

Toronto Metropolitan University

Engineering Competition Fall 2024

Programming Rulebook

1.1 Goal

The goal of the programming category is to encourage engineering students to produce a piece of readable software. The teams will use their software development skills, their technical writing abilities, and their project management skills to design a solution to a posed problem. This solution will then be presented to company executives (judging panel) for approval. The winning solution will not necessarily be the most technically correct but the one that has the most real-world application and is most thoroughly thought out.

1.2 Team Composition

The Programming team will consist of a maximum of four (4) competitors.

1.3 Language

The presentation and any presentation materials must be done in English. However, the language used to create any program is up to the discretion of the competitors as long as it is able to be run and displayed during presentations.

1.4 Topic

The topic will be a real-life problem found in any professional industry which can be solved through the application of programming. The types of industries can include, but are not limited to, finance, health, transportation, manufacturing and construction. Although not completely needed, a team that is formed of students from more than one engineering discipline is advised, as it would help to develop a complete solution.

1.5 Resources

1.5.1 Facilities Required

* One (1) amphitheater (presentation of problem and team presentations)
* One (1) workroom per team (design of solution)

1.5.2 Personnel Required

*1.5.2.1 Judges*

A minimum of three (3) judges (and in any excess, an odd number of judges) are required to assess the problem-solving abilities, proposed solution, communication skills and team dynamics of the competitors. Judges in this category should come from a variety of backgrounds including communications, sales and technical or software engineering experience related to the topic.

*1.5.2.2 Competition Leads*

The Competition Leads are responsible, along with the VP Competitions, for the design and implementation of the Programming competition. The Competition Leads must present the design problem at the beginning of the competition and answer any questions raised by competitors. Only the Competition Leads may answer questions during the design period. The Competition Leads will also answer any questions the judges may have during the competition.

*1.5.2.3 Timekeeper*

The Official Timekeeper must be responsible for enforcing time limits during the question period, solution development and presentations, as stated in the rules.

1.5.3 Equipment Provided By MEC

The following equipment will be made available to all competitors during the competition time period:

*1.5.3.1 During the design phase*

* A design room with at least one (1) table, four (4) chairs and a whiteboard or blackboard
* Internet connectivity
* Information relevant to the design problem, at the discretion of the Competition Leads

*1.5.3.2 During the presentation*

* One (1) digital projector
* One (1) computer containing the team’s presentation file
* Whiteboard(s) or blackboard(s)

1.5.4 External Resources Allowed

The competitors are allowed to use the following equipment:

* Any background research conducted by team members prior to the competition
* Any electronic material stored on CDs, USB keys, disks or other storage devices
  + Please make sure with the Programming Coordinator that the format of any electronic information will be accessible using the equipment used by MEC
* Any textbooks, course notes or other reference material
* Each team member is allowed to use one computer

1.5.5 Software resources

It is expected that the teams participating in this competition have adequate knowledge in choosing the best tools to solve the given problem. The MEC will not place any restrictions on what languages are to be used for the competition.

1.5.6 Plagiarism

Since the use of the Internet and other external resources is permitted in this competition, all information used by competitors must be referenced very carefully. Competitors are not permitted to submit work completed by anyone other than the members of their team. If they decide to recycle their own or someone else's code it must be clearly cited in the presentation. In addition, the competitors also need to clearly explain why and where the recycled code was used in their software. The judges hold the right to ask any team member to describe what a particular section of the code does at any given point during the presentation. If there is any evidence that competitors are submitting plagiarized work, the entire team will be eliminated from the competition. Competitors are expected to act in good faith with the spirit of the competition.

1.6 Procedure/Timeline

1.6.1 Pre-Competition

Prior to the competition, information about the rules of the competition will be available on the competition website, metengcomp.com.

1.6.2 Competition

*1.6.2.1 Problem presentation*

The problem must be presented to all competitors and judges at the beginning of the competition. The competition coordinator(s) must provide detailed explanations of what is expected from the competitors, both orally and in writing.

*1.6.2.2 Question period*

Competitors then have fifteen (15) minutes to ask the competition director(s) any questions. Only the time used to ask the questions (not the answers) should be counted in the fifteen (15) minutes. Time used by judges to pose questions will not be counted.

*1.6.2.3 Solution development*

Teams will be given six (6) to eight (8) hours (at the discretion of the organizers, length to be given to competitors at least seven days in advance) to develop their solutions, produce all required deliverables, and prepare their presentations. All deliverables shall be submitted prior to the end of the provided time.

*1.6.2.4 Rest period*

Competitors must be allowed a minimum of one (1) hour to rest before the presentation phase starts.

*1.6.2.5 Solution Presentations*

Competitors will have a maximum of twenty (20) minutes to present their solutions. All team members must be present and participate in the presentation or be penalized by the judges. Judges then have a maximum of ten (10) minutes to ask questions. Judges can ask a question at any time during the presentation. The clock must be stopped during these interruptions. In order to ensure that all competitors stop working on the case solutions once the design time has ended, the competitors cannot include any material in their oral presentation which is not included within their submitted written reports or presentation materials.

1.6.3 Timekeeping

The following rules will be adhered to with respect to timekeeping.

*1.6.3.1 During the design phase*

* Time is started when the teams arrive at their respective workstations
* The time remaining in the competition must be announced at three (3) hours, one (1) hour, thirty (30) minutes and ten (10) minutes before the end of the competition.

*1.6.3.2 During the presentation*

* Time is stopped when a judge asks a question during the presentation.
* Time is stopped when a team member answers a question asked by a judge.
* The remaining time must be indicated to the competitors 10 minutes, 5 minutes and 1 minute before the end of the allotted time for the presentation to the judges.
* A countdown presentation that is visible to both the judges and presenters must be given during the last 30 seconds of the presentation.

1.6.4 Presentation order

* Presentation order will be determined randomly
* Presentation order will be announced thirty (30) minutes before the

presentations commence. All teams are required to be present at this

announcement

* Teams are not allowed to switch places in the presentation order
* Teams may not be in the audience for presentations of their competition until after they have completed their presentation. Any attempts at entering the presentation room before their allotted time will result in a warning for a first offense, and a ten (10) point penalty for any further offense

1.6.5 Deliverables

*1.6.5.1 For competitors*

Prior to the competition, information about the rules of the competition and the abstract will be available on the competition website, metengcomp.com.

At the competition briefing, each team will receive: a link to an online repository (e.g. hosted on Github, Bitbucket, or Gitlab) that will contain a package describing the problem definition, the design and presentation requirements, the rules, marking scheme and any other information deemed necessary by the competition director(s). Team members only have the right to download/clone the repository on their personal laptop; they are not allowed to add a branch to the repository.

*1.6.5.2 From competitors*

Each team is required to electronically submit all deliverables outlined by the problem, before the end of the design period. This must include the code which will be used to evaluate the team’s solution and their presentation. Only the code provided to the Programming Coordinator(s) will be used for evaluation.

1.6.6 Response to Questions

* Only the competition coordinator(s) may answer questions during the problem presentation and design phases. Volunteers and judges may not answer questions regarding rules and procedures at any time.
* During the presentation of the problem, the competition coordinator(s) shall answer orally and write down the answers provided.
* During the design phase, only questions related to deliverable content shall be answered. No answers shall be provided in response to questions about the problem that might lead to the development of a new approach or which might invalidate a solution.
* During the design phase, answers to questions shall be provided in writing to all teams at the same time. Fifteen (15) minutes may be allowed to elapse for a significant number of questions accumulated before responses are provided. A copy of the responses must be provided to the judges prior to the presentations.

1.7 Assessment and Judging

* The panel must have an odd number of judges and at least three (3) judges.
* The presentations shall be carried out without an audience.
* Feedback forms shall be provided to each team following the announcement of winners, but prior to the end of MEC

1.7.1 Judging Matrix

| **Programming Judging Matrix** | | |
| --- | --- | --- |
| Strategy/Algorithm | Simplicity | /10 |
| Ingenuity | /10 |
| Ability to Achieve Desired Outcome | /15 |
| **/35** | | |
| Code | Structure | /10 |
| Consistency | /5 |
| Readability | /10 |
| Efficiency | /10 |
| **/35** | | |
| Resource Management | Memory Usage Efficiency | /5 |
| Program’s CPU Usage | /5 |
| **/10** | | |
| Presentation | Design Process and Justification | /7 |
| Design Critique | /4 |
| Voice, Articulation and Timing | /4 |
| Visual Aids | /2 |
| Response to Questions | /3 |
| **/20** | | |
| Deduction Total |  |  |
|  | | |
| **Total /100** | | |

1.7.2 Penalty Matrix

| **Point Penalties** | |
| --- | --- |
| Plagiarism | Elimination |
| Insufficient Citation | -50 |
| Documents Received After Deadline | -50 |
| Absent Team Member | -25 |
| Entering presentation room before allotted time (after first offense) | -10 |
| **Total** |  |