

경기도 자율주행 경진대회 교육 워크숍

Subject: 개발환경 구축

Automation Lab.



PC

■ PC 하드웨어 환경



운영체제: Window10

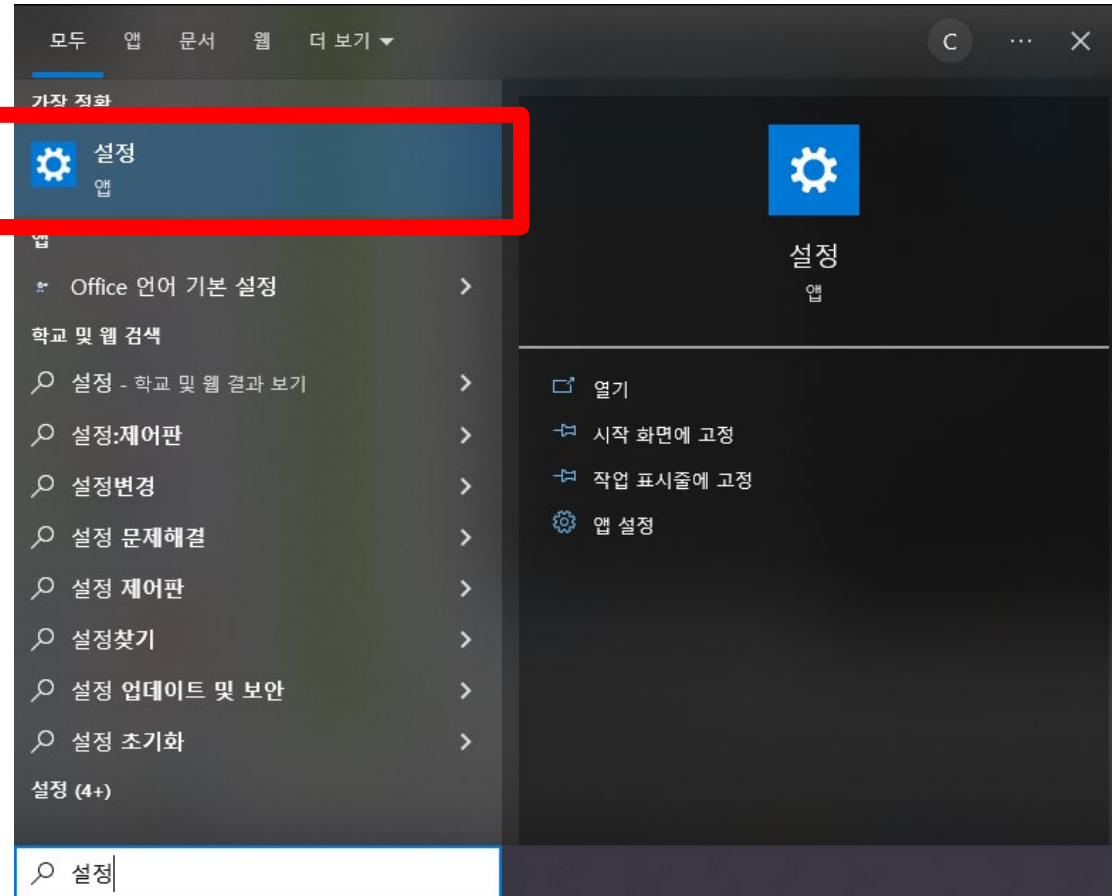


아키텍처: x86, x64

PC

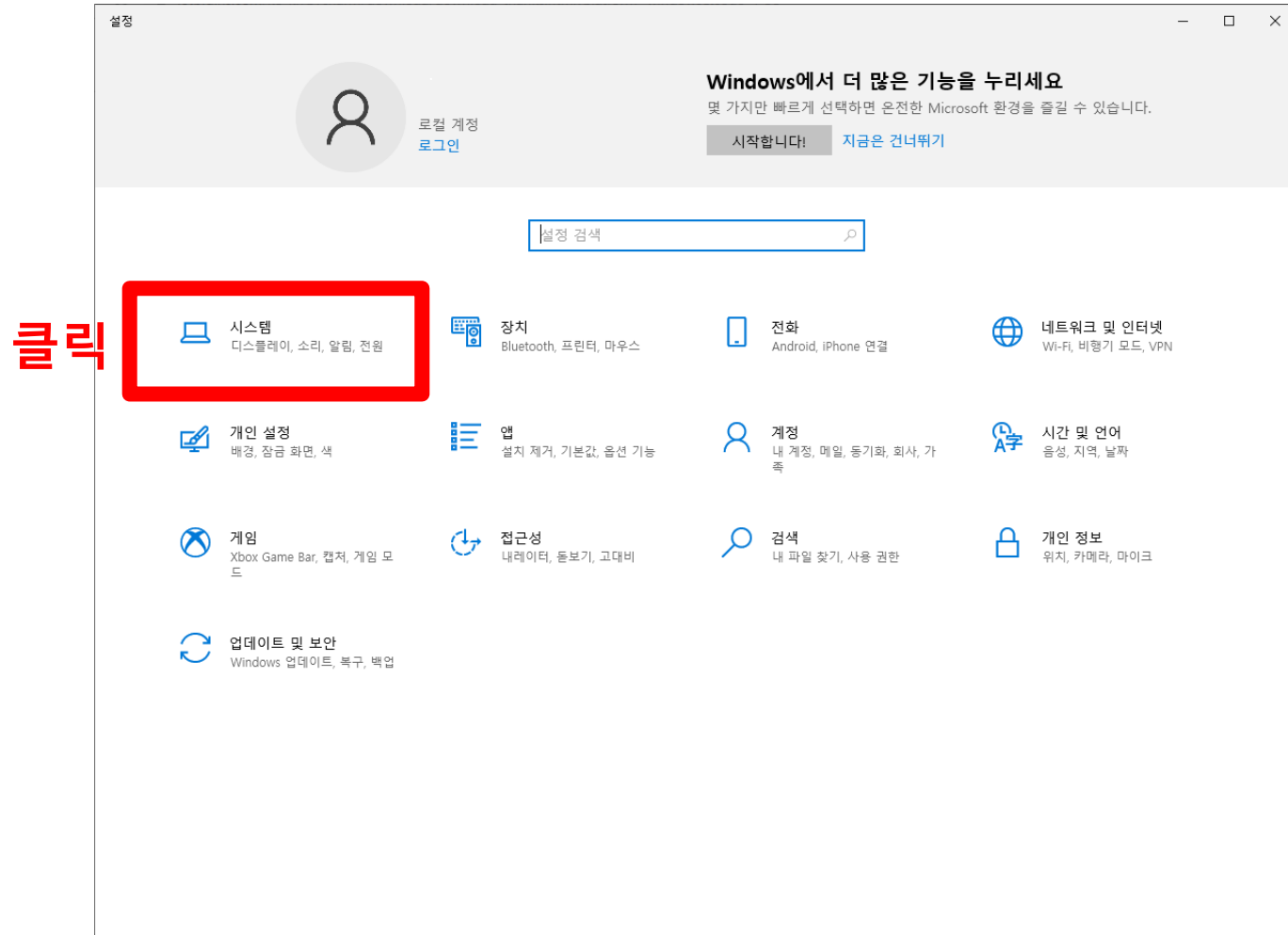
■ PC 하드웨어 사양 확인

클릭



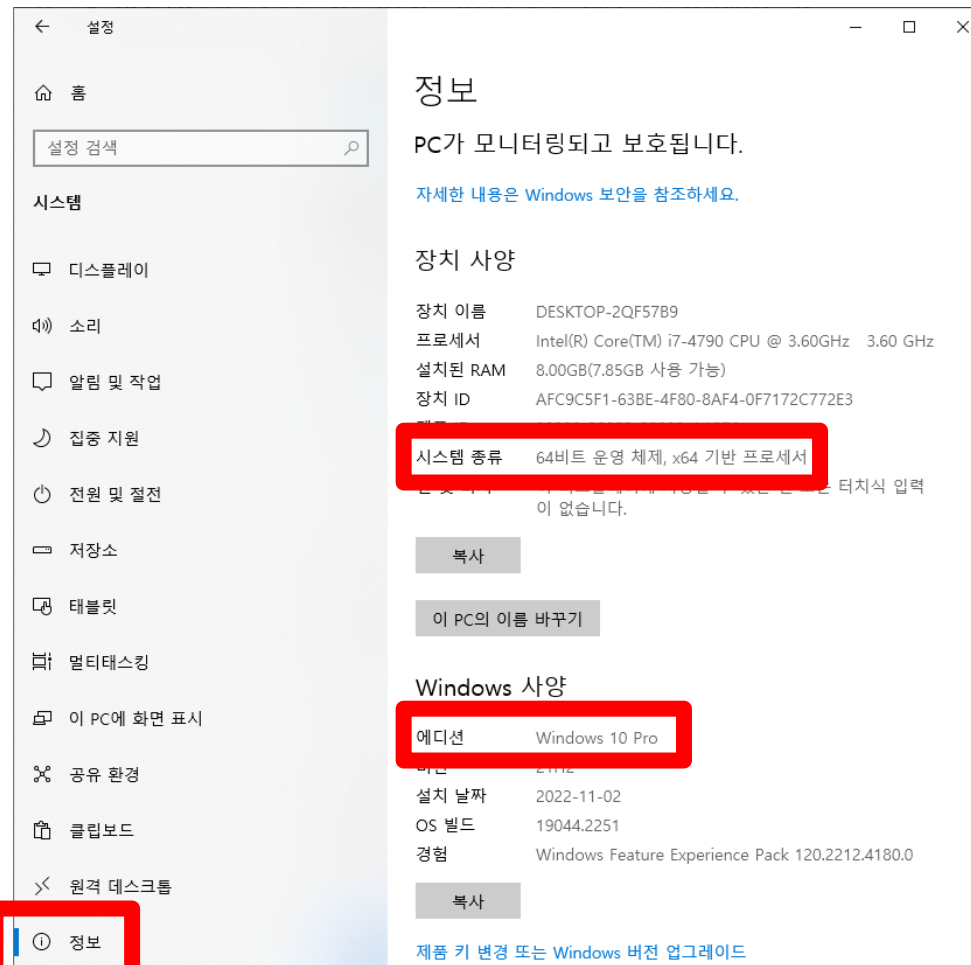
PC

■ PC 하드웨어 사양 확인



PC

■ PC 하드웨어 사양 확인

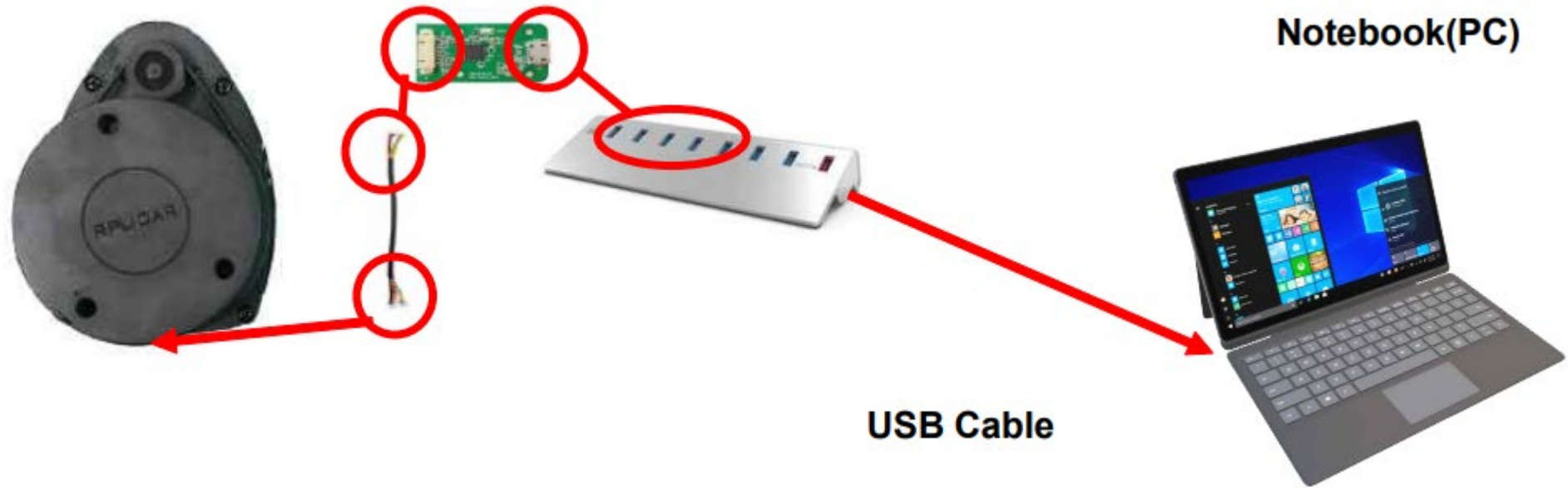


클릭

① 정보

LiDAR

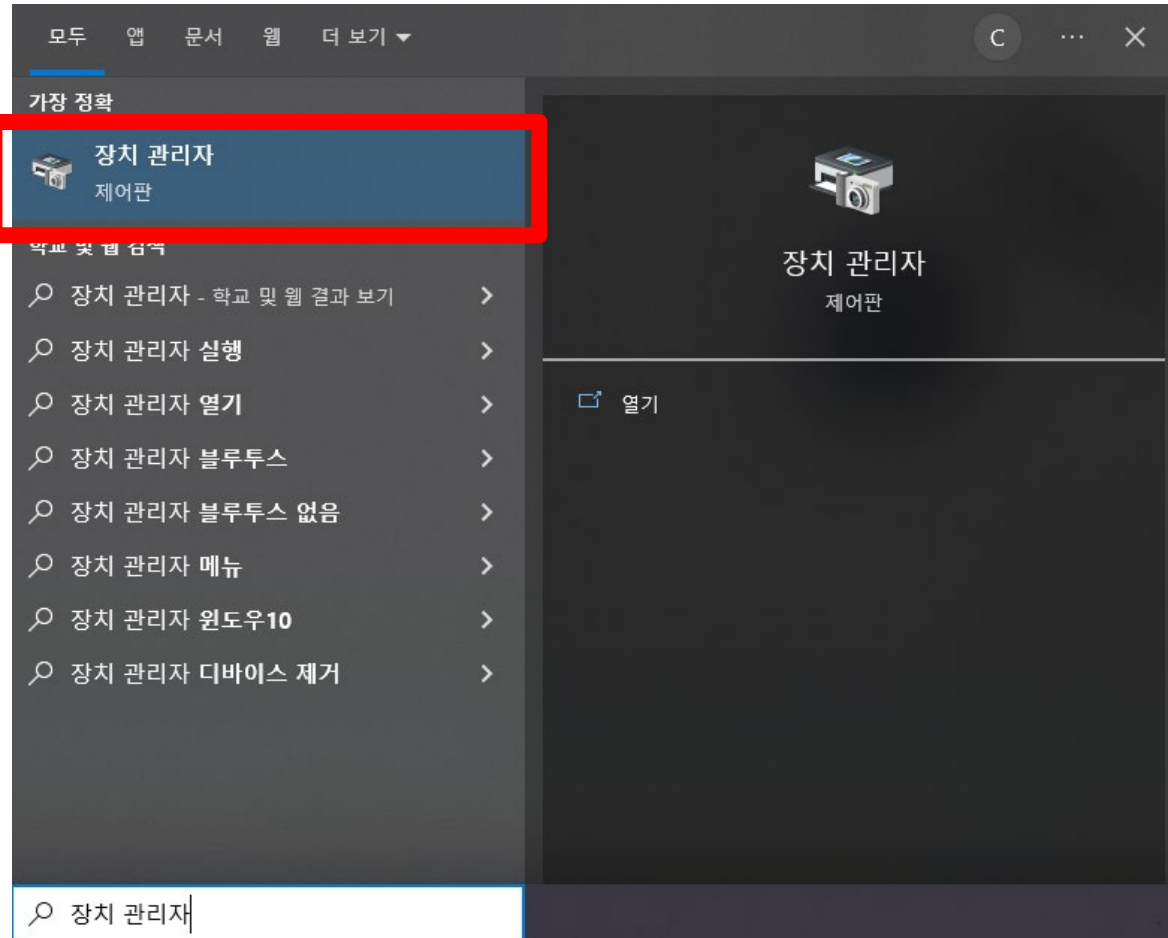
■ 라이다(LiDAR)



LiDAR

■ 라이다 장치 인식 확인

클릭



LiDAR

■ 라이다 장치 인식 확인



기타장치 CP2102 USB 인식 확인

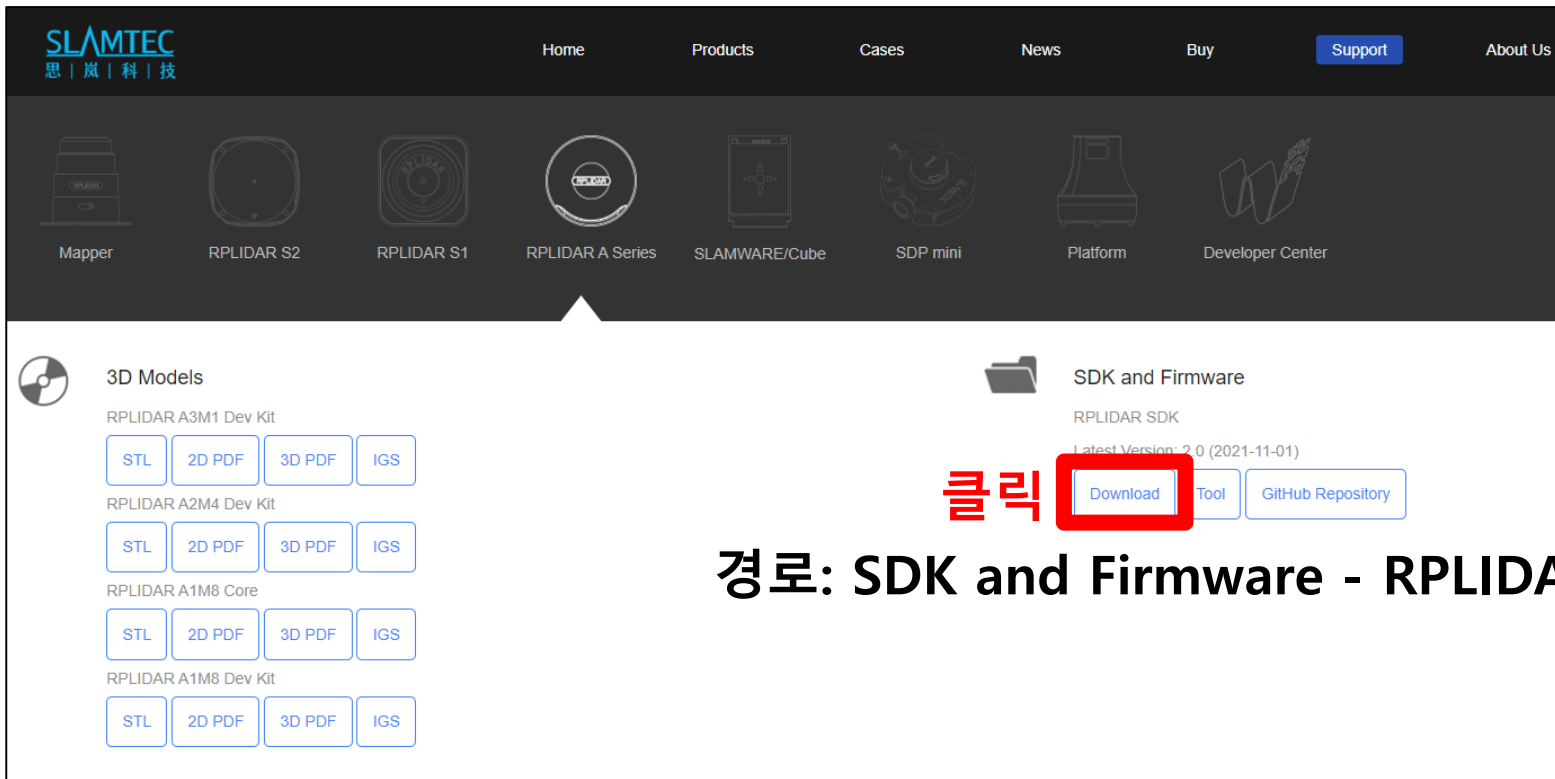
인식 안될 시, 라이다 USB 포트 연결 확인

LiDAR

■ 라이다 드라이버 설치

다운로드 페이지:

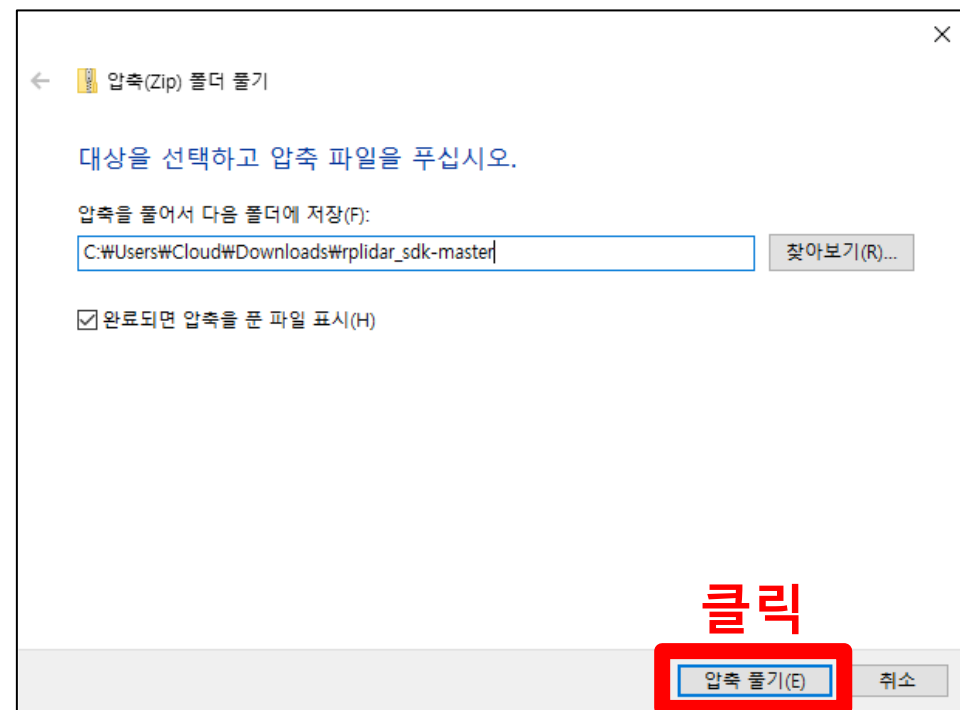
<https://www.slamtec.com/ko/support#rplidar-a-series>



경로: SDK and Firmware - RPLIDAR SDK - Download

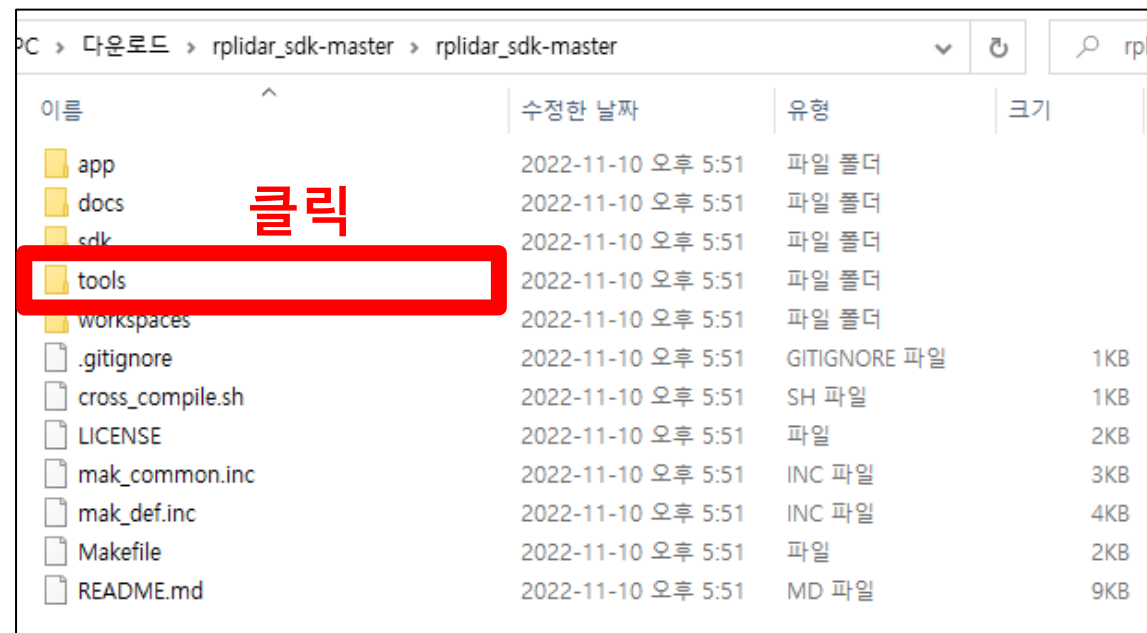
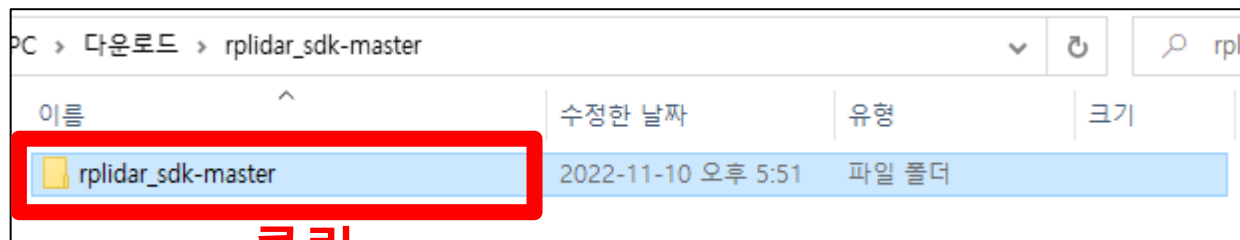
LiDAR

■ 라이다 드라이버 설치



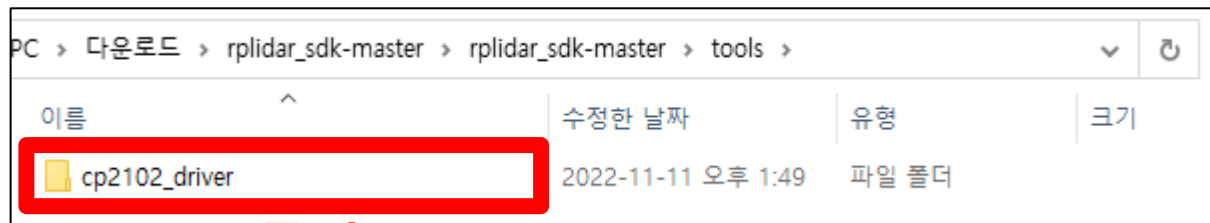
LiDAR

■ 라이다 드라이버 설치

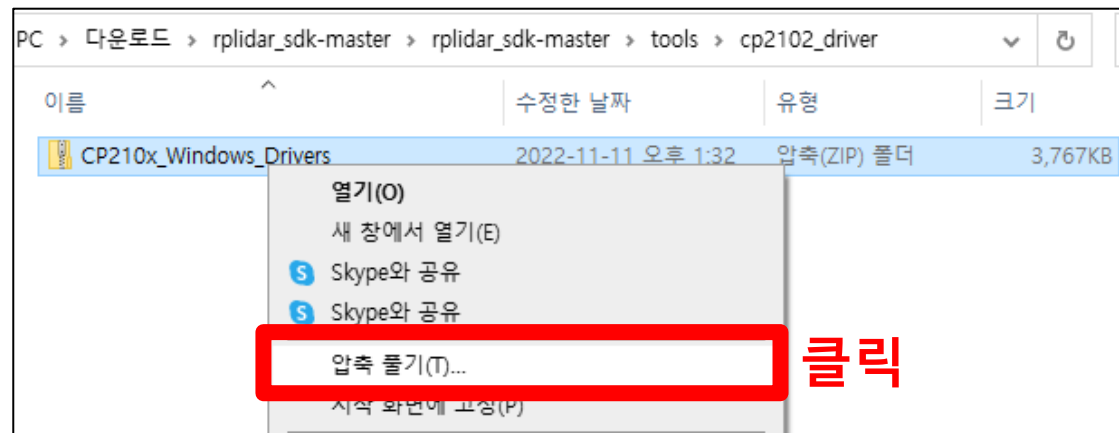


LiDAR

■ 라이다 드라이버 설치



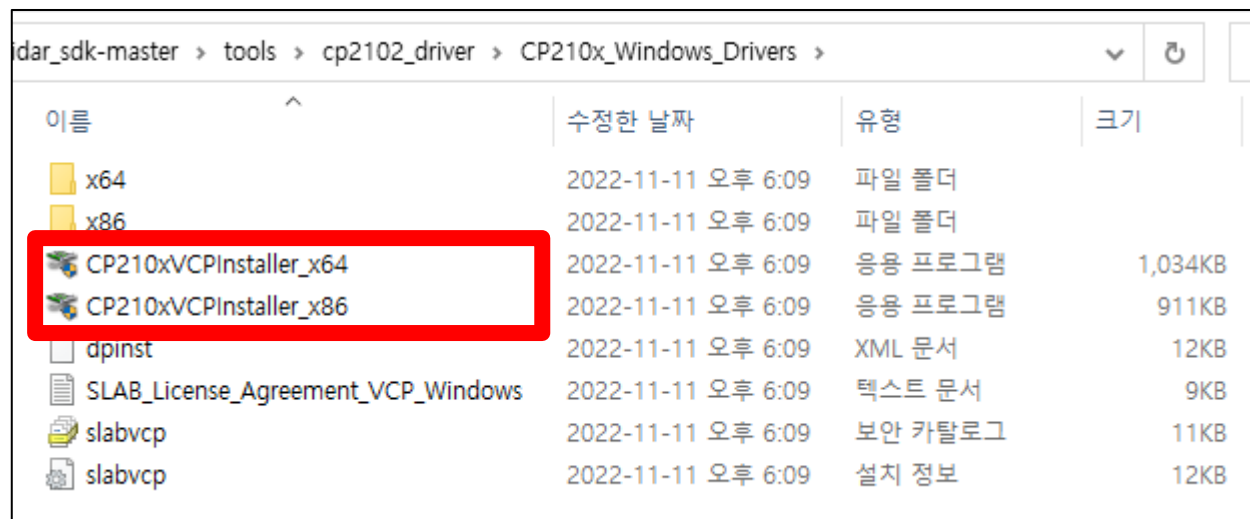
클릭



클릭

LiDAR

■ 라이다 드라이버 설치



이름	수정한 날짜	유형	크기
x64	2022-11-11 오후 6:09	파일 폴더	
x86	2022-11-11 오후 6:09	파일 폴더	
CP210xVCPInstaller_x64	2022-11-11 오후 6:09	응용 프로그램	1,034KB
CP210xVCPInstaller_x86	2022-11-11 오후 6:09	응용 프로그램	911KB
dpinst	2022-11-11 오후 6:09	XML 문서	12KB
SLAB_License_Agreement_VCP_Windows	2022-11-11 오후 6:09	텍스트 문서	9KB
slabvcp	2022-11-11 오후 6:09	보안 카탈로그	11KB
slabvcp	2022-11-11 오후 6:09	설치 정보	12KB

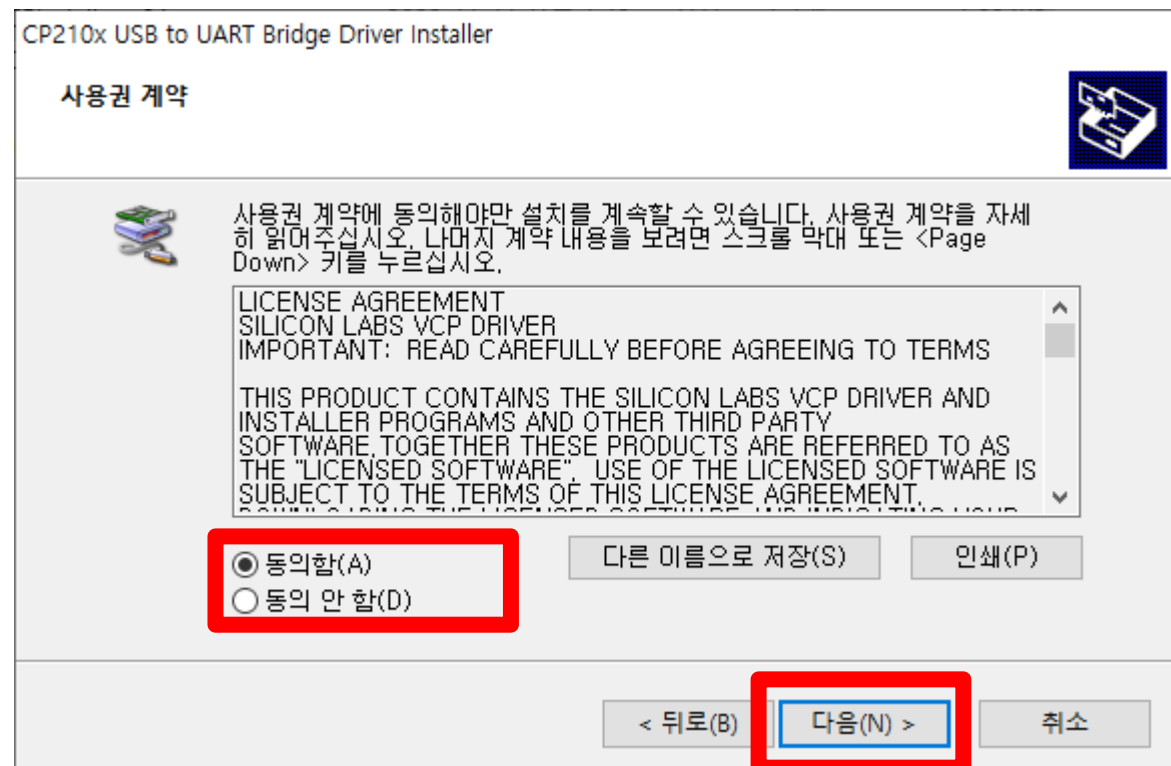
PC 사양에 맞는 프로그램 실행

LiDAR

■ 라이다 드라이버 설치



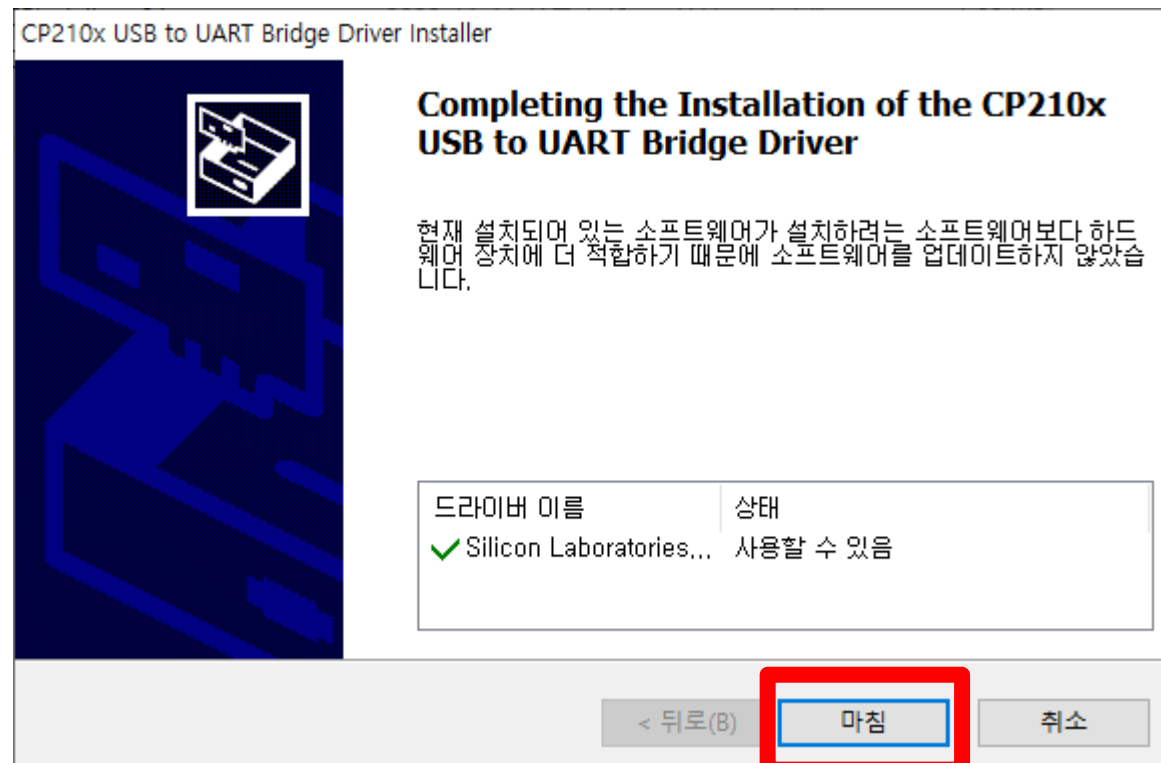
클릭



동의함 체크 후 다음

LiDAR

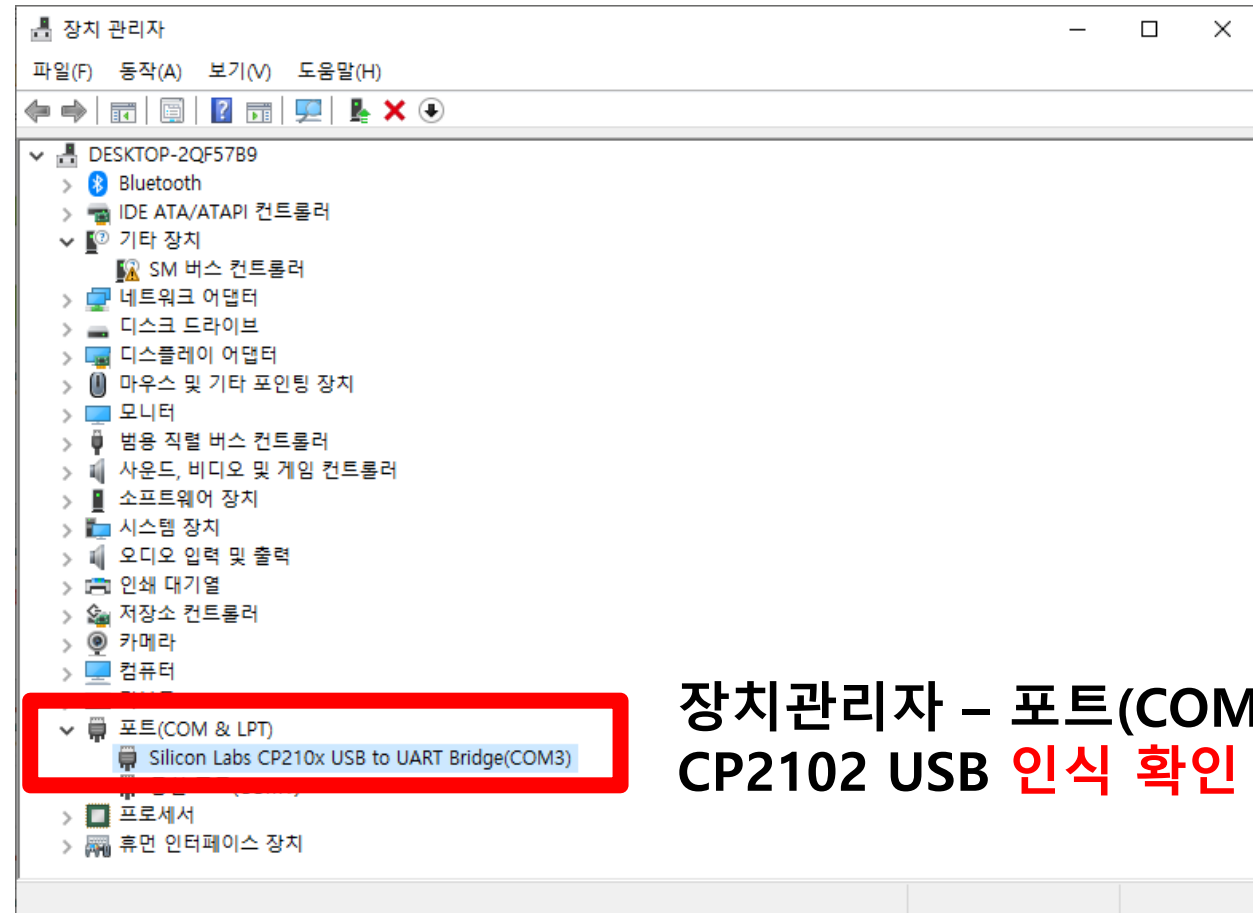
■ 라이다 드라이버 설치



클릭

LiDAR

■ 라이다 장치 인식 확인



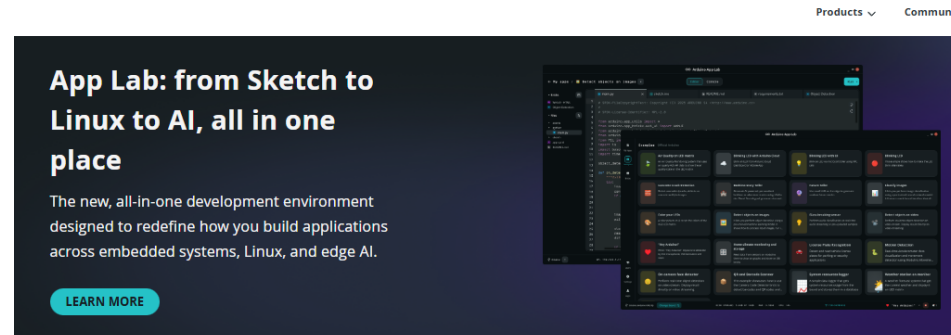
장치관리자 – 포트(COM & LPT)
CP2102 USB 인식 확인

Arduino IDE

■ Arduino IDE 설치

다운로드 페이지:

<https://www.arduino.cc/en/software/>



Bring Your Projects to Life with Arduino Software



Arduino IDE 2.3.6
버전 확인

Windows Win 10 or newer
클릭 후 다운로드

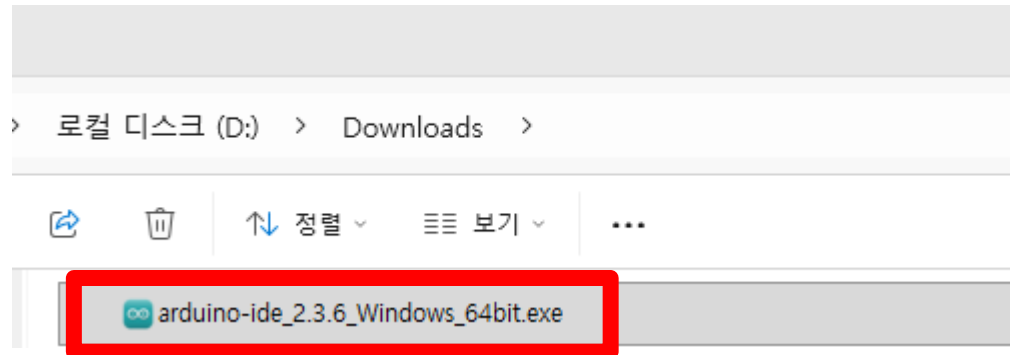
Arduino IDE

■ Arduino IDE 설치

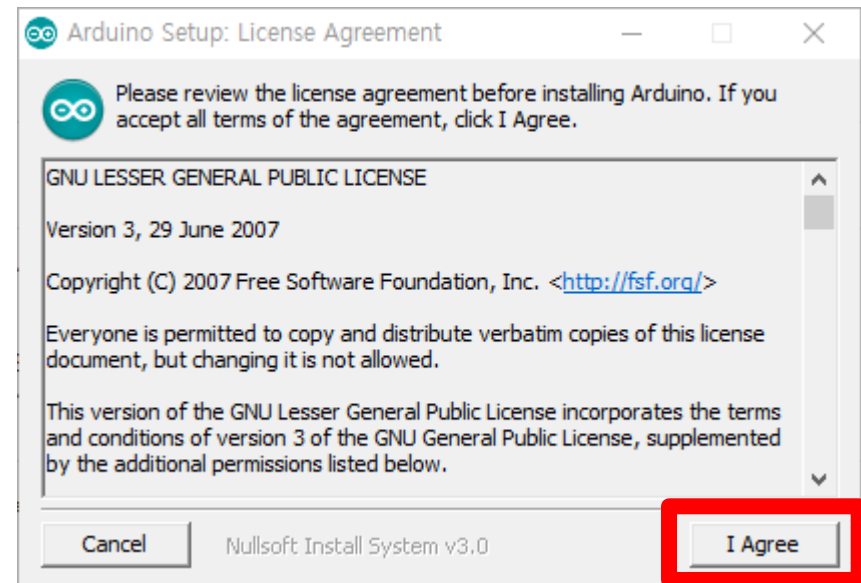


Arduino IDE

■ Arduino IDE 설치



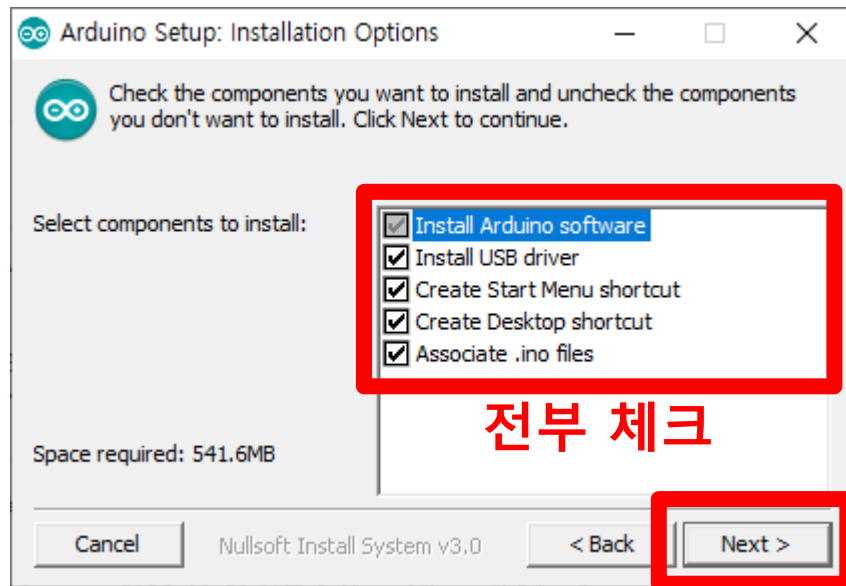
클릭



클릭

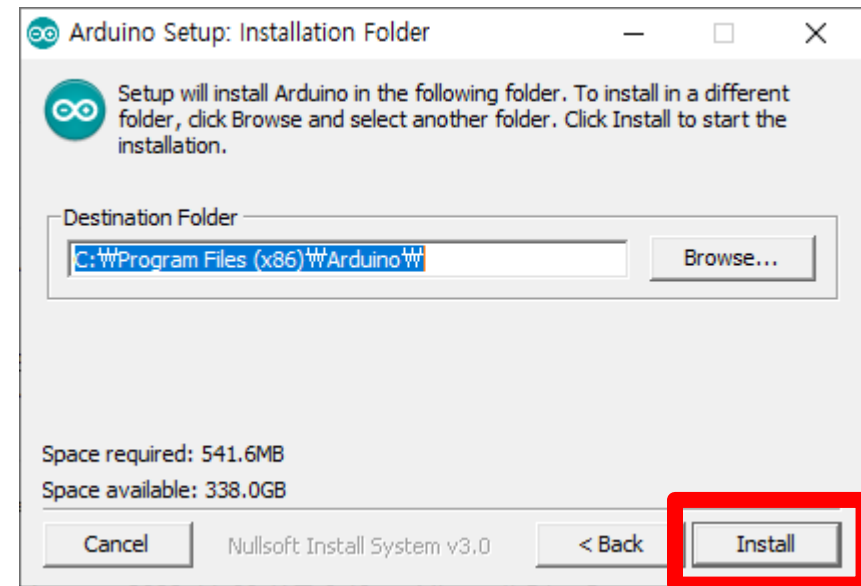
Arduino IDE

■ Arduino IDE 설치



전부 체크

클릭



클릭

Arduino IDE

■ Arduino IDE 설치

장치 소프트웨어 설치 알림 뜰 시, 모두 설치



Arduino IDE

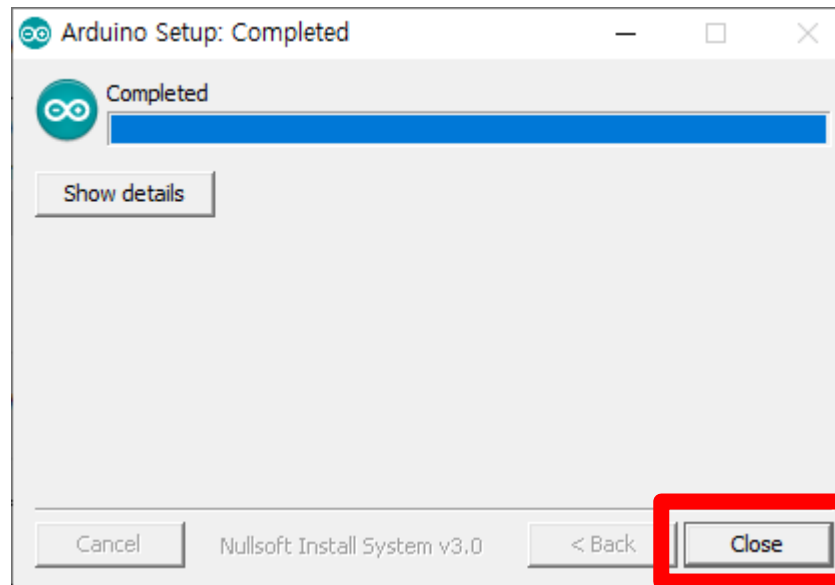
■ Arduino IDE 설치

장치 소프트웨어 설치 알림 뜰 시, 모두 설치



Arduino IDE

■ Arduino IDE 설치

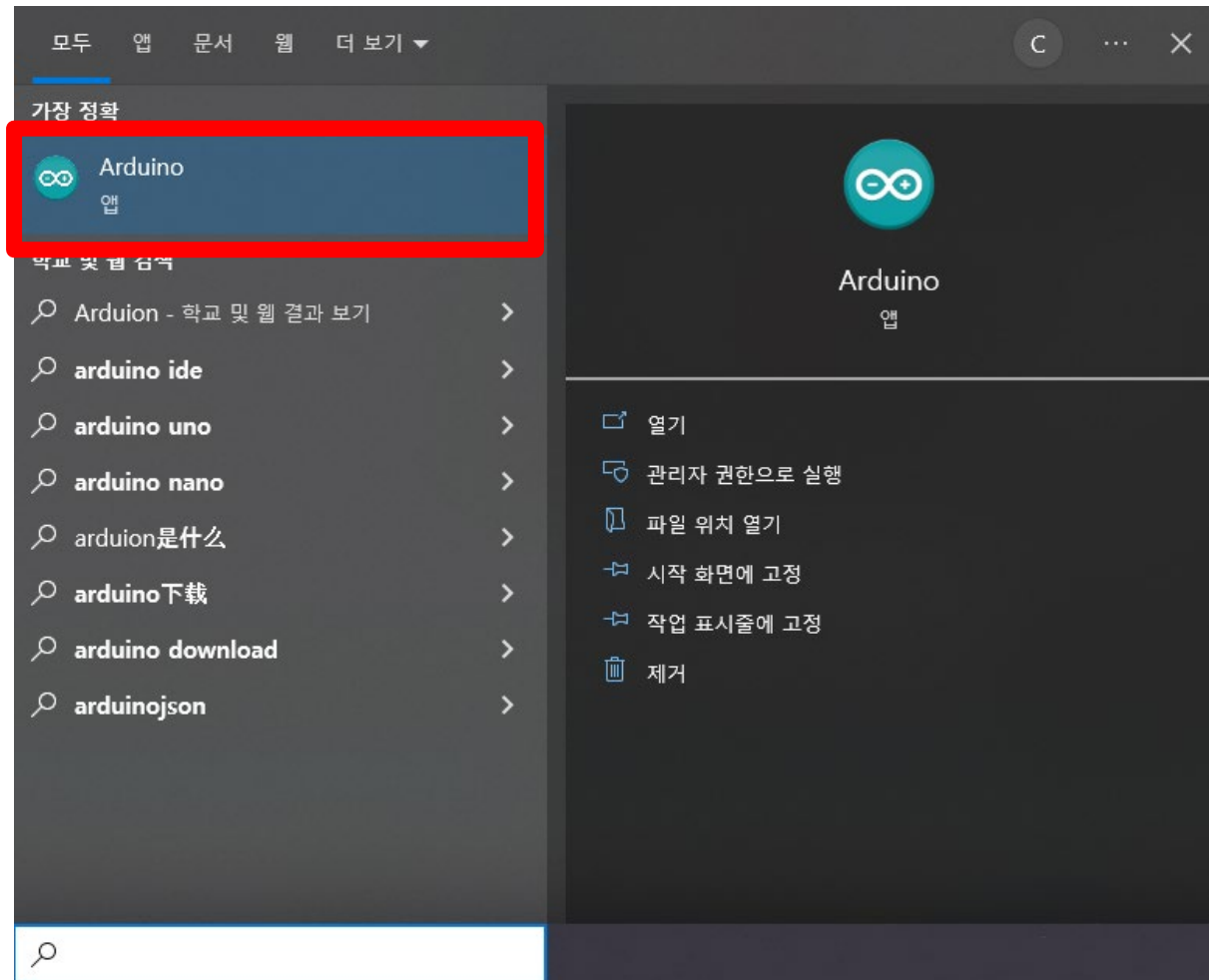


클릭

Arduino IDE

■ Arduino IDE 설치

Arduino 실행



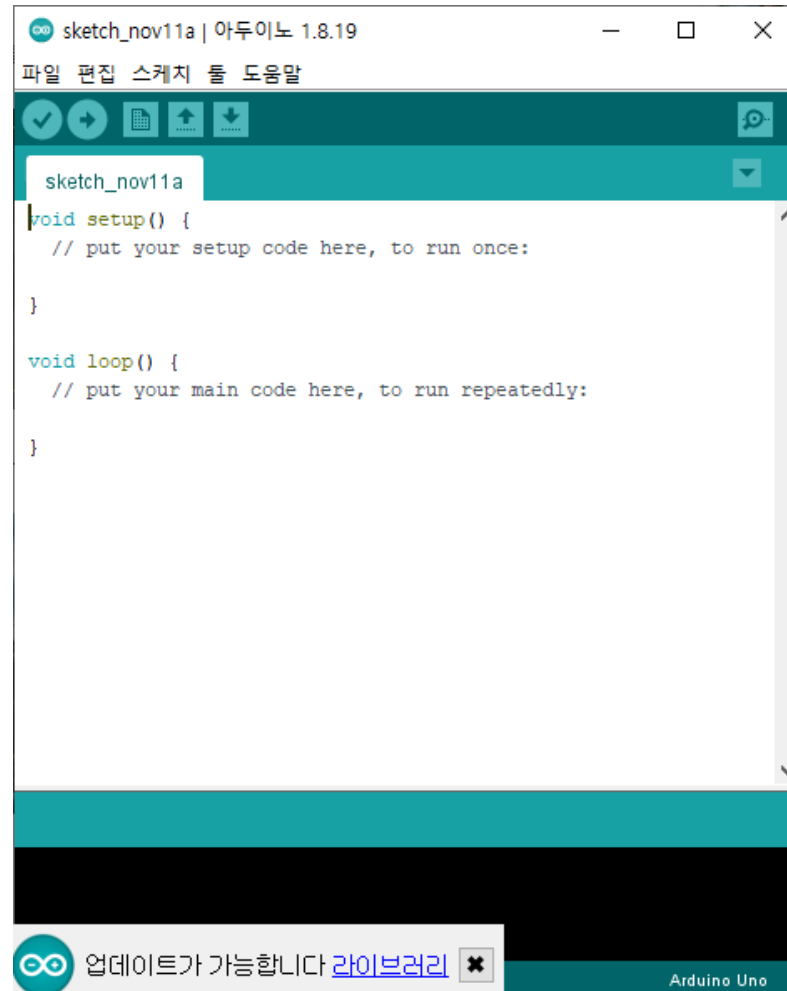
Arduino IDE

■ Arduino IDE 설치



Arduino IDE

■ Arduino IDE 초기 화면



Python

■ Python 설치

다운로드 페이지:

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

설치 할 버전
선택하여 다운로드

The screenshot shows the Python.org website. At the top, there is a navigation bar with links for About, Downloads, Documentation, Community, Success Stories, News, and Events. A search bar and a 'Donate' button are also present. The main section is titled 'Download the latest version for Windows' and features a 'Download Python 3.11.0' button. Below this, there are links for 'Python for Windows, Linux/UNIX, macOS, Other' and 'Want to help test development versions of Python? Prereleases, Docker Images'. A yellow banner promotes 'Support Python In 2022!'. Below the banner, there is a table of 'Active Python Releases' and a section for 'Looking for a specific release?'.

Python version	Maintenance status	First released	End of support	Release schedule
3.11	bugfix	2022-10-24	2027-10	PEP 664
3.10	bugfix	2021-10-04	2026-10	PEP 619
3.9	security	2020-10-05	2025-10	PEP 596
3.8	security	2019-10-14	2024-10	PEP 569
3.7	security	2018-06-27	2023-06-27	PEP 537

Looking for a specific release?
Python releases by version number:









Release version	Release date	Download	Click for more
Python 3.7.14	Sept. 6, 2022	Download	Release Notes
Python 3.8.14	Sept. 6, 2022	Download	Release Notes
Python 3.9.14	Sept. 6, 2022	Download	Release Notes
Python 3.10.7	Sept. 6, 2022	Download	Release Notes
Python 3.10.6	Aug. 2, 2022	Download	Release Notes
Python 3.10.5	June 6, 2022	Download	Release Notes
Python 3.9.13	May 17, 2022	Download	Release Notes
Python 3.10.4	March 24, 2022	Download	Release Notes

Python

■ Python 설치

다운로드 페이지:


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

Release version	Release date	Click for more	
Python 3.7.14	Sept. 6, 2022	 Download	Release Notes
Python 3.8.14	Sept. 6, 2022	 Download	Release Notes
Python 3.9.14	Sept. 6, 2022	 Download	Release Notes
Python 3.10.7	Sept. 6, 2022	 Download	Release Notes
Python 3.10.6	Aug. 2, 2022	 Download	Release Notes
Python 3.10.5	June 6, 2022	 Download	Release Notes
Python 3.9.13	May 17, 2022	 Download	Release Notes
Python 3.10.4	March 24, 2022	 Download	Release Notes

[View older releases](#)

본 교육에서는 **3.9.13 버전**을 활용합니다.
Download 클릭

■ Python 설치



[python](#)
[python](#)

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[Success Stories](#)
[News](#)
[Events](#)

Python 3.9.13

Release Date: May 17, 2022

This is the **thirteenth** and **final regular maintenance release** of Python 3.9.

Note: The release you're looking at is Python 3.9.13, a **bugfix release** for the legacy 3.x series. Python 3.10 is now the latest feature release series of Python 3. [Get the latest release of 3.10.x here.](#)

According to the release calendar specified in PEP 586, Python 3.9.13 is the final regular maintenance release. Starting now, the 3.x branch will only accept security fixes and releases of those will be made in non-zero-only format until October 2026.

Compared to the 3.8 series, this last regular bugfix release is still pretty active at 266 commits since 3.9.12. In comparison, version 3.8.10, the final regular bugfix release of Python 3.8, included only 72 commits. However, it's likely that it was 3.8 that was special here with the governance changes (excluding core-developer) exists. For reference, version 3.7.6, the final regular bugfix release of Python 3.7, included 247 commits.

In any case, 266 commits is quite a few changes, some of which being pretty important fixes. Take a look at the [change log](#) for details.

Major new features of the 3.9 series, compared to 3.8

Some of the new major new features, and changes in Python 3.9 are:

- [PEP 574](#), Module-Side Access/Store/Deletion Methods.
- [PEP 585](#), Union Operator, `|`.
- [PEP 586](#), Type Hinting Generics in Standard Collections.
- [PEP 586](#), Flexible Function and Variable Annotations.
- [PEP 586](#), Python adopts a stable annual release cadence.
- [PEP 587](#), Relating Generic Restrictions On Decorators.
- [PEP 588](#), Support for the `heap` Line-Size Extension in the Standard Library.
- [PEP 589](#), String methods to remove prefixes and suffixes.
- [PEP 591](#), New `Path` parent for `PathLike`.
- [PEP 592](#), Garbage collection does not block on unconnected objects.
- [PEP 593](#), `asyncio` added that allows process management without execs and signals.
- [PEP 594](#), `asyncio` support upgraded to version 3.4.0.
- [PEP 595](#), when Python is installed multiple times in the same process, it does not leak memory anymore.
- A number of Python modules (`argparse`, `hmac`, `set`, `keyword`, `list`, `dict`) are now speed-up using [PEP 580](#) vectorcall.
- A number of Python modules (`calendar`, `codecs`, `collections`, `crypt`, `functools`, `json`, `locale`, `operator`, `random`, `time`, `urllib`) now use `rustpython` installation as defined by [PEP 586](#).
- A number of standard library modules (`collections`, `set`, `sys`, `unittest`, `weakref`, `gensubprocess`, `random`, `select`, `struct`, `termios`, `time`) are now using the stable API defined by [PEP 580](#).

You can find a more comprehensive list in this release's "What's New" document.

More resources

- [Online Documentation](#)
- [Python 3.9 Release Schedule](#)
- Report bugs at <https://bugs.python.org>
- [Help: Find Python and its community](#)

And Now for Something Completely Different

Mr. Praline: (after clearing) "Hello Python! (singing) 'Hello!' (This is your new clock alarm call) (taken piece out of the cage), (blows it up in the air and watches it plummet to the floor.)"

Mr. Praline: Now that's what I call a good gesture.

Dennis: (Michael Peck): No, no... No... he's stunned!

Mr. Praline: (singing) "Hello!"

Dennis: Well! You stunned him, just as he was waking up! Norwegian blues don't really drag!

Mr. Praline: Yes... now look, now I'm definitely fed enough of this. That piece is definitely drowned, and when it's pushed it out 'off on your eye, you assured me that its total lack of movement was due to it being 'dead and changed to following a prolonged nap.

Dennis: Well, he's... he's... ah... probably going for the fourth.

(Bell Chiming)

Files

Version	Operating System	Description	MD5 Sum	File Size	GGPG
Original source (tarball)		Source release	4a783065b52327c7c3a0f2c0a720a77	26410087	Sigs
32 compressed source (tarball)		Source release	4a783065b52327c7c3a0f2c0a720a77	26410087	Sigs
macOS 64-bit ready-to-use installer	macOS	For macOS 10.14 and later, deprecated	4a783065b52327c7c3a0f2c0a720a77	20914144	Sigs
macOS 64-bit universal installer	macOS	For macOS 10.14 and later	4a783065b52327c7c3a0f2c0a720a77	20914144	Sigs
Windows embedded/compact package (x64-bit)	Windows		4a783065b52327c7c3a0f2c0a720a77	1729996	Sigs
Windows embedded/compact package (x64-bit)	Windows		4a783065b52327c7c3a0f2c0a720a77	8639490	Sigs
Windows help file	Windows		4a783065b52327c7c3a0f2c0a720a77	8663644	Sigs
Windows installer (x64-bit)	Windows		4a783065b52327c7c3a0f2c0a720a77	20914144	Sigs
Windows installer (x64-bit)	Windows	Recommended	4a783065b52327c7c3a0f2c0a720a77	20914144	Sigs

About	Downloads	Documentation	Community	Success Stories	News
Applications	All releases	Docs	General	APIs	Python News
Quizzes	Source code	Audio/Visual talks	Handling Lists	Business	Python 3.9
Getting started	Windows	Developer's Guide	GC	Education	Community News
Help	macOS	Developer's Guide	Hardware	Engineering	Python News
Python roadmap	Linux/Windows	FAQ	Python Annual Impact Report	Government	Python News
	License	Non-English Docs	Python Conferences	Scientific	

창 아래쪽 Files 확인

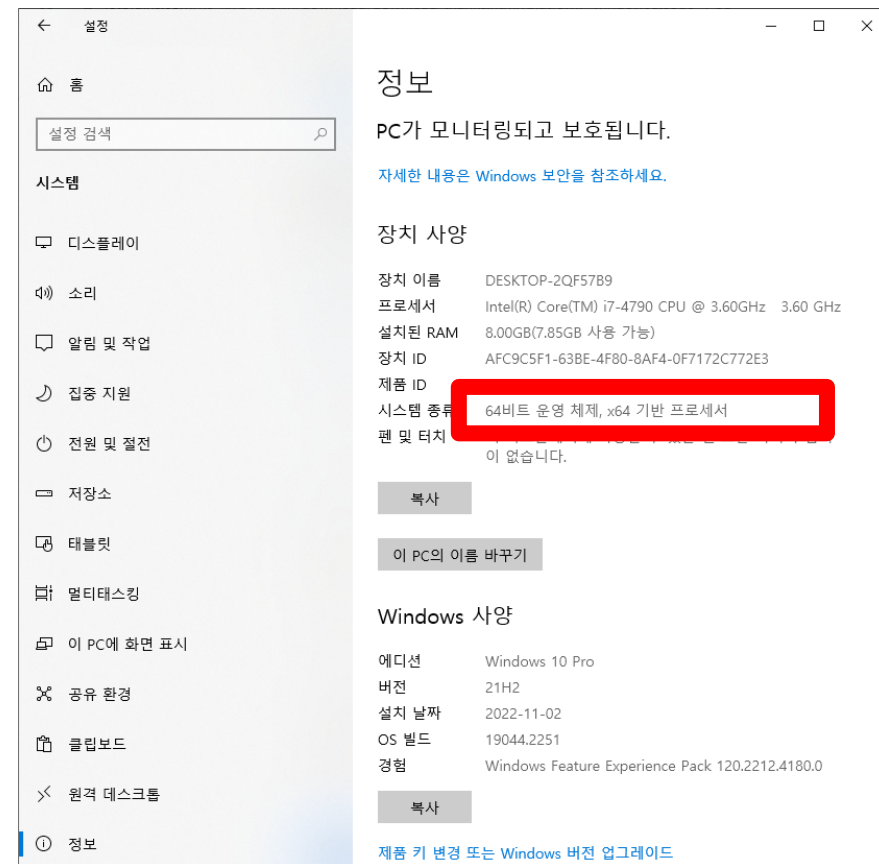
Python

■ Python 설치

Files

Version	Operating System	Description	MD5 Sum	File Size	GPG
Gzipped source tarball	Source release		eafda83543bad127cadef4d288fdb87	26355887	SIG
XZ compressed source tarball	Source release		5e2411217b0060828d5f923eb422a3b8	19754368	SIG
macOS 64-bit Intel-only installer	macOS	for macOS 10.9 and later, deprecated	671848930809decf27f586ddf98c6e9b	30997161	SIG
macOS 64-bit universal2 installer	macOS	for macOS 10.9 and later	76b63cf623e32cdf27c5033434bd69ce	38821163	SIG
Windows embeddable package (32-bit)	Windows		fec0bc06857502a56dd1aeaea6488ef8	7729405	SIG
Windows embeddable package (64-bit)	Windows		57731cf80b1c429a0be7133266d7d7cf	8570740	SIG
Windows help file	Windows		c86feba059b340a1de2a9d2ee7059a6d	8953644	SIG
Windows installer (32-bit)	Windows		46c35b0a2a4325c275b2ed3187b08ac4	28096840	SIG
Windows installer (64-bit)	Windows	Recommended	e7062b85c3624af82079794729618eca	29235432	SIG

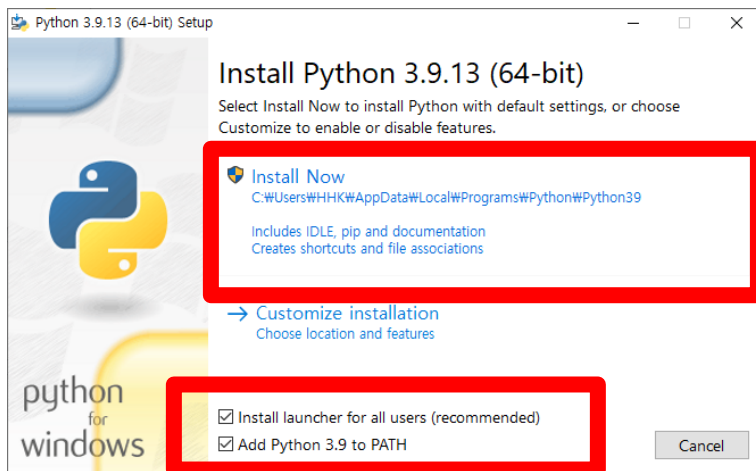
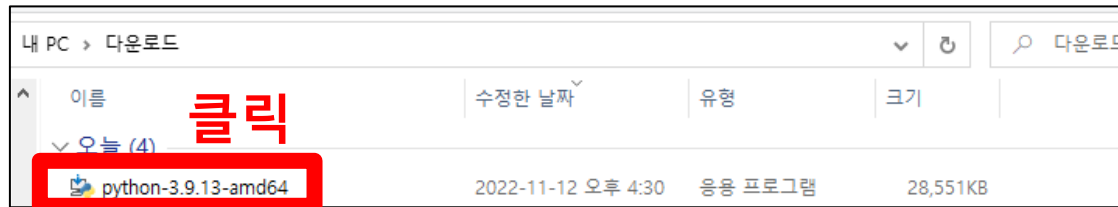
본인 PC 하드웨어 사양(64bit, 32bit) 선택



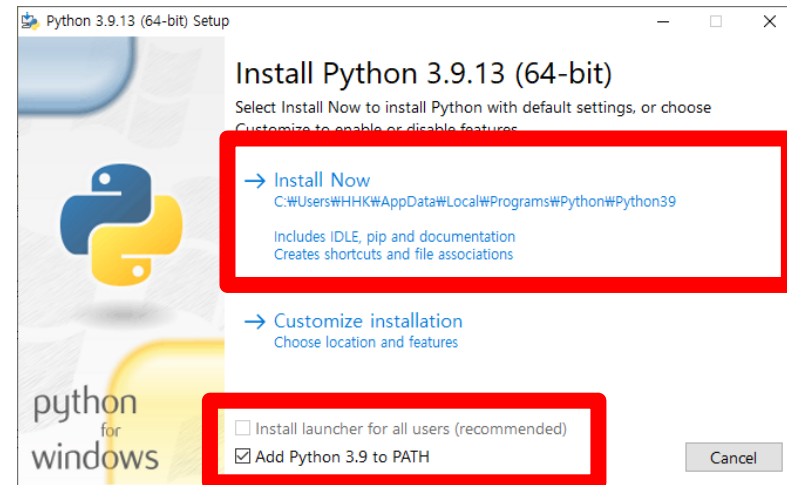
하드웨어 사양
본 교육자료 첫 부분(page 5)에서 확인

Python

■ Python 설치



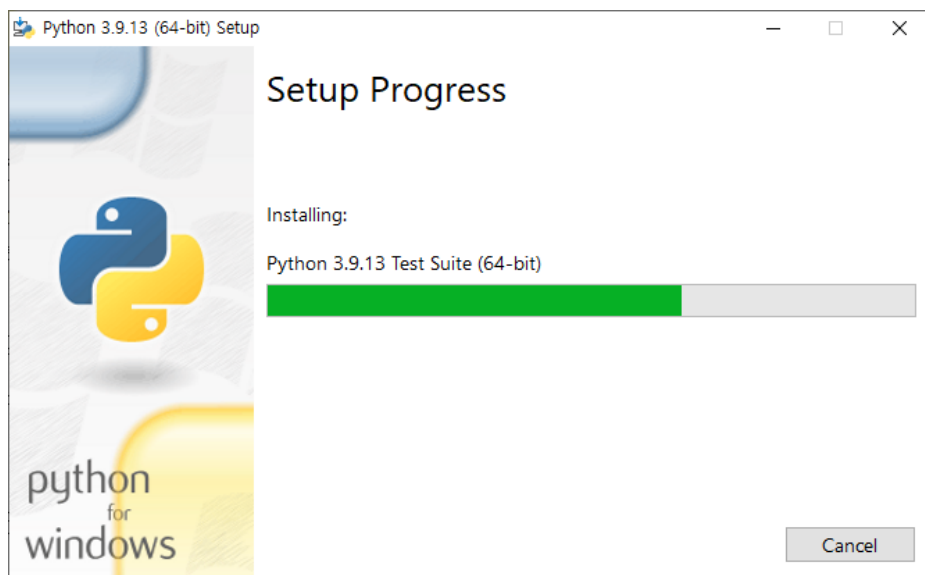
체크박스 둘 다 활성화 되어 있는 경우
둘 다 체크



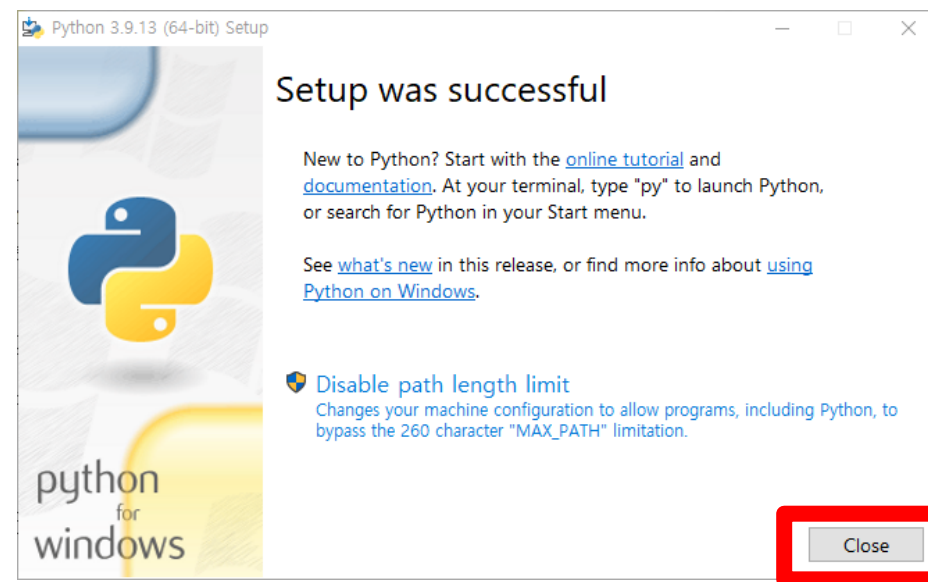
하나만 활성화 되어있는 경우
아래 것만 체크

Python

■ Python 설치



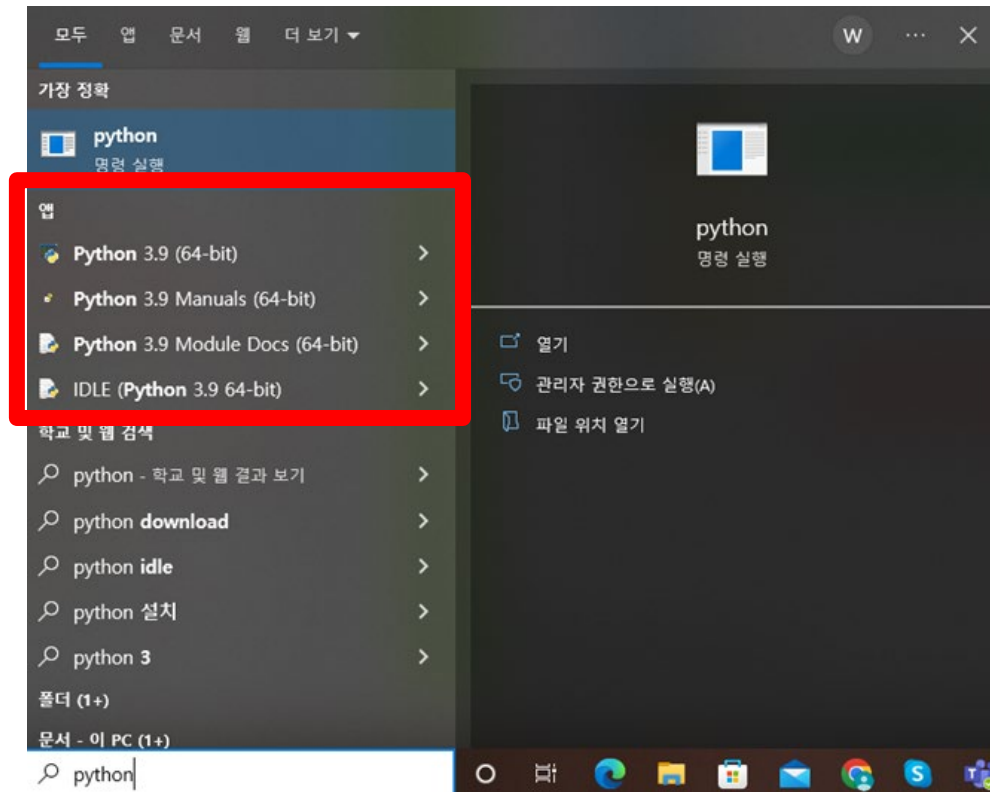
설치 중 화면



클릭

Python

■ Python 설치



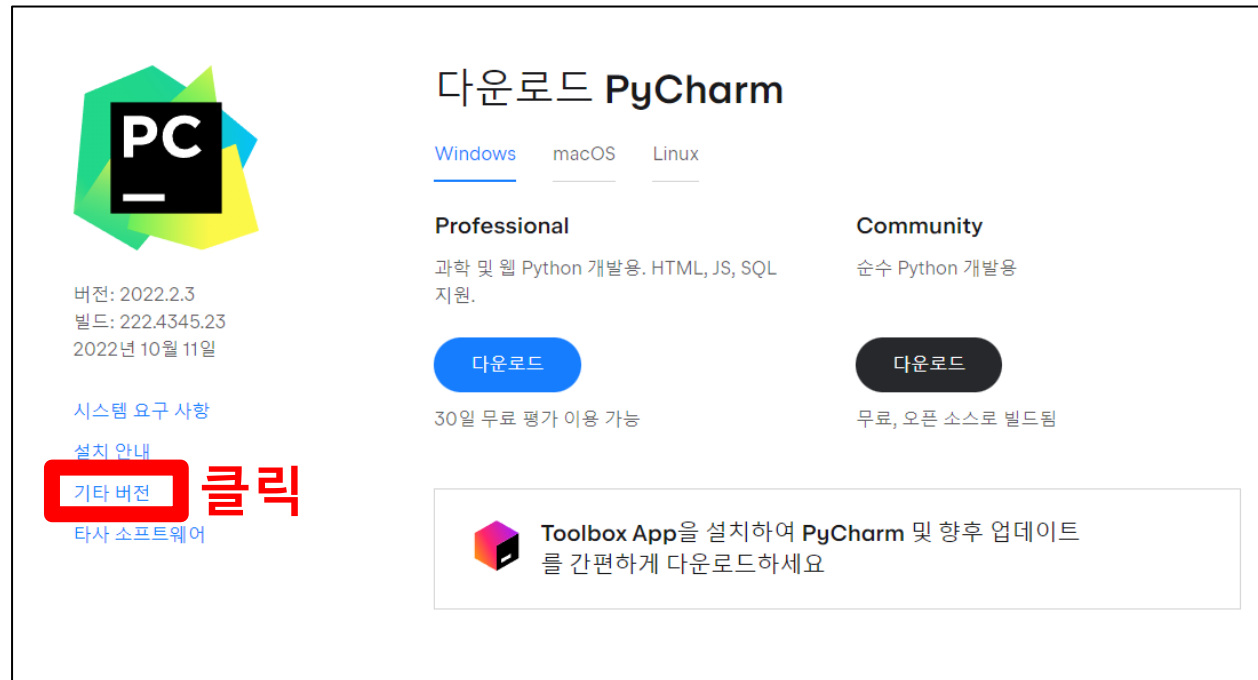
Python 검색 후
설치 완료되었는지 확인

PyCharm

■ PyCharm 설치

다운로드 페이지:

<https://www.jetbrains.com/ko-kr/pycharm/download/#section=windows>



다운로드 PyCharm

Windows macOS Linux

Professional
과학 및 웹 Python 개발용. HTML, JS, SQL 지원.

Community
순수 Python 개발용

버전: 2022.2.3
빌드: 222.4345.23
2022년 10월 11일

시스템 요구 사항
설치 안내
기타 버전 클릭
타사 소프트웨어

다운로드
30일 무료 평가 이용 가능

다운로드
무료, 오픈 소스로 빌드됨

Toolbox App을 설치하여 PyCharm 및 향후 업데이트를 간편하게 다운로드하세요

PyCharm

■ PyCharm 설치

기타 버전

Version 2022.2

PyCharm Professional Edition

[2022.2.3 - Linux \(tar.gz\)](#)

[2022.2.3 - Windows \(exe\)](#)

[2022.2.3 - macOS \(dmg\)](#)

[2022.2.3 - macOS Apple Silicon \(dmg\)](#)

PyCharm Community Edition

[2022.2.3 - Linux \(tar.gz\)](#)

[2022.2.3 - Windows \(exe\)](#)

[2022.2.3 - macOS \(dmg\)](#)

[2022.2.3 - macOS Apple Silicon \(dmg\)](#)

Version 2022.1

PyCharm Professional Edition

[2022.1.4 - Linux \(tar.gz\)](#)

[2022.1.4 - Windows \(exe\)](#)

[2022.1.4 - macOS \(dmg\)](#)

[2022.1.4 - macOS Apple Silicon \(dmg\)](#)

PyCharm Community Edition

[2022.1.4 - Linux \(tar.gz\)](#)

[2022.1.4 - Windows \(exe\)](#)

[2022.1.4 - macOS \(dmg\)](#)

[2022.1.4 - macOS Apple Silicon \(dmg\)](#)

클릭

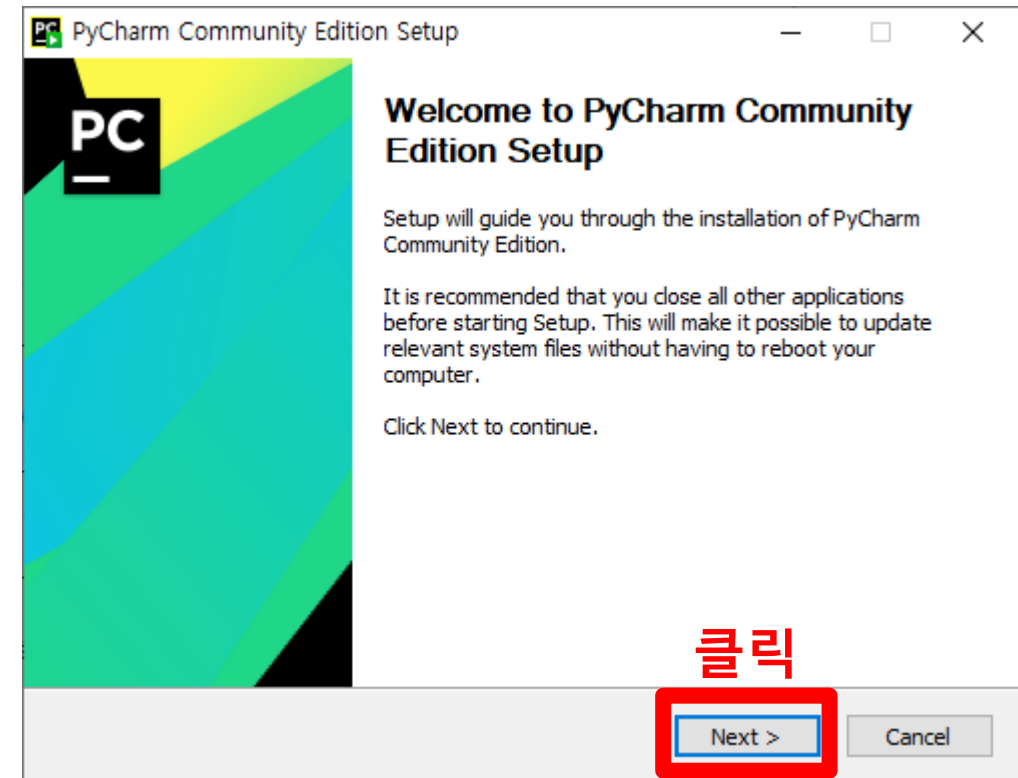
PyCharm

■ PyCharm 설치

PC > 다운로드

이름	수정한 날짜	유형	크기
pycharm-community-2022.1.4	2022-11-12 오후 6:03	응용 프로그램	387,723KB

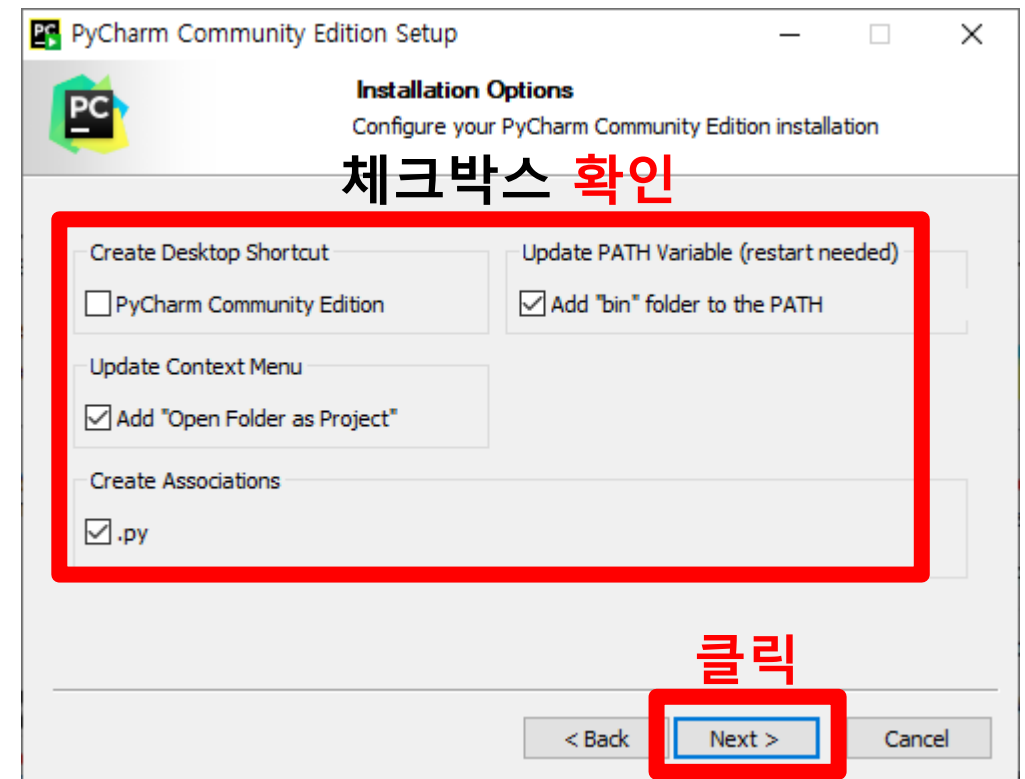
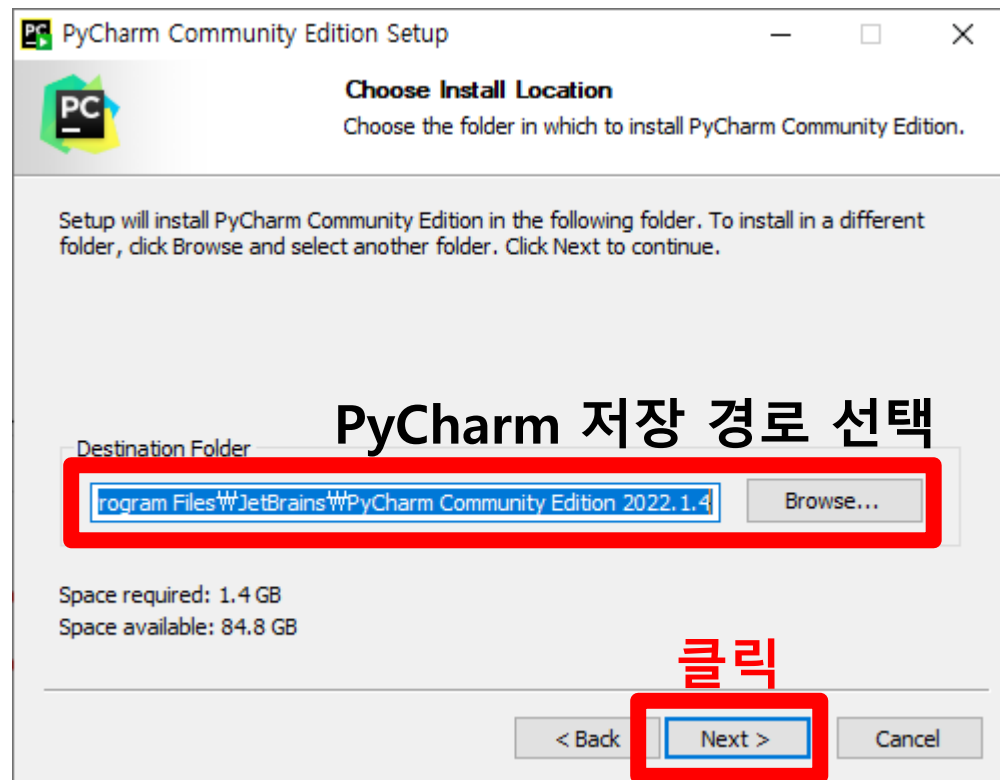
클릭



클릭

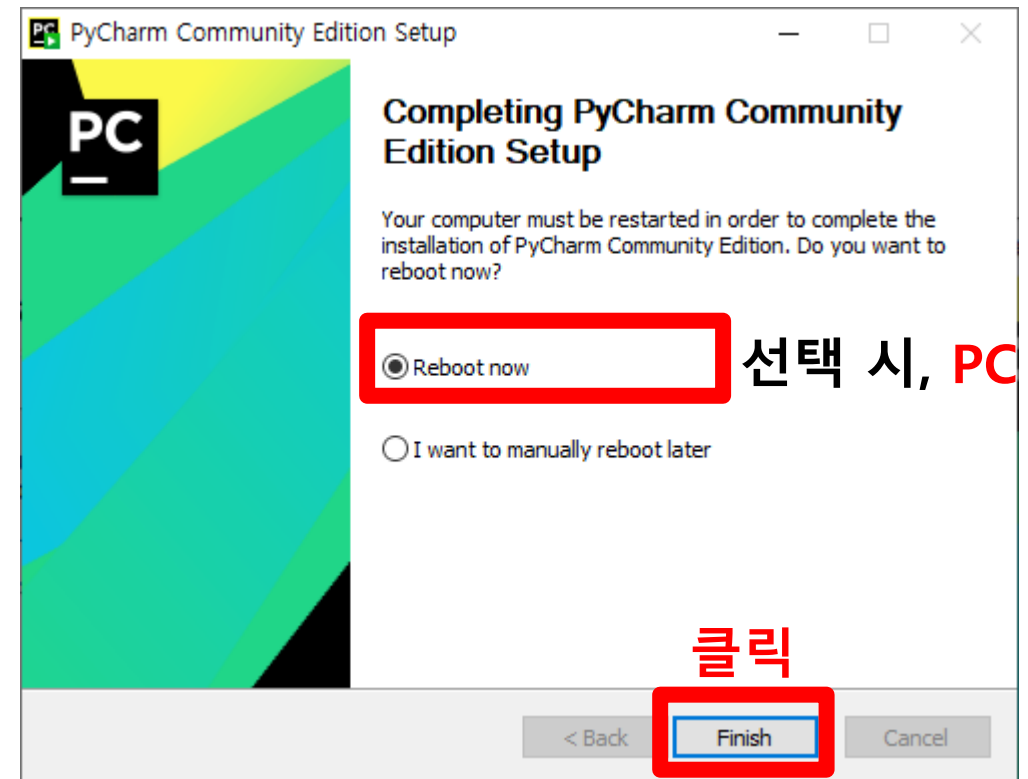
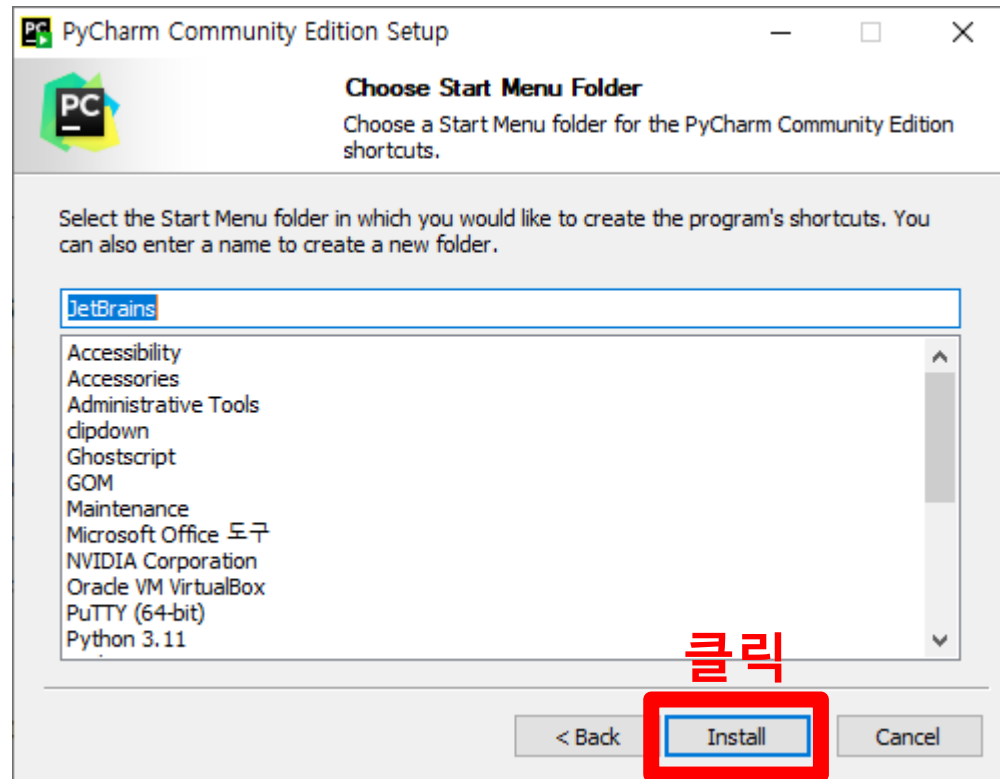
PyCharm

■ PyCharm 설치



PyCharm

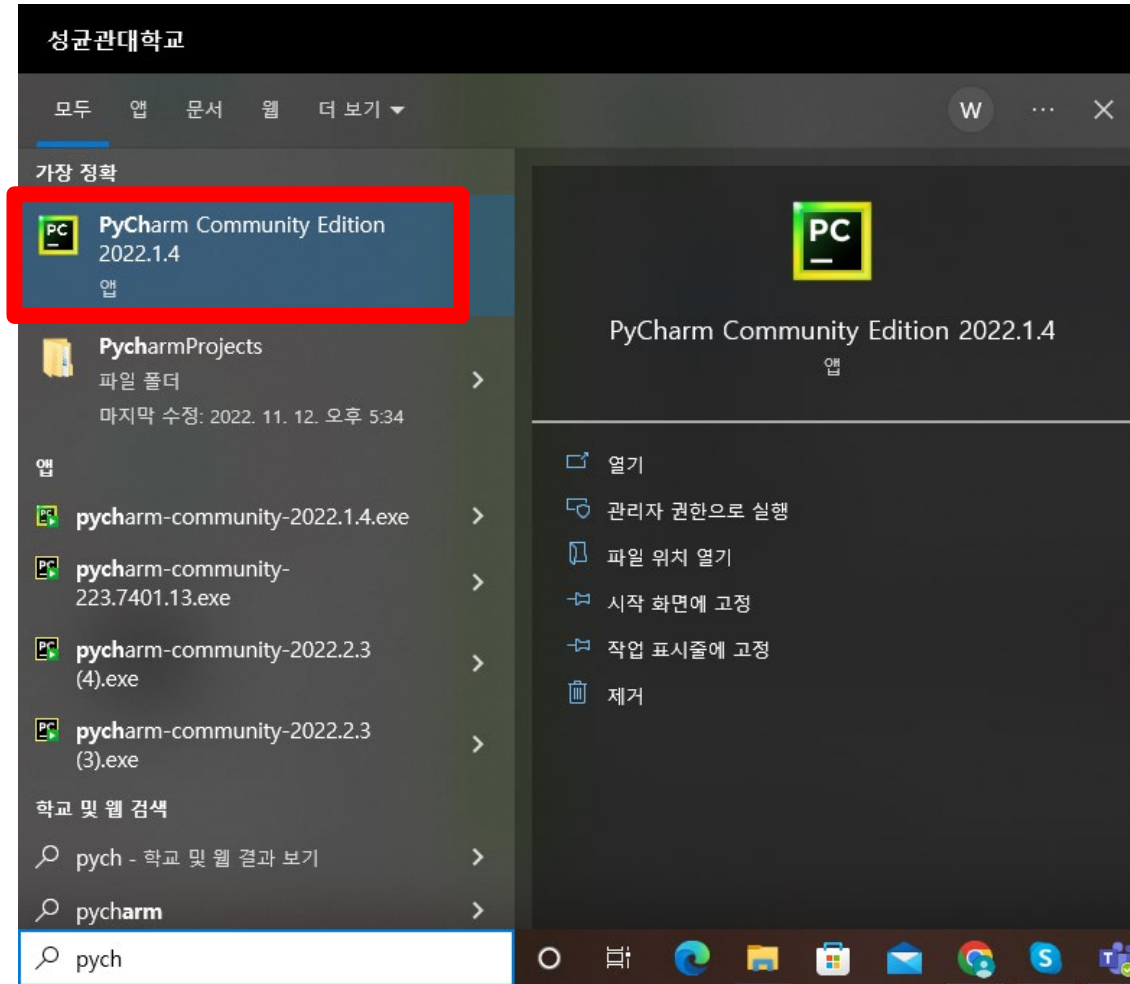
■ PyCharm 설치



PyCharm

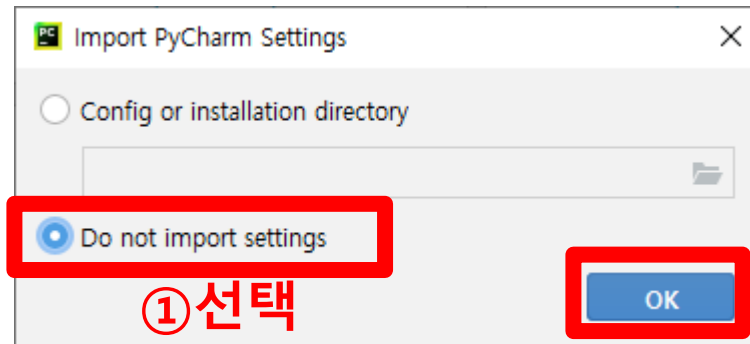
■ Interpreter 설정

PyCharm 실행

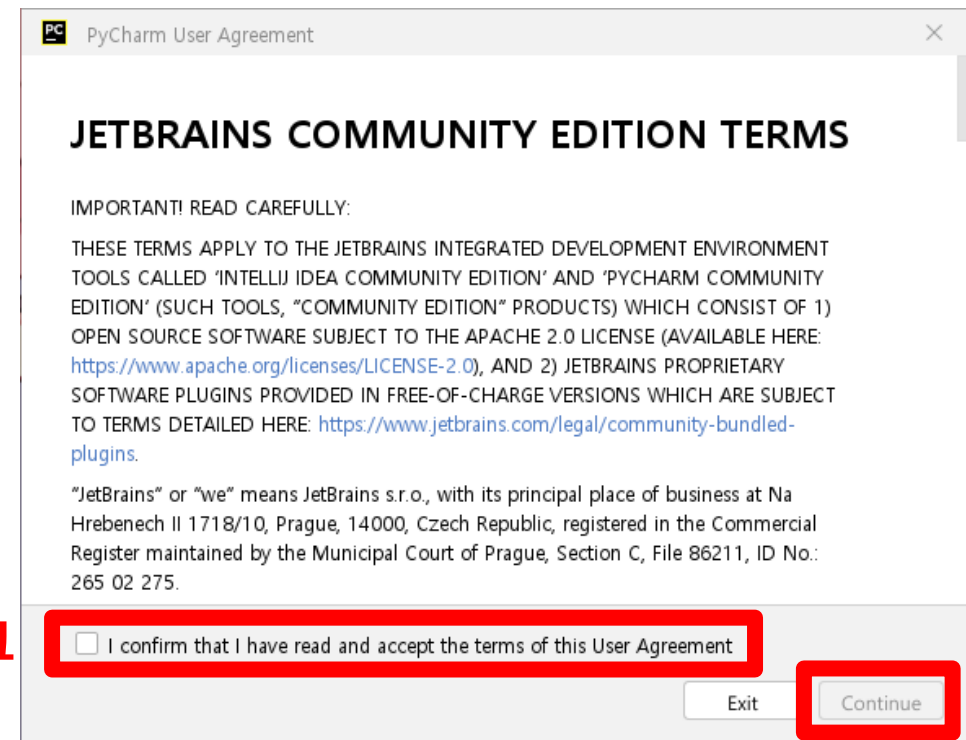


PyCharm

■ Interpreter 설정



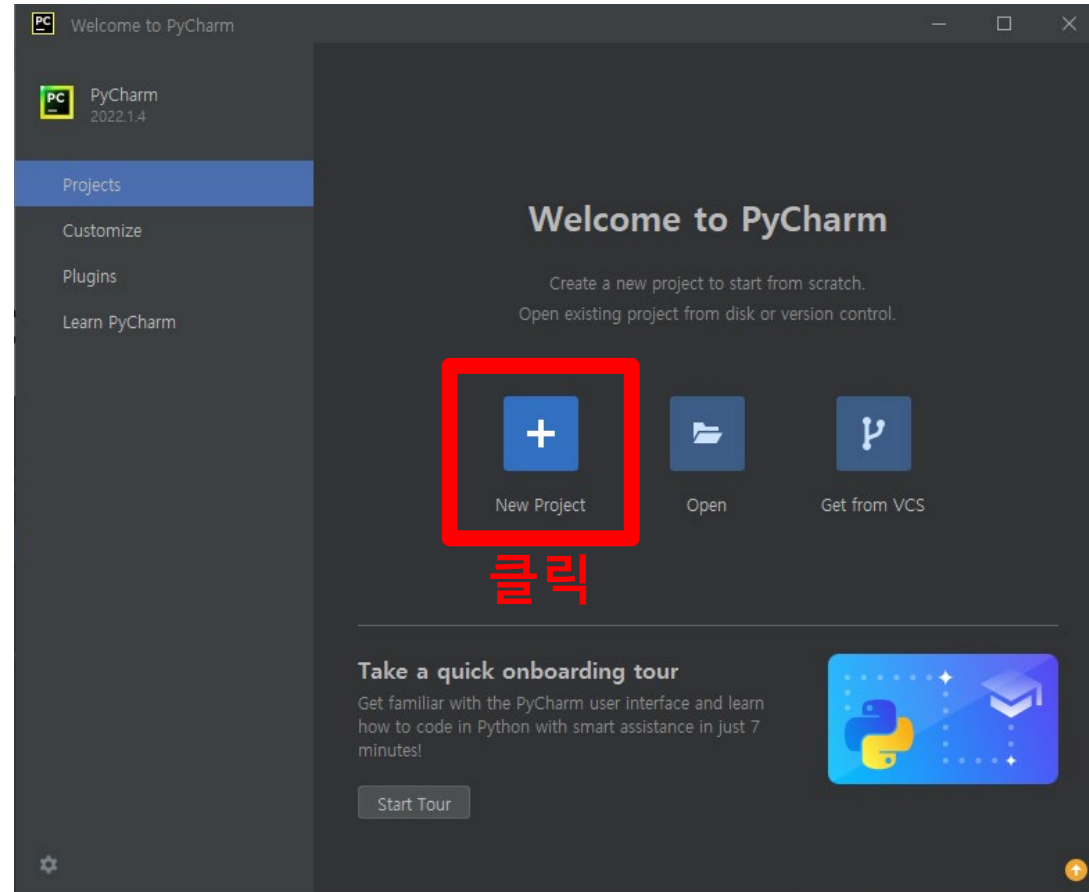
② 클릭



② 클릭

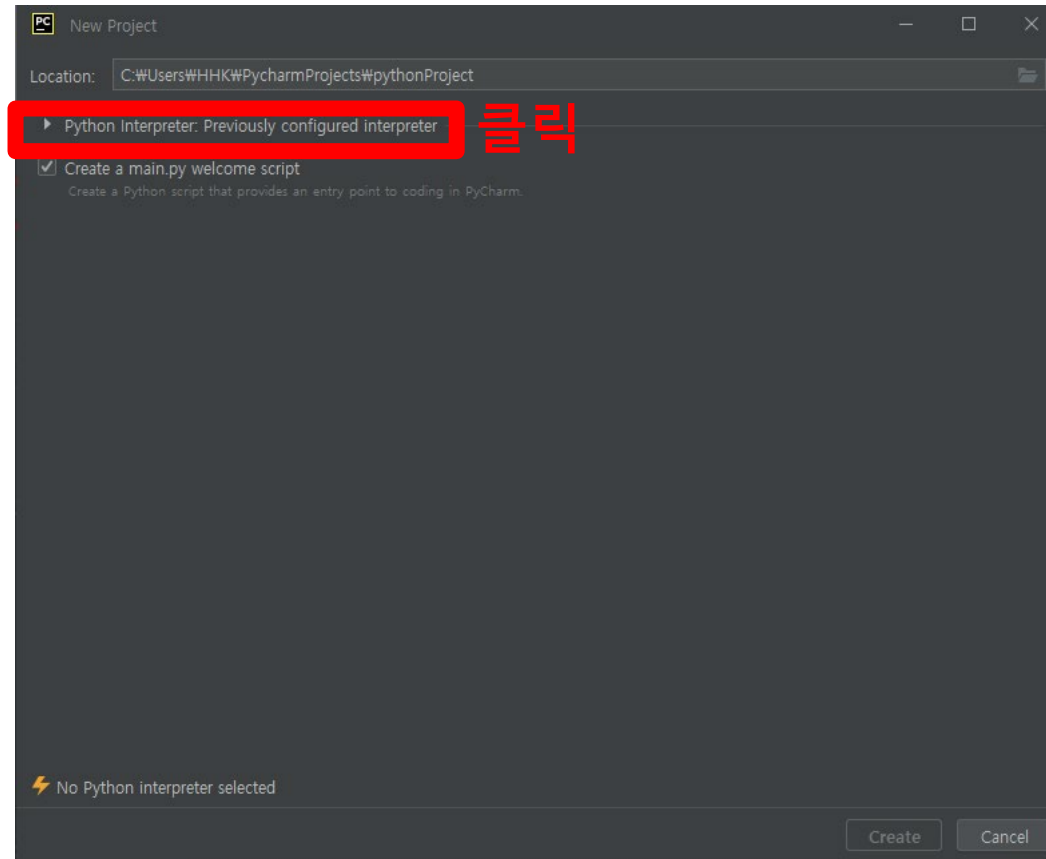
PyCharm

■ Interpreter 설정



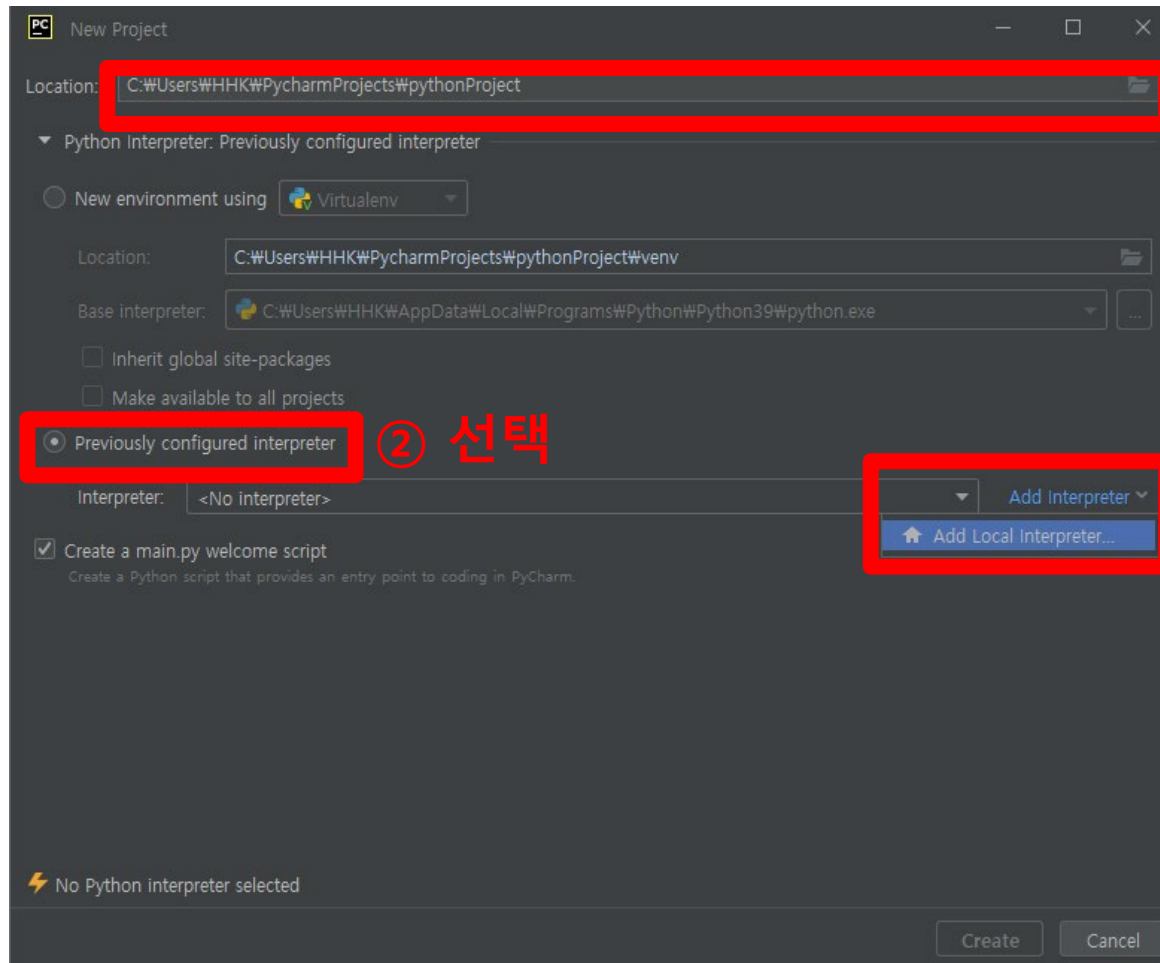
PyCharm

■ Interpreter 설정



PyCharm

■ Interpreter 설정



① 프로젝트 파일 폴더 위치 지정
(초기값 유지)

③ Add Interpreter
-> Add Local Interpreter 클릭

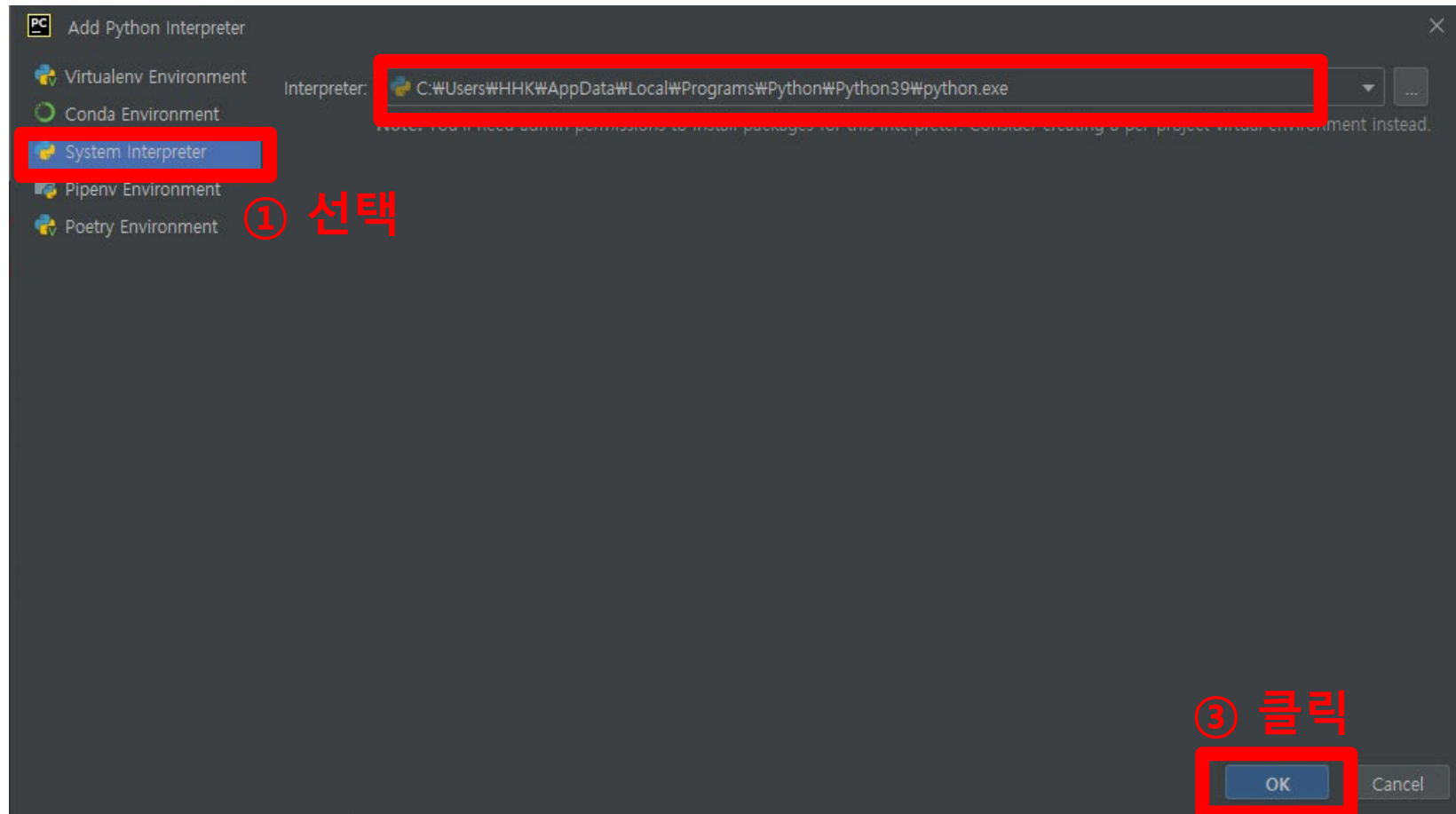


③-1 다음과 같이 뜨는 경우 ... 클릭하여 진행

PyCharm

■ Interpreter 설정

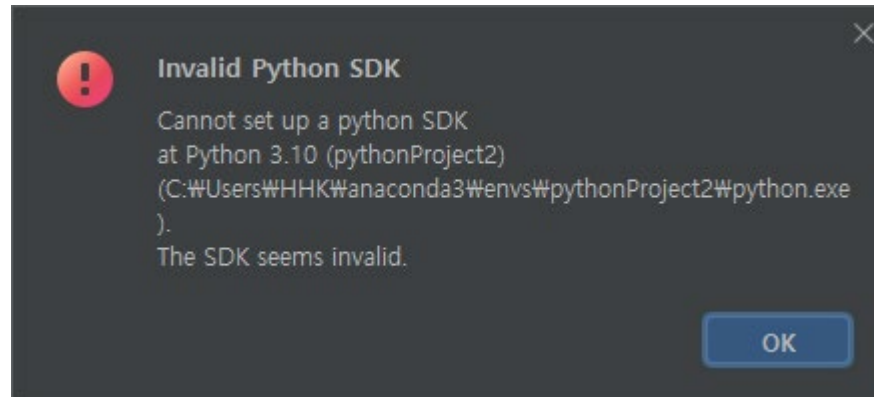
② Interpreter 선택



만일 Interpreter 없으면,
Python이 설치 안 된 것
Python 재설치 필요

PyCharm

■ Interpreter 설정

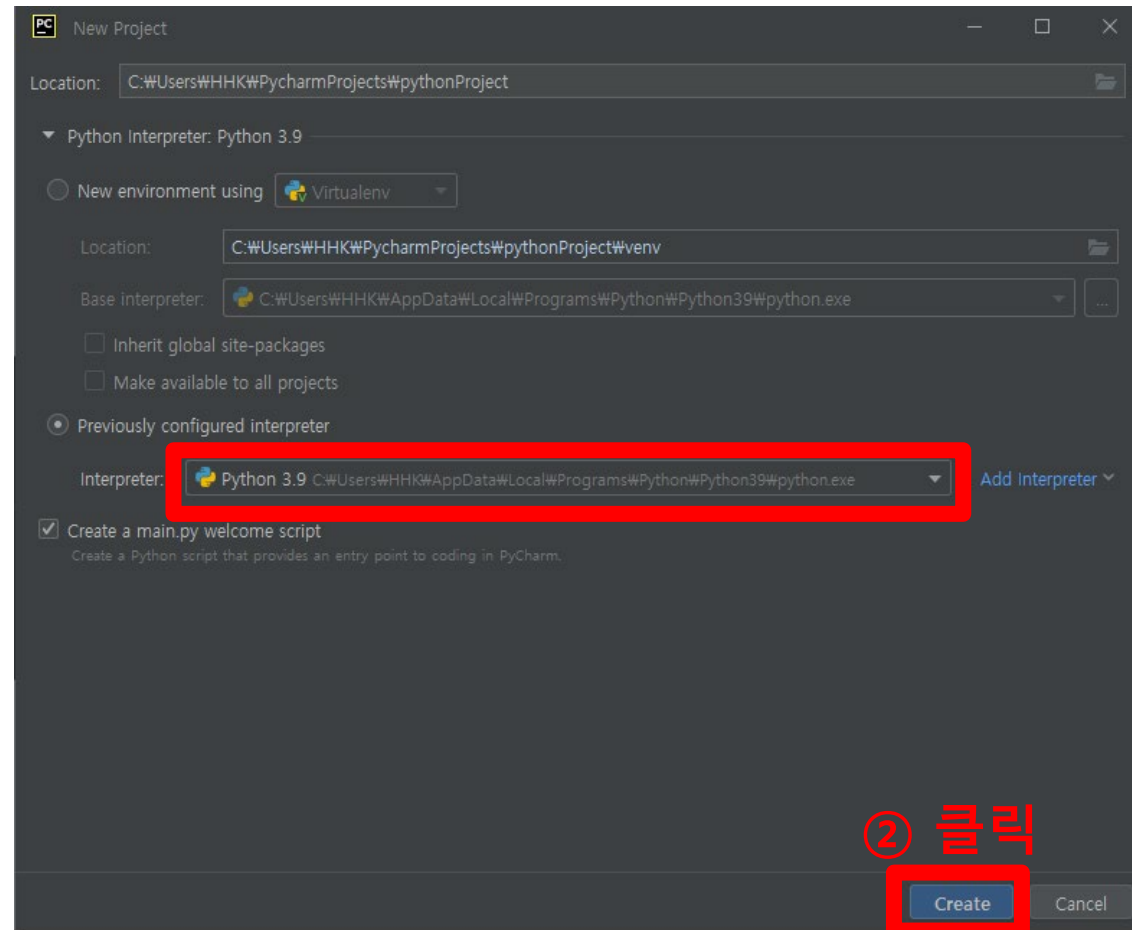


다음과 같은 오류 발생 시

2022.1.4 버전으로 **재설치**

PyCharm

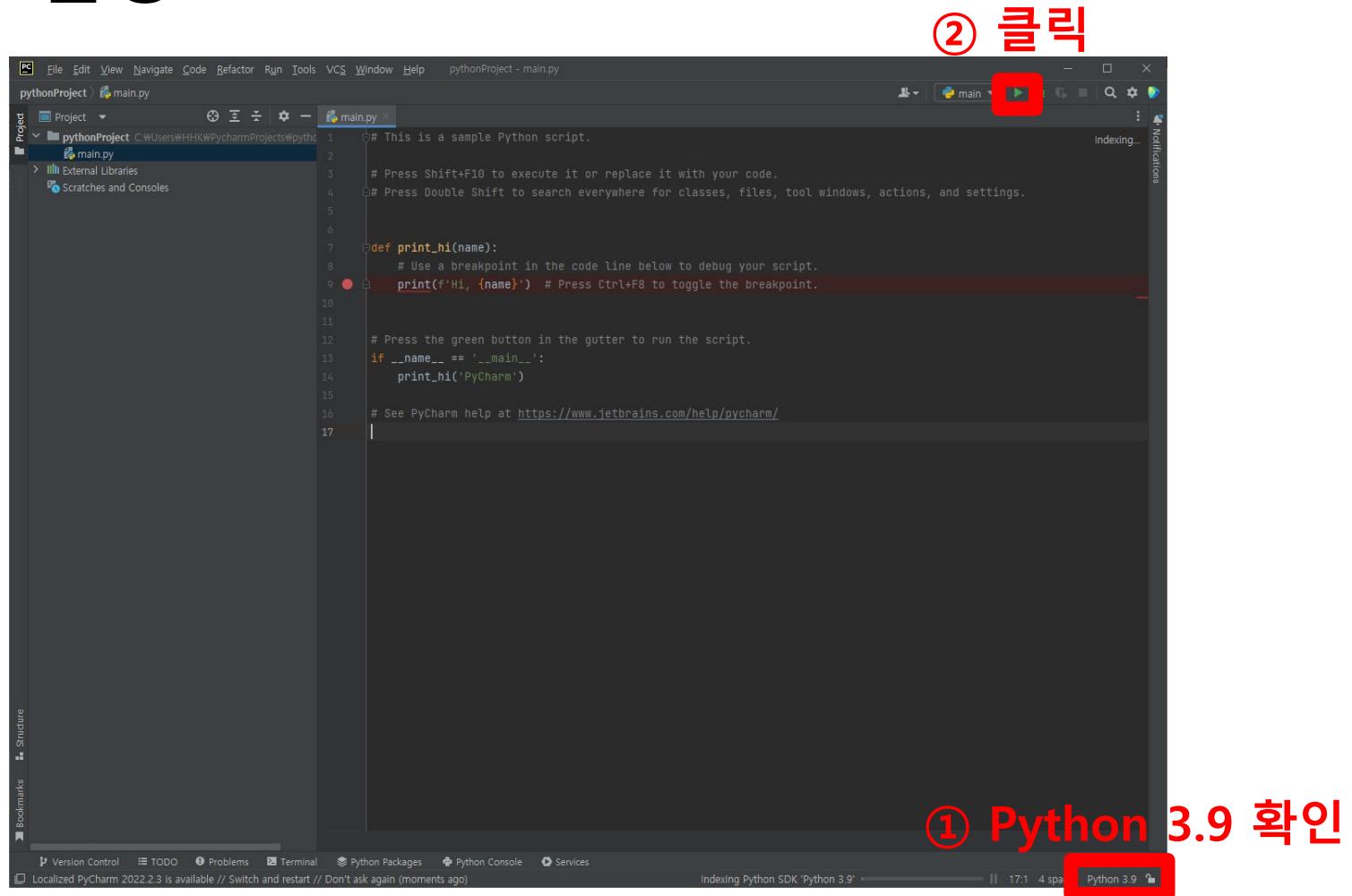
■ Interpreter 설정



① interpreter 확인
(Python 3.9)

PyCharm

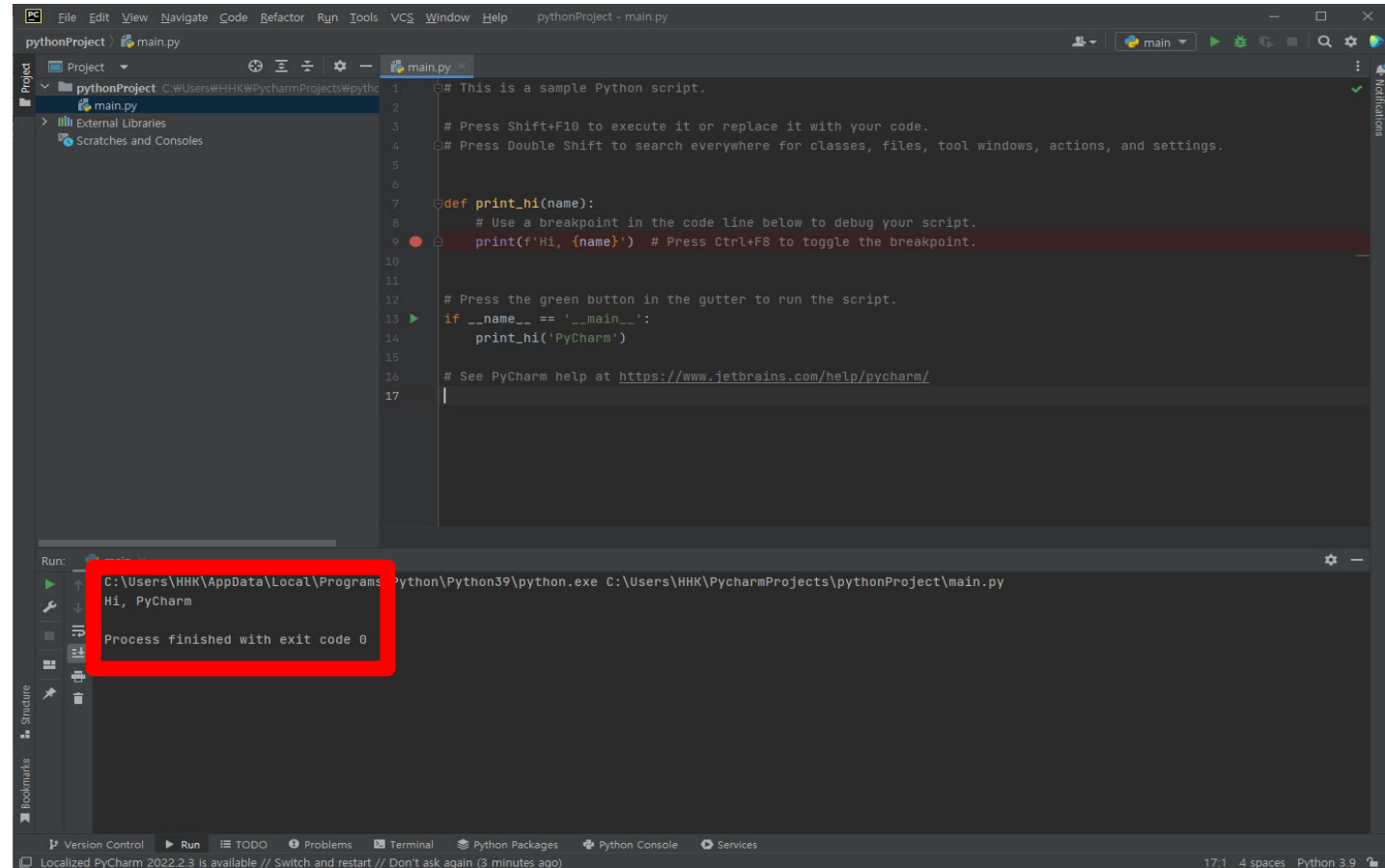
■ Interpreter 설정



PyCharm

■ Interpreter 설정

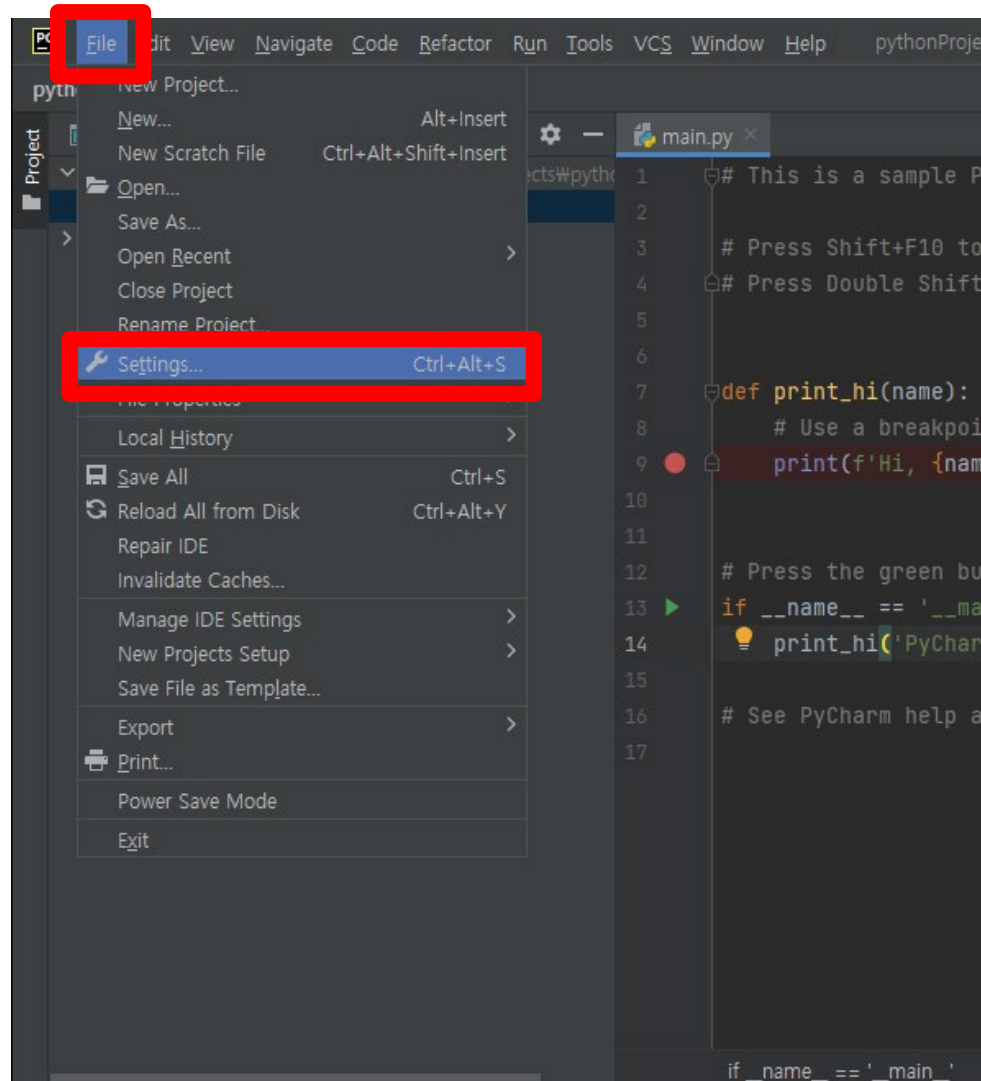
'Hi, PyCharm'
출력 시 성공



Library

■ 라이브러리 설치

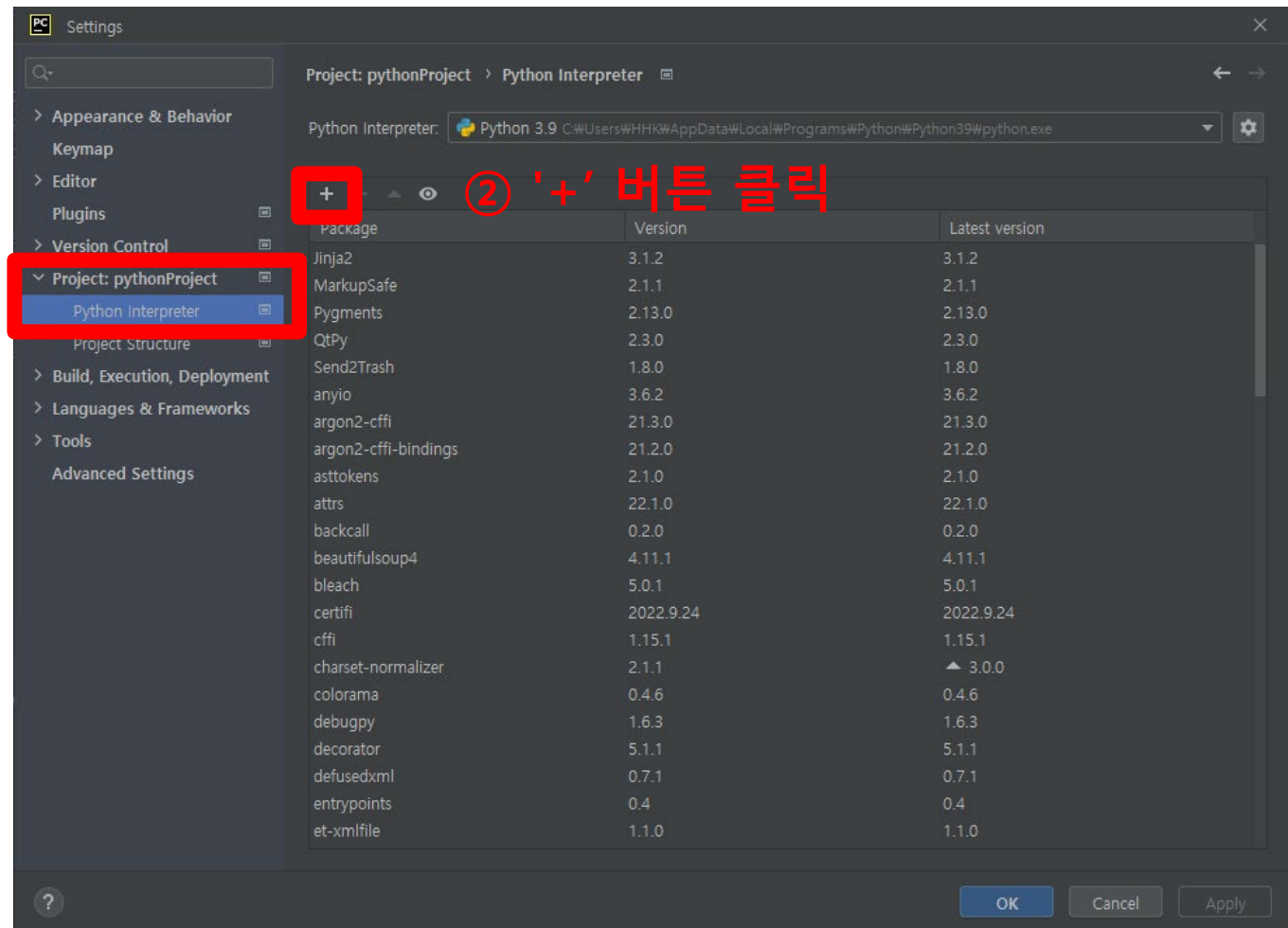
화면 상단
File - Settings 클릭



Library

■ 라이브러리 설치

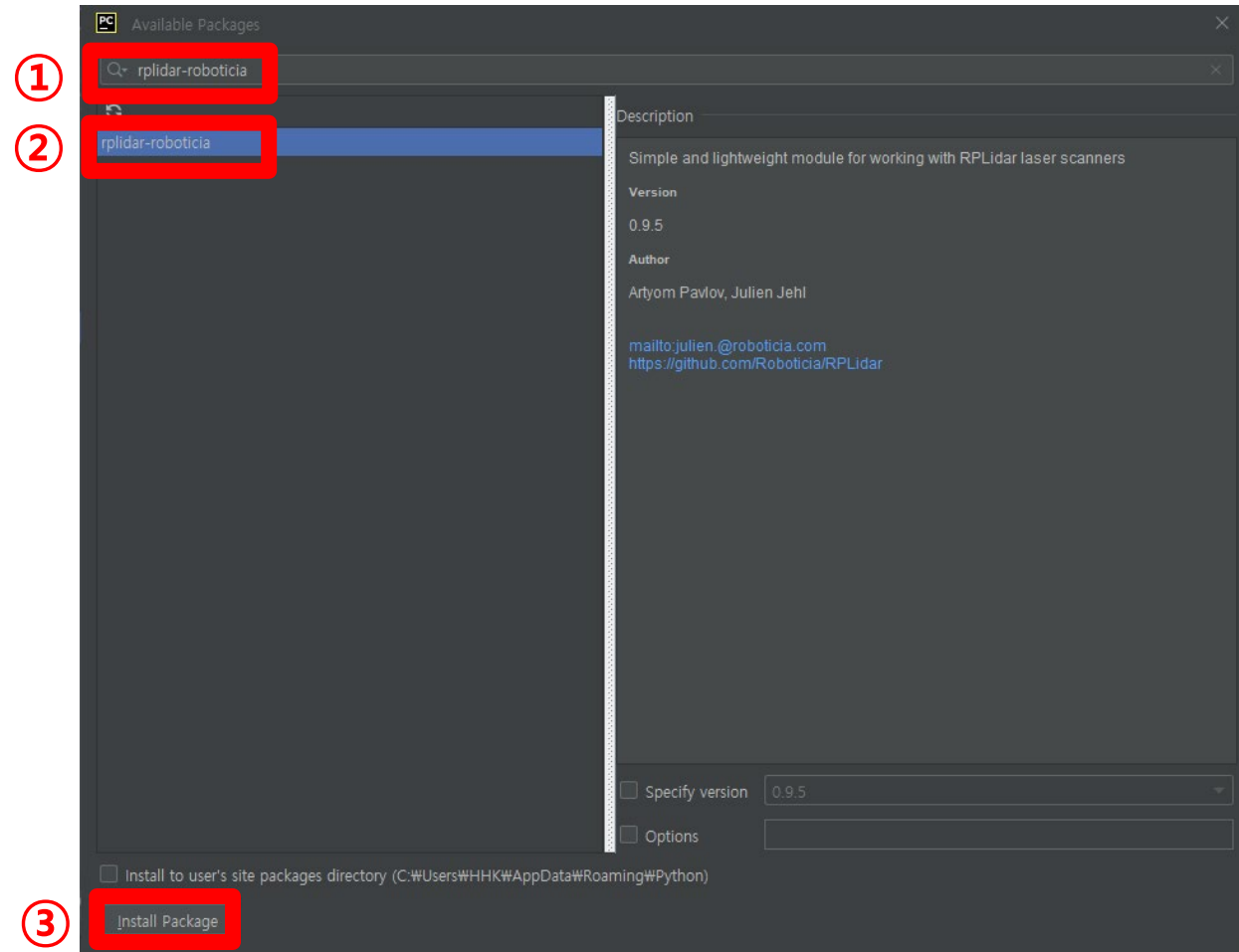
① Project: <프로젝트 이름>
-> Python Interpreter 선택



Library

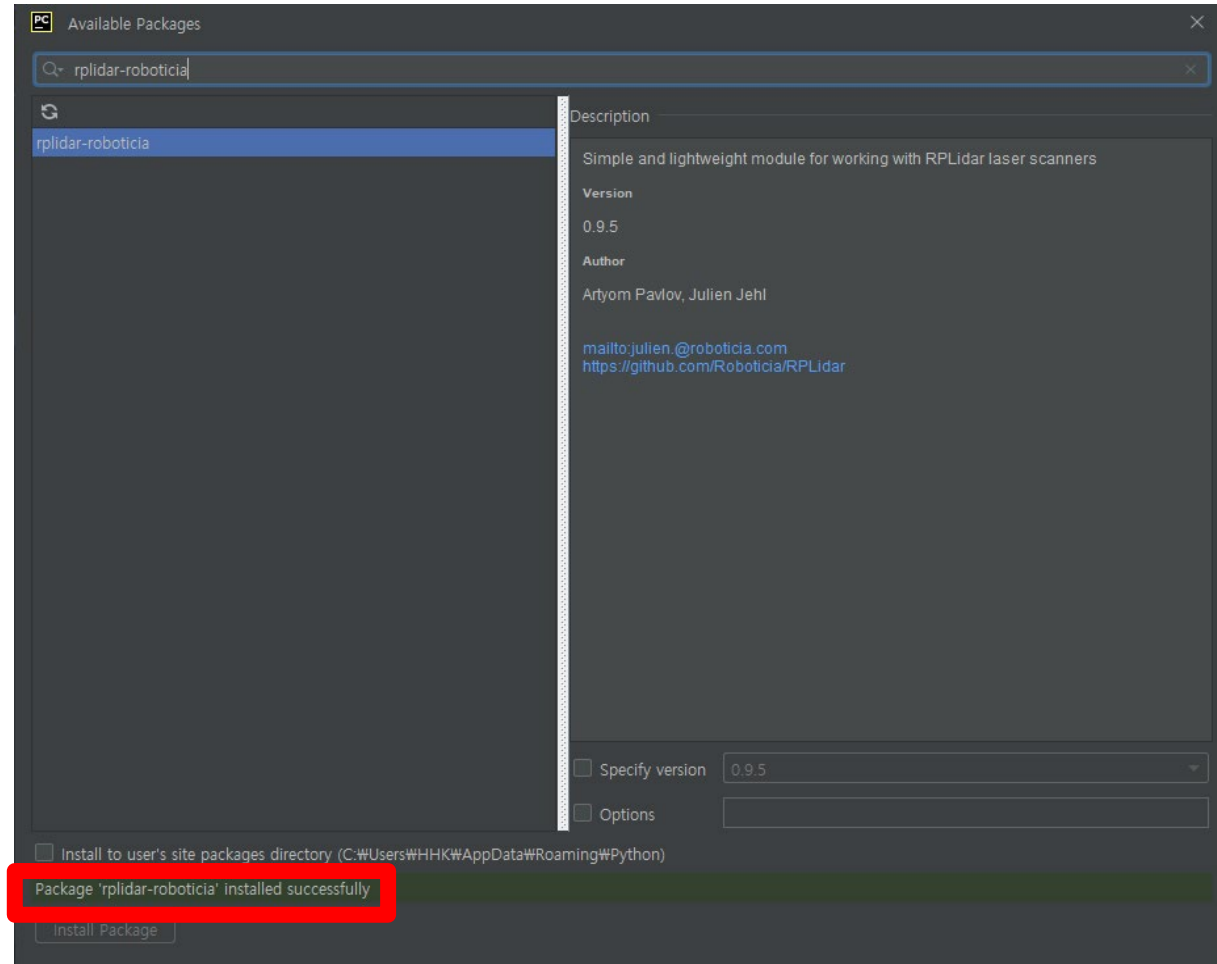
■ LiDAR 라이브러리 설치

- ① rplidar-roboticia 검색
- ② rplidar-roboticia 선택
- ③ Install Package 클릭



Library

■ LiDAR 라이브러리 설치

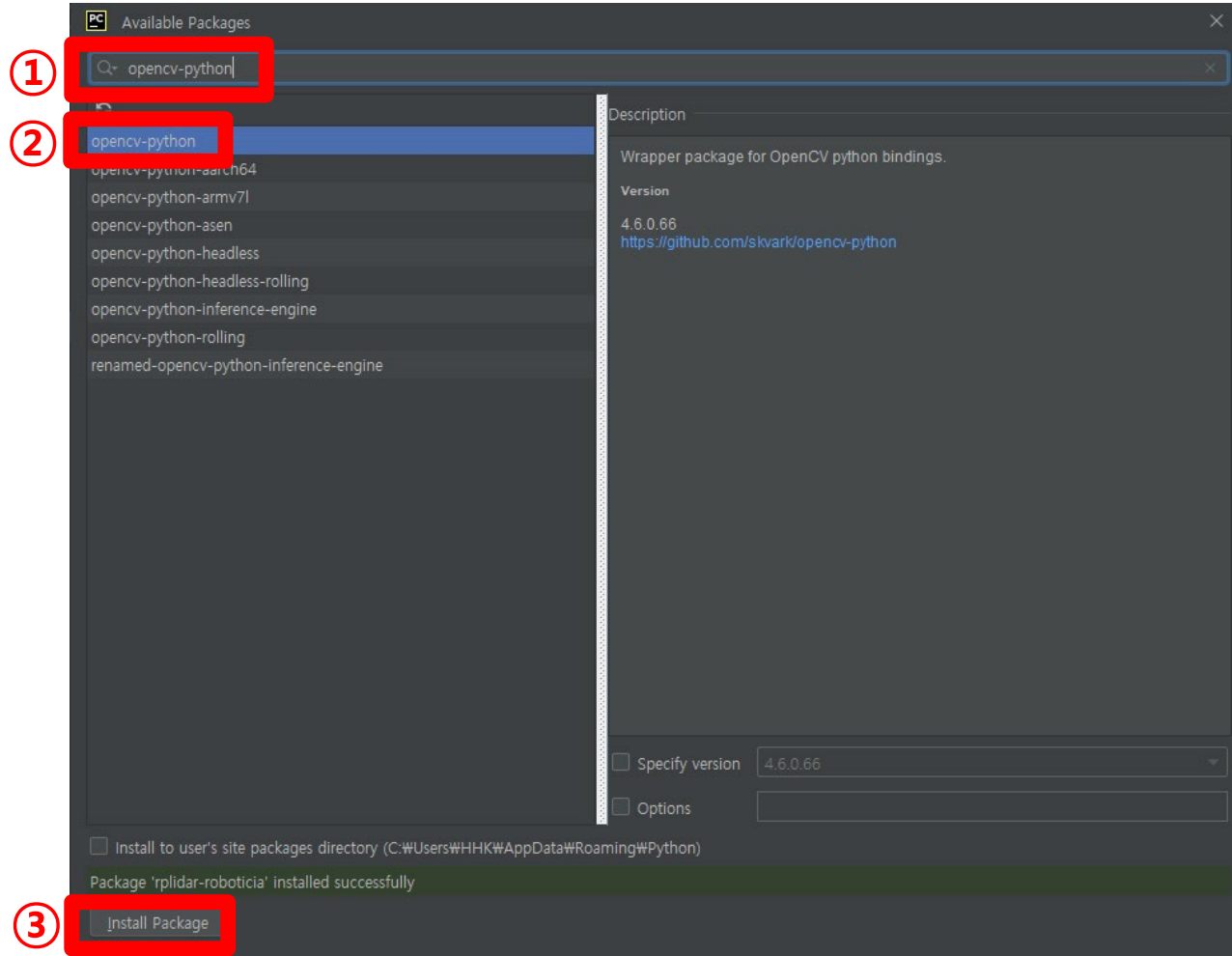


설치 성공 메시지 확인

Library

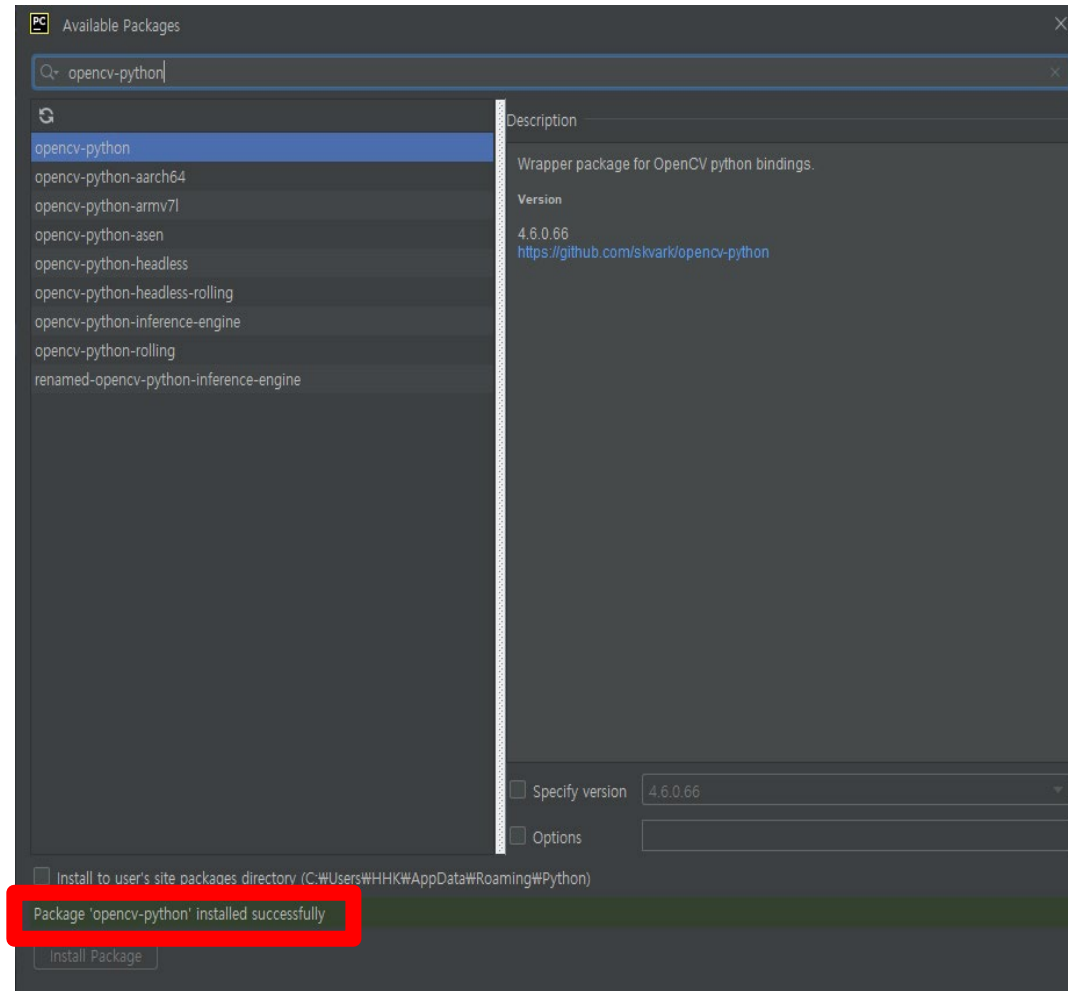
■ Camera 라이브러리 설치

- ① opencv-python 검색
- ② opencv-python 선택
- ③ Install Package 클릭



Library

■ Camera 라이브러리 설치

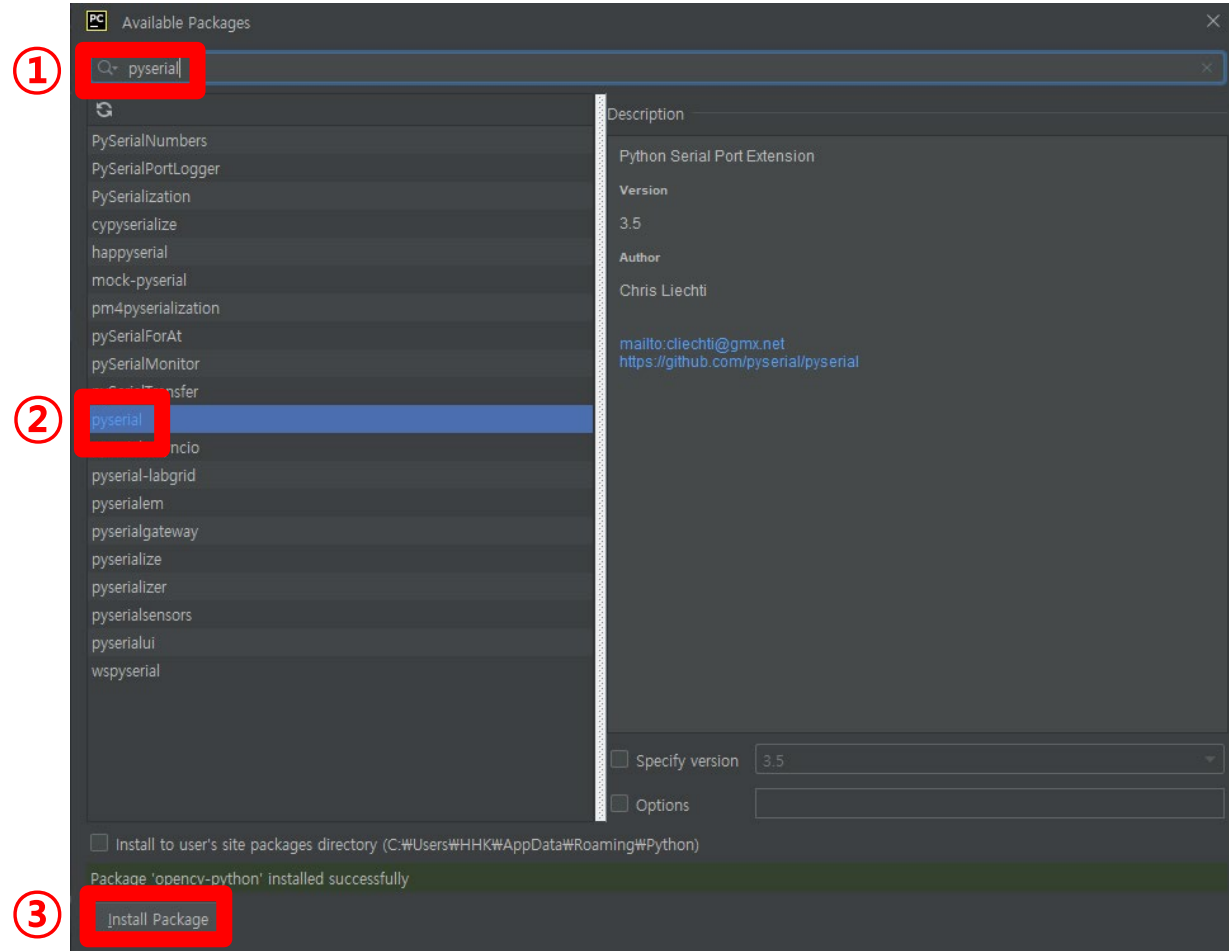


설치 성공 메시지 확인

Library

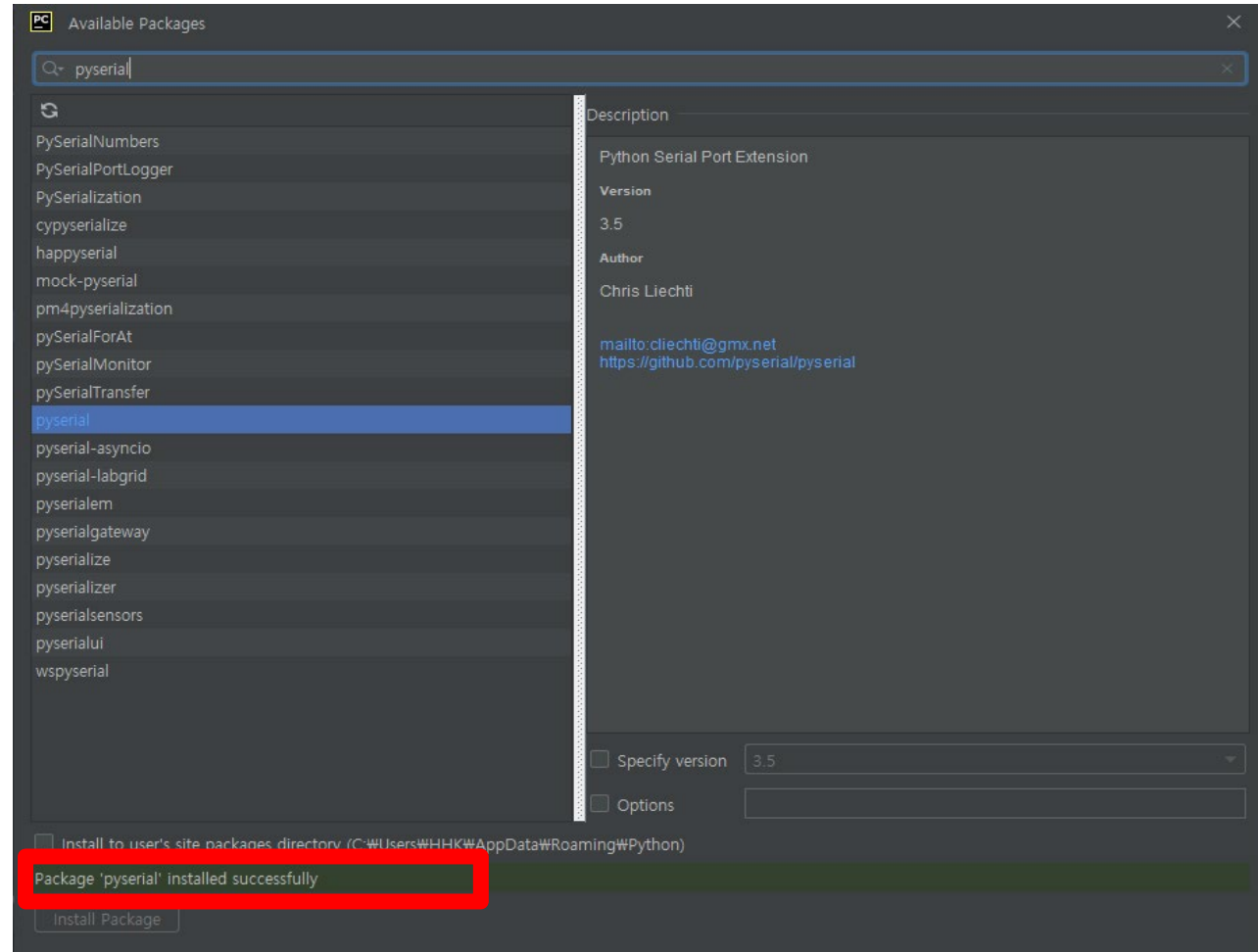
■ 시리얼통신 라이브러리 설치

- ① pyserial 검색
- ② pyserial 선택
- ③ Install Package 클릭



Library

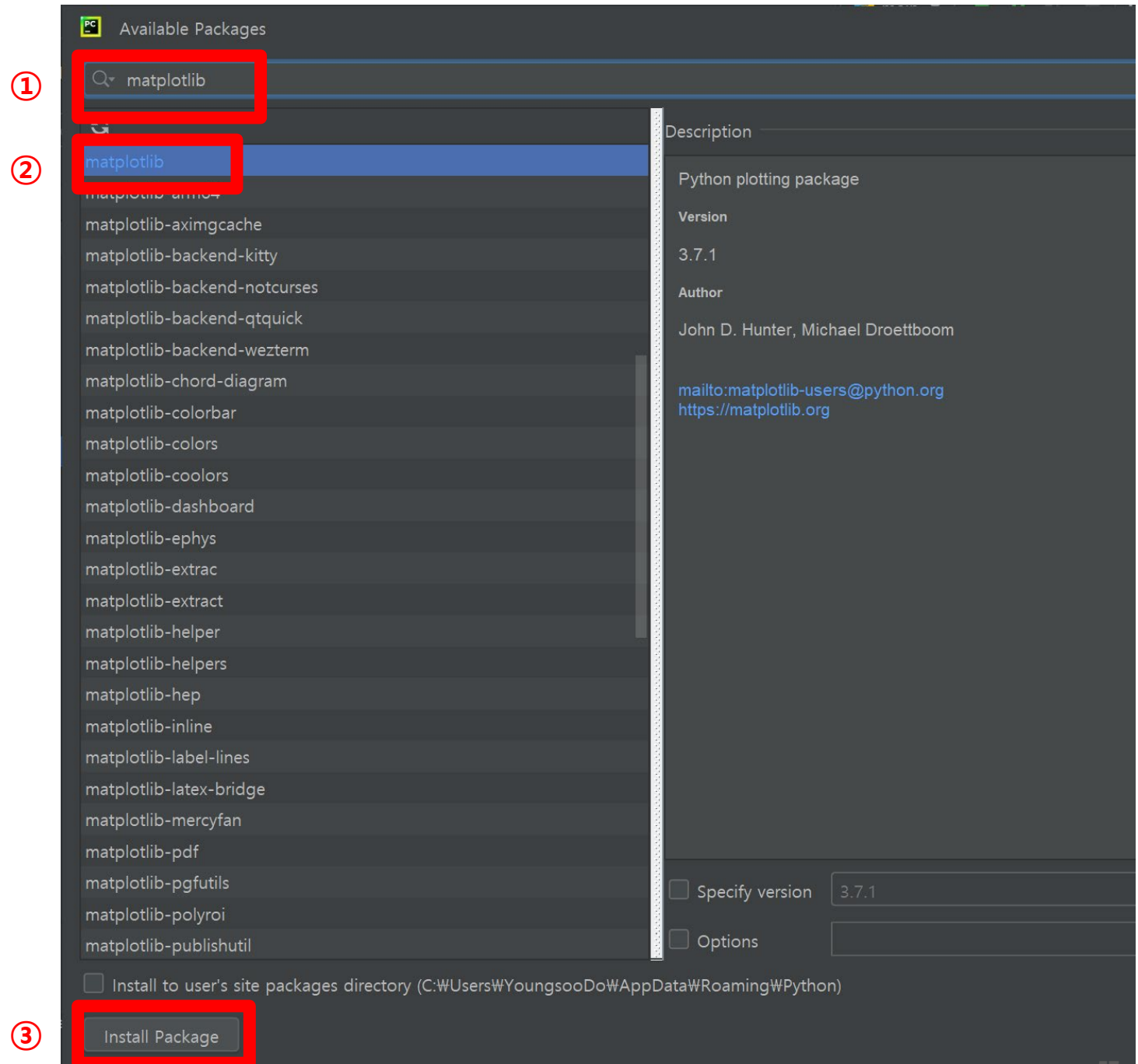
■ 시리얼통신 라이브러리 설치



설치 성공 메시지 확인

Library

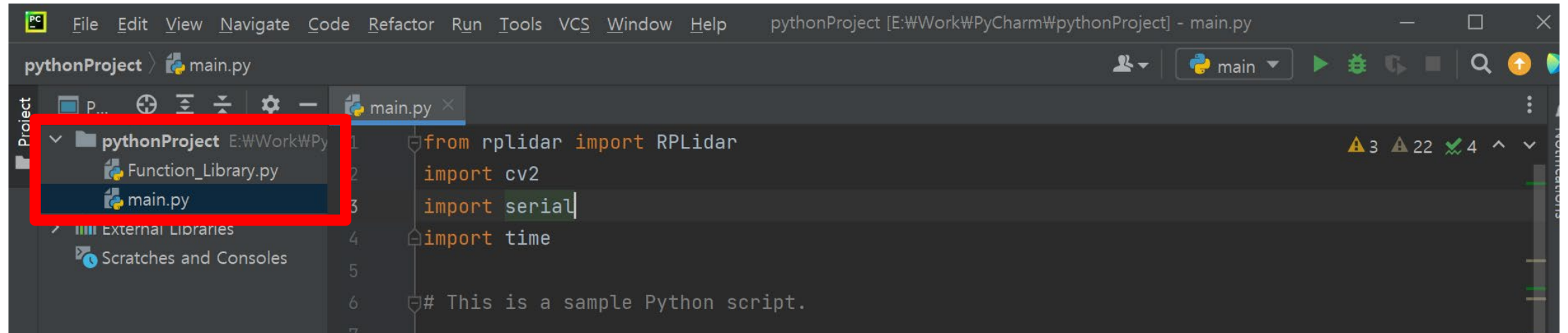
■ Matplotlib 설치



Exercise

■ 라이브러리 및 장치 설치 확인

- 새로운 프로젝트를 생성한 후, 기존의 'main.py' 파일 제거
- 배포된 'Function_Library.py' 파일과 'main.py' 파일을 해당 프로젝트로 옮김



Exercise

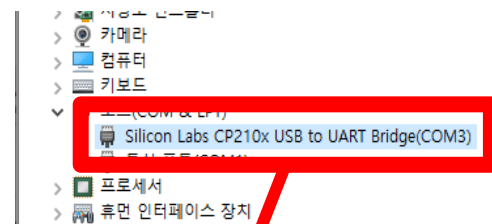
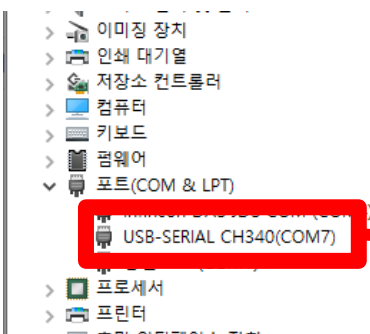
장치 관리자 – LiDAR

■ 라이브러리 및 장치 설치 확인

● 'main.py' 파일의 init 함수의 parameter 값 변경

- Parm 1 : 아두이노 COM port 번호
- Pram 2 : LiDAR COM port 번호

장치 관리자 – 아두이노



```
Project
└─ pythonProject E:\Work\Py
   └─ Function_Library.py
      └─ main.py
         └─ External Libraries
            └─ Scratches and Consoles

main.py
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else:
    print('\tPort : [X]')

print('\tVersion :', cv2.__version__)

# Press the green button in the gutter to run the script.
if __name__ == '__main__':

    # Parm 1 : Arduino's COM port number
    # Parm 2 : LiDAR's COM port number
    # * the port number must be capitalized.
    # * and we can see this port number on device manager in windows.

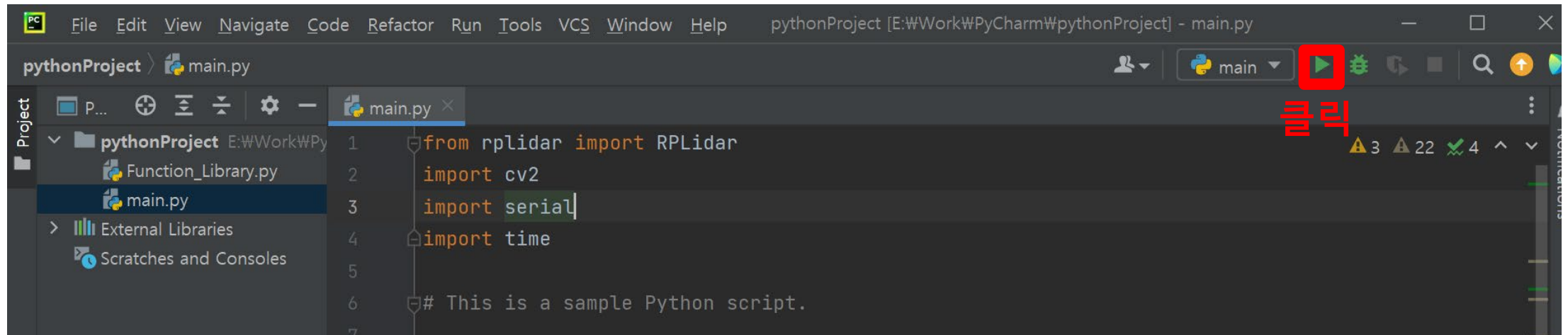
    init('COM5', 'COM11')

# See PyCharm help at https://www.jetbrains.com/help/pycharm/
```

Exercise

■ 라이브러리 및 장치 설치 확인

● Run()



Exercise

■ 라이브러리 및 장치 설치 확인

```
[Arduino] Check
  Lib : [OK]
  Port : [OK]
[LiDAR] Check
  Lib : [OK]
  Port : [OK]
  Info: {'model': 40, 'firmware': (1, 28), 'hardware': 7, 'serialnumber': 'EC8FEDF9C7E29BCEA7E39EF27C5C4304'}
[Computer Vision] Check
  Lib : [OK]
  Port : [OK]
  Version : 4.6.0
```

다음과 같은 문구 출력 시
라이브러리 및 장치 올바르게 설치

Thank You!

Automation Lab.

