Introduction to ACM-ICPC

The University of Hong Kong

Department of Computer Science

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Outline

- Introduction to ACM-ICPC
- Upcoming contests
- Practice and training

Introduction to ACM-ICPC

What is it?

- ACM International Collegiate Programming Contest.
- Official site: https://icpc.baylor.edu/

- The Association for Computing Machinery (ACM) is an international learned society for computing. It is the world's largest scientific and educational computing society.
- You will get free membership for each year you participate in ACM-ICPC.

Basic rules

- Solve about 10 programming tasks in 5 hours.
- 3 members per team.
- 1 computer.
- C++ or Java.

Question style

- Problems are mathematically well-defined, with data range and input/output specifications.
- Example: http://poj.org/problem?id=1001
- No GUI, network etc. are needed. Actually they are not allowed.
- For C++, all you need is iostream and STL.

How is it judged?

- Only source code is submitted and judged.
- Data-based judging. Your source code is compiled and run by the judge. The judge uses a preset dataset as input, and compare your output against the referenced answer.

How is it judged?

- Your solution is judged as correct (AC - Accepted) only if
- It compiles successfully. Otherweise CE - Compile Error.
- It does not crash. Otherwise RE - Runtime Error.
- It uses limited amount of memory. Otherwise MLE - Memory Limit Exceeded.
- It terminates within the time limit. Otherwise TLE - Time Limit Exceeded.
- It outputs all the correct answers. Otherwise WA - Wrong Answer.

An example

- http://poj.org/status

How are teams ranked?

- Teams are firstly ranked according to the number of problems solved, then the total time used.
- The **total time** is the sum of the time consumed for each problem solved. The time consumed for a solved problem is the **time elapsed** from the beginning of the contest to the submittal of the first accepted run plus **20 penalty minutes** for every previously rejected run (Compile Error excluded) for that problem.

Example

- Suppose you have the following submissions:
  - The 12th minute, problem A, correct;
  - The 34th minute, problem B, incorrect;
  - The 56th minute, problem C, incorrect;
  - The 78th minute, problem B, correct;
  - The 90th minute, problem A, incorrect.
- Then your time consumed is 12 for problem A, 78 + 20 * 1 = 98 for problem B and 0 for problem C. Your total time is thus 110.
- Contestants can check ranks **in real time**.
- Example: https://icpc.baylor.edu/scoreboard/

A picture


0:35:09
So far, all accepted solutions for problem E use the easier but slower implementation that runs in n*log n time, said Michal Forisek.

Contest structure

- University selection
  - We will select 3 teams this year.
- Asia regional contests (East Continent sub-region)
  - Our main battle field.
- World finals
  - Top teams in regional contests advance to world finals. About 120 teams in total around the world.

Skills required

- Coding. Implement whatever algorithm you have in mind.
- Algorithm design. Knowledge of classic algorithms and algorithm design techniques. For example, Dijkstra’s algorithm and dynamic programming.
- Programming and debugging onsite under pressure.

Upcoming contests

Contest plan

- We plan to select 3 teams.
- According to ACM-ICPC Regional Contest rules, each team can go to at most 2 regional contests (weekends in Oct and Nov) + EC final (Dec 15-16).
- Usually, a silver medal or above at any regional site can secure a ticket to EC final.
- (We usually depart on Friday and return on Monday by plane.)

Contest plan

- Depending on budget and results of online preliminary contests, each team will go to 1 or 2 regional sites in Hong Kong (CityU), Beijing, Nanjing, and Shenyang.
- EC final: Xi’an.

- Online preliminary contests: Sep 1, Sep 8, Sep 16, Sep 22.
- Everyone is welcomed; top 9 students are encouraged.

Selection contest

- Planned on **September 7 (Fri), 7:00 pm - 9:30 pm**.
  - Individual contest.
  - Rank by ICPC rules.
  - Printed/written notes are allowed.
  - Contest environment: PC^2, https://pc2.ecs.csus.edu/
- Contestants ranking **top 9** will be qualified to participate in regional contests.

- Practice contest: September 6 (Thu), 7:00 pm – 8:00 pm.
  - Not mandatory.

Practice and training

Being self-motivated

- You join us because you are interested in ACM-ICPC, and you can leave at any point if you are not any more.
- We assist you to participate in ACM-ICPC, including organizing online training sessions.
- However, we do not and cannot force you to do anything. You have to be **self-motivated**.

Your benefits

- Opportunity to participate in ACM-ICPC.
- The department appoints a TA (Bintao SUN) for you to consult, regarding the competition and solving programming problems.
- Good prize helps in finding a good job in industry.
- Meet new friends that have the same interest with you.

Practice

- Online judge
- Codeforces: https://codeforces.com/
- Peking University Online Judge (many classic problems, some are a little bit outdated): http://poj.org/
- ACM-ICPC Live Archive (past contest problems): https://icpcarchive.ecs.baylor.edu/
- Etc.

- Virtual judge (DIY contests): https://vjudge.net/

Training plan – this semester

- We organize practice contests regularly, aiming for this year's regional contests.
- Team contest. Follow ICPC rules.
- Problems selected from past regional contests.

- If you are new, you can start from Part 1 in http://i.cs.hku.hk/~provinci/training.html

Training plan – next semester

- Mainly for beginners.
- We collect some online problems to talk about algorithmic topics.

Consultation

- Send me an email if you have any questions about the contest, both technical and non-technical.
- Bintao SUN, btsun@cs.hku.hk

- Appoint with me if you need face to face consultation.

- Our website: https://i.cs.hku.hk/~provinci/

Any questions?