

2024 MidMCM

Problem C: The Modeling Musical Tour

Note: Only teams with all members younger than 14 ½ years old may choose Problem C.



Taylor Swift will be wrapping up her record-breaking Eras Tour in December. In total, the tour schedule included 152 shows that each run around 3.5 hours long. For the US shows, approximately 72,000 fans attend each concert bringing in \$13 million per show. This made the Eras tour the first concert tour to earn over \$1billion. However, getting a ticket to a concert has been no easy feat for many fans. Tickets can be thousands of dollars and sell out quickly. Taylor Swift has also made headlines for being incredibly generous with the members of her team – giving significant bonuses to band members, dancers, lighting and sound technicians, caterers, truck drivers, and other crew members. However, not all musical performers’ tours are as extreme as The Eras Tour.

You are a tour manager at MidMCM Music Agency. A musical performer of your choice (it could be an individual performer like Taylor Swift, a group like iKON, etc.) has approached you to help them plan their next tour. Your team needs to analyze the musical performer’s past tours to develop a model to help plan their next tour.

Requirements

1. **Get Started.** Familiarize yourself with a musical performer and their touring history.
 - a. Choose a musical performer that has had a concert tour in the past.
 - i. Why did they go on tour?
 - ii. How long is a tour?
 - iii. How many shows are in a tour?
 - iv. Where did they go on tour?
 - b. Investigate one of the musical performer’s past tours to identify the factors that should go into planning a tour. Some things to consider:
 - i. What factors need to be considered to run a single show on a tour?
 - ii. What factors need to be considered when planning multiple shows for a tour?
 - iii. What makes a successful music tour?

2. **Create your model.** Develop a model to help plan a tour for the musical performer.
(*Reminder: You can make Assumptions about any information you think you need and can not find.*)
 - a. Some things you may consider include, but are not limited to:
 - i. Number of Concerts
 - ii. Venues
 - iii. Ticket Prices
 - b. What will be the “best” plan for the performer to meet their goals for the tour?
 - i. Maximizing fan attendance?
 - ii. Maximize venues?
 - iii. Maximizing profits?
 - iv. Something else?
3. **Apply your model.** Analyze the past and plan for the future.
 - a. Use your model to analyze the past tour you investigated.
 - i. Identify the strengths and weaknesses of their tour.
 - ii. Was the tour an overall success or failure?
 - b. Use your model to help plan a future tour for the musical performer.
 - i. What aspects of a future tour can your model help with?
 - ii. What does your model suggest the performer should do on a future tour?
4. **Share your model.** Write a one- to two- page letter to the musical performer that describes a possible new tour that your model has helped plan. Explain why this tour will best meet the goals of going on tour for the musical performer.
5. **Reflect.** How might you be able to use your model to help plan a tour for another musical performer? Will it work for every performer?

Your PDF solution of no more than 25 total pages should include:

- One-page Summary Sheet.
- Table of Contents.
- Your complete solution.
- One- to two-page letter.
- References list.
- [AI Use Report](#) (If used does not count toward the 25-page limit.)

There is no specific required minimum page length for a complete MidMCM submission. You may use up to 25 total pages for all your solution work and any additional information you want to include (for example: drawings, diagrams, calculations, tables). Partial solutions are accepted. We permit the careful use of AI such as ChatGPT, although it is not necessary to create a solution to this problem. If you choose to utilize a generative AI, you must follow the [COMAP AI use policy](#). This will result in an additional AI use report that you must add to the back of your solution file, and does not count toward the 25 total page limit for your solution.

[NEW HiMCM/MidMCM: Online Submission Process](#)

The purpose of this article is to assist and guide students and advisors participating in HiMCM/MidMCM. In the article, COMAP, provides information about the new online submission process using the new online submission page <https://forms.comap.org/242386224483964>. You will need your team's control number, advisor id number and your problem choice to complete your submission.

Glossary

Assumptions: hypotheses or educated guesses that take the place of an unknown or uncertain piece of information.

Guidance for MidMCM

COMAP has a Judges' [Commentary article along with the Outstanding papers from the 2022 MidMCM contest available](#). The commentary article provides guidance to both advisors and students. We also provide the following general guidance about MidMCM submission organization.

Solutions must be in PDF format and submitted in one PDF document. This does not preclude MidMCM teams from doing mathematics, graphs, tables, sketches, etc. by hand and including pictures of their work in the single PDF document submission. As students move to high school and the HiMCM, we expect that submissions will be typed. For the MidMCM, advisors may technically assist students in putting their solution components into one PDF format file for submission.

As with HiMCM, there is a 25-page limit for the submission document. This does not mean your solution must be 25 pages. A shorter submission is certainly acceptable. All portions of your submission (text, graphs, tables, charts, pictures, etc.) must be within **one** PDF document that is 25 pages or less. We accept partial solutions. Then, if you have utilized any artificial intelligence programs, such as ChatGPT, you will append an [AI Use Report](#) after your solution – that report does not count towards the 25-page limit on the solution portion of your PDF.

In general, a complete solution submission is organized as follows:

Executive Summary – Write this summary after you have done all your work. This one-page summary is Page #1 of your solution document. It provides an overview of your work and includes actual results.

Table of Contents – List the major items in your solution document to show the organization of your paper.

Introduction and Restatement of the Problem – Introduce the problem. Restate the problem and requirements in your own words.

Assumptions with Justifications – State any assumptions you made to simplify and solve the problem and state why you made those assumptions.

Variable Definitions – Define any variables you use in your model and equations.

Presentation of Model and Solution – Ensure you address all requirements and describe what you are doing in solving the problem. Show and explain all your work. Use representations that help you tell the reader how you solved the problem (for example: equations, tables, graphs, pictures, etc.).

Analysis of Your Work – Address any strengths (good points) and limitations (weaknesses) of your model and solution.

Concluding Paragraph – End your solution paper with a final concluding paragraph that summarizes your results and/or makes recommendations for future work.

Reference List – List any sources that you used to solve the problem (for example, website pages, newspaper or magazine articles, etc.).

AI Use Report – This only applies if you used generative AI systems such as ChatGPT. Follow the guidance provided [here](#). These additional pages do not count toward the 25-page limit for the rest of your submission.