

Perspectives on Student's Mathematical
Approaches for the “B Problem” (Discrete)
of COMAP's
Mathematical Modeling Contest

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Abstract

COMAP's Mathematical Contest in Modeling (MCM) always includes a problem focused on discrete mathematics — the “B Problem.” After summarizing recent contest problems, we will discuss student approaches that have been used and offer insights from Final Judges.



The poster features a yellow background with a black dragon illustration. At the top, the CMAA logo is visible. The text reads: "2020 MCM/ICM Call for Entries February 13-17, 2020". Below the dragon is the website "www.mcmcontest.com".

The MCM and ICM Contests are Sponsored by:

- The American Mathematical Society
- The Institute for Operations Research and the Management Sciences
- The American Statistical Association
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Recent B Problems

2019

Send in the Drones

2017

Merge After Toll

2015

Searching for a Lost Plane

2013

Water, Water, Everywhere

2018

How Many Languages?

2016*

Space Junk

2014

College Coaching Legends

2012

Camping along the BL River

Complete Contest Problem & Results Matrix: 1985–2019

Main Student Approaches

The Main Student Tools

- Explicit Discrete/Combinatorial Model
- An Algorithm Developed for the Problem
- Simulations to Generate Results

The B Problem Paper

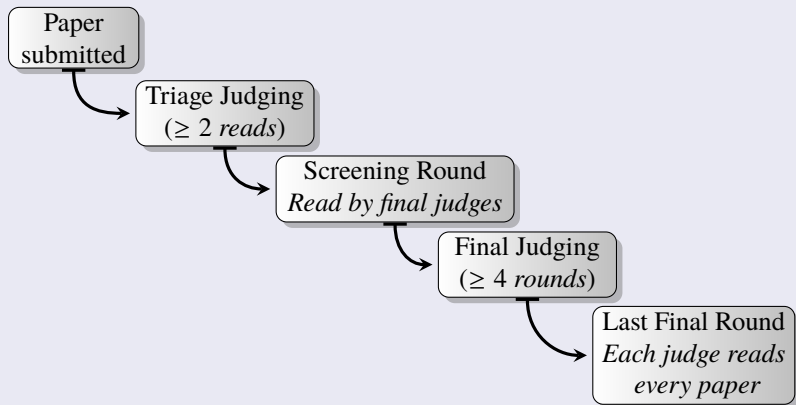
The Standard Structure of a B Problem Paper

- Executive Summary
- Background
- Assumptions with Justifications
- Narrative
 - Model / Algorithm / Simulation
 - Results
 - Sensitivity Analysis
 - Strengths & Weaknesses
- One or two page summary of results for lay-audience
(*often required in a specific format*)
- References

COMAP's "Contest Instructions" has links to \LaTeX and MS Word templates.

Judging the B Problem

Paper Flow



Judging is not *grading*, it's *ranking* (\approx a distributed bucket sort).
If you'd like to be an MCM Triage judge, please contact me.

Judges' List of Critical Paper Parts

The Top Scoring Papers have:

- 1 A well-written Executive Summary with **specific results**
- 2 Assumptions that are clearly stated with **justifications**
- 3 The Narrative . . .
 - 1 shows **development** of the model/algorithm/simulation
 - 2 provides model analysis
 - 3 includes **sensitivity analysis** of important parameters
 - 4 identifies the model's strengths & weaknesses
- 4 Typically requires a “Short Report to Lay-Person” (1-2 pg)
- 5 Relevant references with **proper attribution** throughout
- 6 *Good writing!*

The UMAP Journal has judge's commentaries & outstanding papers

A Commercial

MCM 2019 is February 13-17, 2020

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