Introduction to International Collegiate Programming Contest

Qipeng Kuang

Department of Computer Science

The University of Hong Kong

Outline

- Introduction
- Training
- HKU Arrangement

International Collegiate Programming Contest

- So-called
  - ACM-ICPC (previous sponsor ACM)
  - JB-ICPC (current sponsor Jet Brain)
- Time:
  - Regional: Oct. to Dec.
  - Regional Finals: Dec. to Apr.
  - World Final: usually Apr.
- Rule:
  - 3 members per team
  - 1 computer
  - 5 hours, 10~12 problems

Current Standings
JETBRAINS
ICPC 2018 WORLD FINALS
world finals host
Current Standings

BC 2021
BYTE CAMP

BC 2021
BYTE CAMP

ACM International Collegia ming Contest Asia Qingdao Regio
中国石油大学（华东）

husetts Institute of Technology

Problems

- Submit a code:
  - Usually in C++/C/Python/Java
  - Input -> process -> output
  - Within time and memory limits
- Judge:
  - Test your code by test data
  - You get “Accepted” if you pass all the test data

Problem L. Perfect Matchings

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	512 megabytes

AAA gets a complete graph of $2n$ vertices, where every pair of distinct vertices is connected by a unique edge, as a birthday present. However, AAA thinks the complete graph is not that beautiful and he decides to delete $2n - 1$ edges that form a tree.

Now he wonders the number of different perfect matchings in the remaining graph. Note that a perfect matching is a set of n edges where no two edges share a common vertex. Since the answer may be very large, you only need to output the answer modulo 998 244 353.

Input

The first line contains a single integer n $(2 \le n \le 2\,000)$.

Each of the next $2n - 1$ lines contains two integers u and v $(1 \le u, v \le 2n)$, representing an edge deleted from the complete graph. It is guaranteed that the given edges form a tree of $2n$ vertices.

Output

Output a line containing a single integer, representing the answer modulo 998 244 353.

Examples

standard input	standard output
2 1 2 1 3 3 4	1
3 1 2 2 3 3 4 4 5 5 6	5

How’s the contest like?

- Ability of analyzing, thinking and solving problems
- Interesting Algorithms
- Knowledge that you would not get in the course
- Coding
- Optimization
- Team cooperation

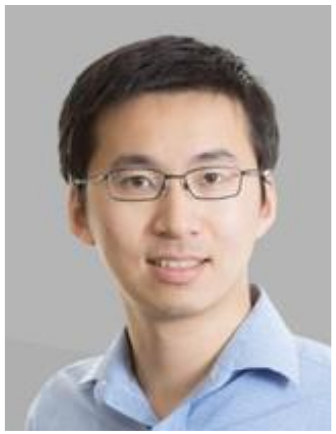
Benefits

- Free travel
- Become outstanding in courses like Discrete Mathematics, Data Structure and Algorithms…
- Enrich your university life
- Find your interest
- Offer to company
  - Those abilities are important in companies
  - Companies see highly on programming contest participants
- Research
  - Those abilities are important in research
  - Problems are similar in various research areas

Tiancheng Lou
Co-founder of Pony.ai
(a company for auto driving)

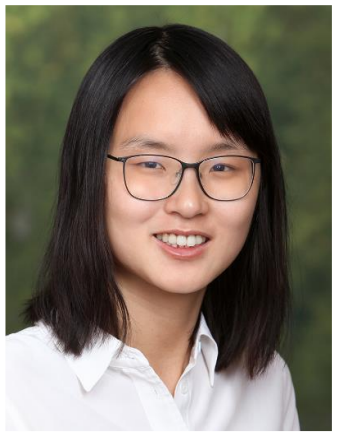
Wenbin Tang
Co-founder of Face++
(a company for visualization)

Valeria Ryabchikova
Top Mind in Huawei
(a company for communication)



Richard Peng
Adjunct Prof. at U. Waterloo
Theoretical Computer Science
“Almost Linear MaxFlow”

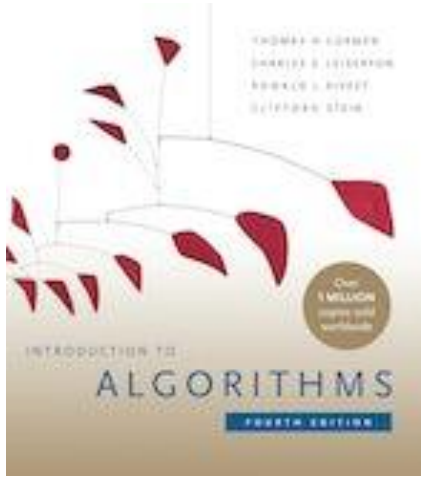
Lijie Chen
Postdoc. at UC Berkeley
Theoretical Computer Science

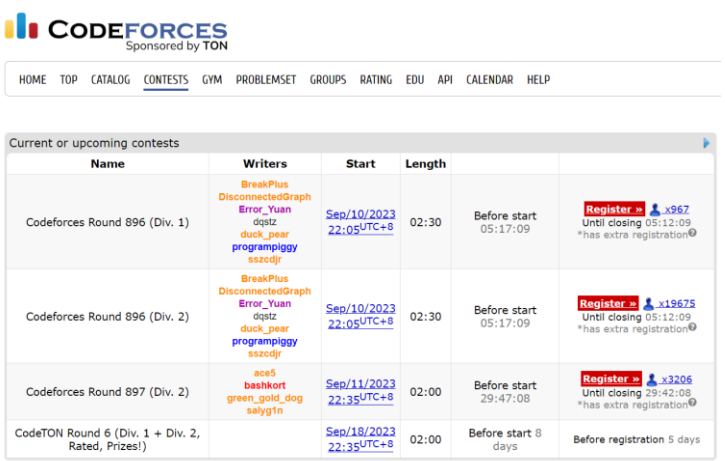


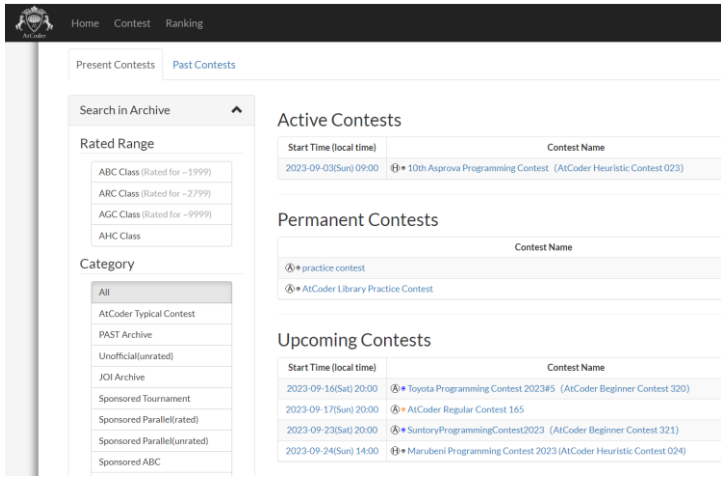
Danqi Chen
Assistant Prof. at Princeton
Natural Language Processing

Beginning

- Exercise on simple problems and contests
  - Codeforces, AtCoder, LeetCode, …
- Learn topics
  - Textbooks, OI Wiki, Online resources (blogs and videos), …







Advancing

- A great amount of problem-solving
- Team training
  - Codeforces Gym
- Participate in online contests
  - Codeforces Div. 3/2/1, AtCoder Beginner/Regular/Grand, …
- It costs most of your weekend and vacation!!
  - My team (2020-2021):
    - 112 sets in 2020, 51 sets in 2021.
    - Solved 1298 problems during the contests, 236 problems after the contests.

Selection Contest

- Sep. 25 (Mon), 19:00 - 20:00 (practice contest)
- Sep. 26 (Tue), 19:00 - 21:30 (real contest)

- We plan to select 3 teams (totally 9 students)
  - (might be adjusted according to the budget and the result of selection contest)
- Only paper materials are allowed!!
- Bring your own laptop with a screen recorder

Eligibility

- You first began post-secondary studies in 2019 or later, OR you were born in 2000 or later
  - (Hence, normally, undergraduate, year-1 postgraduate and some year-2 postgraduate students are eligible.)
- You have competed in regional contests for less than 5 different contest years, and less than 2 World Finals.
- You are able to get the visa to enter Mainland China before the on-site contests.

Weekly Trainings

- 1 or 2 team trainings per weekend
- After that, solve the unsolved problems during the contest
- Personal contests are strongly recommended

- They are not compulsory but if you want to get a good prize in the real contests, you must practice hard.

Contests

- Two regional contests this semester
  - One will be Hong Kong / Macaw Regional Contest
  - The other will be one in mainland China
- Asia East Continent Final (EC Final)
  - If your team is qualified
- World Final
  - If your team is qualified

Q & A

- Registration for selection contest:
  - https://forms.gle/TKmT5w4CGSWwbuz59
- Join our mailing list:
  - https://forms.gle/ri2NBCYYq9ShcUiRA
- Our website:
  - https://i.cs.hku.hk/~provinci/
- Consultation:
  - kuangqipeng@connect.hku.hk