


# MCM-ICM: Procedures and Tips for a Great Experience

## Introduction

The purpose of this article is to assist and guide students and advisors participating in *The Mathematical Contest in Modeling (MCM)* and *The Interdisciplinary Contest in Modeling (ICM)*. In the article, COMAP, provides information about the administration of the contests, as well as tips to ensure your contest experience is smooth, satisfying, and enjoyable. The article is broken up into three sections.

- **Before the Contest** – Covers contest prep and registration.
- **Contest** – Covers common mistakes made by teams and advisors during the contest.
- **After the Contest** – Results and common post contest questions.

Look for  which indicates an important contest tip.

## Before the Contest

*The Mathematical Contest in Modeling (MCM)* and *The Interdisciplinary Contest in Modeling (ICM)* are international contests open to all undergraduate and high school students. Individuals with a Bachelor's degree or above are not allowed.

The MCM/ICM are true team competitions. Each team may consist of one, two, or three (maximum allowed) students. Historically, the best teams have three members. All students on the team **MUST** be enrolled at the same institution at the start of the contest; COMAP will make no exceptions to this rule. Having a math major on your team is not required, and student team members may be from any field of study. After you have created your team, the next step is to choose an advisor.

Any faculty, staff member, or student at your institution can fulfill the role of Advisor. The advisor will act as the main point of contact for the team, and does not have to be from the mathematics department. We do however encourage faculty members to serve as team advisors.

Teams and Advisors are encouraged to prepare for the contest by viewing the previous year's problems and solutions. You can find these problems and solutions, as well as relevant contest articles at [www.mathmodels.org](http://www.mathmodels.org). The problems are free to view, and the solutions and articles are available to mathmodels.org members.



### Contest Tip

Look at problems from previous years to understand the choices you will have when the contest begins. Understand the general differences between MCM and ICM problems, both in terms of the mathematics involved and the topics addressed (MCM: discrete, continuous, data insights; ICM: operations research/network sciences, environmental sciences, policy).

**Registration.** Teams must register via the contest website prior to the contests' beginning. The first step in the process is to pay the \$100 registration fee. After we receive approval from your financial institution, the system will issue a control number for your team. Your team is not officially registered until you have received a team **control number**.

**Be sure to print the page that displays your team's control number, as this page lists the email address and password that you entered when registering.** You will need this information later to complete the contest procedures. Additionally, this is your transaction receipt. You will **NOT** receive an email confirmation of your registration.



### Contest Tip

Be sure to print or save a copy of your team's receipt with your control number, as you will not be given another opportunity to do so. Team Number and Control number are the same. Example 1900000.

## The Contest

The contest problems will become available precisely at 5PM EST on the starting day of the contest. Team members can view the problems by visiting <http://www.comap.com/undergraduate/contests/mcm>.

The contest problems will become available on these mirror sites precisely at 4:50PM EST on the starting day of the contest

<http://www.comap-math.com/mcm/index.html>

<http://www.mathismore.net/mcm/index.html>

<http://www.mathportals.com/mcm/index.html>

<http://www.immchallenge.org/mcm/index.html>

No password will be needed to view the problems; simply go to any of the contest web sites after the starting time of the contest and you will see a link to view the problems. If you cannot access any of the sites, there may be a problem with your local Internet connection. We highly recommended that you bookmark or save the list of mirror sites above for later reference.



#### Contest Tip

The contest problems go live on the mirror sites 10 minutes before the main COMAP website. Access to these mirror sites maybe more responsive as they may have less traffic.

**Problem Choice.** The contest problem page will contain a link to a zip file that contains a folder of 3 MCM problems and 3 ICM problems. Teams are free to choose from any one of the six problems, but should submit a solution to only one problem. Any relevant data files or support materials will be included in the problem folder. Each of the six problems is categorized as shown below:

- **MCM Problem A (continuous)**
- **MCM Problem B (discrete)**
- **MCM Problem C (data insights)**
- **ICM Problem D (operations research/network science)**
- **ICM Problem E (environmental science)**
- **ICM Problem F (policy)**



#### Contest Tip

Be sure to read the problem statements carefully before choosing your team's problem. Each problem will have different and specific requirements, such as required memos or letters, specific solution format, and/or page limits.

**Contest Assistance.** Team members may **NOT** seek help from or discuss the problem with their advisor or anyone else, except other members of the same team. Input, in any form, from anyone other than your own team members is strictly forbidden. This includes, but is not limited to, any communication in the form of: email, telephone contact, electronic messaging, personal conversation, communication via web chat or interactive discussion groups, and any other question-answer systems.

**Problem Notes and Updates** can be found on the MCM/ICM problem page throughout the contest period. If you still have a question that is not covered on the website you can send an email to [mcm@comap.com](mailto:mcm@comap.com). **Be sure to include the team number with your correspondence.**



#### Contest Tip

Be sure to check the website for any updates during the contest. COMAP will update the website with any updated contest information which may include problem specific updates.

**Solutions/Submissions.** Papers including the Summary page must be in English, typed in a readable font of **at least 12-point type**, and must use either US Letter or A4 page size. The solution must consist entirely of written text, and possibly figures, charts, or other written

material only. No non-paper support materials such as computer files or software will be accepted.

The Solution Paper must display the team control number and the page number at the top of every page; for example, use the following page header on each page:

Team # 321

Page 6 of 13



**Contest Tip**

Be sure to carefully check your team number as it is not uncommon to mistype or transpose a number.

The names of the student team members, advisor, or institution should **NOT** appear on any page of the electronic solution. The solution should **NOT** contain any identifying information other than the team control number.



**Contest Tip**

Do not include any type of team identification such as student names, institution name or geographical region. If you are required to include a letter with your submission, be sure not to sign the letter with your name. If you feel as though you need to have a formal closing to such a letter we suggest using: Sincerely, Team #321.

Each team is required to submit an electronic copy of its solution paper by email to [solutions@comap.com](mailto:solutions@comap.com). COMAP will accept only an **Adobe PDF** of your solution. Any team member or the advisor may submit this email.

- In the subject line of your email write: Your team's control number. For example:  
Subject: **1900000**
- Use your team's control number as the name of your file attachments. For example:  
**1900000.pdf**



**Contest Tip**

Be sure to name your file carefully and check your team number, as it is not uncommon to mistype or transpose a number.

- COMAP will only accept an **Adobe PDF** file of your solution. **DO NOT** include your Control Sheet, programs or software with your email as they will not be used in the judging process. Limit one team's solution per email. Your team's summary should be included as the first page of your file and NOT in a separate second file. **\*Note: The attachment must be less than 17MB!! Do not use a cloud service such as Google Docs. Your email must contain an Adobe PDF or Microsoft Word attachment.**



#### Contest Tip

**EMAIL SOLUTION SUBMISSION:** Be sure NOT to use a cloud service such as Google Docs your email must contain an Adobe PDF or Microsoft Word attachment. Email checklist:

- ☐ Email subject is correct (Team #)
- ☐ Attachment (one file) is named correctly (Team #) and attached to the email.
- ☐ The “to” address field is correct ([solutions@comap.com](mailto:solutions@comap.com)).

Each team member must sign the Control Sheet to pledge that he or she abided by the contest rules and instructions.

- **Send the signed Control Sheet by email to COMAP:**

After the signed control sheet is prepared, email it to: [forms@comap.com](mailto:forms@comap.com). In the subject line of your email write: Your team's control number. For example: **1900000**. COMAP will accept only an Adobe PDF or a Photo Image of your control sheet. Limit one control sheet per email. Teams may take pictures of the signed control sheet with a phone or digital camera and then email the images to [forms@comap.com](mailto:forms@comap.com). **\*Note: The attachment must be less than 17MB!! Do not use a cloud service such as Google Docs your email must contain an Adobe PDF or Microsoft Word attachment.**



#### Contest Tip

**EMAIL CONTROL SHEET SUBMISSION:** Be sure not to use a cloud service such as Google Docs your email must contain a physical Adobe PDF or Photo attachment. Email checklist:

- ☐ Email subject is correct (Team #)
- ☐ Attachments are named correctly (Team #) and attached to the email
- ☐ The “To” address field is correct ([forms@comap.com](mailto:forms@comap.com)).

## After the Contest

We recommend that you login to the contest web site using the **Advisor Login** link to verify that your team's Electronic Solution was received at COMAP.

#### Contest Tip

Electronic Solutions status will be updated after the contest deadline has past. In most cases solution status will be updated 24-48 hours after the contest is over.

<b>Electronic Solution Received:</b> Received	<b>Final Designation:</b> (unavailable)
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If after 48 hours your team solution shows as (*not yet received*), that indicates that we did not receive an email submission from your team. Contact us via email with your team number.

<b>Electronic Solution Received:</b> <i>(not yet received)</i>	<b>Final Designation:</b> <i>(unavailable)</i>
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**Judging.** Judging will be completed in March-April and the results will be posted on or before April 30th each year. The Solution Papers will be recognized as Disqualified, Unsuccessful, Successful Participant, Honorable Mention, Meritorious, Finalist, or Outstanding Winner.

**Disqualified** - The team's report was found to be in violation of the contest rules.

**Unsuccessful Participant** - The team's report did not adequately respond to the requirements of the contest problem.

**Successful Participant** - The report responded to the requirements of the contest problem and communicated those results to the judges.

**Honorable Mention** - The team's report contained elements that were judged to contain above average progress in modeling and problem solving.

**Meritorious** - The team's report was judged to be excellent in many aspects of modeling and problem solving. The report showed elements of modeling, problem solving, and communication that are exemplary for the scope of the contest.

**Finalist** - The designation Finalist recognizes those reports at a level of excellence that qualified them for the final round of judging. Reports reaching the final round of judging constitute at most two percent of all reports.

**Outstanding Winner** - The team's report was judged to be at the highest level relative to the contest submissions in terms of modeling, solving the contest problem, and communicating the solution. These reports are generally published and used as examples of outstanding student work.

When the results are available you can login to the contest web site using the **Advisor Login** link to verify your team's Final Designation.

<b>Electronic Solution Received:</b> Received	<b>Final Designation:</b> Successful Participant
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Contest submissions cannot be re-judged. All contest papers go through a rigorous judging process and COMAP stands behind the designations awarded to papers. We do suggest that you review the outstanding papers and read the judges commentary for insights into the quality of the content and presentation of the best papers.



#### Contest Tip

Papers cannot be rejudged for any reason, but you do have the option to request a Judge's Commentary written specifically about your team's paper. You can request this service after the contest results have been announced via the website.

Once the results are made public on the website, PDF certificates will be available for download. The spelling and order of the student names on the certificate is input by your team advisor and COMAP does not change or edit this information.



**Contest Tip**

The order of the student names has no bearing or importance on participation. In the eyes of COMAP and the contest directors, all team members are equal. Advisors should ensure they spell team members' names correctly when registering.

If you find that there is an error with your certificate email COMAP with your team number, the error and the correction. We will only correct spelling errors and typos. We will not change any other information.