01266211

Principles of Computation and Applications

1/2022

- 4 credits, 3-hour lecture, 3-hour lab
- This course introduces fundamental programming concepts and problem-solving techniques that promote computational thinking skills. Theoretical foundations and practical applications of classical data structures and algorithms are explored. Program performance characteristics and complexity analysis are also covered. Students will spend a considerable amount of time writing programs to implement the concepts covered in the course.

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Office Hours : before and after class,
by appointment

TAs

- Tuesdays
  - Jinny
  - Captain
  - Far
- Wednesdays
  - Jinny

What is it all about?

- Problem Solving
  - techniques that promote computational thinking skills
- Data Structure
  - a way of organizing data so that it can be used efficiently
- Algorithm
  - a set of steps to accomplish a task as efficiently as possible
- Programming
  - a process of creating a computer program so that it runs efficiently
  - Python

Prior Knowledge

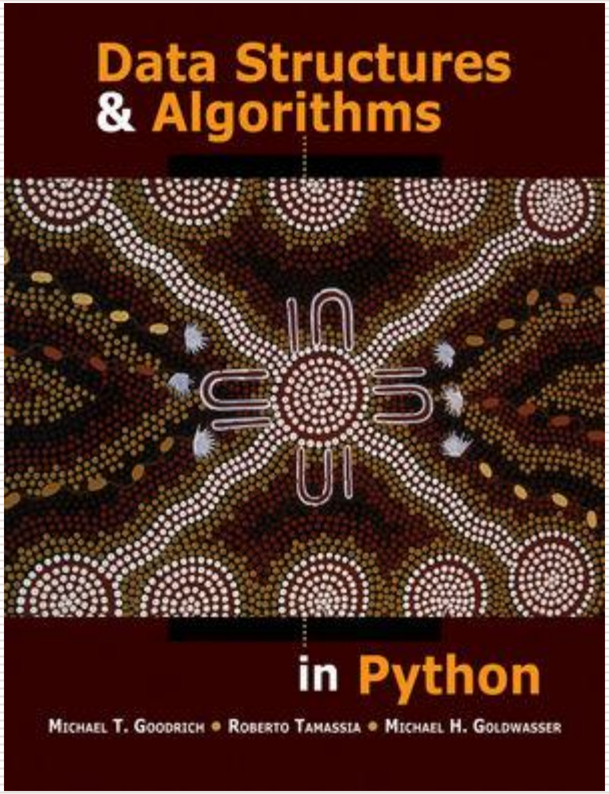
- Basic Python Programming
  - Objects
  - Functions
  - Modules
- Basic Mathematics
  - Logarithmic
  - Series
  - Probability
- Co-/Prerequisite:
  - none

Planned Topics

Week	Topic
1	Problem Solving
2	Python, OOP
3	Algorithm Analysis
4	Recursion
5	Arrays
6	Stacks
7	Queues
8	Midterm Exam
9	Linked Lists
10	Trees, Binary Trees
11	BST, AVL
12	Priority Queues
13	Heaps
14	Hashing
15	Sorting Algorithms
16	Graphs
17	Final Exam

Textbook -- required

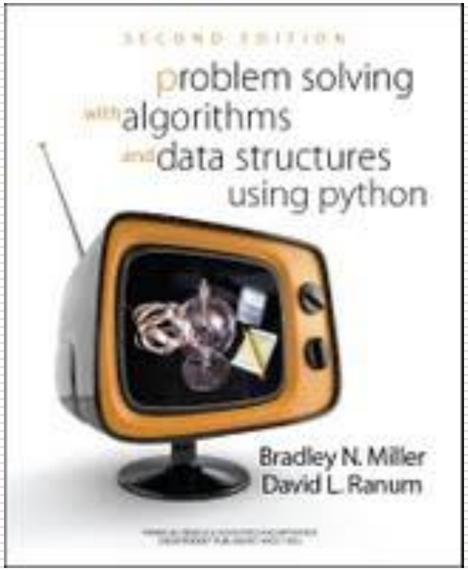
Data Structures & Algorithms in Python


Data Structures & Algorithms
in Python
Michael T. Goodrich • Roberto Tamassia • Michael H. Goldwasser

- Michael T. Goodrich, Roberto Tamassia and Michael H. Goldwasser
- Wiley
- 2013
- ISBN 978-1-118-54958-2 (e-Text)

Textbook -- required

Problem Solving with Algorithms and Data Structures using Python



- □ Bradley N. Miller and David L. Ranum
- □ 2011
- □ ISBN-13: 978-1590282571
- □ ISBN-10: 1590282574

- Interactive textbook

  Problem Solving with Algorithms and Data Structures using Python

  https://runestone.academy/ns/books/published/pythonds/index.html

Helpful Materials

- □ Your favorite Python book ☺
- □ Python Tutorial
  https://docs.python.org/3.10/tutorial/index.html
- □ Python Documentation
  https://docs.python.org/3.10/index.html

Development Environment

- □ Python
- □ No particular IDE is required

- □ Python

  https://www.python.org/
- □ PyCharm IDE (not required, but recommended)

  http://www.jetbrains.com/pycharm/

Assessment

- Lab & homework (30%)
- Project (20%)
  - Team
- Exams (50%)
  - midterm exam (20%)
  - final exam (30%)

Policies

- Assignments are to be submitted before class period.
- Deadlines are hard deadlines. Late submission is **not** accepted in all circumstances.
- The objective of the assignments is to give exposure the course materials on your own. Discussion, exchange of ideas, assistance in debugging or illustrating concepts with sample code is fine and encouraged.

Policies – cont.

- **Plagiarism can have severe consequences. Plagiarism is considered as academic dishonesty. Student who commits plagiarism will be reported to SIIE/Faculty of Engineering and KMITL.**

Policies – cont.

- Programming merits will be given to outstanding pieces of work.
- Students may be excused from the assignment deadlines or examinations only in the event of a medical or personal emergency consulted with an instructor prior to a designated date.