

CSE 730 (Seminar): Data Structures and Algorithms in
Solving Programming Problems

Introduction

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CSE 730 (Seminar): Data Structures and Algorithms in Solving Programming Problems

- Please sign up course on **Piazza** from course webpage <https://cse.buffalo.edu/~shil/courses/CSE730/>
 - announcements,
 - asking/answering questions
 - **collecting problems and solutions**
 - **discussions**
- Instructor
 - Shi Li, shil@buffalo.edu
 - Office hours: Wednesdays 2:00pm-3:00pm (and by appointments), Davis 328,

- CSE431/531: Analysis of Algorithm I.
 - Asymptotic Notations
 - Algorithms for classic problems such as sorting, shortest paths, minimum spanning trees, etc.
 - Meta techniques to design algorithms such as greedy algorithms, divide and conquer and dynamic programming
 - How to analyze algorithms: correctness, running time

Why this course?

- Practice problems for data structures and algorithms
- Designed for both students seeking for industry or academia jobs

Course Structure

Wk	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Tp	DS		GraA		GreA		DP		Free Topic				X	?	
S1	■	■	■	■	■	■	■								■
S2	■		■		■		■								■
S3	■														■
S4															■

Acronyms:

- a lecture = 4 sections
- a section = 30 minutes
- Week 14 : Fall Recess
- Week 15 : Undecided
- DS : Data Structures
- GraA : Graph Algorithms
- GreA : Greedy Algorithms
- DP : Dynamic Programming
- ■ : Overview by Instructor
- ■ : Presentations

① Participation

- attending classes
- suggesting problems
- discussions on Piazza

② Presentation

- 1 credit: ①
- 2 credits: ① + ②
- 3 credits: ① + ② \times 2
- Final grade will be S/U. You get S if you get a score of 70 (out of 100) for your duties.

Problems for Presentations

- Programming problems from coding websites
 - CodeChef (<https://www.codechef.com>)
 - Hackerearth (<https://www.hackerearth.com/practice/>)
 - ACM/ICPC problem collection (<https://icpc.baylor.edu/worldfinals/problems>)
 - USACO (<http://www.usaco.org/index.php?page=contests>)
 - Sphere Online Judge (<https://www.spoj.com>)
 - Peking University Judge Online (<http://poj.org>)
 - ...

	CC	HR	ICPC	USACO	SPOJ	POJ
difficulty	vary	vary	hard	hard	vary	vary
by topic?	yes?	yes	no	no	yes	no

- Exercise problems given by the instructor

Problem Suggestions

- You can suggest problems (from a coding website) using the google document I provide.
- Specify the topic of the suggested problem (which can be one of the 5 topics or anything else)

Discussions on Piazza

- I will ask for solutions for some suggested problems on Piazza (after we finished the topic for the problem)
- Solution collection: within a period (about a few days), you can post your solution for the problem privately (only you and I can see the solution)
- Discussion: after the collection phase, I make some of your solutions public for discussion.

Presentations

- Sign up for 1 or 2 presentation sessions (depending on the credits)
- You can use the problems I provided, students suggested or your own problem
- A presentation session is 30 minutes
 - talk about one or many problems: 1 if the problem is hard, 2 ~ 4 problems if they are easy, avoid too trivial problems
 - define the problem(s) clearly, give sample inputs and outputs
 - give your algorithm in as much detail as possible, analyze its correctness and running time
 - if possible, talk about some implementation issues or tricks
 - though not required, it is recommended that you first AC the problems you'll discuss
- You can meet me during the office hours to discuss your presentation.

Presentations

- If you prefer, you can also talk about algorithms from research papers.
- Make sure there is some theoretical analysis.
- Confirm with me if you are not sure.

Questions?

Remember to sign up on Piazza.