

Introduction to ACM-ICPC and CCPC

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Outline

- Introduction to ACM-ICPC and CCPC
- Selection Contest
- Practice and training

Introduction to ACM-ICPC and CCPC

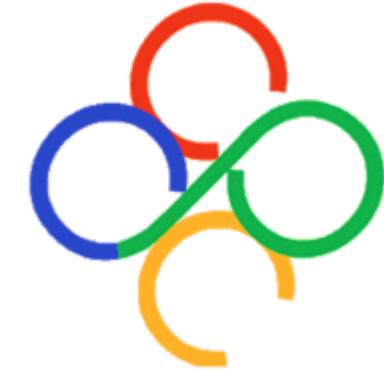
What are they?

- 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.



What are they?

- China Collegiate Programming Contest.
- Official site: <https://ccpc.io/>
- The 1st CCPC was held in 2015.
- HKU Team *GMT+7* ranked 5 in CCPC Final 2018



Basic rules

- Solve 10 to 14 programming tasks in 5 hours.
- 3 members per team.
- 1 computer.
- C++ or Java.

Time Limit: 500MS

Memory Limit: 10000K

Total Submissions: 194564

Accepted: 46622



Question style

- Mathematically well-defined (No Ambiguities)
- Time/Memory limit.
- Data constraints.
- Input/Output specifications.
- No GUI, network knowledge etc. are needed.

Description

Problems involving the computation of exact values of very large magnitude and precision are common. For example, the computation of the national debt is a taxing experience for many computer systems.

This problem requires that you write a program to compute the exact value of R^n where R is a real number ($0.0 < R < 99.999$) and n is an integer such that $0 < n \leq 25$.

Input

The input will consist of a set of pairs of values for R and n . The R value will occupy columns 1 through 6, and the n value will be in columns 8 and 9.

Output

The output will consist of one line for each line of input giving the exact value of R^n . Leading zeros should be suppressed in the output. Insignificant trailing zeros must not be printed. Don't print the decimal point if the result is an integer.

Sample Input

```
95.123 12
0.4321 20
5.1234 15
6.7592 9
98.999 10
1.0100 12
```

Sample Output

```
548815620517731830194541.899025343415715973535967221869852721
.0000000514855464107695612199451127676715483848176020072635120383542976301346240
43992025569.928573701266488041146654993318703707511666295476720493953024
29448126.764121021618164430206909037173276672
90429072743629540498.107596019456651774561044010001
1.126825030131969720661201
```

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; **CE - Compile Error**
- it does not crash; **RE - Runtime Error**
- the memory it requires is within memory limit; **MLE - Memory Limit Exceeded**
- it terminates within the time limit; **TLE - Time Limit Exceeded**
- it outputs all the correct answers. **WA - Wrong Answer**

Example

problems submissions questions scoreboard submit/print docs logout

Tue 28 Oct 2008 09:14:12
time left: 55:16
Auto refresh: 30s (toggle)

Submissions (team deFAULT) show all teams

◀ ▶

time	team	problem	lang	status	verified
2008-10-27 21:35:14	deFAULT	C - Doors and Penguins	cpp	CORRECT	FINAL
2008-10-27 21:34:39	deFAULT	C - Doors and Penguins	cpp	CORRECT	FINAL
2008-10-27 21:20:25	deFAULT	C - Doors and Penguins	cpp	WRONG-ANSWER	FINAL
2008-10-27 21:15:46	deFAULT	C - Doors and Penguins	cpp	WRONG-ANSWER	FINAL
2008-10-27 20:57:29	deFAULT	F - Generic Units Converter	cpp	WRONG-ANSWER	PENDING
2008-10-27 20:56:54	deFAULT	F - Generic Units Converter	cpp	WRONG-ANSWER	PENDING
2008-10-27 20:56:11	deFAULT	F - Generic Units Converter	cpp	WRONG-ANSWER	PENDING
2008-10-27 20:41:35	deFAULT	F - Generic Units Converter	cpp	WRONG-ANSWER	PENDING
2008-10-27 20:20:43	deFAULT	F - Generic Units Converter	cpp	WRONG-ANSWER	PENDING
2008-10-27 19:59:21	deFAULT	F - Generic Units Converter	cpp	TIMELIMIT	PENDING
2008-10-27 19:53:36	deFAULT	F - Generic Units Converter	cpp	TIMELIMIT	PENDING
2008-10-27 19:16:59	deFAULT	G - Zoned Out	cpp	CORRECT	FINAL
2008-10-27 18:55:31	deFAULT	E - Marbles in Three Baskets	cpp	CORRECT	FINAL
2008-10-27 18:35:46	deFAULT	D - Gypsy Moths	cpp	CORRECT	FINAL
2008-10-27 18:32:57	deFAULT	D - Gypsy Moths	cpp	WRONG-ANSWER	FINAL
2008-10-27 18:07:20	deFAULT	E - Marbles in Three Baskets	cpp	TIMELIMIT	FINAL
2008-10-27 17:27:50	deFAULT	E - Marbles in Three Baskets	cpp	TIMELIMIT	FINAL
2008-10-27 16:54:31	deFAULT	H - Shrew-ology	cpp	CORRECT	FINAL
2008-10-27 16:39:10	deFAULT	A - Permutation Recovery	cpp	CORRECT	FINAL

PROBLEM	SCORE
● A - PERMUTATION RECOVERY	1 (19 + 0)
● B - CROSSWORDS INSIDER	0
● C - DOORS AND PENGUINS	3 (314 + 40)
● D - GYPSY MOTHS	2 (135 + 20)
● E - MARBLES IN THREE BASKETS	3 (155 + 40)
● F - GENERIC UNITS CONVERTER	0
○ G - ZONED OUT	1 (176 + 0)
● H - SHREW-LOGY	1 (34 + 0)
SUMMARY	6 / 933

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**.

A picture



So far, all accepted solutions for problem E use the easier but slower implementation that runs in $n \log n$ time, said Michal Forisek. Follow

Contest structure of ICPC

- University selection
 - We will select 3 team this year.
- Regional contests (Asia East Continent sub-region)
 - Our main battlefield.
- World finals
 - Top teams in regional contests advance to world finals. About 140 teams in total around the world.
 - Team “*Will Cyber college students fantasize about Cloud Classroom?*” advances to 45th ICPC World Final Dhaka held on November 6-11, 2022

Skills required

- Coding. Implement whatever algorithms you have in mind.
- Algorithm design.
 - Classic algorithms
 - Data Structures, e.g. Stack/Queue, (persistent) Segment Tree, Link-Cut Tree
 - Graph Algorithms, e.g. Shortest Path, Network Flow, Steiner Tree
 - String Algorithms, Number Theory Algorithms, Geometry Algorithms, etc.
 - Algorithm design techniques like divide-and-conquer, square root decomposition, dynamic programming, efficient search
- Programming and debugging onsite under pressure.

Upcoming contests

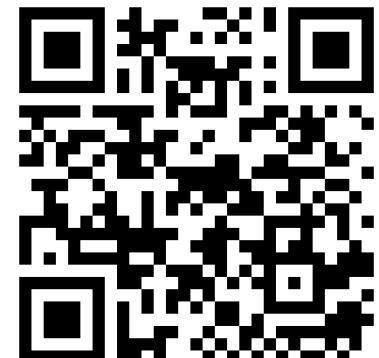
Contest plan

- We plan to select **3** teams.
- ICPC rules: each team can go to at most 2 regional contests
 - Depending on budget and results of online preliminary contests, each team will go to 1 or 2 contests
 - Jinan Regional (online / onsite*, Nov. 26-27, 2022)
 - Hangzhou Regional (online / onsite*, Dec. 3-4, 2022)
 - Nanjing Regional (online / onsite*, Dec. 17-18, 2022)
 - **If available**, 3 teams will participate remotely on one of these sites
 - Hong Kong Regional (**onsite**, Jan. 14-15, 2023)
 - 3 teams will go to Hong Kong Regional

* To Be Determined by corresponding competition committee

Selection Contest

- Planned on **October 7 (Fri), 7:00 pm – 9:30 pm**
 - Individual contest.
 - Rank by ICPC rules.
 - Printed/written notes are allowed.
 - Contest environment: **TBA** (Last year: PC²*)
- Selection:
 - WF 2022 team members (0 – 3 slots)
 - Contestants from selection contest (6 – 9 slots)
 - From above, 9 will be qualified to represent HKU in ICPC competitions
- Practice contest: **October 6 (Thu), 7:00 pm – 8:00 pm**
 - Not mandatory



Registration



Our Website

Practice and training

Being self-motivated

- You can start whenever you want
- You can quit whenever you want
- We assist you to participate in the contests, 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 and CCPC.
 - You can win good medals and take your proud photos!
- The department appoints a TA (Hao XIE) for you to consult, regarding the competition and solving programming problems.
- Experience helps in finding a good job in industry.
- Meet new friends that have the same interest with you.

Practice makes perfect

- Online judge
 - Codeforces: <https://codeforces.com/>
 - Atcoder: <https://atcoder.jp/>
 - TopCoder: <https://www.topcoder.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
- > **Individual/Team Contest** <
- Distribute weekly via team email
- You are also encouraged to participate in the contest held by Codeforces, Atcoder, Topcoder
- If you are new, you can also find some resources in <http://i.cs.hku.hk/~provinci/training.html>

Consultation

- Send me an email if you have any questions about the contest, both technical and non-technical.
- Hao XIE, hxie@connect.hku.hk
- Appoint with me if you need face to face consultation.
- Our website: <https://i.cs.hku.hk/~provinci/>

Any questions?