§A Installation of Python 3.7 and Python Packages

In this course, you will perform programming tasks using Python 3.7. Several Python packages including NumPy, Matplotlib, VPython, and SciPy will be also used. Indeed, there is a number of Python distributions such as **Anaconda** [1] and **Enthought Canopy** which include these packages to save you from installing them yourself. Here we discuss how to install Python and Python packages on your computer separately.

A.1 Installation of Python 3.7

Python interpreter is the software that reads Python programs and performs their instructions. We need to install it for doing any Python programming. You can download the installer of Python interpreter for free from the official Python website at **https://www.python.org/**. This website provides the installers for Windows, Mac OS X, and Linux platforms. The current available versions of Python are versions 2 and 3. At the time of writing this document, the most recent sub-version of Python was version 3.7.2. You should install this version which will be used in this course.

As an illustration, let us consider the installation of Python 3.7.2 on a Windows computer. The installation procedures on other platforms are similar. There are two different versions of Windows installer for Python 3.7.2 — a 32-bit version and a 64-bit version. As most of the computers now are 64-bit, we are going to install the 64-bit version. Below is the step-by-step instructions for installing Python 3.7.2 on a 64-bit Windows computer.

1. Click the link "Windows x86-64 executable installer" in the table under "Files" on the webpage **https://www.python.org/downloads/release/python-372/** to download the Python installer (see Figure A.1).
2. Right-click your mouse on the installation file and select **Run as administrator** (see Figure A.2). A Python 3.7.2 (64-bit) Setup pop-up window with the installation options will appear.

[1] If you want to develop or use Python applications with different Python or package version requirements, then you need to set up different Python environments where each environment consists of a specific Python version and some packages. In such case, you should install Anaconda which provides an easy way to manage multiple Python environments on a single computer.

Files

Version	Operating System	Description	MD5 Sum	File Size	GPG
Gzipped source tarball	Source release		02a75015f7cd845e27b85192bb0ca4cb	22897802	SIG
XZ compressed source tarball	Source release		df6ec36011808205beda239c72f947cb	17042320	SIG
macOS 64-bit/32-bit installer	Mac OS X	for Mac OS X 10.6 and later	d8ff07973bc9c009de80c269fd7efcca	34405674	SIG
macOS 64-bit installer	Mac OS X	for OS X 10.9 and later	0fc95e9f6d6b4881f3b499da338a9a80	27766090	SIG
Windows help file	Windows		941b7d6279c0d4060a927a65dcab88c4	8092167	SIG
Windows x86-64 embeddable zip file	Windows	for AMD64/EM64T/x64	f81568590bef56e5997e63b434664d58	7025085	SIG
Windows x86-64 executable installer	Windows	for AMD64/EM64T/x64	ff258093f0b3953c886192dec9f52763	26140976	SIG
Windows x86-64 web-based installer	Windows	for AMD64/EM64T/x64	8de2335249d84fe1eeb61ec25858bd82	1362888	SIG
Windows x86 embeddable zip file	Windows		26881045297dc1883a1d61baffeecaf0	6533256	SIG
Windows x86 executable installer	Windows		38156b62c0cbcb03bfddeb86e66c3a0f	25365744	SIG
Windows x86 web-based installer	Windows		1e6c626514b72e21008f8cd53f945f10	1324648	SIG

Figure A.1: List of Python 3.7.2 installers on the official download page.

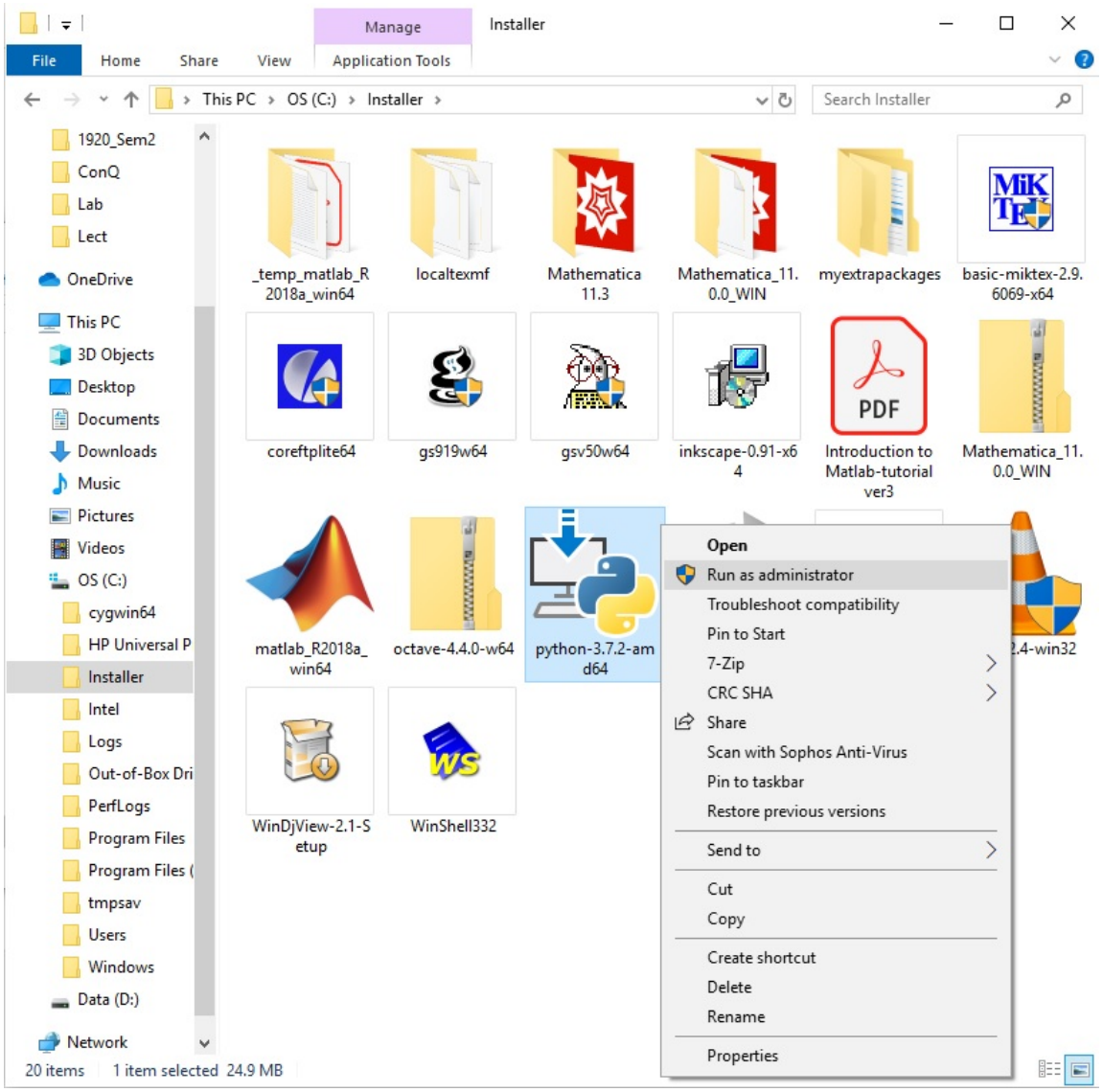

Figure A.2: Launch the Python installer using **Run as administrator** option.

3. On the pop-up window, tick the **Add Python 3.7 to PATH** checkbox at the bottom so that the executable file python can be run in the command prompt without typing in its full path (see Figure A.3). (The Windows System PATH tells your computer where it can find specific directories that contain executable files.) If the Python installer finds an earlier version of Python installed on your computer, then the "Install Python 3.7.2 (64-bit)" option will instead appear as "Upgrade to Python 3.7.2 (64-bit)" (and the checkboxes will not appear at the bottom).

Figure A.3: A Python 3.7.2 (64-bit) Setup pop-up window with the installation options.

4. Click the "Install Now" option on the pop-up window to start the installation process. A new Python 3.7.2 (64-bit) Setup pop-up window will appear with the "Setup Progress" message and a progress bar as shown in Figure A.4.

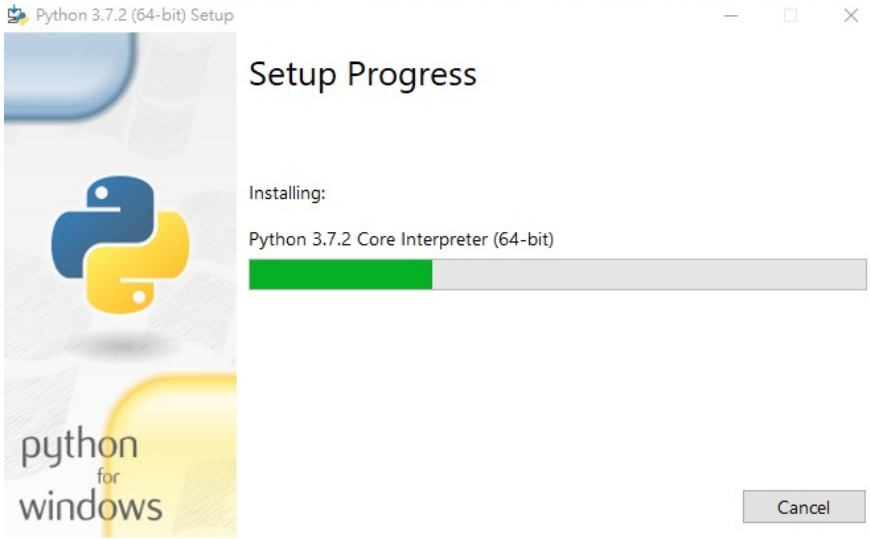

Figure A.4: A Python 3.7.2 (64-bit) Setup pop-up window with a setup progress bar.

5. After the installation process is finished, a new Python 3.7.2 (64-bit) Setup pop-up window will appear with the "Setup was successful" message (see Figure A.5). Click the **Close** button to close the pop-up window.

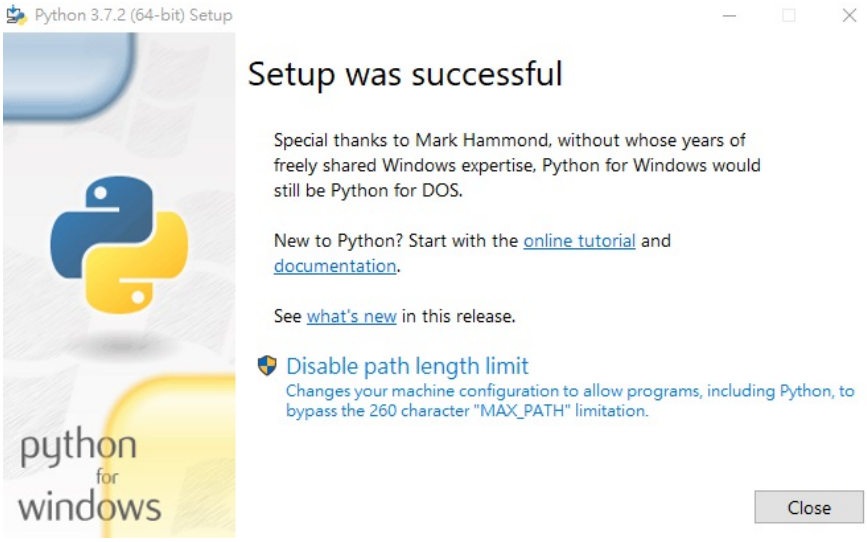

Figure A.5: A Python 3.7.2 (64-bit) Setup pop-up window with the "Setup was successful" message.

A.2 Installation of Python Packages

To install python packages, we are recommended to use `pip` which is the package installer for Python. For Python version 2.7.9 or later and Python 3.4 or later, pip is included by default with the Python installer. The installation procedures for any python packages using `pip` are the same. (For more details about the usage of `pip`, read the documentation on the webpage **https://pip.pypa.io/en/stable/**.) As an illustration, let us consider how to install the SciPy package using `pip`. Below is the step-by-step instructions for installing this package using `pip` on Windows 10.

1. On the Windows desktop, type **cmd** in the search box on the taskbar which is located next to **Start**. (If a search icon instead of a search box is shown on the taskbar, you need to click on the search icon to open the search box. If both the search box and search icon are hidden and you want to show a search box on the taskbar, right-click the taskbar with your mouse and select **Search** → **Show search box**.) In the search results as shown in Figure A.6, click on the "Command Prompt" icon to open a command prompt.

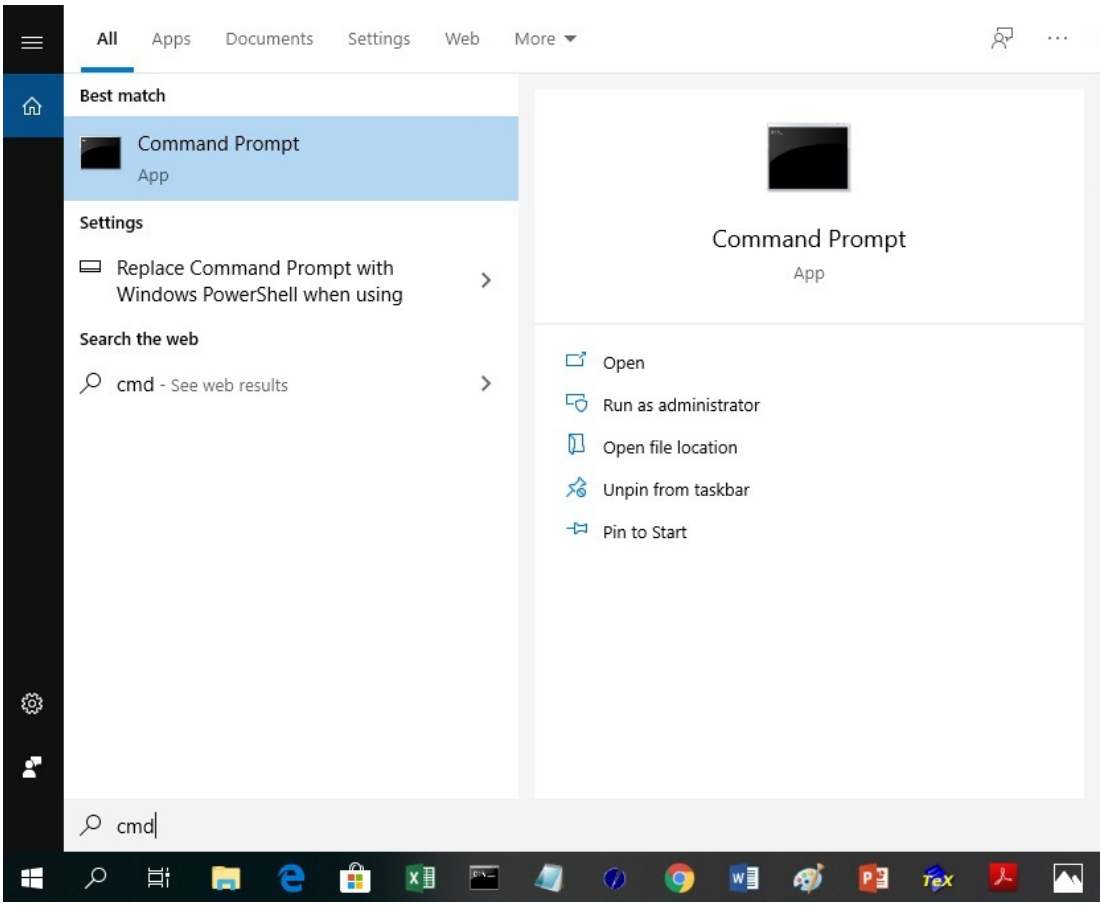

Figure A.6: The search results for **cmd** on Windows 10.

2. In the command prompt, type **pip install --upgrade scipy** to install the latest version of SciPy from the Python Package Index (PyPI), which requires internet access. The messages for the installation process will pop-up in the command prompt. After the installation process is finished, the cursor will move down to the next line and show a new prompt (see Figure A.7).

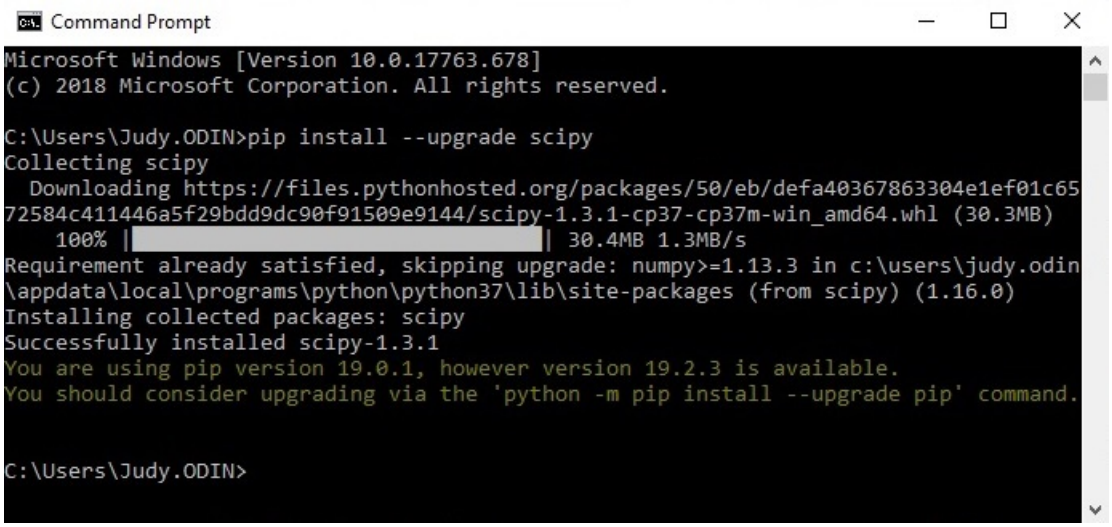

Figure A.7: Installing SciPy using `pip` in the command prompt.