Introduction

David Koes

8/29/23

Instructors

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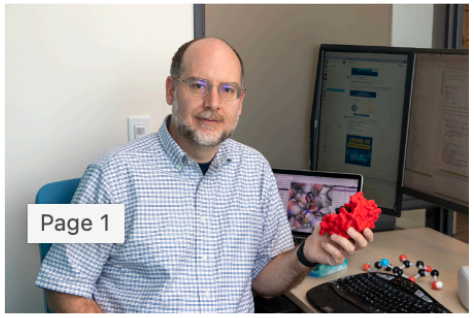
Office Hours:
After class Tuesday



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"Bioinformatics"

bio·in·for·mat·ics *noun plural but singular in construction* \bī-ō-in-fər-'ma-tiks\

Definition of BIOINFORMATICS Cite! +1 Like

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

— **bio·in·for·mat·ic** *adjective*

"Bioinformatics"

Bioinformatics, Computational, and Systems Biology

Bioimaging

Proteomics

Sequence Analysis

Genomics

Molecular Dynamics

Drug Discovery

Biomedical Informatics

Cheminformatics

Systems Modeling

Data Analysis

Protein Dynamics

Protein Structure

"Programming"

pro·gram·ming *noun* \-miŋ\

Definition of PROGRAMMING

Cite! +1 Like

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.

"Programming"

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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.


“Python”

"Python"

"Python"

Python

Designed to be easy to learn

Full featured, powerful language

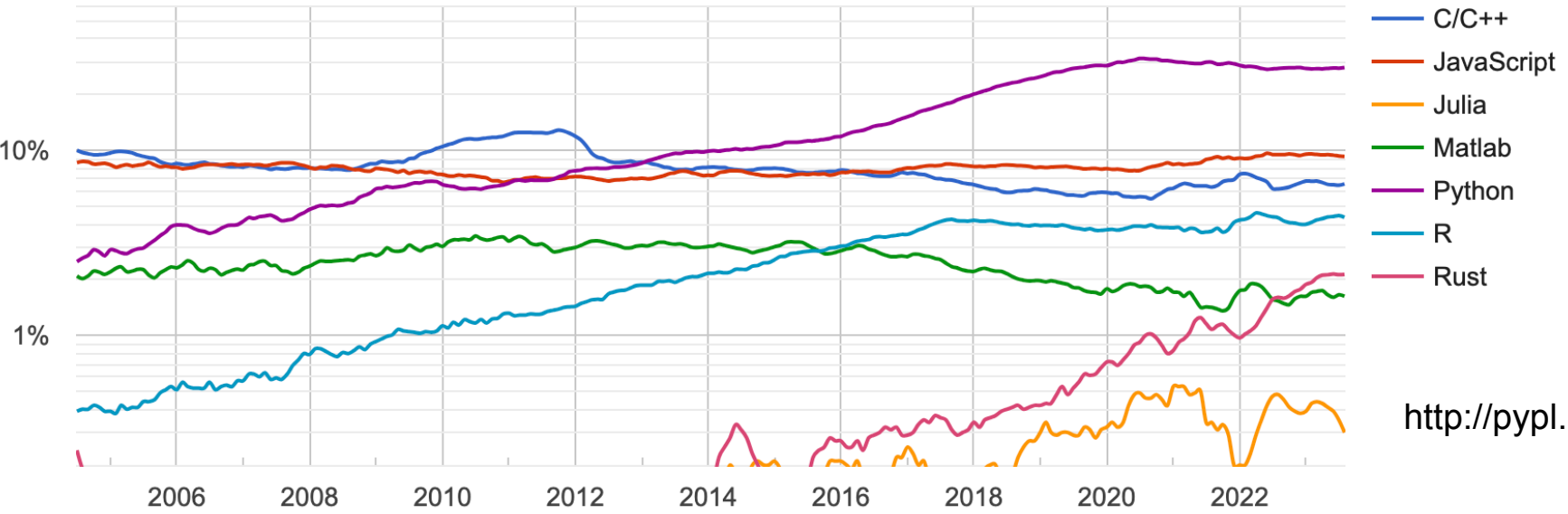
Free - Costs nothing and open-source

Ideal for *scripting*

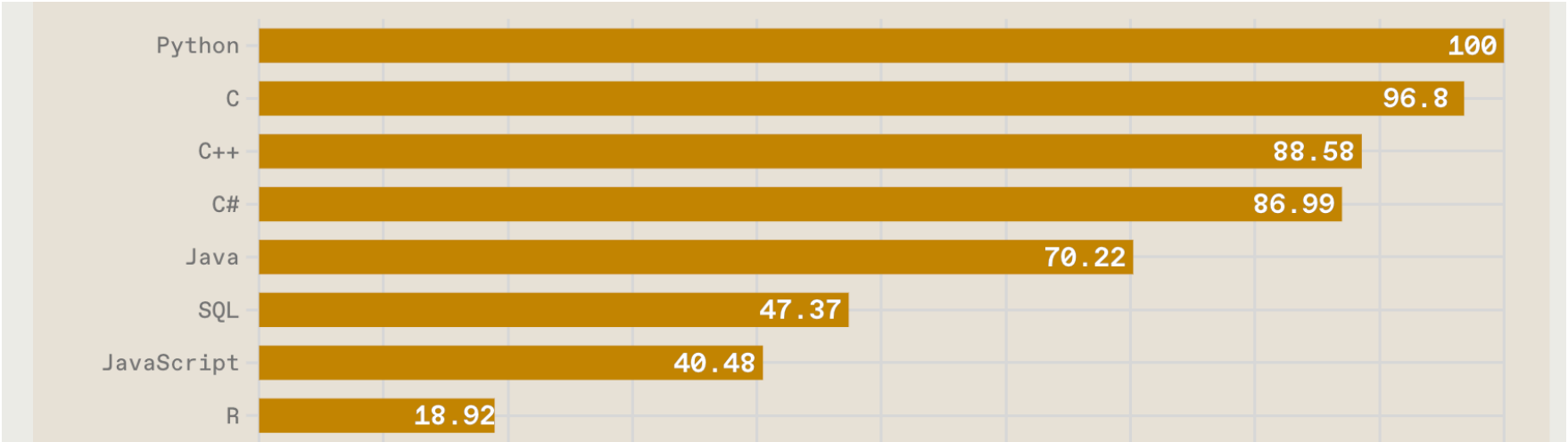
Popular

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%)

PYPL PopularitY of Programming Language



http://pypl.github.io/PYPL.html



https://spectrum.ieee.org/top-programming-languages-2022

computational-biology

Here are 846 public repositories matching this topic...

Language: All ▾ Sort: Most stars ▾

Filter by language	
✓ All	846
Python	301
Jupyter Notebook	114
R	69

genomics

Here are 2,245 public repos

Language: All ▾ Sort: Most stars ▾

Filter by language	
✓ All	2,245
Python	657
R	299
Jupyter Notebook	179
HTML	122
C++	104
Shell	102

Bioinformatics

Bioinformatics is an interdisciplinary field that intersects with biology, compu
and statistics. It concerns itself with the development and use of methods an
collecting and analyzing biological data.

Here are 8,329 public repositories matching this topic...

Language: All ▾ Sort: Most stars ▾

Filter by language	
✓ All	8,329
Python	2,802
R	871
Jupyter Notebook	750

lectures.

bioinformatics web-develo

ly converted from CVS)

ein-structure dna protein biopyt

molecular-modeling

Here are 127 public repositories matching

Language: All ▾ Sort: Most stars ▾

Filter by language	
✓ All	127
Python	53
C++	10
Jupyter Notebook	10

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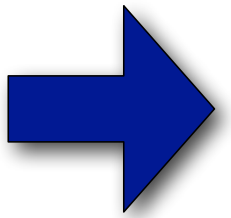
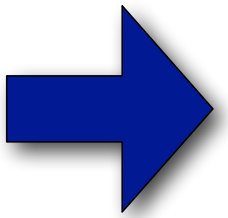
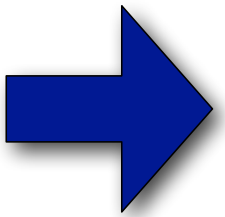
Course Goals

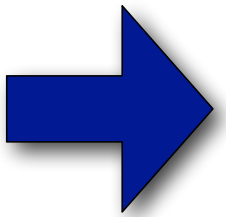




"Analyze the data"

Course Goals





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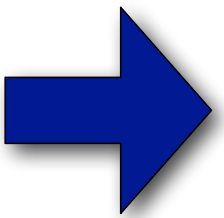

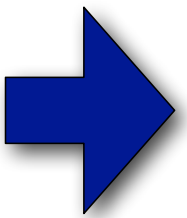

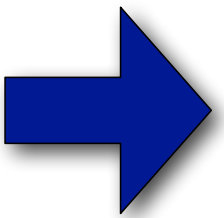

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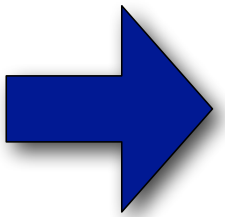

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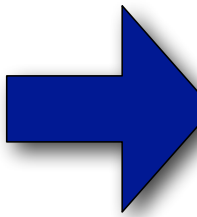
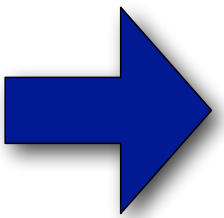


"Do it again"



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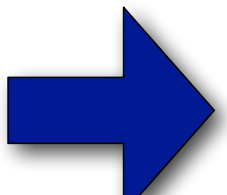

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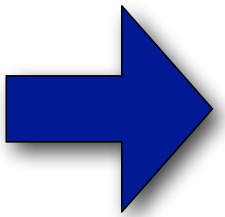
Course Goals



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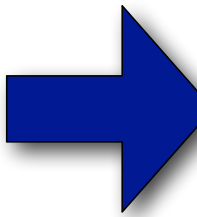

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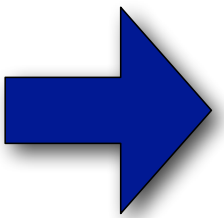

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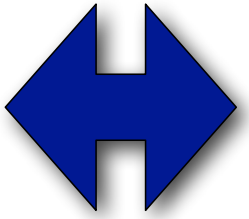


"Do it again"

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%

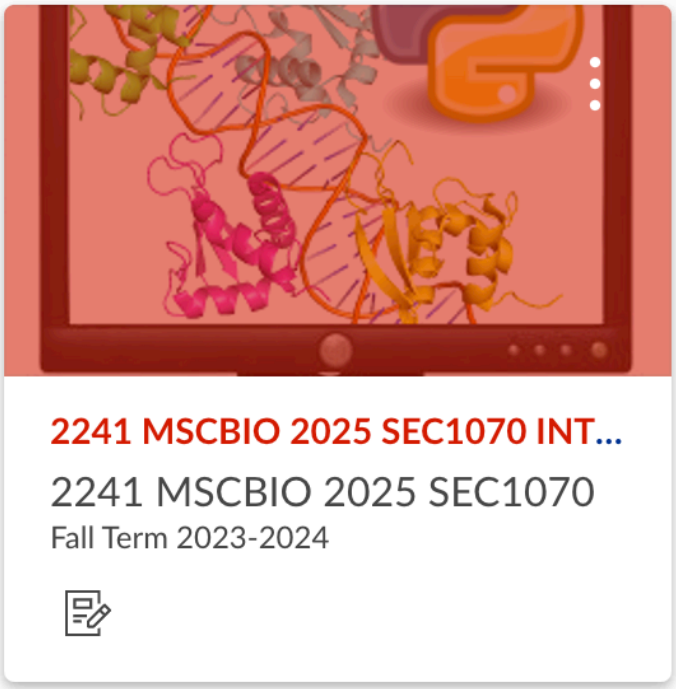
Logistics

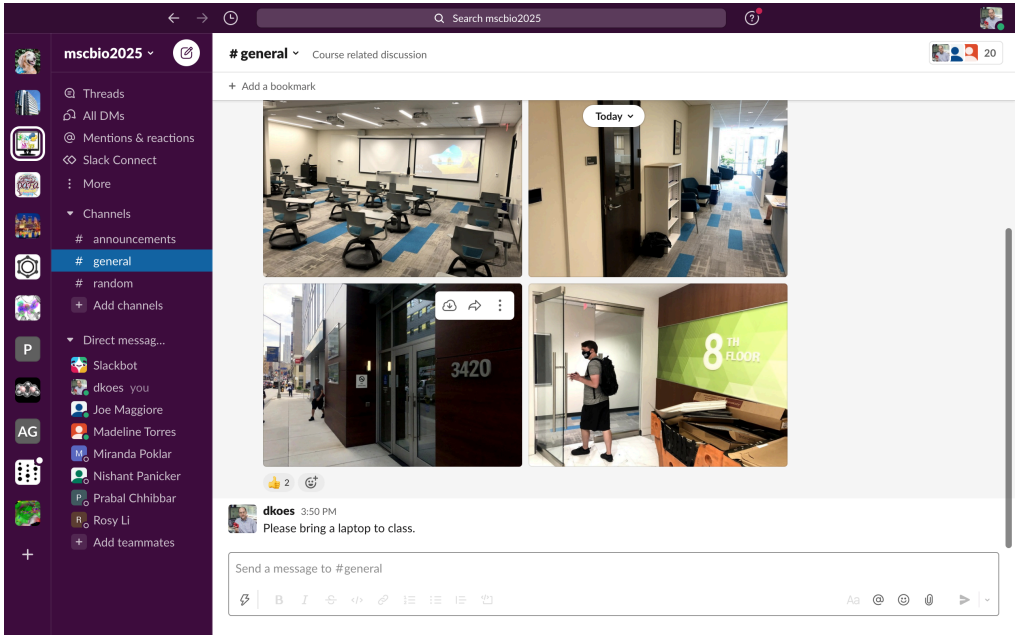
Canvas Course Site

https://canvas.pitt.edu/courses/223604

Communication over Slack

http://mscbio2025.slack.com





Getting Help

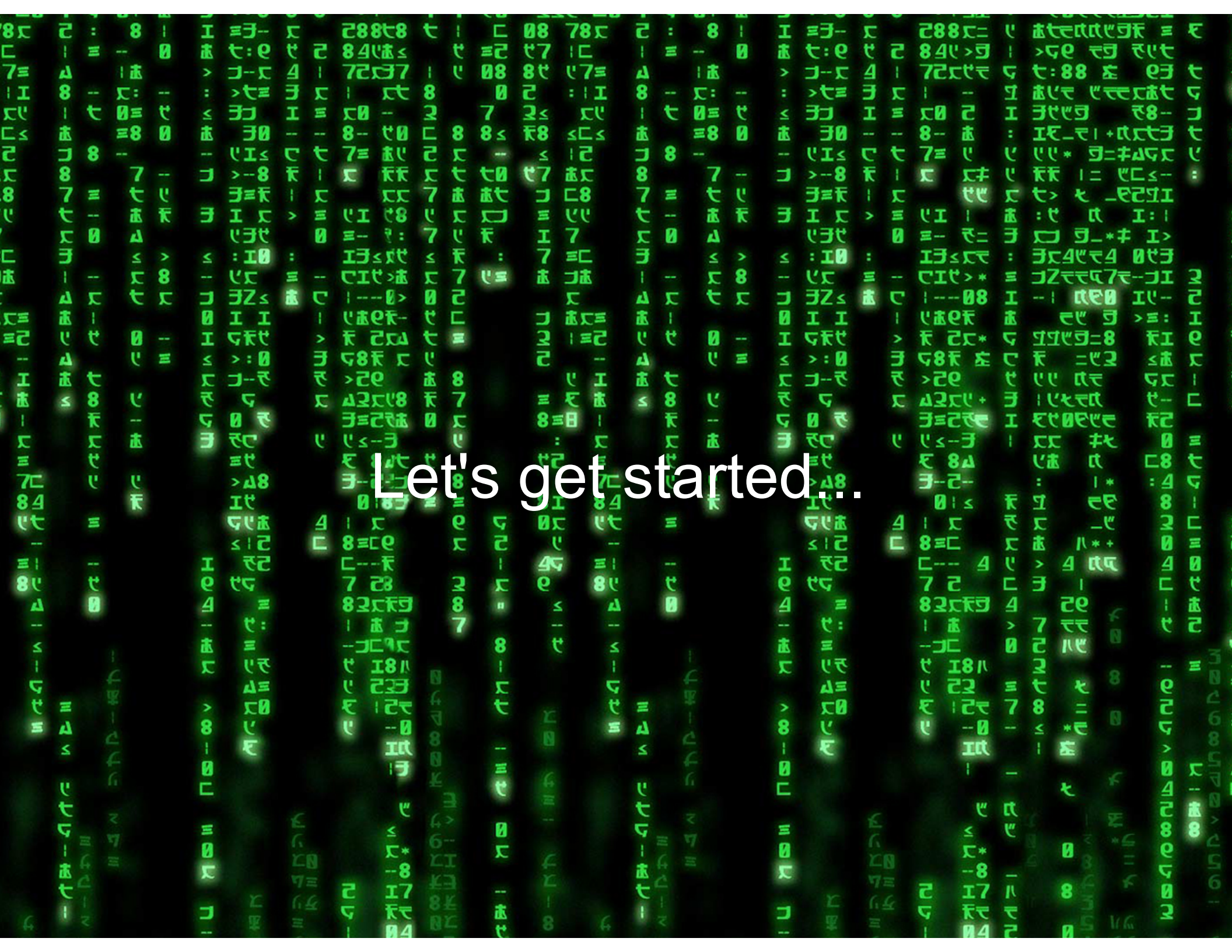
- General questions
  - Ask in #general
    - Use threaded conversations
  - Ask after class in classroom
- One-on-one help
  - Office hours
  - Direct message on slack

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...