Python Syllabus

Course Description

This course will introduce techniques for solving programming problems with fundamental algorithms and data structures. We will explore and make use of core data structures such as linked lists, stacks, queues, graphs and trees, evaluating the tradeoffs of different data structures and algorithms. Specifically, the course covers algorithms for sorting and searching over several of these data structures. This course will be taught with the Python programming language.

Logistics

Meetings

- T, Th, 4-6pm
    - Tuesdays: Adrienne will be on-campus but available on Zoom
    - Thursdays: Zoom

Communication

- Primarily via Piazza and Canvas

Prerequisites

- None; this course is beginner friendly

Grading

- Bi-weekly assignments: 80%
- Cumulative Final: 10%
- “Participation”: 10%

Bi-weekly assignments: Every-other week; Intended to put the weekly concepts into practice.

Participation: This is primarily about you reflecting on your learning and communicating with me.

Late Policy

1 late assignment/quarter, max 1 week late

Otherwise, 25% penalty for each day late

Lowest weekly assignment grade will be dropped

But it needs to be done and earn at least 50%-- you can't choose to just not do an assignment!

Materials and Resources

Grokking Algorithms by Aditya Bhargava

eBook Available via UW LibrariesLinks to an external site.

PyCharm

Free license available from Jet Brains: https://www.jetbrains.com/community/education/#students/Links to an external site.

Topics

- Intro to Data Structures and Python
- Python Fundamentals; Variables, Data Types, Conditionals, etc.

  Intro to Data Structures
- Sorting, Asymptotic Analysis, Testing
- Classes
- Trees and Heaps
- Hashing
- Graphs
- Greedy Algorithms
- Quicksort, Linear Sorts
- Dynamic Programming

Assignments (roughly)

- My First Python Assignment and Exploring Python
- Data Structures for Card Games, Classes
- Huffman Encoding
- Hashtables and Data Indexing
- Maze Generating and Solving