

# Primer on Installing Python and VPython

## **OBJECTIVES**

- Install Python 2.x
- Install the VPython 3D graphics module

## **TIME**

You should finish this installation in about 10 minutes

## **I. Install Python 2.x**

### *1. What is Python?*

Before writing any code, you will need to install the programming language called Python. What you are installing is a set of standard libraries your code can refer to, as well as the Python interpreter. You don't need to fully understand the difference between an interpreted and a compiled language for the purposes of this course, but to put it succinctly, an interpreted language is one that executes your code directly, without you having to worry about creating an executable for your particular computer platform. This means that interpreted languages are relatively easy to use and platform-independent. Examples of interpreted languages you may have heard of are (besides Python) are Perl, Matlab, and Ruby. While all of these are gaining in popularity, compiled languages such as C++ and Fortran are not likely to go away any time soon, since their code typically runs at least 100 times faster than an interpreted language<sup>1</sup>! For heavy duty cutting edge calculations, the efficiency of compiled code is unrivaled.

Like you, however, many software developers are more concerned about about the time spent *writing* code than the time spent executing it. For most applications, the blazing speed of a C++ program is just not worth all the extra effort required to write it. There's a good reason why software giants like Google, Yahoo, and Youtube now use Python for in-house development--even the physics accelerator laboratory CERN now uses Python. So welcome to their ranks! And remember that despite its widespread adoption as a corporate workhorse, Python's original stated goal was to be a language that is fun to program with. After all, its name derives from "Monty Python".

### *2. Download and install Python*

Go to the website, [VPython.org](http://VPython.org). Click the download link on the left hand menu for your platform (Windows, Mac, or Linux). On this page you will see a link to download Python 2.x<sup>2</sup>. Download and run the install file, following any subsequent directions.

## **II. Install the VPython (Visual Python) Module**

### *1. What is VPython?*

Like all modern programming languages, Python is designed to be *object-oriented*. This means that you can easily use "building blocks" of code written by others to build your own programs, obviating the need to reinvent the wheel. For example, why bother creating a data object for a vector when someone else has already done the work? You might have a strong grasp of what a vector means, but to

<sup>1</sup> <http://www.timestretch.com/FractalBenchmark.html>

<sup>2</sup> Although Python 3.x also exists, it is not compatible with Visual Python.

implement it in a program you would have to create a kind of variable that stores components, calculates the vector's magnitude, handles interactions between vectors (such as dot and cross product), rotates the vector, and so on. Whew, that would be a pain. In a programming class, you would probably do all of these things for their heuristic value, but in this class we will happily leave such details to others....enter VPython.

VPython is a module, or a set of related object definitions and functions, that you can import into your programs. VPython greatly simplifies our otherwise prohibitively tedious goal of creating 3D viewable systems by providing the interface to create and draw objects, such as spheres, arrows, and boxes--all of which we will make use of. VPython also includes a Python editor called VIDLE, an improvement over the standard editor, IDLE ("Integrated DeveLopment Environment", also the name of Monty Python comedian, Eric Idle). Technically, this kind of editor is known as an integrated development environment (IDE) because it can run your code using the Python interpreter in addition to helping you edit your code. Other IDEs also exist for Python which you may use if you prefer.

## *2. Download and install VPython*

From the same download page on [VPython.org](http://VPython.org) and underneath the Python download link, you will find the VPython download link. Download and run the install file, following any subsequent directions. Place the VIDLE shortcut on your desktop if you like.

### **III. Check to Make Sure Everything Works**

Now that everything is installed, we will run the simplest of programs to verify everything is working correctly. Open the VIDLE program. The quintessential startup program, "Hello World", is particularly simple in Python compared to other languages. In the VIDLE text window, type

```
print "Hello, World!"
```

The exact nature of the text is immaterial, so we could have just as easily written

```
print "Ekke Ekke Ekke Ekke Ptang Zoo Boing Zow Zing"
```

and achieved the same result. Once you have written your statement of choice, save your file as "hello.py", where ".py" is the extension that signifies the file is a Python program. Now press F5 to run your program. If all goes well, a Python shell window will pop up displaying your text.