

APPENDIX A

INSTALLING PYTHON

THIS appendix explains how to install on your computer the software you will need for programming in the Python programming language. All of the software is distributed by its makers for free and is available for download on the Internet. To make best use of the book there are four software packages you should install: the Python language itself, and the packages “numpy”, “matplotlib”, and “visual” (also called “vpython” in some places).

There are currently two different versions of Python in circulation, version 2 and version 3. This book uses version 3, which is the most recent and up-to-date version and has some nice features not available in version 2. Unfortunately, at the time of writing, version 3 was not quite ready for prime time, because some packages, including the matplotlib package, had not yet been updated to work with it. It is possible that this problem will have been rectified by the time you read this (Python is being rapidly improved and updated all the time), but if it hasn't one can get around the problem fairly easily. The trick is to use Python version 2, the older version, which allows us to use all the packages we need, but to “switch on” the most important features of version 3, which version 2 allows one to do by including the following line at the beginning of every program:

```
from __future__ import division, print_function
```

(Note the two underscore characters “_” on either side of the word “future”.) If you include this line in your programs, then version 2 will behave essentially the same as version 3 and all the programs in this book will work fine. This line is not included explicitly in the programs as they are reproduced in the book, but if you are using Python version 2—at least until the creators of the Python packages get around to updating their products—you should add it at the beginning of all programs. You can find a further discussion of the

differences between Python versions 2 and 3 in Appendix B.

Bearing this in mind, the simplest way to install Python and the additional packages needed for this book is as follows.

1. Open a web browser and go to www.vpython.org, which is the web page for the `visual` package. Click on the “download” link for your operating system, Windows or Macintosh. (The packages are also available for users of the Linux operating system. The installation procedure is different for Linux, but if you are a Linux user you probably know what you’re doing better than I do.)
2. The `visual` download page helpfully gives a link to the correct version of the programs for the Python language itself. You should download and install the Python language first, before anything else. As discussed above, you should install version 2, unless you know that you want to use version 3. Most likely you will use version 2.7 or later.
3. Having installed the Python language you should follow the instructions to download and install the `visual` package (also sometimes called “`vpython`”). If you are using Windows this will automatically install the `numpy` package for you as well. If you are using a Mac you will need to install `numpy` separately—see step 5 below.
4. Next you need to install the package `matplotlib`, which you can find at www.sourceforge.net/projects/matplotlib/files/matplotlib. You should click on the link for the latest version of `matplotlib`, which at the time of writing is version 1.1.1, and you will be presented with a list of packages for different computers. Select and install the one that corresponds to your computer and the version of Python that you installed. For instance, you would click on `matplotlib-1.1.1.win32-py2.7.exe` for a Windows computer with Python version 2.7 installed.
5. If you use a Mac, you will also need to install the package `numpy`. (If you use Windows, `numpy` will already have been installed for you when you installed `visual`.) You can download the latest version of `numpy` from sourceforge.net/projects/numpy/files/numpy and install.