

2020 HiMCM
Problem A: The Best Summer Job

Although it's only November, you need to start planning for your 2021 summer job. You have a variety of choices this year and want to determine your "best" choice. You pose this problem for your team of math friends:

*We have many opportunities for a summer job. Some allow us to work from home virtually/electronically, some are a walk or bike ride away, and others require us to drive or take a train. Each job offers differing numbers of hours each week and the hourly rates also vary. Some involve physical activity, or at least not sitting at a desk (e.g. cashier at a store, lifeguarding, or wait staff at a restaurant), while others are mostly **sedentary** and perhaps use analytical and organizational skills (e.g. data analysis, office administration, or research).*

Let's develop a model that will evaluate the choices we have for our summer jobs and help us all find the "best" job. While we certainly want to earn and save some money, we also want to have time for recreation activities (e.g. exercise, outings, and social time with friends). Let's make our model one that will be helpful for all high school students to think about and analyze their summer job options.

1. What factors should high school students who are looking for a summer job consider? List and describe the various factors your team identifies. Note that factors may be quantitative or qualitative, constant or variable, and **deterministic** or **probabilistic**. Be sure to include units as appropriate.
2. Use your factors to develop a model or algorithm (or set of models/algorithms) for a high school student to use to evaluate their summer job options based on their own situation and preferences as inputs to your model.
3. Test your model with at least ten **fictional** persons that you create with reasonable data. Explain your development of these fictional persons and the data you chose. Analyze the results of the application of your model on these persons.
4. Describe and show how you would present your model for a person to understand and use. For example, you might use a webpage or an app or a school newspaper article. **NOTE:** You do not need to publish an actual webpage or develop an actual app, but describe and provide the layout of your proposed presentation.

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

- One-page Summary Sheet.
- Table of Contents.
- Your complete solution.
- References list.

Note: The HiMCM Contest now has a 25 page limit. All aspects of your submission count toward the 25 page limit (Summary Sheet, Table of Contents, Reference List and any Appendices).

Glossary

Deterministic: processes that have only one (predetermined) outcome.

Fictional: not real or true; made up.

Probabilistic: processes based on the theory of probability or that randomness plays a role in predicting future events.

Sedentary: characterized by much sitting and little physical activity.