**Optimization of Weekly Diet Preference with Linear Programming**

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**Task Outlines:**

(add name to the tasks you wish to work on, several people can work together in one task)

Data - Data collection of preference (everyone)

Data - Data collection of nutrition information (everyone)

Data - Data collection into constraints (everyone)

Code - LP input Generating (Baihan, Dae)

Code - LP output (Baihan, Dae)

Writing - Introduction (Xinyuan)

Writing - Background (Xinyuan)

Writing - Give history of similar and related problems(Yijun)

Writing - The model itself (Dae)

Writing - implementation, including coding methods and challenges (Baihan, Dae)

Writing - Solution (Xinyuan)

Writing - Commentary on solution(Yijun)

Writing - Variations(Yijun)

Writing - Conclusion (Baihan)

Writing - References (everyone note down when collecting and writing)

Writing - Appendixes (Baihan)

Writing - Peer reviewing and revising on other people’s parts (everyone) (Dae)

Writing - Final Formatting & Printing (Baihan)

**Data Outline:**

https://drive.google.com/drive/u/0/folders/0B6BZ-0nxfo4YaW5sS1dKWTZMWmc

* Categories (Meat, )
* Food Types

--------------- Writing Start --------------

**Introduction (5 points)**

Describe what you will be modeling and what mathematical concepts you will primarily be incorporating (e.g., linear programs, graphs, markov chains, etc.)

**Background (15 points)**

Describe how you came upon this problem. (5 points)

Give history of similar and related problems. (10 points)

**The model itself (40 points)**

Thoroughly describe the mathematical model (e.g., the LP) you have developed for your investigation. (20 points).

Describe the implementation, including coding methods and challenges. (20 points)**.**

The data format was picked form

**Solution (20 points)**

Present any calculations, describing all methods used, including all code, R commands, etc.

**Commentary on solution (20 points)**

What did you find out? What do your model and calculations tell you?

**Variations (30 points)**

Modify your problem in at least two different ways, analyze how your model needs to be updated, and find solutions to these problem variations. What do these variations tell you?

**Conclusion (10 points)**

**References/bibliography (10 points)**

1. United States Department of Agriculture -Agricultural Research Service -USDA Food Composition Databases

**Appendixes (optional)**

Feel free to put long tables, code, output, etc., in appendices, but be sure to describe and label them well so that one can read them on their own without having to refer back to the rest of the paper.

**Objective:**

To maximize the happiness for our group members from having meals each week.

(Note: The happiness is defined for each category of food, such as fruits, vegetables, meat, and cereal, based on a small survey within our small group.)

**Constraints:**

1. Budget constraint: cost for food needs to be lower than $x (say $150 per week)
2. Nutrients constraints: need to be sufficient for different kinds of nutrition (vitamin etc.)
3. Calories and sodium should not be above recommended values for a week
4. Diversity of food (say, cannot have more than 20% of a certain category)

**Data:**

1. Survey on happiness (preference score) in different categories of food in a Likert scale of 0 to 10.
2. Nutrients of common food around campus
3. Calories and sodium of common food around campus
4. Costs of common food around campus
5. Proportions of food to define diversity

**Method:**

Linear Programming