

Introduction to International Collegiate Programming Contest

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Outline

- [Introduction](#)
- [Training](#)
- [HKU Arrangement](#)

International Collegiate Programming Contest

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







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 ($2 \leq n \leq 2\,000$).

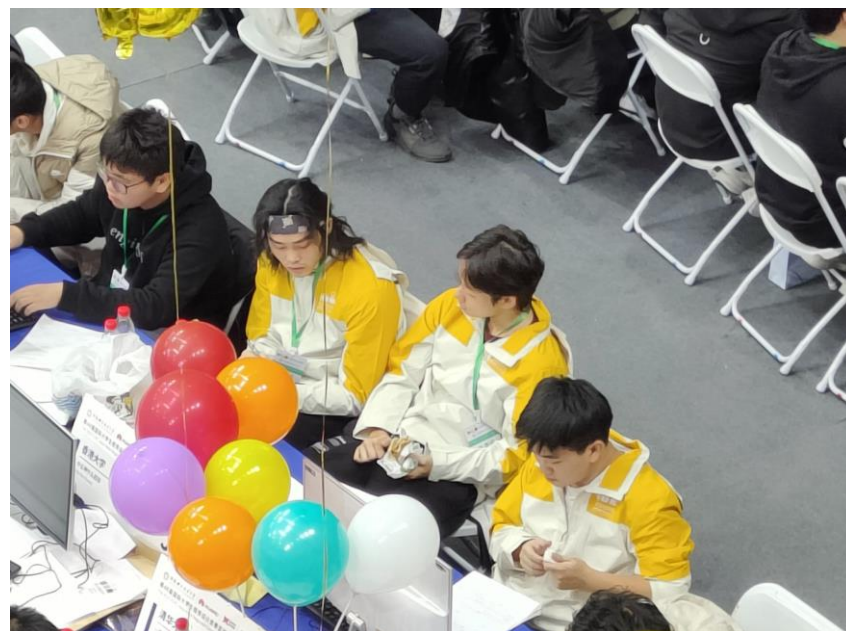
Each of the next $2n - 1$ lines contains two integers u and v ($1 \leq u, v \leq 2n$), representing an edge deleted from the complete graph. It is guaranteed that the given edges form a tree of $2n$ vertices.

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

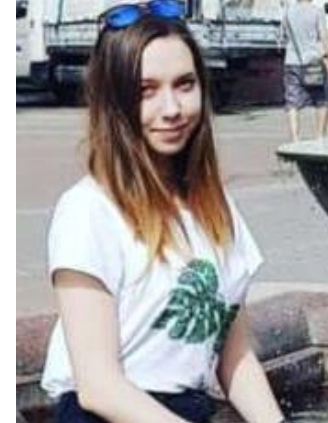
- Free travel
- Become outstanding in courses like Discrete Mathematics, Data Structure and Algorithms...
- Enrich your university life
- Find your interest
- Offer to company
 - Those abilities are important in companies
 - Companies see highly on programming contest participants
- Research
 - Those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



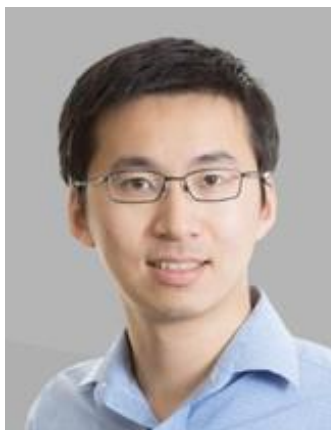
Tiancheng Lou
Co-founder of Pony.ai
(a company for auto driving)



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



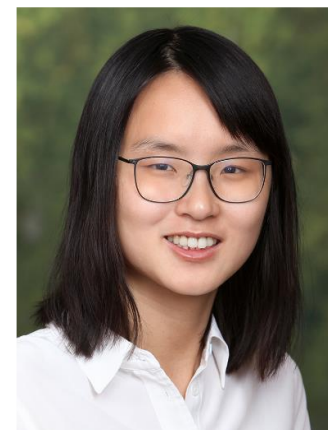
Valeria Ryabchikova
Top Mind in Huawei
(a company for communication)



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



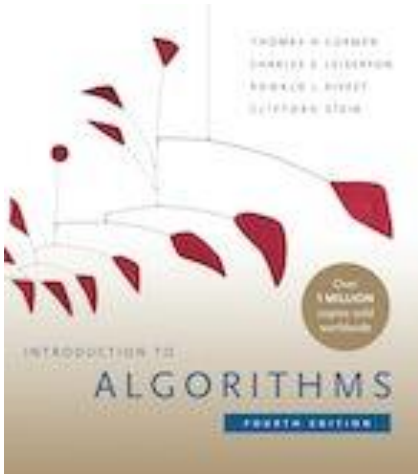
Lijie Chen
Postdoc. at UC Berkeley
Theoretical Computer Science



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), ...



CODEFORCES Sponsored by TON					
HOME TOP CATALOG CONTESTS GYM PROBLEMS SET GROUPS RATING EDU API CALENDAR HELP					
Current or upcoming contests					
Name	Writers	Start	Length		
Codeforces Round 896 (Div. 1)	BreakPlus DisconnectedGraph Error_Yuan dqstz duck_pear programiggy sazcdj	Sep/10/2023 22:05UTC+8	02:30	Before start 05:17:09	Register x967 Until closing 05:12:09 *has extra registration
Codeforces Round 896 (Div. 2)	BreakPlus DisconnectedGraph Error_Yuan dqstz duck_pear programiggy sazcdj	Sep/10/2023 22:05UTC+8	02:30	Before start 05:17:09	Register x19675 Until closing 05:12:09 *has extra registration
Codeforces Round 897 (Div. 2)	ace5 bashkort green_gold_dog salygin	Sep/11/2023 22:35UTC+8	02:00	Before start 29:47:08	Register x3206 Until closing 29:42:08 *has extra registration
CodeTON Round 6 (Div. 1 + Div. 2, Rated, Prizes!)		Sep/18/2023 22:35UTC+8	02:00	Before start 8 days	Before registration 5 days

Home Contest Ranking	
Present Contests	Past Contests
Search in Archive	
Rated Range	
ABC Class (Rated for ~ 1999)	
ARC Class (Rated for ~ 2799)	
AGC Class (Rated for ~ 9999)	
AHC Class	
Category	
All	
AtCoder Typical Contest	
PAST Archive	
Unofficial(unrated)	
JOI Archive	
Sponsored Tournament	
Sponsored Parallel(rated)	
Sponsored Parallel(unrated)	
Sponsored ABC	
Active Contests	
Start Time (local time)	Contest Name
2023-09-03(Sun) 09:00	10th Asprova Programming Contest (AtCoder Heuristic Contest 023)
Permanent Contests	
Contest Name	
practice contest	
AtCoder Library Practice Contest	
Upcoming Contests	
Start Time (local time)	Contest Name
2023-09-16(Sat) 20:00	Toyota Programming Contest 2023#5 (AtCoder Beginner Contest 320)
2023-09-17(Sun) 20:00	AtCoder Regular Contest 165
2023-09-23(Sat) 20:00	Suntory Programming Contest 2023 (AtCoder Beginner Contest 321)
2023-09-24(Sun) 14:00	Marubeni Programming Contest 2023 (AtCoder Heuristic Contest 024)

Welcome to **OI Wiki** ! Watch 200 Stars 16k

Olympiad in Informatics, or **OI**, entered China in 1984, and it is among five major high school academic competitions. Since 1989, a national training team for International Olympiad in Informatics, or IOI, will be selected each year.

International Collegiate Programming Contest, or **ICPC**, is held by ICPC Foundation, and is one of the most influential computing competitions in colleges. There are two parts in ICPC -- Regionals and World Finals respectively. It is also known as ACM competition since this organization sponsored it in the past.

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. 21 (Sat), 19:30 - 20:30 (practice contest)
- Sep. 22 (Sun), 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 2020 or later, OR you were born in 2001 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 can 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
- ACM-HK Programming Contest

Q & A

- Registration for selection contest:
 - <https://forms.gle/19BmwshWJD4HphEn7>
- Join our mailing list:
 - <https://forms.gle/ri2NBCYYq9ShcUiRA>
- Our website:
 - <https://i.cs.hku.hk/~provinci/>
- Consultation:
 - kuangqipeng@connect.hku.hk