Introduction

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“Bioinformatics”

Definition of BIOINFORMATICS

: the collection, classification, storage, and analysis of biochemical and biological information using computers especially as applied to molecular genetics and genomics

— bio-in-form-ic adjective
“Bioinformatics”

Bioinformatics, Computational, and Systems Biology

Bioimaging
Molecular Dynamics
Systems Modeling
Protein Dynamics

Proteomics
Genomics
Biomedical Informatics

Sequence Analysis
Drug Discovery
Cheminformatics

Data Analysis

Protein Structure
“Programming”

Definition of PROGRAMMING

1. the planning, scheduling, or performing of a program

2. a: the process of instructing or learning by means of an instructional program
   b: the process of preparing an instructional program
“Programming”

Computer programming

From Wikipedia, the free encyclopedia

Computer programming (often shortened to programming) is the comprehensive process that leads from an original formulation of a computing problem to executable programs. It involves activities such as analysis, understanding, and generically solving such problems resulting in an algorithm, verification of requirements of the algorithm including its correctness and its resource consumption, implementation (or coding) of the algorithm in a target programming language, testing, debugging, and maintaining the source code, implementation of the build system and management of derived artefacts such as machine code of computer programs. The algorithm is often only represented in human-parseable form and reasoned about using logic. Source code is written in one or more programming languages (such as C++, C#, Java, Python, Smalltalk, etc.). The purpose of programming is to find a sequence of instructions that will automate performing a specific task or solve a given problem. The process of programming thus often requires expertise in many different subjects, including knowledge of the application domain, specialized algorithms and formal logic.
There is an on-going debate on the extent to which the writing of programs is an art form, a craft, or an engineering discipline.

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“Python”
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Python

Designed to be easy to learn
Full featured, powerful language
Free - Costs nothing and open-source
Ideal for *scripting*
Popular
Worldwide, Python is the most popular language, Python grew the most in the last 5 years (4.8%) and Java lost the most (-5.8%).
Course Goals

“Analyze the data”
Course Goals

“Analyze the data”

Introduction
Course Goals

“Analyze the data”

“Do it again”

“Analyze the data”

“Do it again”

Introduction
Course Goals

“Analyze the data”

“Do it again”

“Analyze the data”

“Do it again”

Introduction
Course Goals

Gain experience programming
Learn Python
Survey computational methods

*Improve skills to be a more productive and successful researcher*
Logistics

12 Programming Assignments
Due midnight on Tuesday
Autograded - submit until it works
1 day late - 5 point penalty
Additional extensions require instructor approval
Each assignment worth ~7%
Final Project (create an assignment)

Final Grades
A: >93%
B: >85%
Logistics

Canvas Course Site
https://canvas.pitt.edu/courses/223604

Communication over Slack
http://mscbio2025.slack.com
Getting Help

General questions
  Ask in #general
    Use threaded conversations
  Ask after class in classroom

One-on-one help
  Office hours
  Direct message on slack
Academic Honesty

Do your own work

Do not share or look at other students’ code

Do discuss concepts and problem solving strategies
Let's get started...