Syllabus
Computational Methods for Psychology & Neuroscience

Psychology 327, Fall 2014
Lecture, WF 10:10–11:40PM, TLC 204
Lab, Th 2:20–4:20, Harder Somewhere

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Class URL: http://learn.skidmore.edu

Basics

In this class we will have a look at the various computational tools currently used in psychology and neuroscience. We'll talk about some of the major programs used by scientists in these fields and try to learn a bit about some of them so that you won't be totally caught off guard should you encounter them in your future. In addition, we'll look at doing a little programming in one of the languages that underlies a lot of these packages — Python.

You'll do a few programming projects, a few visualization projects, and all-in-all, get a (very) broad exposure to the tools currently in use.

Outcome Goal Objectives Buzzword Pedagogy

Students who complete this class will have a broad understanding of scientific computation writ large, and more specifically in the domains of psychology and neuroscience. They will complete several projects designed to test and demonstrate their knowledge and ability in some foundations of computer science, computer programming, *and* in the *proper* use of various higher-level scientific software packages.

Specifically,

- Basic scientific programming techniques.
- Basic scientific software usage techniques.
- Ability to generaize these techniques to other languages and systems.

Assessment will be via

- Four (4) programming projects spread through the semester.
- Three (3) will be common across all students in the class.
- One (1) will be a self-determined, final programming project that will cary the majority of the grade in the course.

Materials

We're going to use materials from a few sources — mainly the book *Practical Computing for Biologists* by Haddock & Dunn (ISBN 978-0-87893-391-4) along with parts of a book prepared by some colleagues at Harvey Mudd. I'll get most of that stuff up onto BlackBoard (learn.skidmore.edu) and it will be available for you to print or read on-screen.

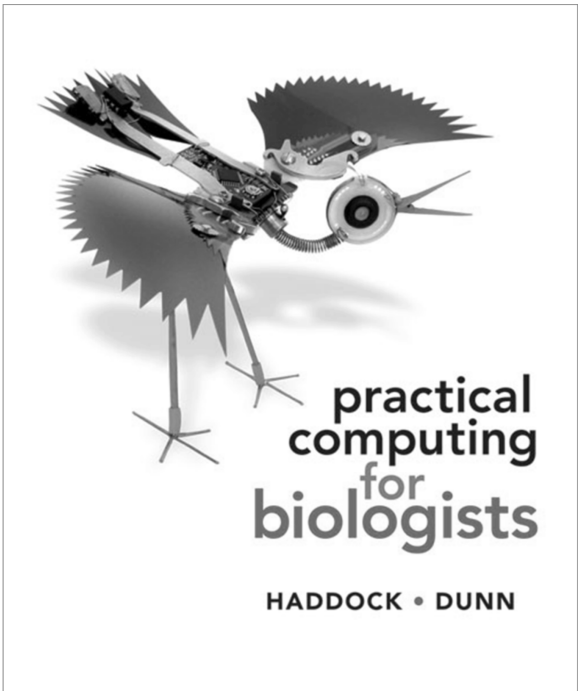

Figure 1: Your Book.

Software

Almost all of the software we will use in this class is Open Source, e.g., it will cost you nothing. Most of the packages work equally well on Macs and PCs. If you have a laptop, you should probably bring it to class and lab. If you don't we have plenty of workstations available with the software we'll use. As with the materials, I'll make the software available via links in BlackBoard also.

Some useful places:

- www.psychopy.org - Python for psych & ns experiments
- continuum.io - Commercial Python w/ free academic version
- www.enthought.com - Commercial Python w/ free academic version
- stackoverflow.com - Great place to find answers on programming
- python.org - official Python site
- www.barebones.com/products/textwrangler - A nice text editor
- practicalcomputing.org - The book's site

Schedule

Roughly- we'll go at it like this:

Part 1: *Regular Expressions*
A strange little thing to start with, but hey, why not?

Part 2: *The Shell*
Learn the secret of 'shell fingers.' Amaze your friends with your newfound digital dexterity.

Part 3: *Programming*
We'll get a quick start into what is programming via the Picobot.

Part 4: *Python*
Programming functionally in Python.

Part 5: *Psychopy*
Experiment environments.

Part 6: *Graphics*
Working with pictures / images / things like that.

Part 7: *Advanced Topics*
Stuff we haven't thought about yet!

There will be a project due at the end of each part. The requirements for each will be featured on BlackBoard.

Small Print

- The Skidmore Honor Code rules above all in this class.

  See http://cms.skidmore.edu/advising/integrity/index.cfm for details on the Honor Code.
- Miss more than 3 classes and I *reserve the right* to fail you.
- Miss the first day and I *reserve the right* to drop you from the class and admit someone on the wait-list.
- Plagiarism will result in failing the course.
- Generous swaths of slack shall be cut to those who provide respect.
- This document subject to random changes with proper notice in class / via email / BlackBoard.
- Notice Regarding Americans with Disabilities Act: Services and accommodations are available to students covered under the Americans with Disabilities Act. If you require accommodations in this course contact Student Academic Services

  http://cms.skidmore.edu/academic_services for further assistance.
- Accommodated Learners: If you have any visual, perceptual, or physical challenges that might result in the need for some form of accommodation I am more than willing to help you help yourself. Contact Student Academic Services

  http://cms.skidmore.edu/academic_services for further assistance.