Outline

- Programs and algorithms

- Bash scripting

- Bioinformatics and programming languages

- Python

Programs and algorithms

- Program
  - A set of instructions telling a computer exactly what to do.

- Programming language
  - A language designed to provide instructions to a computer.
  - Each language has specific syntax and semantics.

- Script
  - A program, often relatively short and usually written in an interpreted language.

- Algorithm
  - A sequence of operations to be followed to solve a problem (independent of a specific programming language).

Scripting

- **Bash**
  - A unix shell and command processor. Can execute commands directly from terminal or from a text file.

- **Script (more specific than previous definition)**
  - A series of commands or instructions to automate a task. The commands are written in a text file that is then executed by a program without being first compiled (converted into the binary machine code).

- **Scripting language**
  - A computer programming language that supports scripts. The scripts are typically interpreted by the program and do not have to be compiled.

Bioinformatics and programming

Programming languages commonly used in bioinformatics

Interpreted languages (slower but easier and often shorter):
- Python (Biopython)
- Perl (BioPerl)
- R (Bioconductor)
- MATLAB

Compiled languages (faster but more difficult):
- C
- C++
- Java

Why Python?

- Very versatile.

- Easy to read syntax.

- A high level interpreted language – code is processed at runtime.

- Python is a great for beginners and advanced programmers.

- Lots of resources for general programing and computational biology.

- It's fun!

- It's empowering.

- It's a desirable skill that looks good on your CV/resume.

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Why Python?

What is Python good for?

- Can be used to build just about anything (although not always the best or fastest option)!

  - Backend web development

  - Data analysis

  - Productivity/automation tools

  - Stitching programs together into pipelines

  - Games

  - Apps

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Why Python?

Python is easily the top general purpose interpreted language

Open source projects

Python

Perl

Todos Santos 2018   Andrew Binstock, 2014