Algorithm Design and Analysis
Course Logistics

http://ada.miulab.tw #ADA2022

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國立臺灣大學 National Taiwan University

Algorithm Design & Analysis

- Instructors
  - 陳縕儂 Yun-Nung (Vivian) Chen (before midterm)
  - 蕭旭君 Hsun-Chun Hsiao (after midterm)
- Time: Thursday 789, 14:20-17:20
- Location: Online @ YouTube & COOL

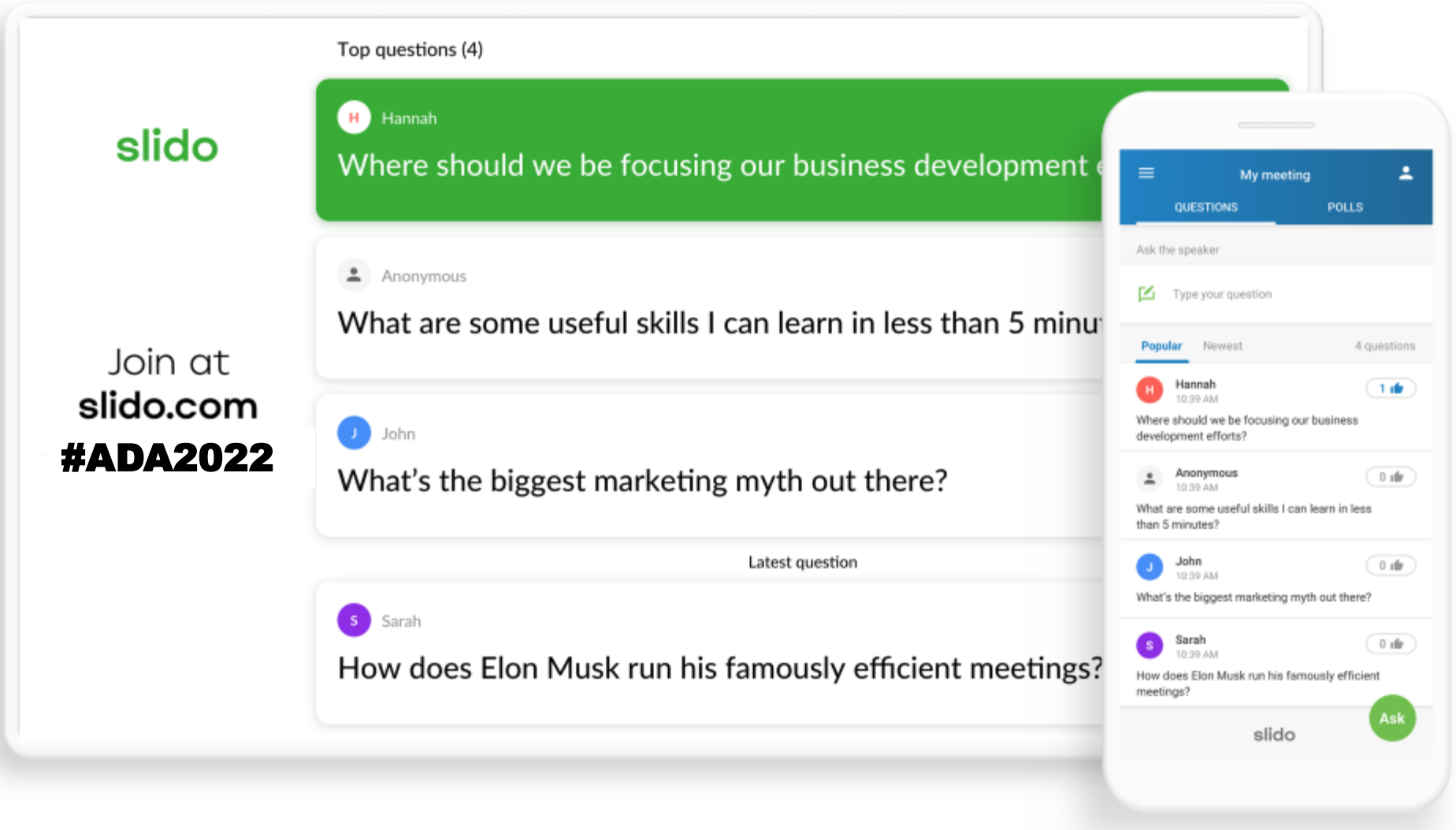
- NTU COOL: https://cool.ntu.edu.tw/courses/17712
  - Slides uploaded before each lecture
- sli.do real-time QA: #ADA2022
- Email: ada-ta@csie.ntu.edu.tw
  - To ensure timely response, email title should contain “[ADA2022]”
  - Do NOT send to our personal emails
- Knowledge required
  - Programming (C/C++)
  - Data structure

sli.do

NTU COOL

- Registered students
  - Added to NTU COOL automatically
- Audited students
  - Fill out the Google Form
- Notice!
  - Announcement
  - TA hours
  - Discussion forum

slido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#ADA2022
Top questions (4)
Hannah
Where should we be focusing our business development
Anonymous
What are some useful skills I can learn in less than 5 minu
John
What's the biggest marketing myth out there?
Latest question
Sarah
How does Elon Musk run his famously efficient meetings?
My meeting
QUESTIONS
POLLS
Ask the speaker
Type your question
Popular
Newest
4 questions
Hannah
10:39 AM
1
Where should we be focusing our business development efforts?
Anonymous
10:39 AM
0
What are some useful skills I can learn in less than 5 minutes?
John
10:39 AM
0
What's the biggest marketing myth out there?
Sarah
10:39 AM
0
How does Elon Musk run his famously efficient meetings?
Ask
slido

gradescope Entry Code: **V5BRBJ**

- Homework submission
  - Specify the location for each problem

6. (10 pts) Refer to the previous problem for an explanation of the context of this code. Fill in the missing line.

It can be solved with one line but there are multiple possible approaches. If your solution requires two or three lines, fill in those lines above and below the blank as needed.

```
/** replace last factor with the value i */
public void replaceLastFactor(int i) {
    int prev = data.set(data.size() -1, i);
}
```

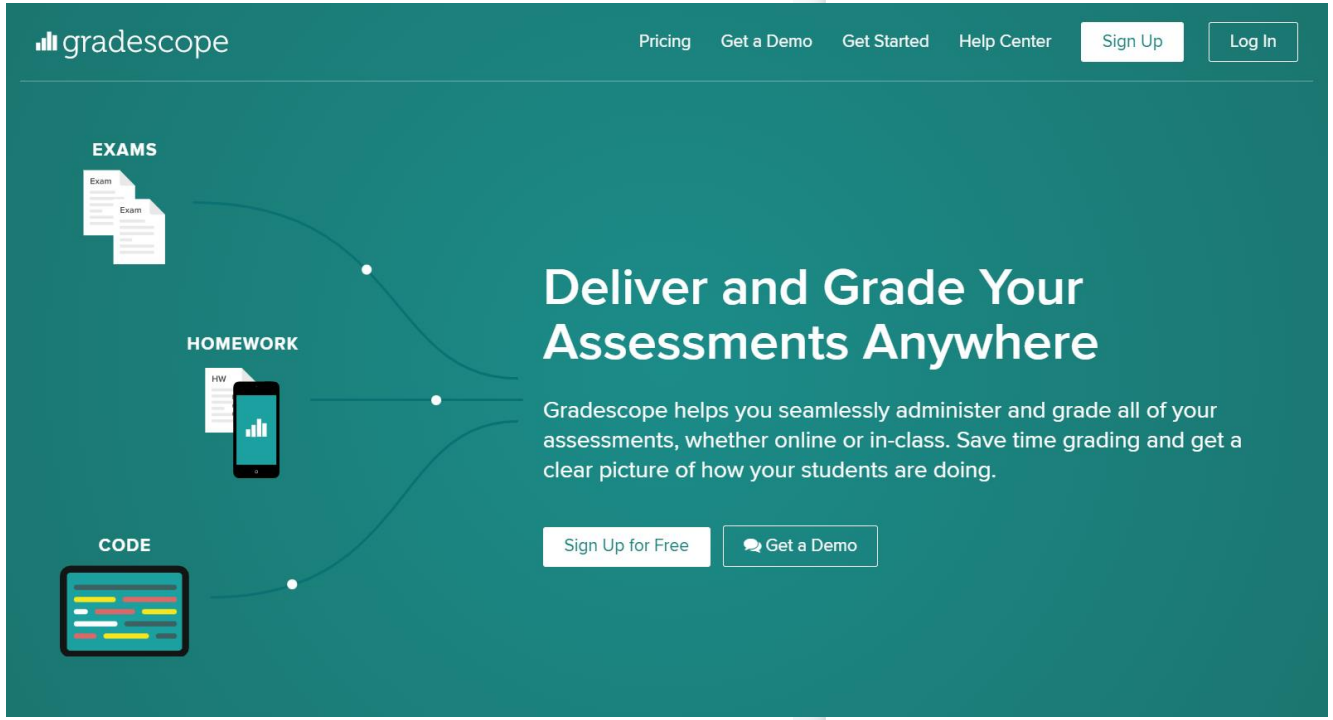
TOTAL POINTS
5.0 / 10.0 pts

1 **+10.0**
Correct:
`this.set(this.size()-1, i)`
OR
`set(size()-1, i)`

2 **+10.0**
Correct:
`this.remove(this.size()-1)`
`this.addFactor(i)`

3 **+5.0**
Partial credit: An answer that has the form
`x.set(x.size()-1, i)`
but where x is some variable that is either out of scope, or an inappropriately declared instance variable.

4 **+5.0**
Partial credit for answer with



Gather

- Office hours at Gather.town

GATHER FOR EDUCATION

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Revive classes, office hours, and study sessions with collaborative objects and private group areas.

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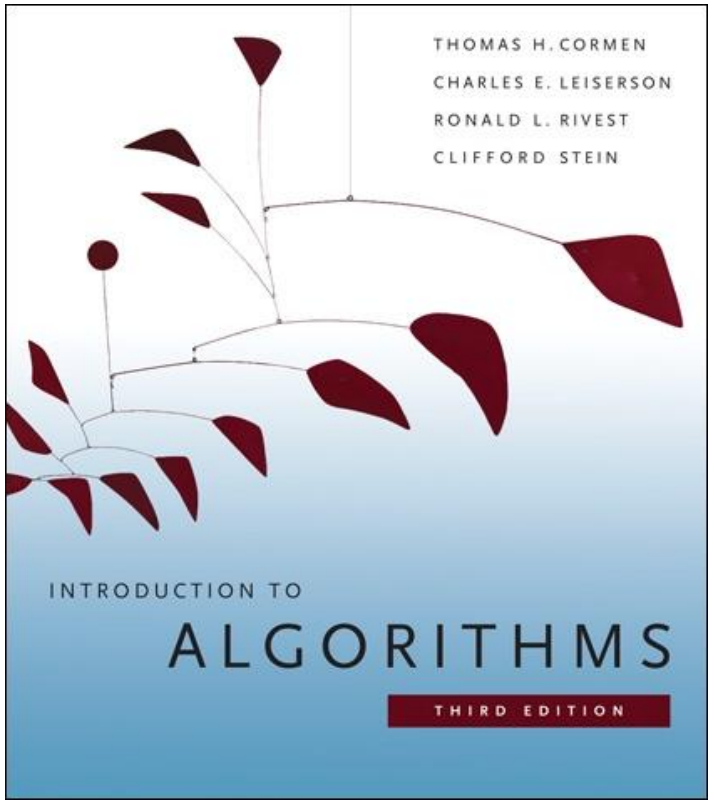
Textbook

- Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein. Introduction to Algorithms. 3rd edition, MIT Press, 2009



Slides credited from hil

Course Objective

- After taking this course, you should be able to
  - ***Design*** correct and efficient algorithms
  - ***Implement*** the designed algorithms
  - ***Prove*** the correctness of algorithms
  - ***Analyze*** the complexity of algorithms

Course Overview

Algorithmic Fundamentals

- Introduction
- Asymptotic Analysis

Algorithm Design Strategy

- Divide-and-Conquer
- Dynamic Programming
- Greedy Algorithms

Algorithm Analysis

- Amortized Analysis
- NP Completeness

Graph & Selected Topics

- Graph Algorithms
- Others

Course Syllabus

Week	Topic	Note
1 2022/09/08	Course Logistics & Introduction	
2 2022/09/15	Divide-and-Conquer	HW1 Release
3 2022/09/22	Divide-and-Conquer	
4 2022/09/29	Dynamic Programming	
5 2022/10/06	Dynamic Programming	HW1 Due / HW2 Release
6 2022/10/13	Greedy Algorithms	
7 2022/10/20	Greedy Algorithms	
8 2022/10/27	Midterm Exam	HW2 Due
9 2022/11/03	Graph Algorithms	
10 2022/11/10	Graph Algorithms	HW3 Release
11 2022/11/17	Graph Algorithms	
12 2022/11/24	Amortized Analysis	
13 2022/12/01	NP Completeness	HW3 Due / HW4 Release
14 2022/12/08	NP Completeness	
15 2022/12/15	Approximation Algorithms	
16 2022/12/22	Final Exam	HW4 Due

Powerful Teaching Team


蔡旻諺 (Lead TA)


簡謙益 (Lead TA)


蘇柏瑄


張程凱


許博翔


曹宸睿


王勻


洪郁凱


林胤辰

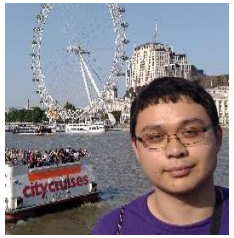

簡瑀鋅


陳冠辰


林秉軒


王品翔


沈立程


鄭天盛


張志謙


陳伶瑋


胡材溢


王政祺


王均倍


林泓毅


張正穎


朱俊能


李芸芳


林東君

Grading Components

- **Homework Assignments (40%)**
  - 4 in total; once per 2-3 weeks
  - Programming and non-programming problems
- **Mini-homework (20%)**
  - Best 10 hand-written scores (10%) + Best 5 programming scores (10%)
  - Duration: 1 week for hand-written ones; 2 weeks for programming ones
- **Midterm (20%)**
  - Course content before midterm
- **Final Exam (20%)**
  - All course content
- **Extra Bonus**

Grading Rules

- Non-programming problems
  - 可以與人討論及上網查資料，但必須理解後以自己的話來寫
  - 註明該次作業為
    1) 完全獨立完成
    2) 列出參考資料 (網址、課本頁數)
    3) 致謝共同討論同學
  - 須以線上上傳 (COOL/gradescope)
  - 盡量用電腦寫，若用手寫看不懂字體時一律不算分
- Programming problems
  - 以測試資料分數計算，作業結束後會公布測試資料
  - 上傳規定會在每次作業說明中，請務必仔細閱讀
- **作業抄襲，考試舞弊，抄襲者與被抄襲者學期成績零分**

Question?

Important announcement will be sent to @ntu.edu.tw mailbox & post to the course website

Course Website: http://ada.miulab.tw
Email: ada-ta@csie.ntu.edu.tw