MATH208
Data Structure

Szu-Chi Chung

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Lectures

- Class hours: Mon. (9:10-12:00)
  - Classroom: 理 SC 2004
- Lecture: Szu-Chi Chung (鍾思齊)
  - Office: 理 SC 2002-4
  - Office hours: Mon. 16:00~18:00 and Wed. 16:00~18:00
- T.A.:李祐瑄, 林柏仰
  - Office: 理SC 1011-3
  - TA hour: Wed. 16:00~17:00 (at 理SC 1011-3) and Thur. 14:00~15:00 (at 理2004)
- Math Runway – Friday 12:00

Textbook and requirement

- The assignment and related material will be available on the course webpage. Course website and Facebook group
  - https://phonchi.github.io/nsysu-math208/materials/
- Textbook*: Problem Solving with Algorithms and Data Structures using Python, 3rd Edition*
  - Authors: Brad Miller and David Ranum
- Problem Solving with Algorithms and Data Structures using C++
  - Authors: Brad Miller, David Ranum and Jan Pearce
- For the basic data structure code checkout
  - https://github.com/phonchi/pythonds3

Grading policy

- Grading
  - Homework 50% (5 assignments, mainly coding parts (Python/C++))
  - Participants: 5% (participates at least 10 times can get the full score)
  - Take-home Quiz: 5% (2 times, conceptual, single choice and short answer questions)
  - Midterm exam 20% (conceptual, single choice and short answer questions)
  - Final exam 20% (conceptual, single choice and short answer questions)
- Midterm (conceptual)
  - It will be held on 2024/04/08 at 理 SC 0008
- Final (conceptual):
  - It will be held on 2024/06/03 at 理 SC 0008
- You need to use Python/C++ in this course

Resources

- Python/C++ basics
  - Python for Everybody or https://ocw.aca.ntu.edu.tw/ntu-ocw/ocw/cou/111S107
- Object-oriented
  - https://openhome.cc/zh-tw/python/ or https://openhome.cc/Gossip/CppGossip/
- Practicing
  - Hackerrank
  - https://neetcode.io/practice
- Visualization
  - Python/C++ Tutor
  - https://visualgo.net/en
  - https://cmps-people.ok.ubc.ca/ylucet/DS/Algorithms.html

What we are going to study in this semester

- Python/C++ Object oriented fundamentals
  - Flow Control
  - Functions
  - Variables and containers
  - Encapsulation polymorphism and inheritance (Classes)
- Algorithm analysis
  - Big O
  - Timing benchmark
- Linear structure
  - Array/Linked list
  - Stack/Queue
- Recursion and dynamic programming
- Searching and Sorting
- Nonlinear data structure
  - Hash tables
  - Trees
    - Binary search tree
    - AVL tree
  - Graphs
- Not covered
  - Advanced graph and dynamic programming
  - Divide and conquer and Greedy algorithm
  - Network flow
  - NP and computational intractability

Relate to other courses

- Related Courses
  - Algorithms
  - Python and machine learning algorithms
- Other courses
  - Advance programming
  - Web programming
  - Network programming
  - Software engineering
  - Data science/Machine learning/Artificial intelligence