UKIEPC 2023





Contest Introduction

You may:
- Start an editor of your choice
- Log in to domjudge via browser
  https://ukiepc2023.cloudcontest.org
- Read the domjudge manual
  https://www.domjudge.org/docs/team-manual.pdf

You may **not**:
- open the problem set
- start to code anything

UKIEPC 2023

- Start time is 11am across all sites.
- Questions will become visible on the server as soon as the contest starts.
- Available languages:
  - **Python 3.8 (PyPy 7.3.9)**
  - **Java 17 (OpenJDK 17.0.8.1)**
  - **C++20 (g++ 11.4.0)**
  - **C17 (gcc 11.4.0)**
- There are 14 problems - A-N - They are **not** in difficulty order
  - Read all of the questions!

Rules during contest

- Do not share code or discuss with others until after the contest
- Only 1 computer (1 screen) per team (no phones, tablets etc)

- No searching the web
  - You may only visit the domjudge url.
    - https://ukiepc2023.cloudcontest.org
  - You ***may also*** visit the official documentation listed on this page
    - https://www.domjudge.org/docs/team-manual.pdf
- Written, non-digital, material is allowed
  - You are allowed to use pen and paper, and to print problems or code
  - If you have a TCR, you should **not** use a digital copy to copy+paste.

Judging

- All judging is automated server-side by DOMjudge
  - Don’t print prompts eg. “Enter input:”. Read from standard-in, and print to standard-out.
    - Java files should have a «public static void main()»
    - Java files should not include «package xyz;» commands
  - If in doubt, check the submission page for errors on the sample inputs.
  - The DOMJudge Manual has code samples: https://www.domjudge.org/docs/team-manual.pdf
- Time limits are judged on execution time, not compile time.
  - If your solution fails to compile, the solution will be rejected but we won’t add penalty time.
  - You will be able to see compiler output by clicking on it in the submissions tab.
- Memory limit: 2GiB
  - If you need more than this, you may need to try another approach.

Judgements

COMPILER-ERROR	There was an **error when compiling** your program. On the submission details page you can inspect the exact error. You will not collect any penalty points for this.
TIMELIMIT	Your program **took longer than the maximum allowed time** for this problem; therefore it has been aborted. Your program might hang in a loop, or your algorithm may need to be more efficient.
RUN-ERROR	There was an **error during the execution** of your program. Caused by division by zero, indexing arrays out of bounds, using excessive memory, and so on. Check that your program finishes with exit code 0!
NO-OUTPUT	Your program **did not generate any output**. Check that you write to the standard out.
OUTPUT-LIMIT	Your program generated **more output than the allowed limit**. The output was truncated and considered **incorrect.**
WRONG-ANSWER	The output of your program was **incorrect**.
TOO-LATE	You submitted after **the contest ended**! Your submission is stored but will not be scored.

Scoring

- The team with the most solves and (in case of a tie) lowest time wins!
- Your time for a problem is the time at which you first correctly solved it
  - e.g. 13 for 13 minutes since the competition started
- If your answer is wrong, you get a penalty of 20 minutes / points
  - e.g. 2 wrong submissions on problem X = 40 points
  - Solving at 90 minutes = 90 + 40 = 130 points
  - Penalties are only applied on problems you eventually solve
  - No penalty for code failing to compile

Example

NWERC 2018 — final standings

Filter

RANK	TEAM	SCORE	A	B	C	D	E	F	G	H	I	J	K
1	**Treenity** University of Cambridge	11 1323	170 1 try	103 1 try	56 2 tries	289 3 tries	146 1 try	215 2 tries	77 2 tries	40 1 try	12 1 try	91 1 try	24 1 try
2	**Los Patrons** University of Oxford	10 1145	217 2 tries	38 1 try	85 2 tries	1 try	176 1 try	268 2 tries	157 2 tries	12 1 try	18 1 try	72 1 try	22 1 try
3	**Double Cycle Cover** University of Tartu	10 1470	267 1 try	63 1 try	214 1 try		104 1 try	193 1 try	134 2 tries	35 1 try	12 1 try	280 8 tries	8 1 try
4	**Triniceratops** University of Cambridge	9 788	177 1 try	59 1 try	31 1 try	1 try	159 1 try	6 tries	197 2 tries	6 1 try	10 1 try	93 2 tries	16 1 try
5	**TUMbling** Technische Universitaet Muenchen	9 835	188 1 try	49 1 try	74 2 tries		161 1 try	5 tries	125 1 try	23 1 try	12 1 try	147 2 tries	16 1 try
6	**2 Brits and a Dutchman** University of Oxford	9 1021	297 2 tries	147 2 tries	83 1 try		229 1 try		112 1 try	18 1 try	10 1 try	60 1 try	25 1 try
7	**Q++** Leiden University	9 1185	267 1 try	123 1 try	77 1 try		205 1 try		135 2 tries	39 2 tries	13 1 try	236 2 tries	30 1 try
8	**<(OvO)>** Saarland University	9 1226	293 4 tries	50 1 try	166 1 try		101 3 tries		152 1 try	25 2 tries	8 1 try	209 5 tries	22 1 try
9	**Oxford Ji-geiko** University of Oxford	9 1498	295 1 try	74 2 tries	135 1 try	1 try	281 1 try	1 try	210 3 tries	26 1 try	16 2 tries	180 8 tries	41 2 tries
10	**_=_=>_+_<<_;_(~~{})+[]+(++[[]][+[]]+~[]*~[])** Technische Universitaet Muenchen	8 915		138 1 try	60 1 try		263 3 tries		154 1 try	26 2 tries	23 1 try	117 3 tries	34 1 try
11	**Let's party!** Karlsruhe Institute of Technology (KIT)	8 953	235 1 try	72 1 try	173 5 tries		4 tries		110 2 tries	24 1 try	12 1 try	179 2 tries	28 1 try
12	**The Thorycoders** Universiteit Utrecht	8 961		62 2 tries	179 2 tries		150 1 try		209 1 try	33 2 tries	22 1 try	211 2 tries	15 1 try
13	**incogniTUM** Technische Universitaet Muenchen	8 997	298 3 tries	58 1 try	107 1 try		165 3 tries		207 1 try	32 1 try	15 1 try	3 tries	35 1 try
14	**Me[♠]talci** University of Cambridge	8 1056		148 2 tries	56 1 try		176 2 tries		212 3 tries	36 2 tries	5 1 try	262 3 tries	21 1 try

Balloons!



Some sites (optionally) give out a balloon for each task solved

Questions >> Request Clarification

- All clarifications are handled through DOMjudge
  - Press ‘request clarification’ on the overview page.
  - Enter information.
  - You will receive an answer on the same page within ~15 minutes.
- Global clarifications will be sent through DOMjudge too
  - **You should watch out for these**
  - You will receive a notification in your browser for every new clarification.
- Clarifications will **not** be handled via other means

End of Contest

- The contest scoreboard will freeze during the last hour.
  - You can still see your own results on the submissions page.
- The contest will end automatically after 5 hours.
- Results will be announced shortly afterward.
  - Presented on YouTube Live
- Solutions will also be presented

Final Comments from the Jury

- Example input data is available
  - Download this (rather than type it out by hand)

- You will be able to download the Problem Set and example input data from https://bit.ly/UKIEPC23Downloads



Good luck!

