The Seventeenth Annual North American Computational Linguistics Open Competition

2023 Student Handbook

Last updated: September 20, 2022
Please check http://www.nacloweb.org for updates and announcements

2023 Contest Dates (USA and Anglophone Canada)*
Open Round: January 26, 2023 / Invitational Round: March 16, 2023

Site registration deadline: January 15, 2023
Student registration deadline: January 23, 2023
Contact nacloinquiries@googlegroups.com if you miss the deadline.
Walk-ins allowed with advance permission of the local site host.

* The dates for the 2023 Francophone contest in Canada will be announced later. Check the OLCF site.
Contact information

If you have questions, contact us at:

nacloinquiries@googlegroups.com

Important Dates

Site registration deadline: January 15, 2023

Student pre-registration deadline: January 23, 2023

Open round date: January 26, 2023

Walk-in students may be accepted by site hosts on contest day, but you must check with the local host to confirm because this practice varies among participating sites.

Invitational round date: March 16, 2023

Contest start times

The starting time varies by time zone. Look for the tables in the body of this document.
SUMMARY: How to register for the North American Computational Linguistics Open competition

If you are a student who is eligible to compete in NACLO (see later in this handbook for eligibility criteria), you may register by following these steps:

1. Go to https://www.nacloweb.org/register_student.php
2. Fill out all required fields and then click “REGISTER AS STUDENT.” Important points:
   a. Make sure to use an email address that you check regularly so that you do not miss important contest information from NACLO.
   b. Make sure to select a site; you will not be able to compete if you do not select a site. If no suitable site is available, see the instructions on the registration form about asking a teacher or staff member to register your high school or homeschool as a site.

ABOUT

Introduction

NACLO (the North American Computational Linguistics Open competition) is a contest for U.S. and Canadian pre-university students in which contestants solve compelling puzzles in linguistics and computational linguistics. Requiring no previous knowledge of linguistics, languages, or computing, these puzzles can be solved by analytical reasoning alone. They serve as a fun and educational introduction to a field to which many high school students have never been introduced. Winners of NACLO are eligible to compete in the International Linguistics Olympiad (IOL), one of about twelve international high school academic Olympiads.

NACLO is targeted at high school students, but many younger students enjoy participating. See below for eligibility requirements.

Contact

This handbook provides answers to most questions related to NACLO. However, if you have any additional
questions, you may reach the NACLO Organizing Committee by sending an email to nacloinquiries@googlegroups.com.

**Contest in Canada**

Canada is represented by two teams at the IOL: An Anglophone team which is selected through NACLO, and a Francophone team which is selected through the Canadian Francophone Linguistic Olympiad (OLCF). Information about the OLCF can be found [here](#).

**Contest Overview**

**Open Round**

The Open Round is open to all interested high school and middle school students; its purpose is to introduce students to the disciplines of linguistics and computational linguistics, as well as to identify the contestants who will advance to the Invitational Round. The open round will be on January 26, 2023.

**Invitational Round**

The purpose of the Invitational Round is to select national winners, who will be eligible to participate in the international competition, the International Linguistics Olympiad (IOL), if they meet IOL eligibility requirements (see relevant section below). Therefore, the problems in this round are harder than the Open Round problems. The invitational round will be on March 16, 2023.

**Contest start times and length**

The Open (First) Round is three hours long. Note that the judges have the authority to lengthen it in the event of unforeseen circumstances. There are two start times for the Open Round, 9:00am Central and 9:00am Pacific.

Sites in the Eastern and Atlantic time zones are expected to compete at the Central time zone starting time, which will be 10:00am in the Eastern time zone and 11:00am in the Atlantic time zone.

Sites in the Mountain, Alaskan, and Hawaiian-Aleutian time zones are expected to compete at the Pacific time zone starting time, which will be 7:00am Hawaiian-Aleutian, 8:00am Alaskan, and 10:00am Mountain.
Because the jury answers clarification questions live during the contest, NACLO cannot be flexible about the contest times. For students who have a conflict, their best chance may be to take the contest with the other set of time zones. For example, a student in the Pacific time zone can start the contest at 7am in order to participate with the Central, Eastern, and Atlantic time zones, but only if their entire site participates at this time or a new site is created by a teacher specially for that student.

The start times shown here are when students can work on the problems. Registration and other administrative activities should be completed earlier. Hosts and participants should arrive at the site 30-45 minutes prior to the designated start time to set up for the contest.

The Invitational (Second) Round will be four hours long. The contest will start at 9 AM local time in all time zones except the Atlantic Time Zone.

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**HOW TO PARTICIPATE**

**University sites**
A number of colleges and universities host the NACLO contest. The list of available university locations is available on the NACLO website. To participate in one of these NACLO sites, please choose the site when you register online.

The site host will contact registered students with directions and other important information about the day of the contest.

Schools that are sending several students to a university site may hire a school bus. If your school is not providing a school bus, you will need to arrange your own transportation with the help of your parents and teachers.

Some universities may use the contest as an opportunity to reach out to students who are interested in studying linguistics or computer science. They may provide information on careers in linguistics and language technologies and how you can study linguistics and language technologies in college.

**High School sites**

Students who cannot or choose not to participate at a university site can participate at their own school if the school is a registered NACLO site.

If your school is not currently a registered NACLO site, please follow the instructions provided below under “High School Locations”. **Please do not register to participate in NACLO at a high school site unless you are enrolled at the school.**

**NACLO Eligibility**

To participate in NACLO, you must satisfy all of the following criteria:

- You have never been enrolled as a full-time college or university student.
- You must be less than 20 years old on the first day of the IOL, whose dates are at [https://ioling.org/upcoming/](https://ioling.org/upcoming/).
- You are a citizen of the US or Canada or a student in a secondary school in the US or Canada.
- You are available to participate in the contest at one of the times it's offered.
- You can either participate in the contest at a registered university site or find a teacher or librarian who can run a high school site as specified elsewhere in this handbook.

**IOL Eligibility**
To be eligible for the Canadian IOL team, you must:

- Be eligible for and participate in NACLO.
- Be a citizen of Canada or a student in a Canadian secondary school, and provide proof if asked.

To be eligible for the US IOL team, you must:

- Be eligible for and participate in NACLO.
- Be a citizen of the US or a student in a US secondary school, and provide proof if asked.

Important: In a given year, you may only attempt to qualify for one national IOL team, per IOL Regulations. You may participate in more than one IOL-qualifying contest, but must declare before each one which national team you intend to qualify for. Therefore, if you are participating in NACLO and an IOL-qualifying contest in any other country (e.g., UKLO in the United Kingdom, OBL in Brazil, etc.) in the current year, you must declare this by emailing nacloinquiries@googlegroups.com prior to the NACLO Open Round (January 26, 2023). If no email is received before this date, you will by default be considered ineligible for both the Anglophone Canadian and US IOL teams.

Important: In the case of a multinational contest, like NACLO, all students must be considered as attempting to qualify for only one national IOL team, and must indicate which beforehand, per IOL Regulations. Therefore, if you are eligible for both the Anglophone Canadian and US IOL teams, according to the criteria above, you must choose one team that you wish to be considered for. You will be considered ineligible for the team you do not choose. To declare your choice, you must email nacloinquiries@googlegroups.com prior to the NACLO Open Round (January 26, 2023). If no email is received before this date, you will be considered by default to have chosen the country which you selected during registration.

High School Locations

More than 100 high schools host NACLO. If your high school is not a registered site but wants to host NACLO 2023, you and your teacher need to register. First, please ask your teacher to read the Coordinator Handbook available at https://www.nacloweb.org/resources/handbook/. Next, your teacher should
register the school [here](#). Then, your teacher should register as a High School Host [here](#). You can register to participate [here](#). For a list of current high school site locations, visit the webpage [here](#).

Do not register for a high school you do not attend without asking that school's site host beforehand.

**Homeschooled Students**

If you are homeschooled (according to the official rules of your state or province), you can still register for NACLO. Ask your parents to follow the instructions in the NACLO Coordinator Handbook.

**BEFORE THE CONTEST**

**Training Sessions**

Some universities or high schools may provide training sessions for students in their area. These are not required for participation in NACLO and not all participating sites provide them. The training sessions may include problem solving practices, an overview of linguistics and computational linguistics, and ideas about careers in linguistics and computational linguistics. Training sessions may be done in the evening at a university or during the school day at your school. If you are near a university that is hosting NACLO, be sure to check their NACLO website or contact the site host to find out whether the site is hosting a training session.

In addition, NACLO is creating and uploading training videos at its [YouTube Channel](#). NACLO also hosted a Math Jam at the Art of Problem Solving ([session transcript](#)) and plans to offer another session this year. Finally, the NACLO website includes [practice problems](#) and [additional resources](#).

**Special Needs**

If you have special needs, please notify the contest organizers at [nacloinquiries@googlegroups.com](mailto:nacloinquiries@googlegroups.com) as soon as possible. You should discuss all your special needs well in advance of the contest, and the NACLO organizing committee will respond to you with details and options specific to your needs.

**What Happens on Contest Day?**

**Students participating at a university**

You should arrive at the university site at least 45 minutes before starting time so that you have time to find the room, check in, use the bathroom, etc. Typically, seating will be 20 minutes before the starting
time, and the rules will be read at 15 minutes before the starting time. The contest booklets will be handed out at the designated starting time, and the facilitator at the university will tell you when to start working on the problems.

**Students participating at a high school**

Your teacher will give you the contest location. Make sure to be there before the starting time. Typically, seating will occur at 20 minutes before the starting time, and the rules will be read at 15 minutes before the starting time. The contest booklets will be handed out at the designated starting time, and your teacher will tell you when to start working on the problems.

**General Contest Rules**

You must submit all your solutions in writing, using a *black pen*, only in the space provided and ensure that your handwriting is legible. The use of a black pen is essential to ensure legible photocopying or scanning of the solutions, which may be done to streamline the grading process.

You are allowed to use extra blank paper; however, there should never be answers to more than one question on a single sheet of paper. Extra paper should be scanned together with the booklet. The answers will be split by problem number and shipped to graders around the world. You should write only on one side of the papers so that these pages can be scanned if needed. Furthermore, you may not take any booklets or scratch paper with you when you leave the site.

You may solve the given problems in any order, and you should try to solve as many problems as possible. You are not penalized for incorrect answers. Some problems (mostly on the Invitational round) may include "practice" (short answer) and "theory" (explanation) questions; the practice sections are worth approximately 60% of the score, and the theory sections are worth approximately 40%. You may receive partial credit for providing an incomplete solution to a problem, and/or partial credit for specific ideas for solving it. Thus, if you have ideas for solving a problem, you should write them even if you have not been able to develop a complete solution. In other words, you should show your work and/or thought process when solving these problems.

Given the large number of expected participants in the first round, most or all of the problems in that round will not require a “theory” part. Instead, the answers will be automatically gradeable. "Blue," “17”, “1A, 2D, 3D, 4E, 5C”, "nihuetzi," and "A>C>G>F>B>E>D" are fine answers. The problem booklets will be designed to include an answer sheet.

**Allowed and disallowed materials**

You should bring your own pens and pencils. You are not allowed to bring your own paper. The facilitators will provide all paper needed.
You must write your solutions in black ink, and you may use pencils only for scratch work. You may use blank paper for scratch work; however, you should copy your final solutions into the spaces provided in the problem booklet, and you may enclose additional sheets only if the space in the booklet is insufficient. Scratch paper is to be handed in with the answer booklet but kept separate from it.

You may not use any electronic devices except basic wristwatches. In particular, you may not use calculators, computers, tablets, cell phones, pagers, or wristwatches with built-in calculators. Attempts to use electronic devices will normally lead to disqualification. If you have any medical electronic devices, required for health reasons, you should let the facilitators know before the contest.

You may not use any written or printed materials such as books or your own notes produced before the contest.

**Conduct during the contest**

You should follow all instructions of the facilitators; if you have questions about the rules or acceptable conduct during the contest, you should raise their hand and ask a facilitator.

You may not talk with anyone except facilitators, and you may not collaborate with other contestants. Attempts to communicate with other contestants will normally lead to disqualification.

Bags should be placed under the seats before the contest, and they may not be used during the contest. If you have brought snacks, these should be placed on the desk before the contest begins.

If you have a cell phone, pager, or any other sound-emitting device in your bag, you should turn it off before the contest. Just switching it to vibrate or silent mode is not sufficient.

You may take bathroom breaks during the contest; however, you may not take your bags, any electronic devices, problem booklets, or your notes with you when temporarily leaving the room. Also, two contestants may not take a bathroom break at the same time.

Unless the local facilitator overrides this rule (e.g., due to university or high school regulations), you may bring a snack into the contest site and eat during the contest, but you should be considerate of others. In particular, you should avoid "noisy" foods, such as foil-wrapped chocolates, and foods with a strong odor. The facilitators have the authority to remove any types of food from the contest site if they feel that these types of food may distract other contestants. Noisy wrappers should be opened before the contest begins.

If you arrive late, you may still participate in the contest; however, you may not ask facilitators to repeat any instructions or announcements that have been missed. Also, you may not ask for time extensions at the end of the contest, which means that you will have less time than the other contestants.

**Questions during the contest**
If you have a question, raise your hand, and one of the facilitators will talk with you. When talking with a facilitator, you should keep your voice low, to make sure that you do not distract other contestants and do not accidentally provide a hint for solving the problem.

If you need a clarification for a specific problem, the facilitator will need to contact the judges via email, which means that an immediate answer may not be available. Please note that local facilitators are unable to answer student questions without contacting the judges. If the judges agree that the problem requires a clarification or correction, they will normally announce it to all site facilitators via email.

If the judges feel that an answer is already contained in the booklet, or that attempting to give you an answer may give someone an unwanted hint, they may refuse to answer the question by telling you that they are unable to answer the question.

**Scoring**

Every problem will be worth a specified number of points; harder problems are generally worth more points.

The judges will score each solution based on its correctness, quality, and clarity, and determine the overall score as the sum of solution scores. The judges will complete the scoring and announce the results (ideally, within three to six weeks after the competition).

*The judges are solely responsible for scoring the solutions, ruling on unforeseen situations, and selecting the winners; their decisions are final.*

**FREQUENTLY ASKED QUESTIONS**

**Can younger students (e.g., middle school students) participate?**

The competition is intended for students in the 13-18 age group. If you are younger than 13, with parental permission, you can also participate. In this case, please do not register online. Instead, ask your parents to contact nacloinquiries@googlegroups.com directly.

**How many problems should I expect?**

Participants should expect 6-9 problems during the Open Round and 8-12 (generally harder) problems in the Invitational Round.

**What problem types should I expect?**
You may encounter the following problem types; however, this list is not exhaustive, and you may also get problems of other types. The problems will contain all information required for solving them, and you do not need any specialized linguistic knowledge.

- **Translation problems:** A problem includes a set of sentences in a foreign language and their translations into English, which may be in order or out of order. Your task is to learn as much as possible from these translations and then translate other given sentences to or from English. Note that the foreign language may have "tricky" structure and grammar. For example, German sentences often end in verbs. Japanese people talk differently about their family and about someone else’s family. Some languages do not use articles or any equivalent of "to be." Others treat animate and inanimate objects differently. Be prepared to figure out these unfamiliar features from the text.

- **Number problems:** A problem includes foreign sentences that describe basic arithmetic facts, such as "six times four is twenty-four," and your task is to figure out how to translate different numbers and expressions. Some languages use bases other than ten; others use different words for the same number depending on the objects being counted, etc.

- **Writing systems:** Your task is to figure out how a particular writing system works and then use it to write out a given text, such as an ancient inscription. Some languages are written right to left or top to bottom, others do not use vowels, etc.

- **Calendar systems:** Your task is to figure out what calendar was used by a particular civilization based on sentences that refer to it.

- **Formal problems:** In this context, "formal" means that you have to build a logical model of a language phenomenon. For example, a transformation rule may say "to convert an active voice sentence to passive voice, make the object of the former sentence the subject of the latter one, convert the verb to passive voice by using an appropriate form of the verb "to be" with the past participle of the verb, and add "by" before the word that was the subject of the former sentence." If we apply this rule to "Maya ate an apple," we get "An apple was eaten by Maya."

- **Phonological problems:** Your task is to figure out the relationship between the sounds of a language and its writing system.

- **Computational problems:** Your task is to develop a procedure to perform a particular linguistic task in a way that can be carried out by a computer.

- **Other types:** Deciphering kinship systems, transcribing spoken dialogue, associating sentences with images, translating unknown languages from scratch, and many other types of problems.

**Where can I find example problems and related reading materials?**

find more than 200+ past problems on the main NACLO website under “Practice Problems.”

You may find past IOL problems by going to [https://ioling.org/problems/](https://ioling.org/problems/).
What knowledge and skills do I need?

You mostly need logical thinking, as well as basic general knowledge, such as about arithmetic and standard calendars. You do not need prior knowledge of linguistics, computer science, programming, or foreign languages.

How many people participate in NACLO?

Recently, 1,700+ students have been participating yearly at 100+ high school sites and about 50 university sites.

What happens if I do well?

If you earn a high score at the Open Round, you will advance to the Invitational Round. You will be notified if you are invited to participate in the Invitational Round. The top-scoring four US students and the top-scoring four Anglophone Canadian students in the Invitational Round will be chosen to represent the United States and Anglophone Canada at the International Linguistics Olympiad provided they meet IOL eligibility requirements (see “IOL eligibility” section on pp. 4-5). Additionally, four more top-scoring US students may be invited as a second team to represent the United States at the IOL. Team members will be expected to participate in weekly online practices from early May to mid-July.

If I advance to the International Linguistics Olympiad, will I have to pay for my trip?

NACLO always tries to raise funds to cover travel expenses so that team members do not need to pay. For the past several years, the US National Science Foundation has paid all the expenses for the two US teams. We also actively engage in fundraising to cover the Anglophone Canadian team. However, we may not always succeed in our fundraising efforts. Therefore, if you are selected for the team (US or Canada), we will inform you about the funding situation and let you know whether you will need to find additional sources of funding.

How well did the United States teams do at the IOL in 2007-2022?

In 2007, the United States participated in the International Linguistics Olympiad for the first time. The top US team tied for first place; furthermore, one of the US contestants, Adam Hesterberg, earned the highest score in the individual contest and won one of two “first diplomas.” In 2008, the top US team tied for first/second place, and the second team tied for third/fourth place. Furthermore, US contestant Hanzhi Zhu received a gold medal. The 2009 team earned a team gold. In 2010, the team earned the most awards ever – a gold medal (Ben Sklaroff), two silvers, three bronzes in the individual contest + the team first place for the highest team score at the individual contest. In 2011, even more awards came the US team’s way, including a gold medal for Morris Alper.

2012 was another very successful year with two US students (Alex Wade and Anderson Wang) getting gold medals, four others getting silver or bronze, and one of the two US teams winning the team contest. In 2013, Alex Wade won a gold medal with the highest score among all participants whereas one of the US teams (Team Red) won the team contest. In 2014, Darryl Wu won an individual gold medal, and USA Red won a team gold medal. In 2015, James Wedgwood, James Bloxham, and Kevin Yang won individual gold medals.
medals. USA Red finished in first place among all teams based on the average score in the individual contest and also finished in second place in the team event. In 2016, US contestant James Wedgwood won a gold medal in the individual round for the second year running and US contestants also scooped three silver medals and two bronze medals. Additionally, USA Red earned the team trophy for the highest combined score on the individual event. Continuing the trend, the teams also won six medals at the 2017 IOL. Brian Xiao of USA Red won a gold medal while silver medals went to three other US contestants and bronze to two other US contestants. In 2018, perhaps the USA’s best-ever year, USA Blue won gold in the team contest and USA Red won silver; four members won individual gold medals, three won silver, and one won bronze. USA Blue came first for combined individual scores. In 2019, two members won gold and five won silver, and USA Red earned the team trophy for combined individual scores. The Olympiad was not held in 2020. In 2021, it was held virtually. One member won gold, four earned bronze, and two earned an honorable mention. USA Red won silver in the team contest and USA Blue earned an honorable mention. In 2022, The US won one gold medal, three silver medals, and one honorable mention. USA Red won the trophy for the team with the highest individual scores. USA Red also won a bronze medal in the team competition.

You may find more information about the results at the International Linguistics Olympiad website and the NSF press releases on the NACLO website.

How well did Canada do at the IOL?

Canada participated in the IOL for the first time in 2011. The team received a bronze medal (Daniel Mitropolsky) in 2011. In 2013, Daniel Lovsted won a bronze medal. In 2014, Daniel Lovsted won an individual gold medal, Yan Huang received a silver medal, Simon Huang won a bronze medal, while the Canadian team finished in second place overall based on the average score in the individual contest. In 2015, Emma McLean received a bronze medal. In 2018, Ken Jiang and Kevin Liang received bronze medals, and Shuli Jones received an honorable mention. In 2019, Ken Jiang won a gold medal, and Tianqi Jiang and Nathan Kim received silver medals. Furthermore, the Canada Anglophone team finished in third place by combined score in the individual contest. In 2021, Kunaal Chandrashekar received a bronze medal and Thomas Frith received an honorable mention. The Canada Anglophone team received a bronze medal in the team contest. In 2022, Kunaal Chandrashekar won a silver medal, and Aidan Wang and Kevin Yan won bronze medals.

You may find more information about the results at https://ioling.org/results/CAN and https://ioling.org/results/CEN.

What if my question was not answered above?

If you have further questions, please contact nacloinquiries@googlegroups.com.
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