

01

# Introduction to Python

# 파이썬 개요



1991년 2월 20일 발표

- 저자: Guido van Rossum
- 인터프리터 언어 소스 코드를 한 줄씩 읽어 실행하는 프로그램
- 오픈 소스 저작권자가 소스 코드를 공개하여 누구나 별다른 제한 없이 자유롭게 사용·복제·배포·수정할 수 있는 소프트웨어
- 공동 작업과 유지 보수에 용이
- 구글, 인스타그램, 넷플릭스 등 IT 기업에서도 사용

# 파이썬 개요



**TIOBE**

the software quality company

→ 프로그래밍 언어의 인기를 알 수 있는 지표

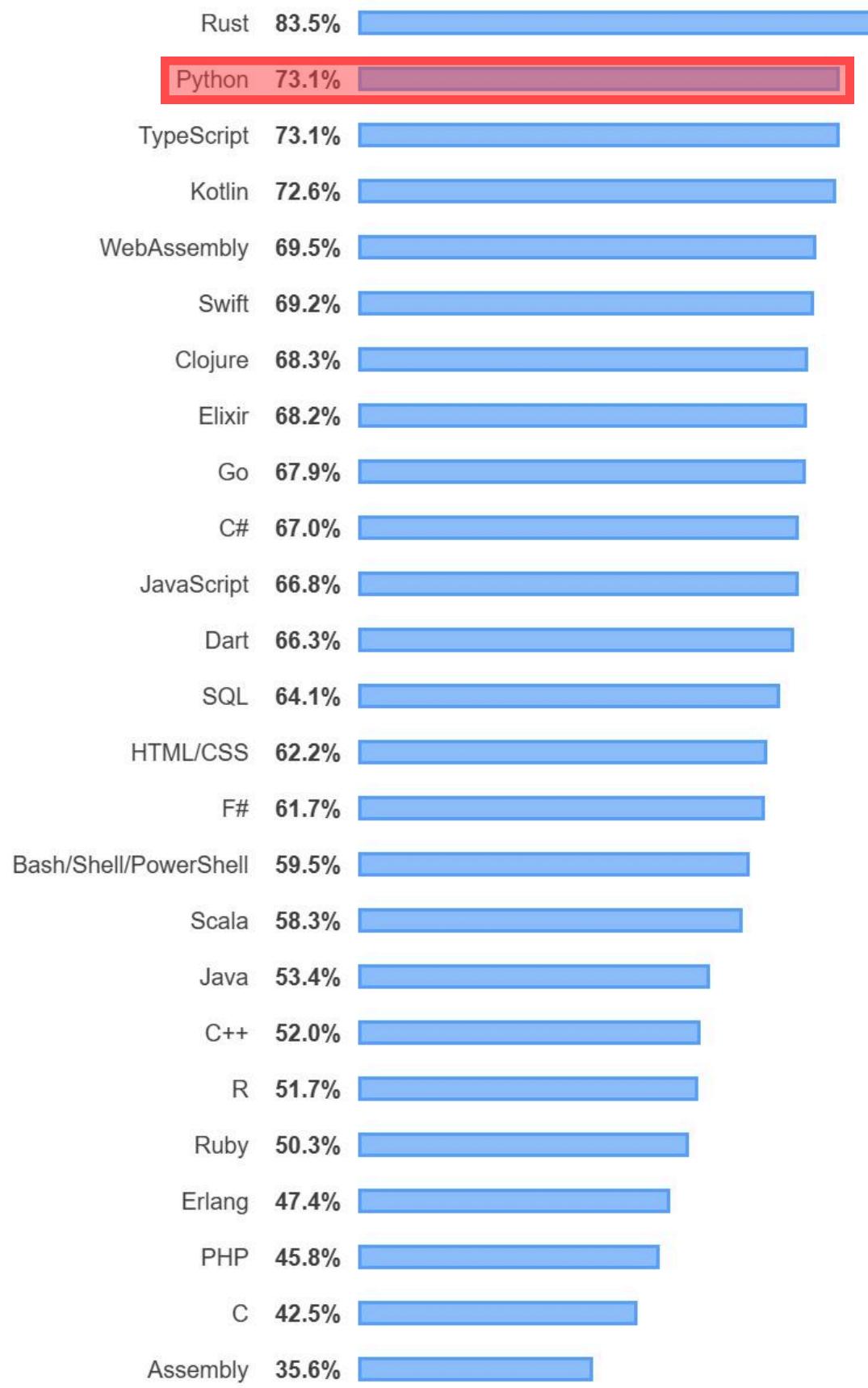
Jun 2025	Jun 2024	Change	Programming Language	Ratings	Change
1	1		Python	25.87%	+10.48%
2	2		C++	10.68%	+0.65%
3	3		C	9.47%	+0.24%
4	4		Java	8.84%	+0.44%
5	5		C#	4.69%	-1.96%
6	6		JavaScript	3.21%	-0.11%
7	7		Go	2.28%	+0.35%
8	9	▲	Visual Basic	2.20%	+0.54%
9	11	▲	Delphi/Object Pascal	2.15%	+0.62%
10	10		Fortran	1.86%	+0.33%

<https://www.tiobe.com/tiobe-index/> (25년 07월 기준)

# 파이썬 개요

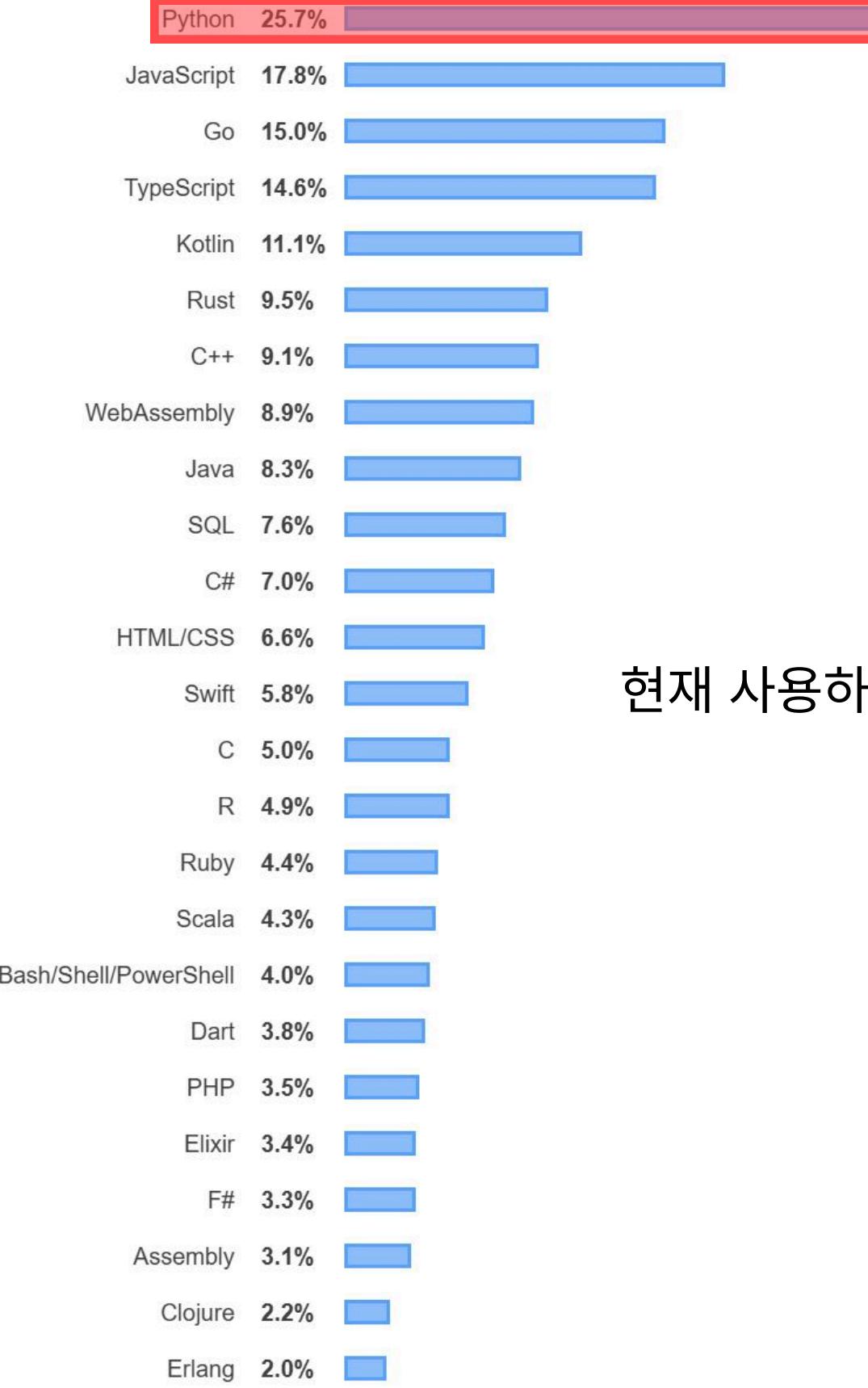


Loved    Dreaded    Wanted



해당 언어를 사용하는 개발자 중, 계속해서 이 언어를 사용하고 싶은 개발자의 비율

Loved    Dreaded    Wanted



현재 사용하고 있지는 않지만 사용하고 싶은 언어

% of developers who are developing with the language or technology and have expressed interest in continuing to develop with it

% of developers who are not developing with the language or technology but have expressed interest in developing with it

# 사용 분야

- 데이터 수집
  - 웹 크롤링(Web Crawling)
  - 웹 스크래핑(Web Scraping)
- 데이터 분석
  - 통계 분석 및 시각화
- UI 프로그래밍
- 웹 서버 개발
- 사물 인터넷(IoT)
  - 라즈베리파이
- 인공지능
  - 자연어 처리
  - 머신러닝

# 파이썬 설치 (Windows)

- 파이썬 공식 사이트(<https://www.python.org/>)에 접속
- Downloads → Download Python

The screenshot shows the Python.org homepage with the 'Downloads' tab selected. On the left, there's a code snippet demonstrating Python list comprehensions and the enumerate function. To the right, there's a section titled 'Compound Data Types' with a brief explanation of lists. Below these, there's a call-to-action for 'Get Started' and 'Download'.

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

Python version	Maintenance status	First released	End of support	Release schedule
3.14	pre-release	2025-10-01 (planned)	2030-10	PEP 745
3.13	bugfix	2024-10-07	2029-10	PEP 719
3.12	security	2023-10-02	2028-10	PEP 693
3.11	security	2022-10-24	2027-10	PEP 664
3.10	security	2021-10-04	2026-10	PEP 619
3.9	security	2020-10-05	2025-10	PEP 596
3.8	end of life, last release was 3.8.20	2019-10-14	2024-10-07	PEP 569

The screenshot shows the 'Downloads' page for Windows. It features a prominent 'Download the latest version for Windows' button. To the right, there's a cartoon illustration of two boxes descending from the sky on parachutes. Below the download button, there's information about other OS versions and links for pre-releases and Docker images.

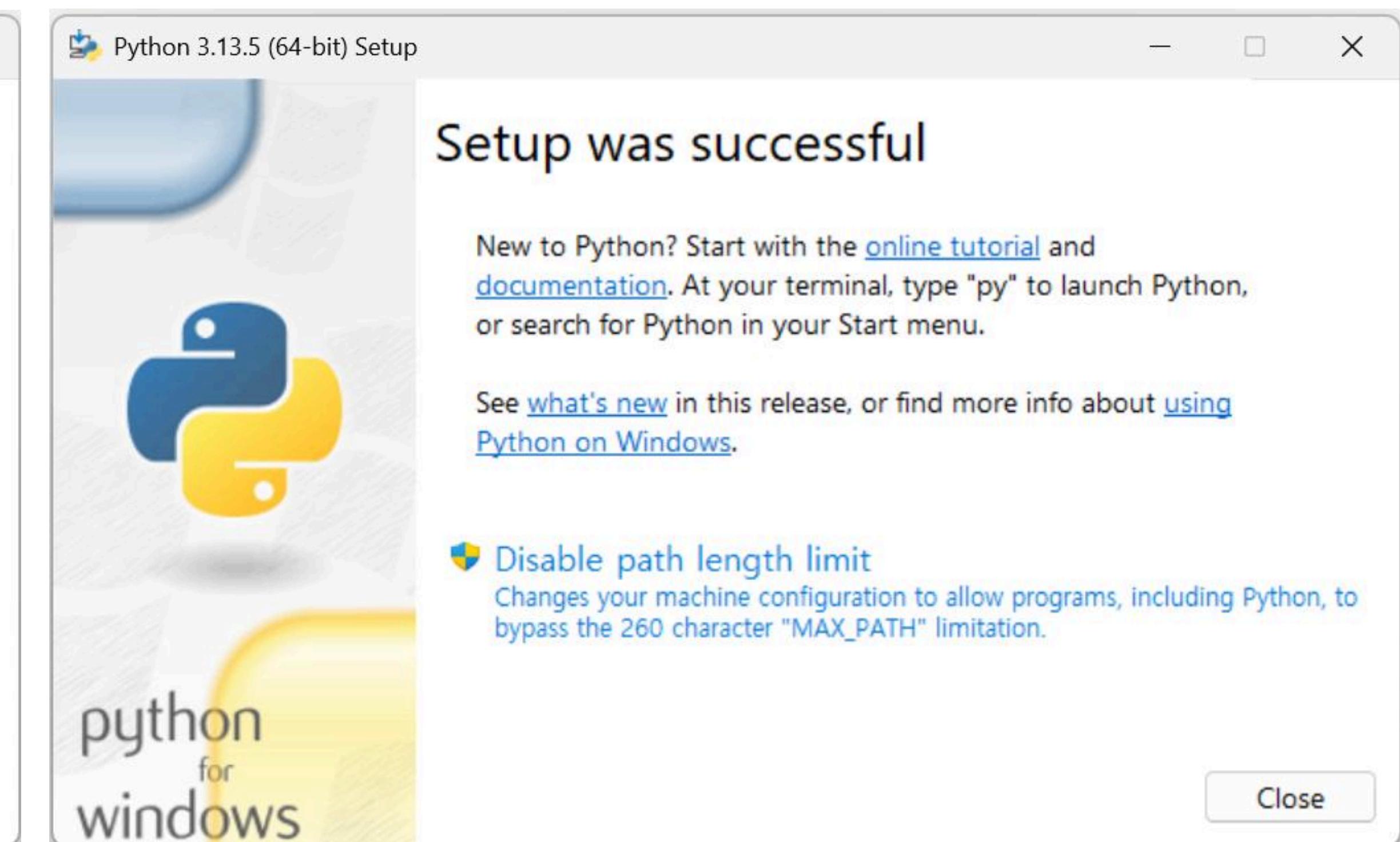
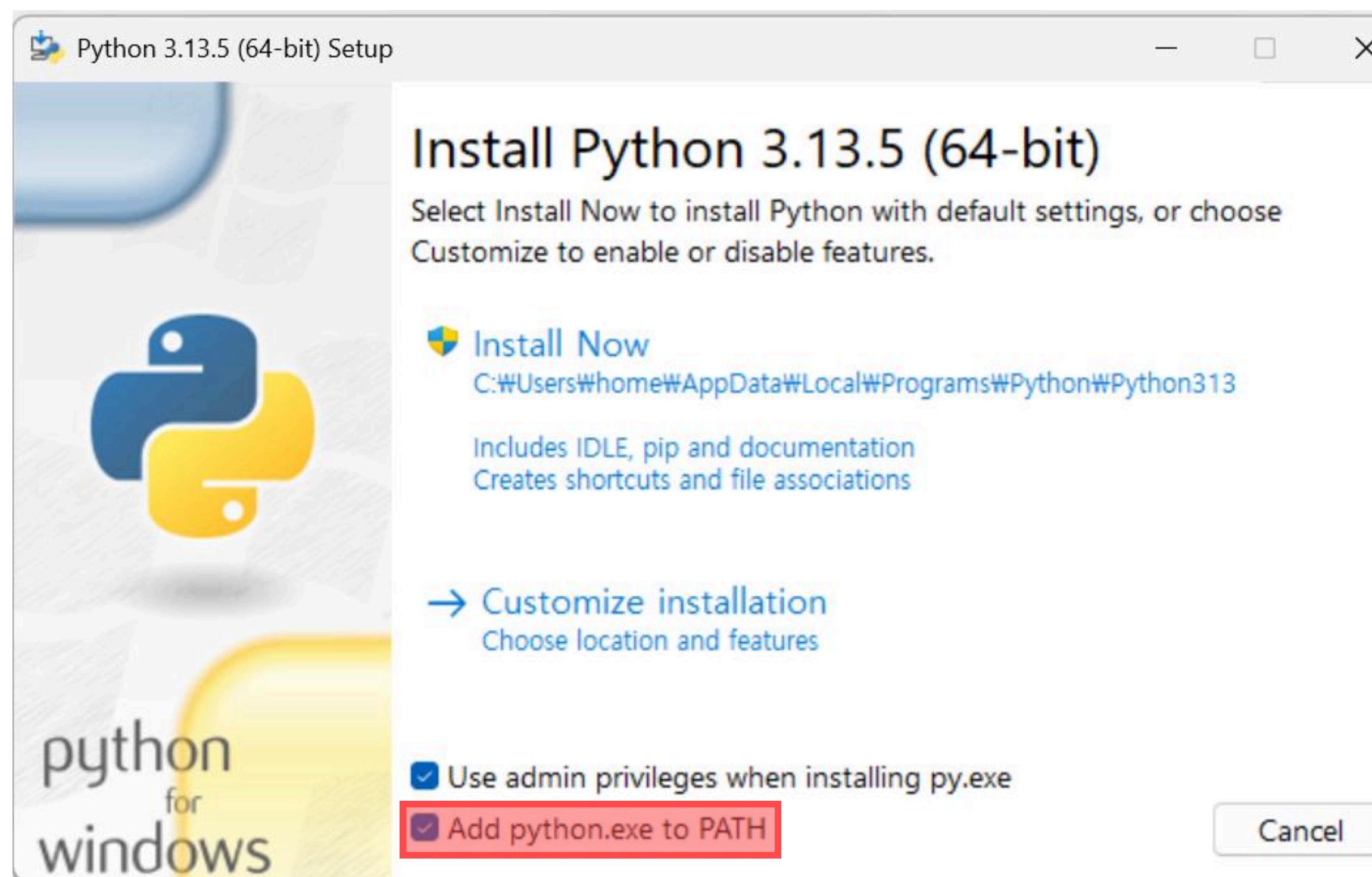
Active Python Releases

For more information visit the [Python Developer's Guide](#).

Python version	Maintenance status	First released	End of support	Release schedule
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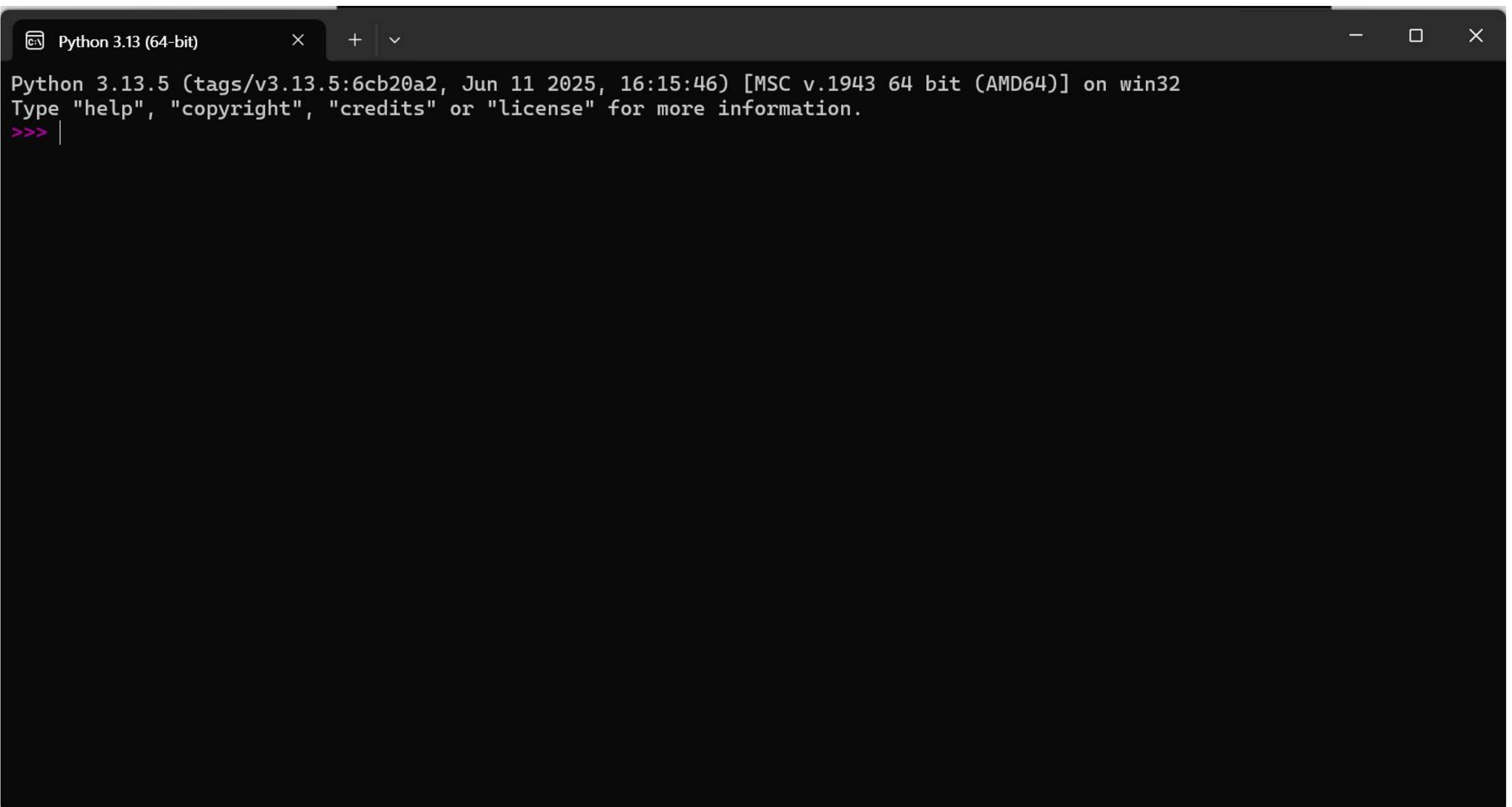
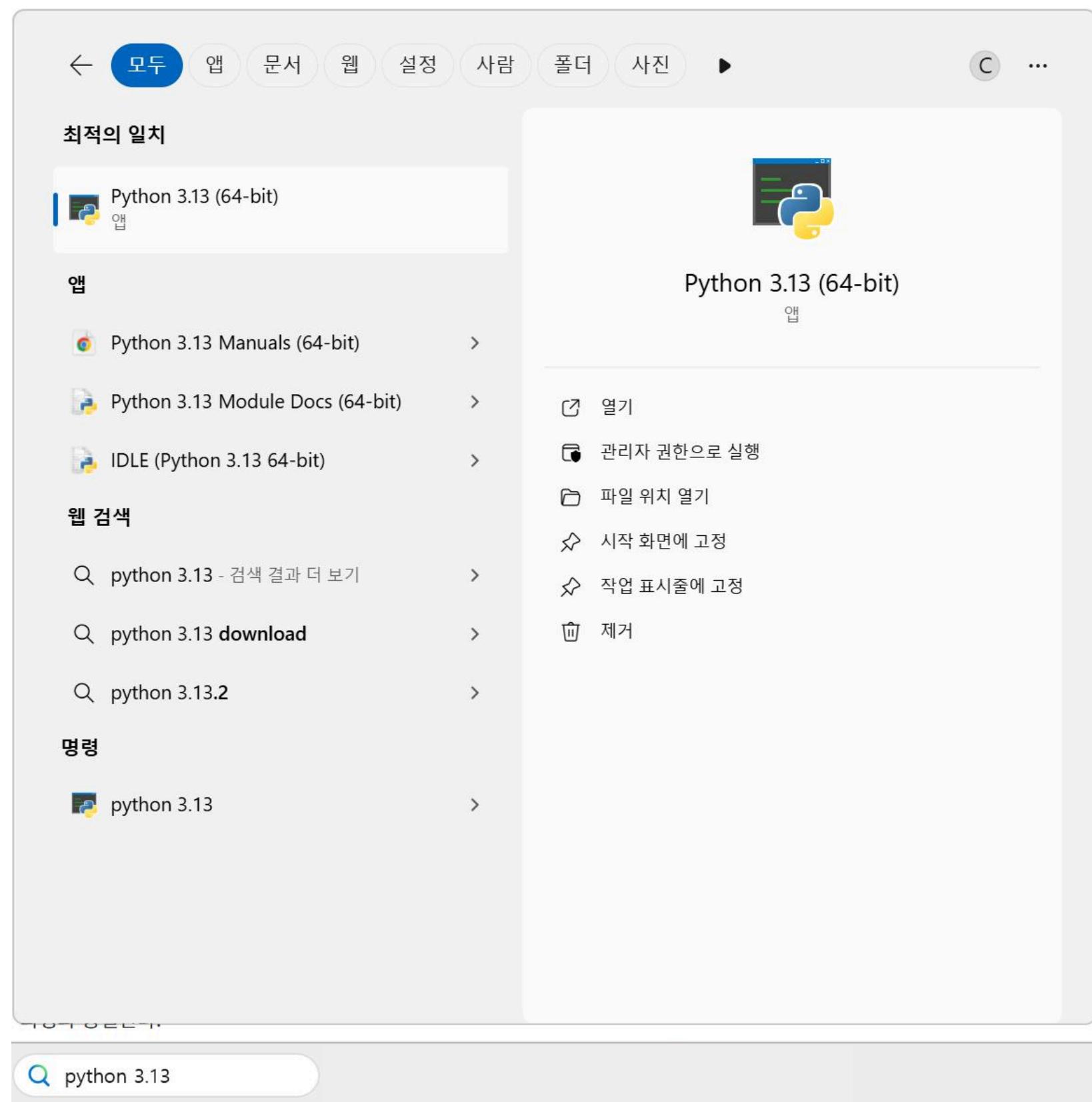
# 파이썬 설치 (Windows)

- 설치 프로그램에서 'Add python.exe to PATH' 체크 → 명령창에서 바로 파이썬 실행 가능
- 기본 설정에 맞춰 설치



# 파이썬 설치 (Windows)

- python을 검색하면 설치된 버전의 명령창 실행 가능
- 실행 시 아래와 같은 화면 확인



# 설치 (Mac)

- 최신 버전 또는 원하는 버전(Stable Releases) 설치

The screenshot shows the Python.org homepage with a focus on the Windows download section. At the top, there's a navigation bar with links for About, Downloads, Documentation, and Community. Below the navigation, a large yellow button says "Download the latest version for Windows". Underneath it, a smaller button says "Download Python 3.13.5". Text below the buttons says "Looking for Python with a different OS? Python for [Windows](#), [Linux/Unix](#), [macOS](#), [other](#)". Another section below asks if you want to help test development versions of Python 3.14 with [Pre-releases](#) or [Docker images](#). At the bottom, there's a table titled "Active Python Releases" showing maintenance status and first release dates for various Python versions from 3.10 to 3.14.

Python version	Maintenance status	First released
3.14	pre-release	2025-10-01 (planned)
3.13	bugfix	2024-10-07
3.12	security	2023-10-02
3.11	security	2022-10-24
3.10	security	2021-10-04
3.9	security	2020-10-05

The screenshot shows the "Downloads > macOS" page. The title is "Python Releases for macOS". A prominent red box highlights the "Latest Python 3 Release - Python 3.13.5". Below this, there are two sections: "Stable Releases" and "Pre-releases". The "Stable Releases" section lists releases from April 2025 down to February 2025, each with a "Download macOS 64-bit universal2 installer" link. The "Pre-releases" section lists releases from June 2025 down to February 2025, also with download links.

## Python Releases for macOS

### Stable Releases

- [Python 3.13.5 - June 11, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)
- [Python 3.13.4 - June 3, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)
- [Python 3.13.3 - April 8, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)
- [Python 3.12.10 - April 8, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)
- [Python 3.13.2 - Feb. 4, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)
- [Python 3.12.9 - Feb. 4, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)

### Pre-releases

- [Python 3.14.0b3 - June 17, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)
- [Python 3.14.0b2 - May 26, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)
- [Python 3.14.0b1 - May 7, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)
- [Python 3.14.0a7 - April 8, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)
- [Python 3.14.0a6 - March 14, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)
- [Python 3.14.0a5 - Feb. 11, 2025](#)
  - Download [macOS 64-bit universal2 installer](#)

# 설치 (Mac)

- macOS 용 installer 설치
- python-3.13.5-macos11.pkg 실행(버전에 따라 파일명은 달라질 수 있음)

## Files

Version	Operating System	Description	MD5 Sum	File Size	GPG	Sigstore	SBOM
<a href="#">Gzipped source tarball</a>	Source release		88dc0b8317cab6e46e8336995bcc577f	28.1 MB	<a href="#">SIG</a>	<a href="#">.sigstore</a>	<a href="#">SPDX</a>
<a href="#">XZ compressed source tarball</a>	Source release		dbaa8833aa736eddbb18a6a6ae0c10fa	21.8 MB	<a href="#">SIG</a>	<a href="#">.sigstore</a>	<a href="#">SPDX</a>
<a href="#">macOS 64-bit universal2 installer</a>	macOS	for macOS 10.13 and later	a0f126bf757effdbf7e1d0863a6f176f	67.1 MB	<a href="#">SIG</a>	<a href="#">.sigstore</a>	
<a href="#">Windows installer (64-bit)</a>	Windows	Recommended	da9f24ae94e5b3491f3d92b07d34cc72	27.5 MB	<a href="#">SIG</a>	<a href="#">.sigstore</a>	<a href="#">SPDX</a>
<a href="#">Windows installer (32-bit)</a>	Windows		d3898d8ea3a1524b043458311446c0b3	26.2 MB	<a href="#">SIG</a>	<a href="#">.sigstore</a>	<a href="#">SPDX</a>
<a href="#">Windows installer (ARM64)</a>	Windows	Experimental	75b8a99cf9fd5c15771b598bc067385	26.8 MB	<a href="#">SIG</a>	<a href="#">.sigstore</a>	<a href="#">SPDX</a>
<a href="#">Windows embeddable package (64-bit)</a>	Windows		370a345dbea8bbc1830a2385f24632d2	10.4 MB	<a href="#">SIG</a>	<a href="#">.sigstore</a>	<a href="#">SPDX</a>
<a href="#">Windows embeddable package (32-bit)</a>	Windows		589d9d4938b4e19c9fa4de83aad3d425	9.2 MB	<a href="#">SIG</a>	<a href="#">.sigstore</a>	<a href="#">SPDX</a>
<a href="#">Windows embeddable package (ARM64)</a>	Windows		0d2b5391a1df1319242f17a8339b8bc6	9.7 MB	<a href="#">SIG</a>	<a href="#">.sigstore</a>	<a href="#">SPDX</a>

# 아나콘다 설치

- 아나콘다 공식 사이트(<https://www.anaconda.com/>) 접속
- Free Download

The screenshot shows the official Anaconda website homepage. At the top, there is a navigation bar with the Anaconda logo, followed by links for Products, Solutions, Resources, and Company. On the right side of the navigation bar are buttons for "Free Download" (highlighted with a red border), "Sign In", and "Get a Demo >". Below the navigation bar, there is a section titled "Introducing" followed by a sub-section title "The Anaconda AI Platform for secure open source development and governance >". The main visual focus is a large, bold headline: "Advance AI with Clarity and Confidence". Below the headline is a subtitle: "Simplify, safeguard, and accelerate AI value with open source.". At the bottom of the main content area are two buttons: "Sign Up for Free >" and "Get a Demo >".

Introducing | The Anaconda AI Platform for secure open source development and governance >

# Advance AI with Clarity and Confidence

Simplify, safeguard, and accelerate AI value with open source.

Sign Up for Free > Get a Demo >

# 아나콘다 설치

- Email 주소 입력 또는 ‘Skip registration’

The screenshot shows the Anaconda Distribution download page. At the top, there is a navigation bar with the Anaconda logo, menu items (Products, Solutions, Resources, Company), and links for Free Download, Sign In, and Get a Demo. Below the navigation, the word "Distribution" is prominently displayed in large, bold letters, followed by "FREE DOWNLOAD\*". A registration message encourages users to register for access to Cloud Notebooks, Navigator, AI Assistant, Learning, and more. To the right, a callout box titled "Provide email to download Distribution" contains an "Email Address:" input field, a consent checkbox, and a note about communication preferences. It also includes an "or" link for alternative registration and a "Submit >" button. A "Skip registration" link is located at the bottom of the callout.

ANACONDA. Products Solutions **Resources** Company

↓ Free Download Sign In Get a Demo >

# Distribution

## FREE DOWNLOAD\*

Register to get everything you need to get started on your workstation including Cloud Notebooks, Navigator, AI Assistant, Learning and more.

- ✓ Easily search and install thousands of data science, machine learning, and AI packages
- ✓ Manage packages and environments from a desktop application or work from the command line
- ✓ Deploy across hardware and software platforms
- ✓ Distribution installation on Windows, MacOS, or Linux

\*Use of Anaconda's Offerings at an organization of more than 200 employees requires a Business or Enterprise license. See [Pricing](#)

Provide email to download Distribution

Email Address:

Agree to receive communication from Anaconda regarding relevant content, products, and services. I understand that I can revoke this consent [here](#) at any time.

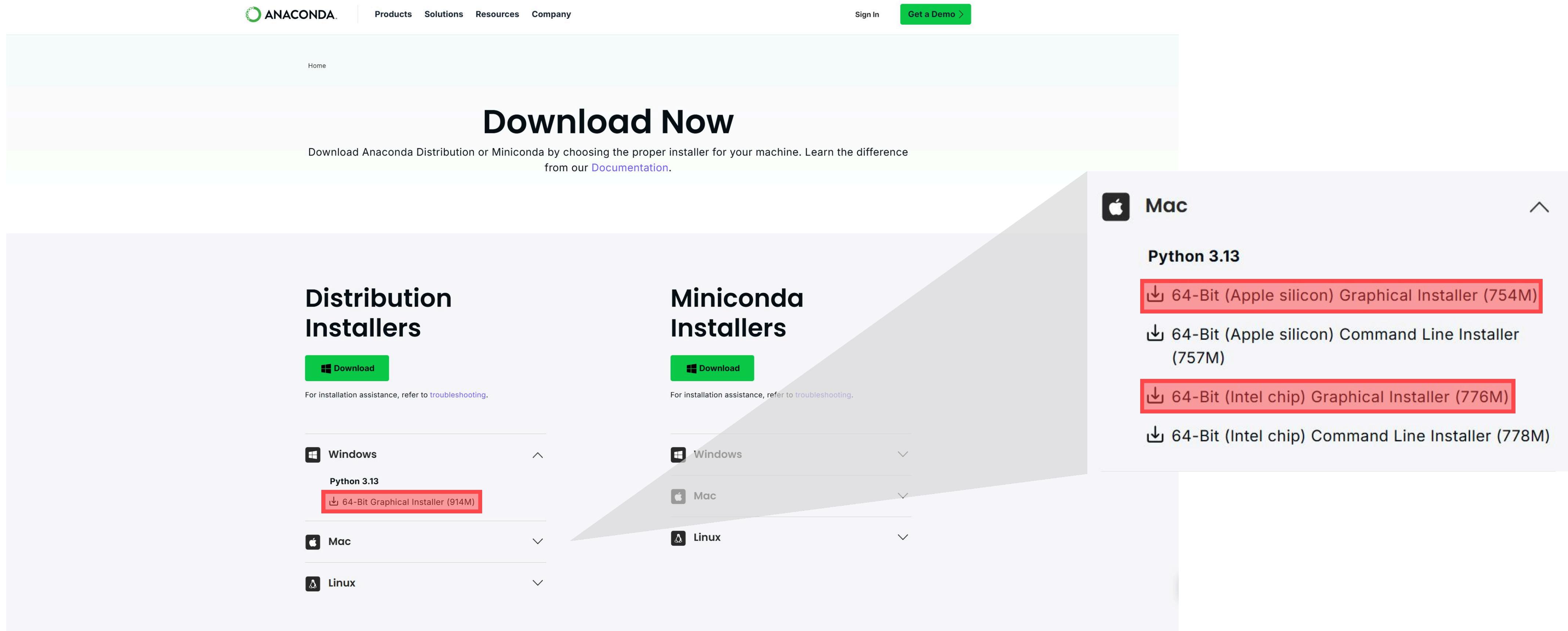
By continuing, I agree to Anaconda's [Privacy Policy](#) and [Terms of Service](#).

**Submit >**

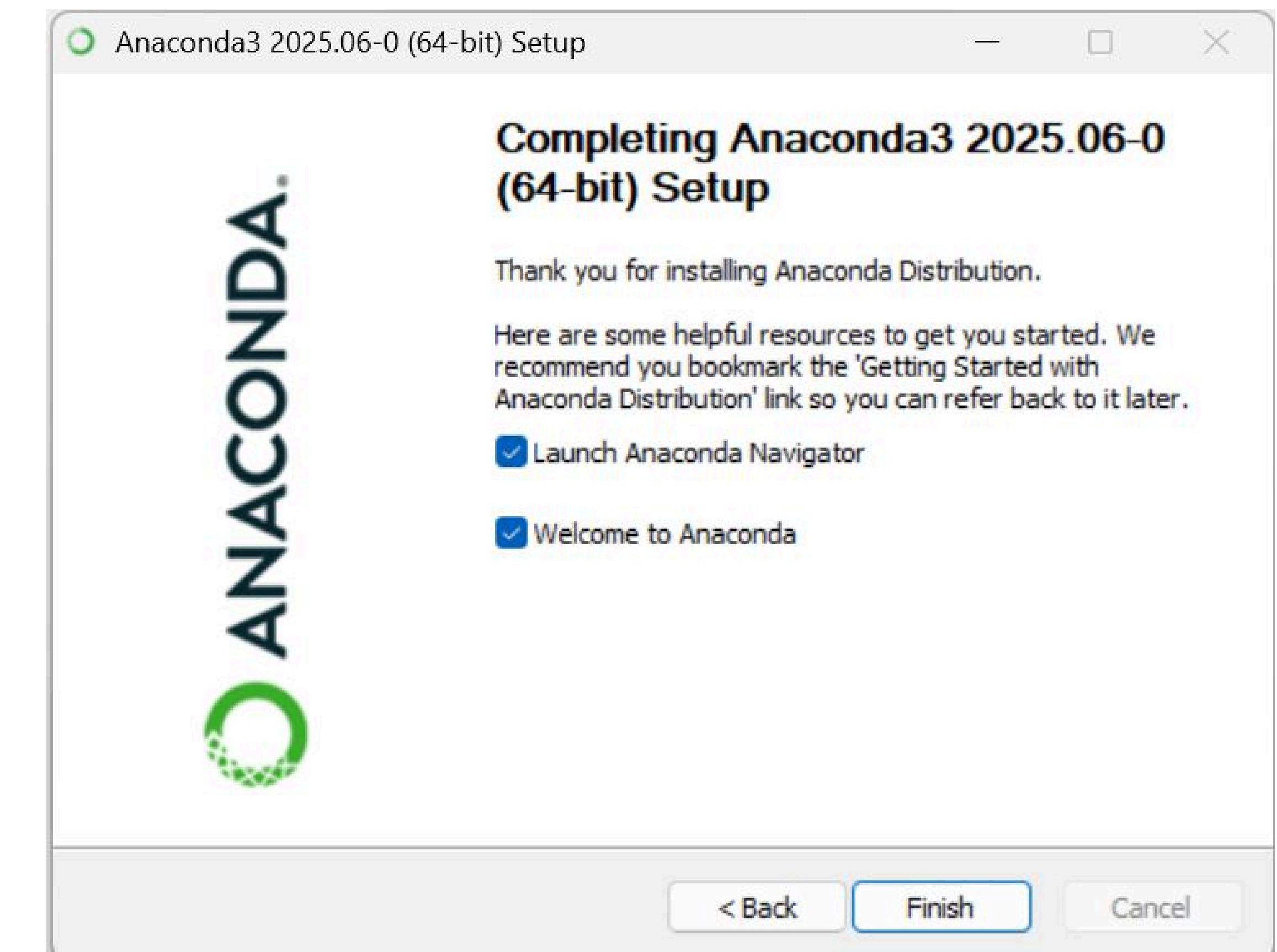
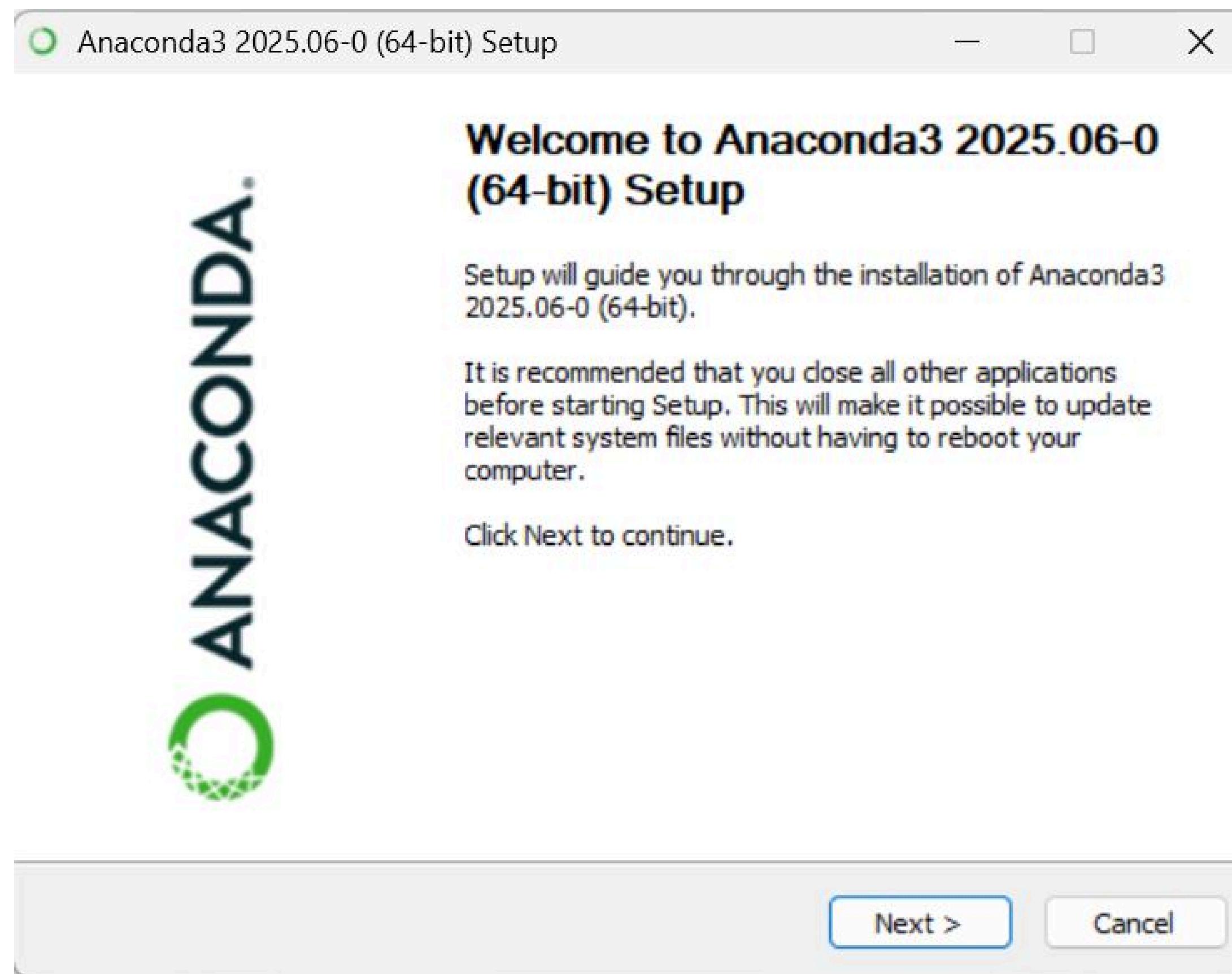
Skip registration

# 아나콘다 설치

- 사용 중인 운영체제에 맞추어 Graphic Installer 설치

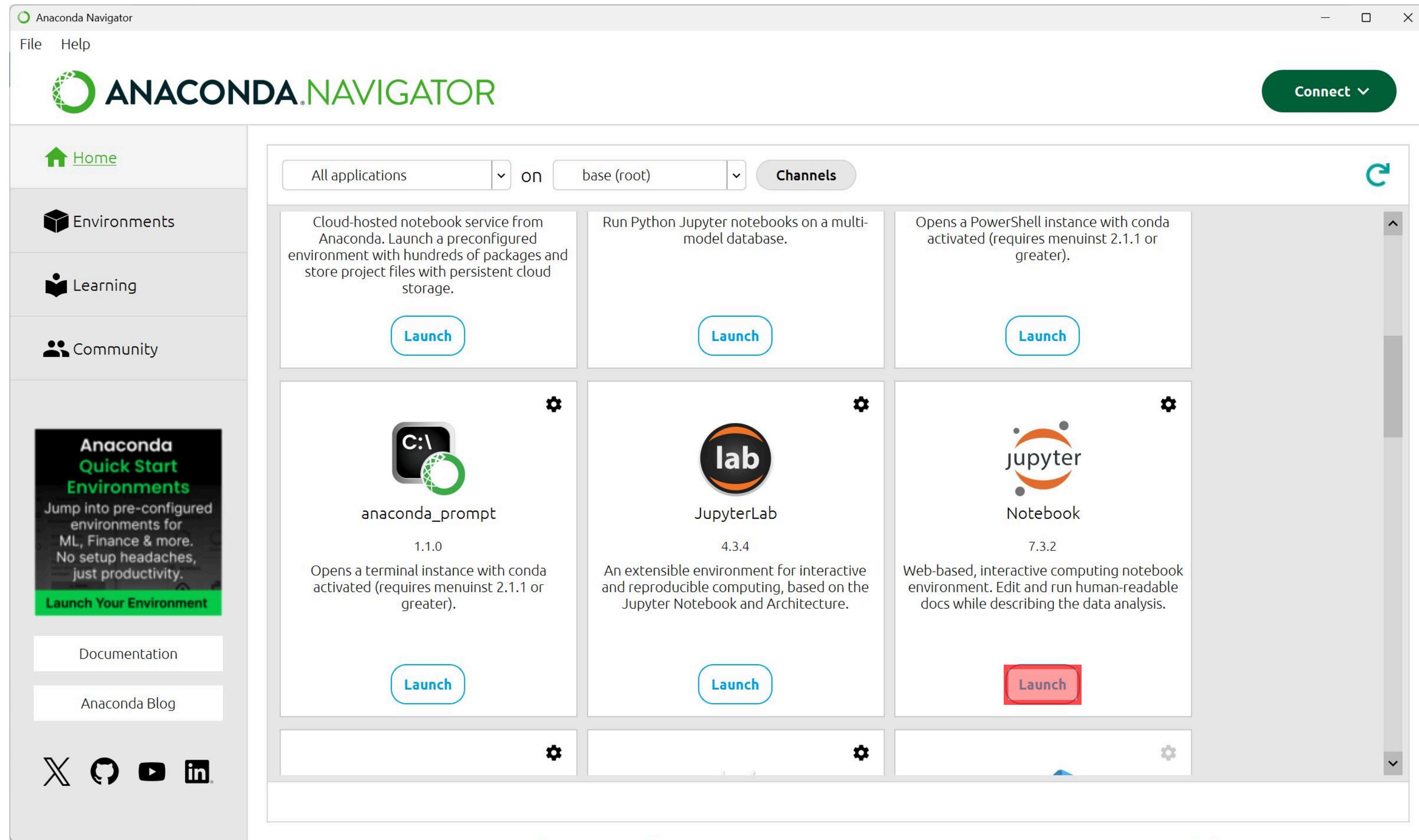


# 아나콘다 설치



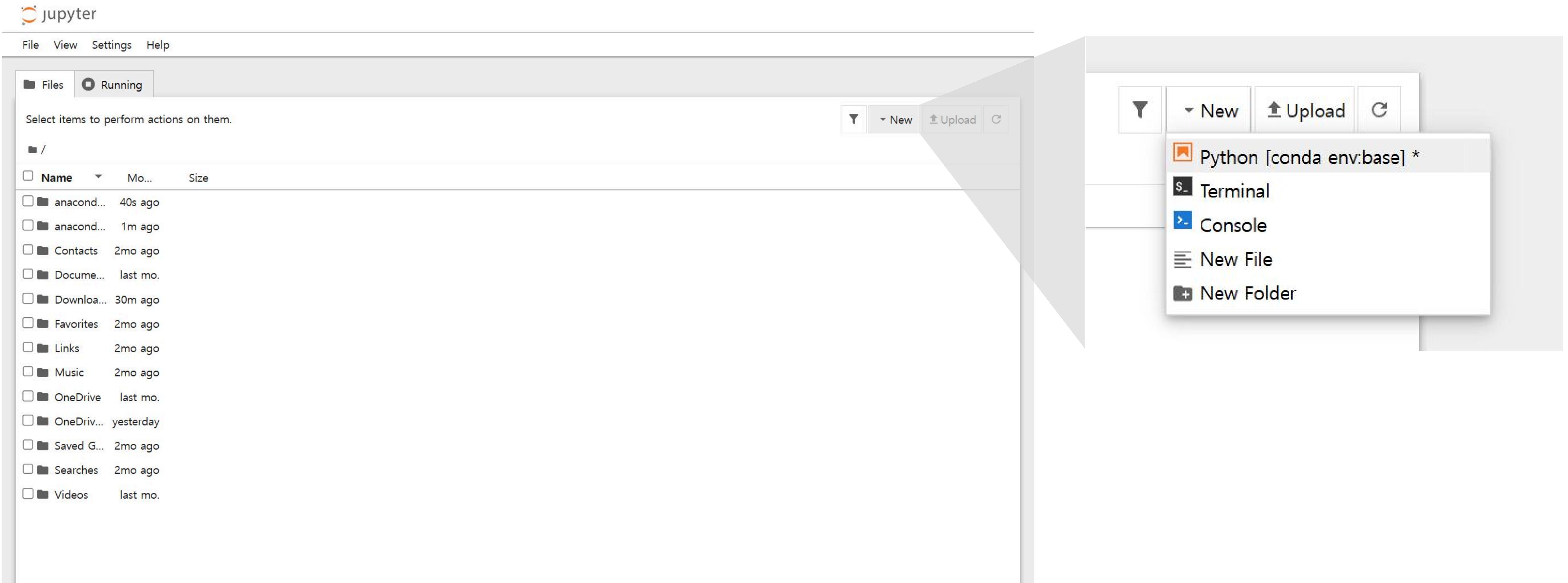
# 아나콘다 설치

- 설치 후 바로 실행 또는 [Anaconda Navigator]를 찾아 실행
- [Notebook]을 찾아 Launch



# 아나콘다 설치

- 파일을 생성하고자 하는 폴더에서 노트북(.ipynb) 파일 생성
- New → Python



# 아나콘다 설치

## 간단한 예제 실행

- `print("Hello World!")` 입력 후 Ctrl+Enter
- 셀(Cell) 아래에 Hello World! 출력

The screenshot shows a Jupyter Notebook interface. At the top, there's a toolbar with icons for file operations, a Python logo, and a "Trusted" button. Below the toolbar, the menu bar includes File, Edit, View, Run, Kernel, Settings, Help, and a "Last Checkpoint: 8 minutes ago" message. The main area contains a code cell with the following content:

```
[1]: print("Hello World!")
```

When run, the cell outputs:

```
Hello World!
```

Below the cell, there's another cell input field starting with "[ ]:" and a set of small green icons for cell navigation.

# 아나콘다 실행

## 주피터 노트북 단축키

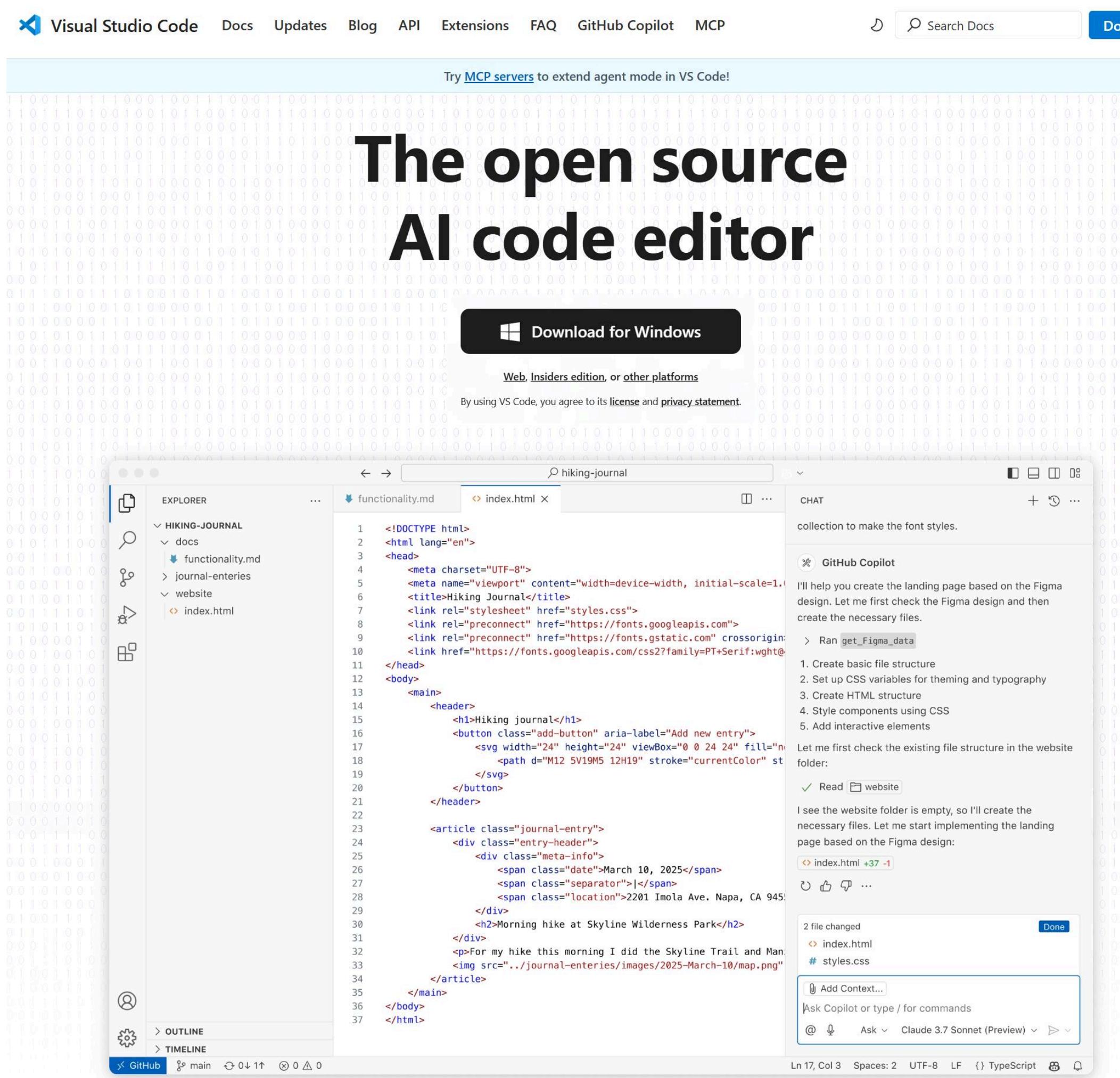
- A(Above): 선택된 셀 위에 새로운 셀 추가
- B(Below): 선택된 셀 아래에 새로운 셀 추가
- X: 선택된 셀 잘라내기
- C: 선택된 셀 복사
- V: 선택된 셀 아래에 붙여넣기
- D+D: 선택된 셀 삭제
- Shift+Enter: 선택된 셀 실행 후 다음 셀로 이동
- Ctrl+Enter: 선택된 셀 실행 (이동 X)
- Tab: 들여쓰기/자동 완성 ] 편집 모드
- Ctrl+/: 주석 처리/해체 ] 편집 모드

Running 탭에서 실행 중인 노트북 파일 중단 가능



# Visual Studio Code

- Microsoft에서 개발한 텍스트 에디터(<https://code.visualstudio.com/>)



The screenshot shows the Visual Studio Code interface with a dark theme. The left side features the Explorer sidebar with a tree view of files and folders. The main editor area displays a Python script named "sam2\_object\_tracker.py". The script contains code for a SAM2ObjectTracker class, which inherits from SAM2Base. It includes imports for time, collections, typing, cv2, numpy, torch, and various SAM2 modules. The code defines \_\_init\_\_ and update\_kalman\_filter methods, among others. A status bar at the bottom indicates the file has 2 changes and is in TypeScript mode.

```
import time
from collections import deque
from typing import Tuple, List, Optional, Dict, Any
from typing import Union

import cv2
import numpy as np
import torch
import torch.nn.functional as F
from sam2.modeling.sam2_base import SAM2Base, NO_OBJ_SCORE
from sam2.modeling.sam2_utils import get_id_sine_pe
from sam2.utils.kalman_filter import KalmanFilter

class SAM2ObjectTracker(SAM2Base):
    def __init__(self,
                 num_objects=10,
                 verbose=True,
                 samurai_mode=True,
                 stable_frames_threshold: int = 15,
                 stable_ious_threshold: float = 0.3,
                 min_obj_score_logits: float = -1,
                 kf_score_weight: float = 0.15,
                 memory_bank_iou_threshold: float = 0.5,
                 memory_bank_obj_score_threshold: float = 0.0,
                 memory_bank_kf_score_threshold: float = 0.0,
                 **kwargs):
        super().__init__(**kwargs)

        self.num_objects = num_objects
        self.curr_obj_idx = 0

        self.model_constants = {}

        self.past_frames = {'short_term': deque(maxlen=7), 'long_term': deque(maxlen=7)}
        self.verbose = verbose
        self.use_mask_input_as_output_without_sam = False

    # Init Kalman Filter
    self.kf = KalmanFilter()
    self.kf_mean = {}
    self.kf_covariance = {}
    self.stable_frames = {}

    # Hyperparameters for SAMURAI
    self.stable_frames_threshold = stable_frames_threshold
    self.stable_ious_threshold = stable_ious_threshold
    self.min_obj_score_logits = min_obj_score_logits
    self.kf_score_weight = kf_score_weight
    self.memory_bank_iou_threshold = memory_bank_iou_threshold
    self.memory_bank_obj_score_threshold = memory_bank_obj_score_threshold
    self.memory_bank_kf_score_threshold = memory_bank_kf_score_threshold

    def update_kalman_filter(self,
                            obj: int,
                            ious: torch.Tensor,
                            low_res_multimasks: torch.Tensor,
                            high_res_multimasks: torch.Tensor,
                            sam_output_tokens: torch.Tensor):
        """
        Updates the Kalman filter for object tracking based on the current object, IoU scores,
        low and high resolution multi-masks, and SAM output tokens.
        """

        Updates the Kalman filter for object tracking based on the current object, IoU scores,
        low and high resolution multi-masks, and SAM output tokens.

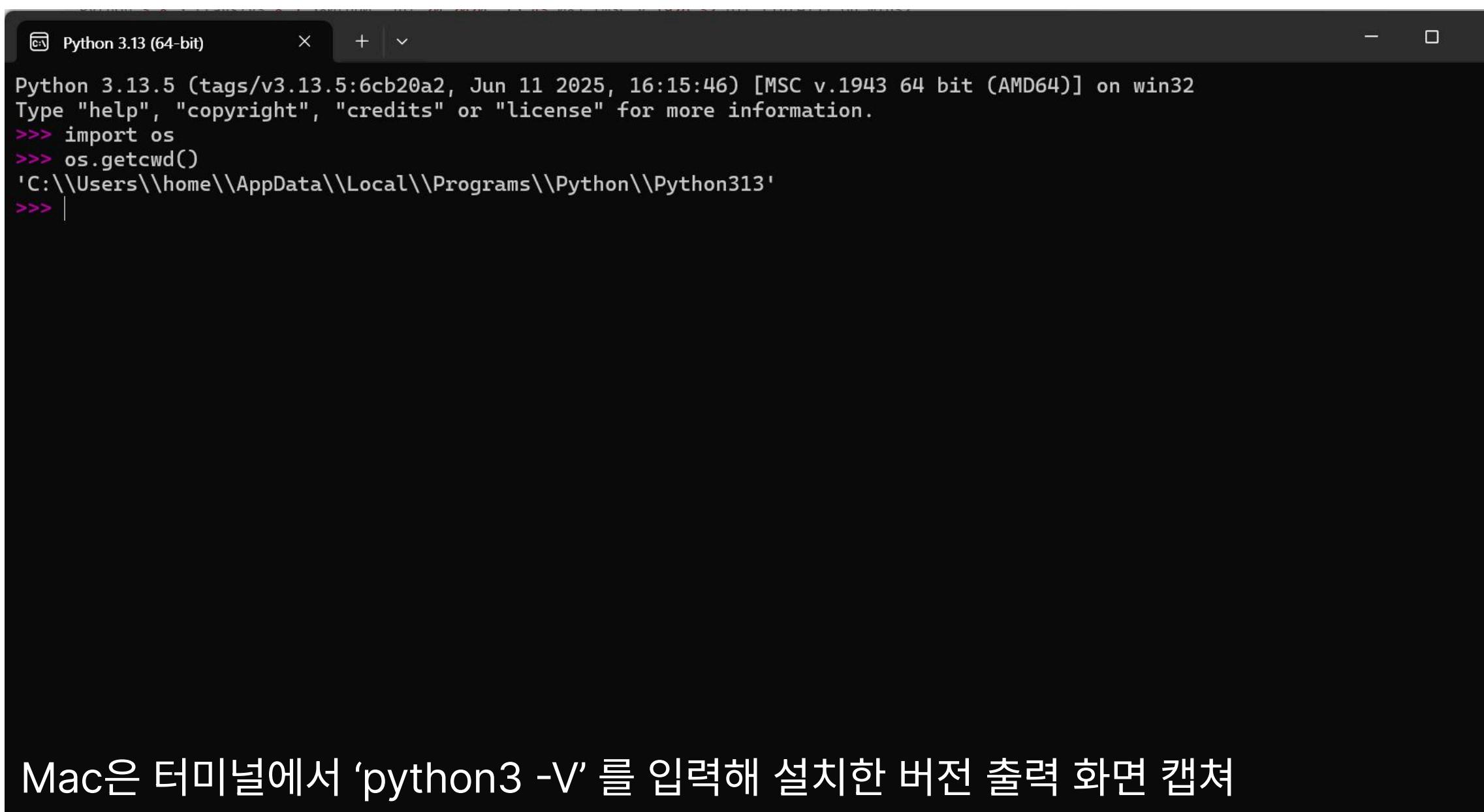
        The original code can be found in the SAMURAI repo and has been adapted to work with multiple objects:
```

# 1주차 과제

## 설치 후 실행한 화면을 캡쳐, 업로드

- 파이썬 명령창에서 아래 명령 실행 후 화면 캡쳐

```
>>> import os  
>>> os.getcwd()
```



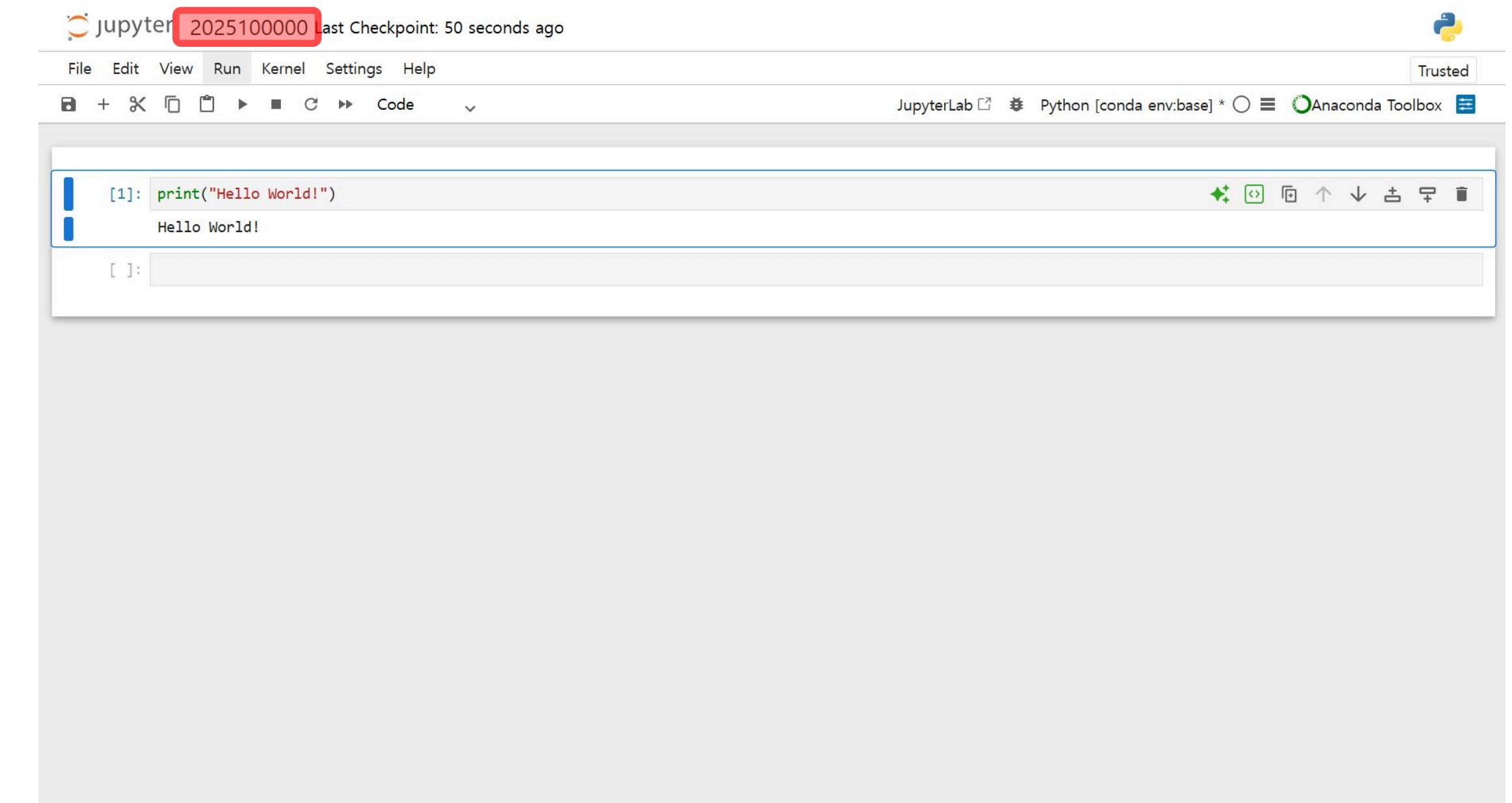
```
Python 3.13.5 (tags/v3.13.5:6cb20a2, Jun 11 2025, 16:15:46) [MSC v.1943 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import os
>>> os.getcwd()
'C:\\\\Users\\\\home\\\\AppData\\\\Local\\\\Programs\\\\Python\\\\Python313'
```

Mac은 터미널에서 'python3 -V' 를 입력해 설치한 버전 출력 화면 캡쳐

- jupyter notebook 파일

- print("Hello World!") 실행한 파일 제출
- 파일명 본인 학번으로 편집

해당 부분 눌러서 편집 가능



```
[1]: print("Hello World!")
Hello World!
```