**Virtual Programming: Installing the Simulator**

**YOU WILL NEED:**

To use our simulator, you will need to have python 3 installed on your machine. We also recommend that you have the numpy library installed, though this should not be necessary.

You will also need the simulator code. This can be found as a zip file on our website (https://www.csc.liv.ac.uk/~lad/pyrobots/resources/pirover\_simulator.zip).

The simulator file is called

pirover\_simulator.zip

**INSTALLATION INSTRUCTIONS:**

Unzip the simulator into the location of your choice. It will create a folder called pirover\_simulator. This folder contains two files pysim.py (for use on Windows and Linux machines) and pysimosx.py (for use on Macs)

If possible, add directory path to pirover\_simulator to the PYTHONPATH used by IDLE (there are instructions for this in the next section). If this isn’t possible there are workarounds described in the workbook in Chapter 2 (for working at the command line) and Chapter 5 (for working with files) but it will be an easier experience you do not need to grapple with.

**SETTING THE PYTHONPATH:**

Setting up the correct PYTHONPATH varies between operating systems and Python installations. We have found the following usually work:

**On Linux/Mac:** Add

export PYTHONPATH=$PYTHONPATH:/path/to/pirover\_simulator

to the end of the file ~/.bashrc  where /path/to/pirover\_simulator  is the path to the pirover\_simulator folder. For example if I extracted the zip file to

/Users/nah/code/pirover\_simulator

I would add the following to my ~/.bashrc  file:

export PYTHONPATH=$PYTHONPATH: /Users/nah/code/pirover\_simulator

**On Windows:** There are two set up options for windows:

1. Edit PySimStarter.bat (found in the pirover\_simulator folder) to contain the locations of Python and IDLE. These are:

* C:\Program Files\Python37 (which will need to be replaced with the path to Python on your system)
* C:\Program Files\Python37\Lib\idlelib (which will need to be replaced with the path to IDLE on your system)

1. Or add PYTHONPATH as a user variable and give it the value

%PYTHONPATH%;\path\to\simulator

where \path\to\simulator is the path to pirover\_simulator

The process for setting user variables varies depends upon your version of Windows and you may need Administrator privileges. Ten Forums has tutorials for recent versions of the operating system at:

https://www.tenforums.com/tutorials/121855-edit-user-system-environment-variables-windows.html

**RUNNING THE SIMULATOR:**

You can run the simulator in several ways using a a) *starter program* (for Windows), b) from the *command line* or c) from a Python development environment such as *IDLE*. Brief instructions for each of these options follows:

* **Using PySimStarter (Windows):** Double click on PySimStarter.bat (this will need to have been set up correctly for your system – see above)
* **At the Command line (Windows and Linux):** Type python3 pysim.py in the pirover\_simulator folder then press return.
* **At the Command line (Macs):** Type python3 pysimosx.py in the pirover\_simulator folder then press return.
* **In IDLE (Windows and Linux):** Open the file pysim.py using the file menu. Then select **Run Module** from the **Run** menu.
* **In IDLE (Macs):** Open the file pysimosx.py using the file menu. Then select **Run Module** from the **Run** menu.
* **Other Development Environments (e.g., PyCharm, Anaconda):** We have not tested the simulator in other environments. It should work if PYTHONPATH is set correctly. Please follow the instructions for running programs that come with the development environment.

**PROGRAMMING SIMULATED ROBOTS:**

Instructions for programming the simulated robots can be found in the workbook.



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