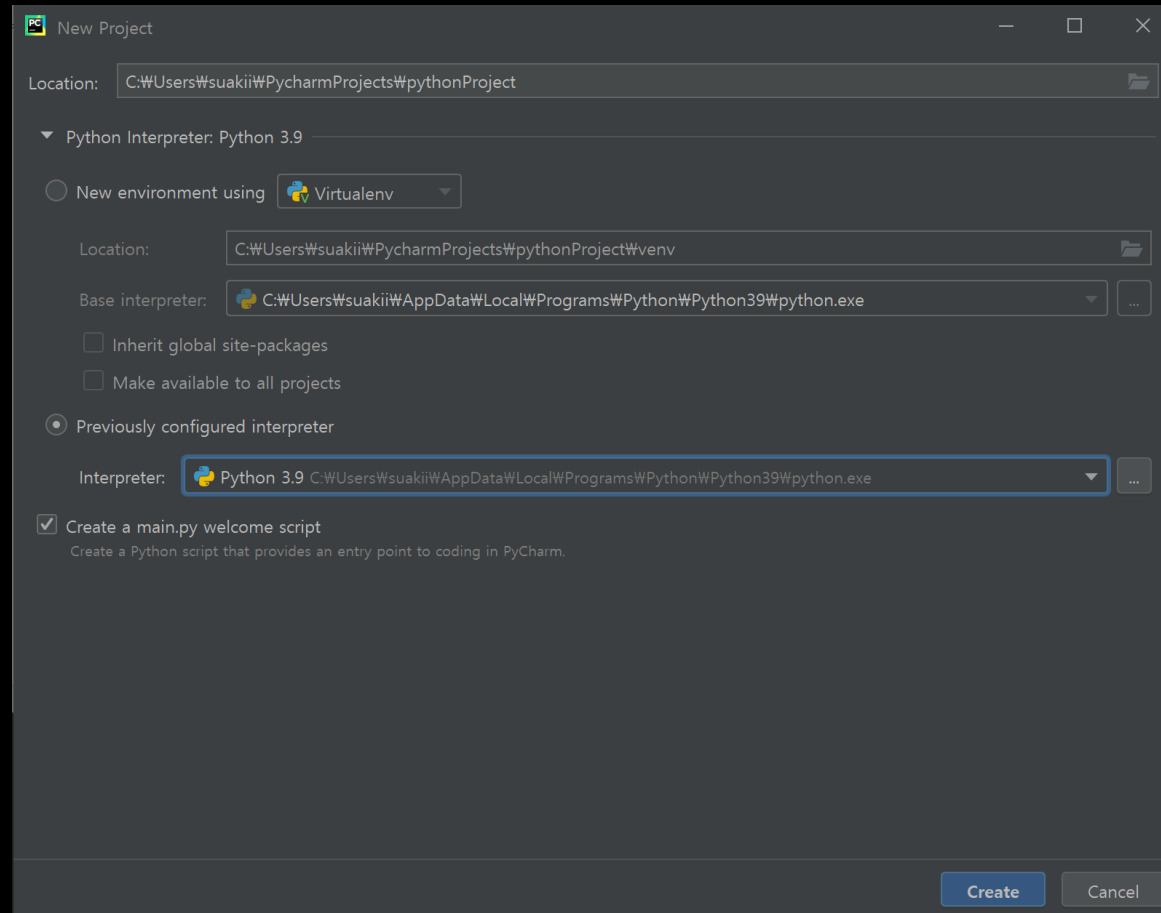
Hello World From PyCharm



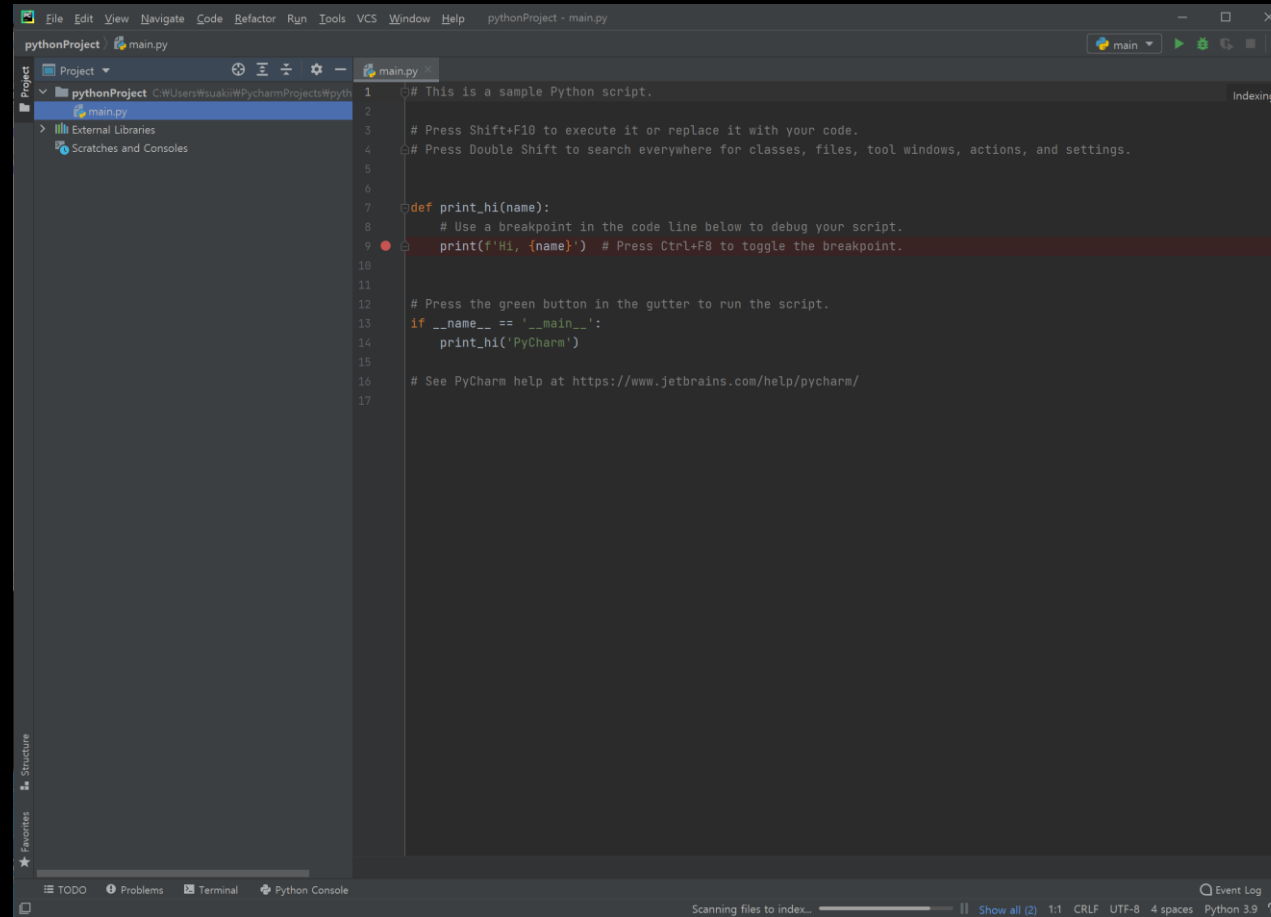
Pycharm



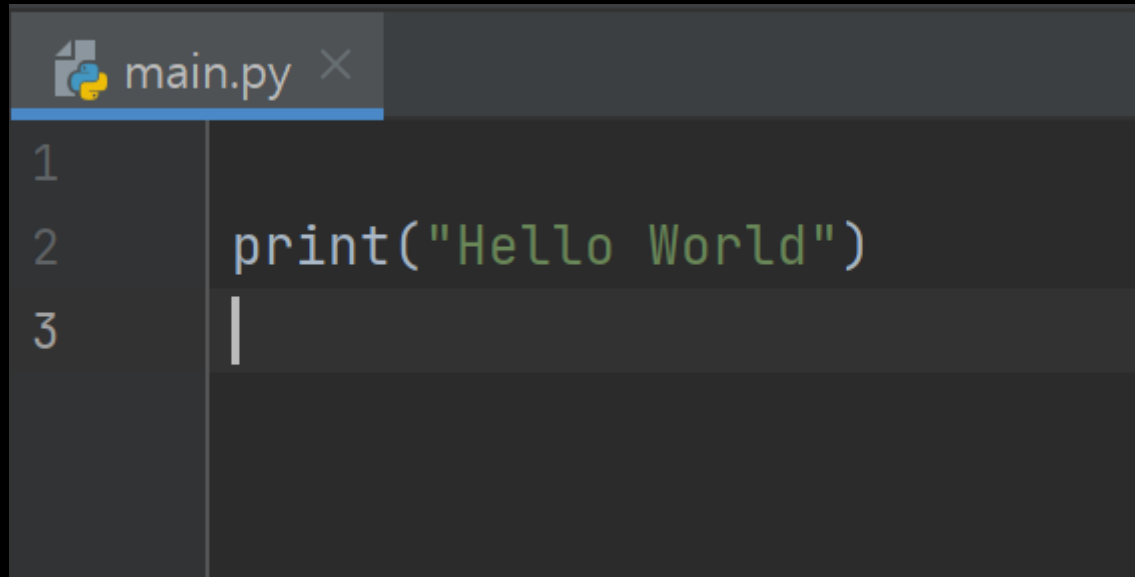
PyCharm



PyCharm



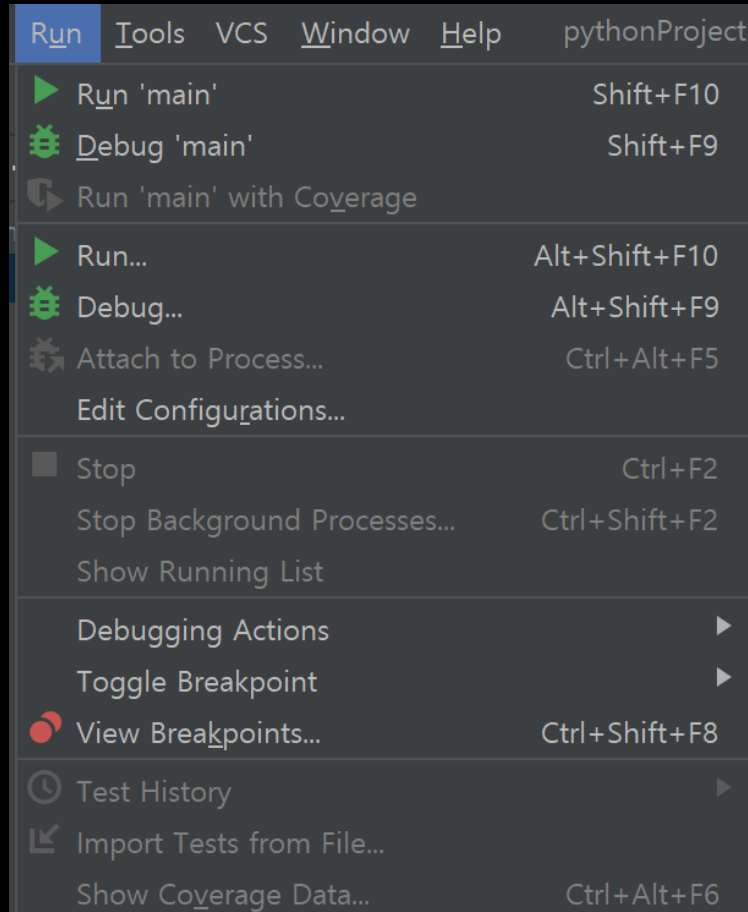
PyCharm



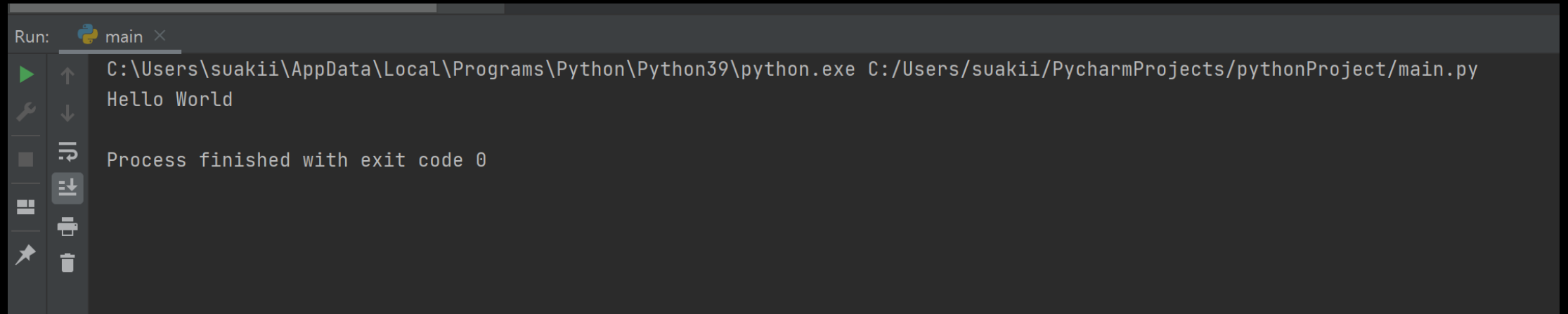
The image shows a PyCharm IDE window with a single tab titled 'main.py'. The code editor displays three lines of Python code. Line 1 is empty. Line 2 contains the statement `print("Hello World")`. Line 3 contains a single vertical bar character `|`, indicating the current cursor position. The line numbers 1, 2, and 3 are visible in the left margin.


```
1  
2 print("Hello World")  
3 |
```


PyCharm









Hello PyCharm

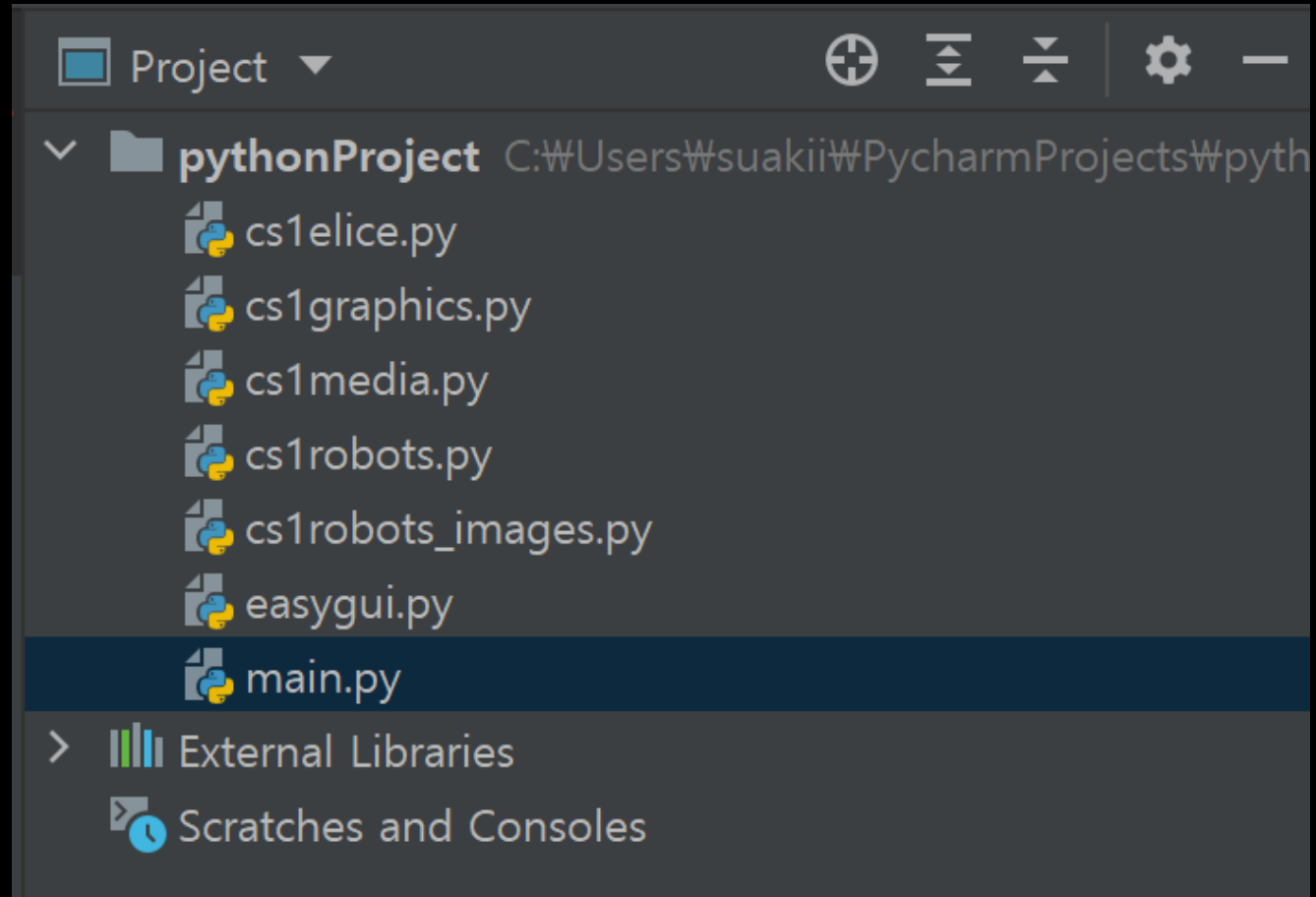
A screenshot of the PyCharm Run console. The console has a tab labeled 'Run:' with a Python icon and 'main' followed by a close button. On the left side of the console, there is a vertical toolbar with icons for running (green play button), debugging (bug icon), and other actions. The main area of the console displays the command executed: 'C:\Users\sukii\AppData\Local\Programs\Python\Python39\python.exe C:/Users/sukii/PycharmProjects/pythonProject/main.py'. Below the command, the output 'Hello World' is shown. At the bottom, a status message reads 'Process finished with exit code 0'.

```
Run:  main ×  
C:\Users\sukii\AppData\Local\Programs\Python\Python39\python.exe C:/Users/sukii/PycharmProjects/pythonProject/main.py  
Hello World  
Process finished with exit code 0
```

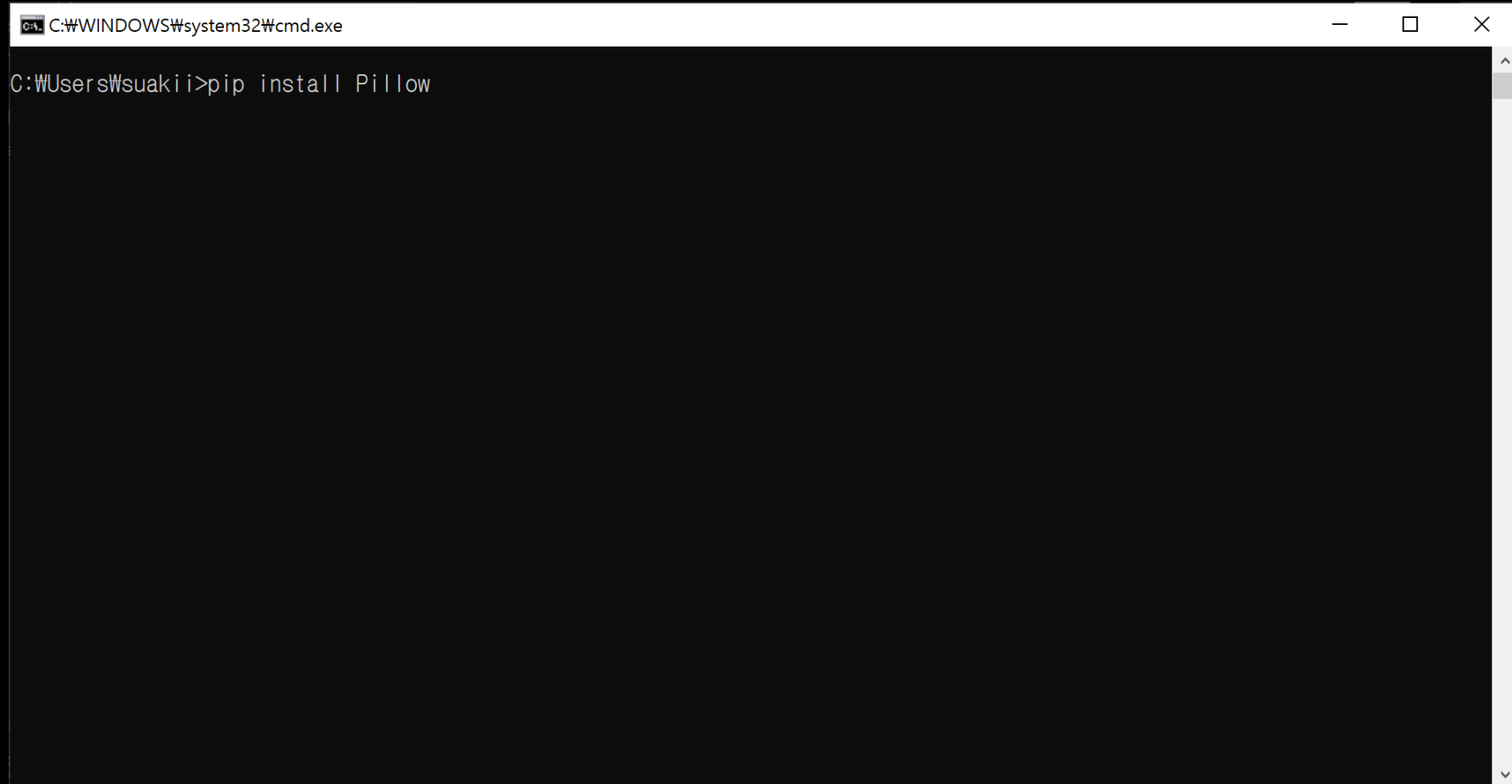
Library Install

<input type="checkbox"/> 이름	수정한 날짜	유형	크기
<input type="checkbox"/>  cs1elice.py	2015-12-29 오후 8:02	PY 파일	1KB
 cs1graphics.py	2016-06-09 오전 9:49	PY 파일	216KB
 cs1media.py	2015-12-29 오후 8:02	PY 파일	15KB
 cs1robots.py	2016-02-03 오후 10:52	PY 파일	19KB
 cs1robots_images.py	2015-12-29 오후 8:02	PY 파일	37KB
 easygui.py	2018-03-04 오후 9:53	PY 파일	4KB

Library



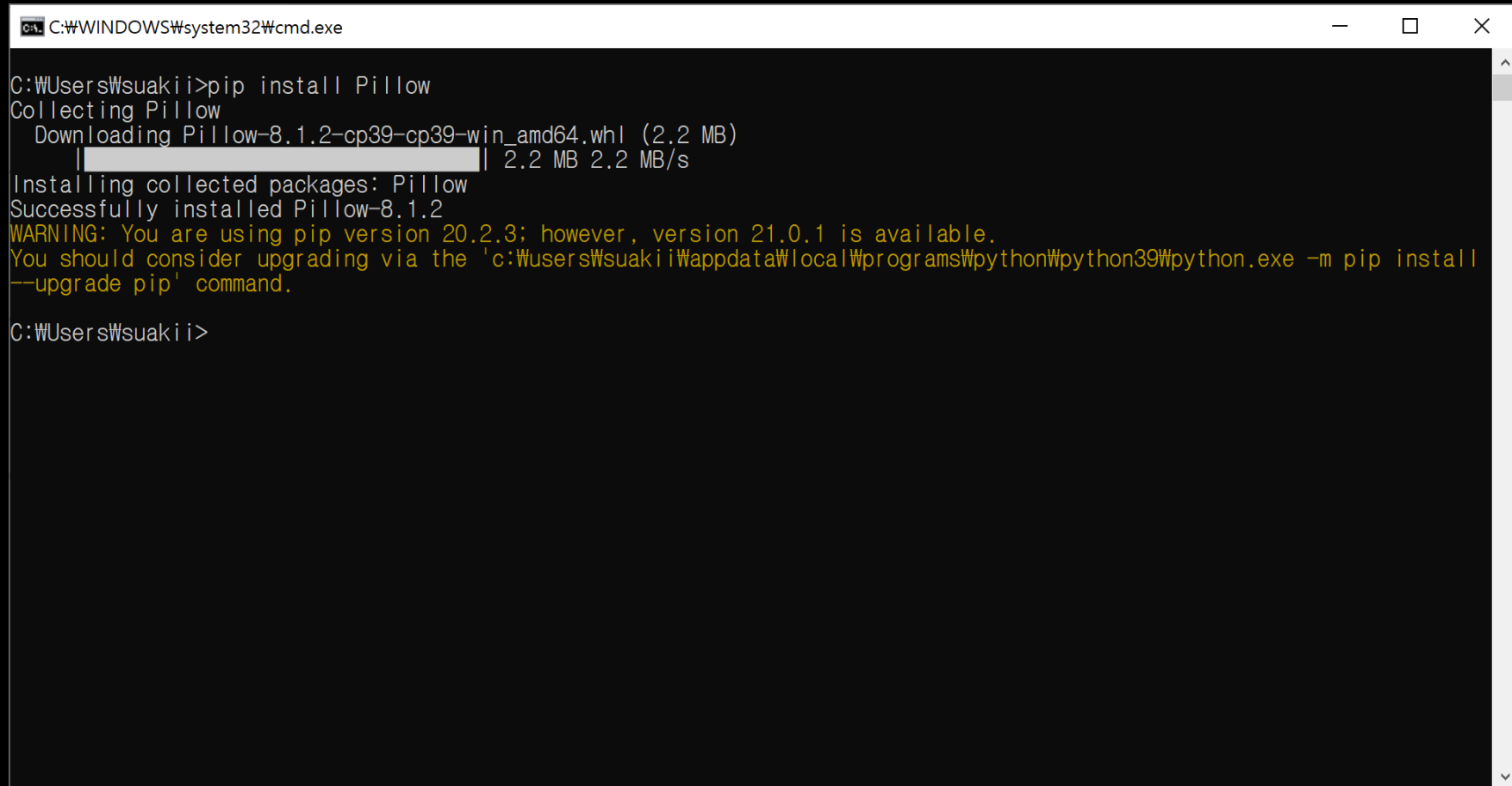
Library Install - Pillow



```
C:\WINDOWS\system32\cmd.exe
C:\Users\suakii>pip install Pillow
```

The image shows a Windows Command Prompt window with a white title bar. The title bar text is "C:\WINDOWS\system32\cmd.exe". The window has standard Windows window controls (minimize, maximize, close) on the right. The command prompt area is black with white text. The prompt "C:\Users\suakii>" is followed by the command "pip install Pillow". The cursor is at the end of the command line.

Pillow Install



```
C:\WINDOWS\system32\cmd.exe

C:\Users\suakii>pip install Pillow
Collecting Pillow
  Downloading Pillow-8.1.2-cp39-cp39-win_amd64.whl (2.2 MB)
    | 2.2 MB 2.2 MB/s
Installing collected packages: Pillow
Successfully installed Pillow-8.1.2
WARNING: You are using pip version 20.2.3; however, version 21.0.1 is available.
You should consider upgrading via the 'c:\Users\suakii\appdata\local\programs\python\python39\python.exe -m pip install
--upgrade pip' command.

C:\Users\suakii>
```

Break Time