AM3: ISMB2006 Tutorial

Title: Python programming for Life Science researchers.

Topic Area: IT

Main presenter: Sebastián Bassi

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Teaching experience: Several Linux and computer technology related courses. Like a Internet Introduction Course in 1994, and Linux in 1999 and Molecular Biology for Programmers in 2002, Quilmes National University. Author of several articles for User Linux.
Earlier tutorial presentations: DNALinux presentation in CAFECONF 2005 (Capital Federal Linux User Group Conference) at UADE (www.uade.edu.ar, www.cafeconf.org) in Buenos Aires, Argentina. Introduction to Linux for molecular biologists, in the "Molecular and Integrative Physiology, Instituto de Investigaciones Biologicas, Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Mar del Plata", November 2005.

50 word abstract: Python is an *object-oriented* programming language that is very easy to use. Despite its user friendly nature, its very powerful and are available several modules that extends language capabilities, like BioPython. This tutorial will introduce how to use Python for everyday research uses, like data manipulation, XML processing, and cgi-interface.

Tutorial level: Introductory

Prior knowledge required: This course doesn't require any previous knowledge, but knowledge in any computer language will be useful.

Suitability of this tutorial for ISMB: Python is a popular computer language that is gaining momentum between scientific users. Python is used in a wide range of applications, from P2P (like Bittorrent) to dynamic generated webpages (like Google uses). Scripting languages like Perl, Python and Ruby are used extensively for data manipulation, a task frequently used in scientific work. BioPython will be used as example of the power and simplicity of Python, since you can for example do a BLAST search using a one line of code and process it with very few lines. Another advantage worth pointing is that Python programs runs on virtually every platform, from PDA to supercomputers. After tutorial completion, students should be able to make their own programs.

Profile of Presenter 1: Sebastián Bassi is one of the developers of BioPython

(http://www.biopython.org/participants/) and had contributed with web interface to EMBOSS programs using BioPython. He use Python extensively in his work at Advanta Seeds, a plant biotech center in Balcarce, Argentina. He the main developer of DNALinux and author of several articles in Users Linux magazine.

Tutorial Outline:
Table of contents (estimated time in minutes)
Python concepts. What is different from other languages. (15)
Interactive use. Python as a calculator. (10)
Data structures. Variables, Lists, strings, dictionaries (30)
Program control flow. For, if-else, while (20)
Modularize. Functions. Modules. (15)
File management. Reading and writing text files. Data manipulation (30)
XML. Overview and processing. (30)
Useful modules. Cgi, htmlgen, BioPython. Build a melting point calculator with a web interface that generates HTML and use BioPython functions. (60)