

ECOO Programming Contest 2021

Procedures, Rules, and Contacts

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1 Purpose

In recognition that the current situation surrounding COVID-19 prevents ECOO from running in its usual fashion for a second year, the ECOO programming contest will be held online. This contest aims to provide computer science students an opportunity to demonstrate their skills and knowledge while representing themselves and their schools against other computer science students in the province.

This contest is designed to provide a manageable challenge to all computer science students in Ontario, regardless of their proficiency in programming.

2 Contest Procedure

2.1 Registration

Registration is open to all students currently enrolled in a secondary school in Ontario, Canada. Competitors must be students of the school in grades nine (9) through twelve (12). Unlike previous years, there is no limit to the number of students who can sign up from each school.

The registration deadline is **April 14, 2021 at 6:00 PM EDT**. Registering before this deadline is important to guarantee participation in the contest. There is no guarantee late registrations will be accepted.

Competitors may register individually or through a teacher. Please note that in either situation, a teacher working for an accredited school in the province of Ontario must confirm the student if the student wins an award. Students who wish to register may do so before the aforementioned deadline at register.ecoo.mcpt.ca.

2.2 Main Contest Information

The 2021 ECOO Programming Contest will be run online on Saturday, May 1st, 2021 from 11:00 AM to 2:00 PM EDT. This contest will consist of six (6) problems which will be accessible online within the three hour time span.

Neither alternative dates nor additional contest time will be provided under *any* circumstances.

Due to logistical issues, teacher supervision is not required during the contest period.

2.2.1 Problem Difficulty

The following outlines the estimated difficulties and requirements for each of the six (6) problems in the main contest.

Problem 1 This problem is fairly straightforward.

Problem 2 This problem may require a combination of loops/conditionals.

Problem 3 Same requirements as Problem 2 but of a higher difficulty.

Problem 4 This problem may require some basic/intermediate algorithms and/or algorithmic thinking.

Problem 5 This problem may require more advanced algorithms and/or more advanced algorithmic thinking.

Problem 6 IOI level problem.

2.3 Practice Contest Information

Students will be able to compete in a practice contest at any point between April 15th, 2021 at 6:00 AM EDT and April 20th, 2021 at 11:00 PM EDT. Students will have a three (3) hour period to solve the problems starting when they join the contest (note that joining the contest after 8:00 PM EDT on April 20th will result in the time being cutoff at 11:00 PM EDT).

The practice contest will consist of six (6) problems and will attempt to mirror the conditions of the main contest.

Participation in the practice contest is not a requirement to participate in the Main Contest described in section 2.2.

2.3.1 Problem Difficulty

The practice contest will be easier than the main contest while retaining the relative difficulties of problems.

2.4 Contest Access

Competitors will access the online judge at judge.ecoo.mcpt.ca. This site will be used for accessing contest problems and submitting solutions. A ranked scoreboard will also be accessible through this website.

In order to familiarize themselves with the online judge, the competitors are highly encouraged to participate in the practice contest.

2.5 Competitors

Competitors must compete **individually**, without assistance from others. Each competitor will receive an account on the online judge which shall be used for the competition.

2.6 Competitor Workstation

Because this contest will be held online, competitors are to compete from home. All devices including, but not limited to, computers, phones, monitors, keyboards, mice, and calculators are allowed during the contest.

Access to the internet is required for participation.

2.7 Languages

The online judge accepts many programming languages including, but not limited to, Java, C, C++, Python 2/3, and Javascript, with a full list of exact runtimes to be made available at judge.ecoo.mcpt.ca/runtimes.

2.8 Submitting

All data must be read from Standard Input and outputted into Standard Output. Individual problem descriptions will describe the format of the input and output data required.

Problems also have specific *time limits* and *memory limits* that cannot be exceeded. These are displayed on individual problem pages and exceeding them means that the test case will be marked wrong, as described below.

After submitting to a problem, results for each of the individual test cases will be displayed. The statuses and their meaning are described below:

- AC **Accepted:** output is correct.
- WA **Wrong Answer:** output is incorrect.
- TLE **Time Limit Exceeded:** the program exceeded the *time limit* and was thus terminated.
- MLE **Memory Limit Exceeded:** the program exceeded the *memory limit* and was thus terminated.
- OLE **Output Limit Exceeded:** the program outputted too much data (specific to each problem, but generally over 256MB) to standard output.
- IR **Invalid Return:** the program returned an error.
- RTE **Runtime Error:** the program exited with an error.
- CE **Compile Error:** the program failed to compile. No test cases were tested.

Additional explanations and examples will be available at judge.ecoo.mcpt.ca/codes.

For every test case that does not receive an “AC” status, the output of the competitor’s program, if any, is also displayed. This can be used to try and debug your program and attempt to correct it for the second submission. It should be noted that the returned data will be truncated to prevent leaking of test data.

Note that unlike previous years, there is no limit to the number of submissions that can be submitted to each problem.

2.9 Scoring

Each submission will be assigned a score based on the number of correct answers achieved by the program, the time of submission, and whether the submission was the first submission or not to the given problem. These three criteria are described in detail below:

Correctness: Each submission will receive a score out of one hundred (100) based on the number of correct (“AC”) cases achieved by the program.

First Submission Bonus: An additional ten (10) points will be granted to a competitor’s first submissions to a problem, assuming it has received a perfect score on Correctness.

Time Bonus: An additional number of points, calculated as the number of minutes left in the contest divided by five (5), rounded down are awarded to submissions with at least one (1) problem point earned.

A competitor’s total score is calculated by summing the highest scoring submission for each problem, if one exists.

2.9.1 Batching

In light of the contest being held online, a batching system will be introduced to some or all of the test data for the problems in both the Practice and Main Contests.

Test data will be split into sections each worth a fraction of the problem’s total point value. All of the test cases in a batch must be passed with the “AC” verdict in order to gain the batch’s point value.

2.9.2 Examples

1. If a team submits to a problem for the first time, twenty-two (22) minutes into a contest and their problem solution is perfect, their final score would be calculated as follows:

$$\frac{10}{10} \times 100 = 100 \text{ for Correctness}$$

$$10 \text{ for First Submission Bonus}$$

$$\lfloor \frac{180-22}{5} \rfloor = 31 \text{ for Time Bonus}$$

$$= \mathbf{141 \text{ Points Total}}$$

2. If a team submits to a problem for the first time, thirty (30) minutes into the contest, and their problem solution fails two test cases out of 10, their final score would be calculated as such:

$$\begin{aligned} \frac{8}{10} \times 100 &= 80 \text{ for Correctness} \\ 0 &\text{ for First Submission Bonus} \\ \lfloor \frac{180-30}{5} \rfloor &= 30 \text{ for Time Bonus} \\ &= \mathbf{110 \text{ Points Total}} \end{aligned}$$

3. If a team submits to a problem for the second time, sixty (60) minutes into the contest, and their problem solution is perfect, their final score would be calculated as such:

$$\begin{aligned} \frac{10}{10} \times 100 &= 100 \text{ for Correctness} \\ 0 &\text{ for First Submission Bonus} \\ \lfloor \frac{180-60}{5} \rfloor &= 24 \text{ for Time Bonus} \\ &= \mathbf{124 \text{ Points Total}} \end{aligned}$$

4. If a team submits to a problem for the second time, thirty (33) minutes into the contest, and their problem solution passes all the test cases in the first batch (worth twenty (20) points) and fails one test case in the second batch (worth eighty (80) points), their final score would be calculated as such:

$$\begin{aligned} \frac{20}{100} \times 100 &= 20 \text{ for Correctness} \\ 0 &\text{ for First Submission Bonus} \\ \lfloor \frac{180-33}{5} \rfloor &= 29 \text{ for Time Bonus} \\ &= \mathbf{49 \text{ Points Total}} \end{aligned}$$

2.10 Scoreboard & Results

The contest scoreboard will be publicly available and continuously updated on the online judge website. It will display the competitor's username along with the score achieved on each problem. This scoreboard will include all competitors in the province.

Thirty (30) minutes prior to the end of the competition, the scoreboard will be frozen.

Once results have been verified and all issues have been investigated, each school board will be ranked **separately**, with the corresponding results being released publicly. This falls in line with contests of previous years, where competitors were competing within their school board and not province wide. It also gives participating school boards the option of providing prizes and other awards to students that rank highly in their community.

Digital participation certificates will also be provided to every competitor after the end of the competition.

2.11 Clarifications

If a competitor believes that there is an issue with a problem, they are to submit a ticket through the judge system. This can be done on the problem page and will be responded to promptly.

If a clarification results in a change to problem data or description, a notice will be posted on the problem page.

This clarification system is **not** to be used for asking for help on the problem solution.

3 Rules

Competitors agree to, and must follow, the rules throughout the competition period. Failure to abide by these rules will result in immediate disqualification. If one has suspicions and/or evidence of cheating, please contact an organizer.

3.1 External Resources

Competitors may use any online or offline resources during the contest. This includes directly using programming templates, algorithms, and other source code directly in one's submission.

3.2 Spam

Excessive submissions to the online judge or attempts made to overwhelm the contest platform will result in immediate disqualification from the contest.

3.3 Reverse Engineering

Attempts made to reverse engineer or gain access in any way to the test data or individual test cases of a problem will result in immediate disqualification from the contest.

3.4 External Communication

External communication with others, regardless of if they are participating in the contest or not, about the contest, is strictly prohibited and will result in immediate disqualification from the contest.

The publishing or discussing of contest problems and/or solutions with others through any form of communication is also strictly prohibited *during* the competition hours.

3.4.1 Examples

The following are **not allowed** in competition:

- Messaging friends on Discord, asking for help solving a problem.
- Posting a contest problem on stackoverflow.com.
- Answering another competitor's request for help on a problem.

Note that this is not an exhaustive list.

4 Contact

For any questions about the ECOO Programming Contest please email ecoo@mcpt.ca. Examples of possible email topics (not an exhaustive list):

- Questions about registration/registration issues.
- Requests for accommodations (efforts for accommodation will be made, given sufficient notice).
- Technical issues regarding the contest and contest platform (except for problem clarifications as described in section 2.11).

5 Websites

The following is a list of websites (and descriptions) that are significant for the 2021 ECOO programming competition:

- ecoocs.org / ecoo.mcpt.ca General contest information including dates, links to other related sites, past contest problems, and this rule document.
- judge.ecoo.mcpt.ca Contest platform. Where problem statements can be accessed and where submissions will be made for both the Practice and Main Contests.
- register.ecoo.mcpt.ca Registration form for the contest.

6 Team

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