

LLM Generator Write-Up

LLM Generator used: <https://myninja.ai/>

Why I chose Ninja AI: I thought it would be fun to use one that isn't a well-known system like ChatGPT. For one, I assumed everyone in the class would use ChatGPT, so I wanted to be different in that regard. For seconds, I thought a lesser known system might produce different results from ChatGPT which could show whoever is grading my assignment a different LLM that is solely focused on programming results. This isn't the primary function of ChatGPT, so more accurate results might occur.

My Prompt:

I'm in a course called Decision Analytics. I need to complete a problem surrounded around my diet. For this assignment, you need to construct a personalized diet using current recommended dietary allowances from the U.S. Food and Drug Administration, updated to account for recent research on sodium intake and health.

The constraints for this linear programming problem, should consider seven components of nutrition and their daily values, as shown in the following table:

Component Max/Min Daily Amount and measure

Sodium Maximum 5,000 milligrams (mg)

Energy Minimum 2,000 Calories (kilocalories, kcal)

Protein Minimum 50 grams (g)

Vitamin D Minimum 20 micrograms (mcg)

Calcium Minimum 1,300 milligrams (mg)

Iron Minimum 18 milligrams (mg)

Potassium Minimum 4,700 milligrams (mg)

Set this up as a standard linear programming problem with decision variables taking any non-negative values. In other words, partial servings are permitted. I need everything in this list to be converted to grams. I also need the nutritional values in the foods provided below to be converted to grams if not already in grams. Calories can remain in their respective measurement.

For nutritional constraints, consider setting these to satisfy a weekly diet. That is, multiply each daily requirement by seven (7).

To adapt the problem to your personal diet, collect nutrition facts from five packaged food items in your household. Use packaged foods that are part of your normal diet and for which you have prices. Also, ensure that across the set of food items there are

positive values for each of the eight components of nutrition. Adjust the price for each food item so that it represents one serving size, as defined on the nutrition facts label. Each food item represents a decision variable in the linear programming problem.

These are the items I've found:

Whole Grain Pasta:

Serving Size: 56g

Calories per Serving: 180

Cost/Serving: ~\$0.25

Traditional Pasta Sauce:

Serving Size: 136g

Calories per serving: 70

Cost/Serving: ~\$0.56

The goal or objective of this problem is to find the minimum-cost diet (servings of food items) that satisfies the eight nutritional requirements. Use Python PuLP or AMPL (perhaps with its Python API).

White Rice:

Serving Size: 45g

Calories per Serving: 160

Cost/Serving: ~\$0.14

Ground Turkey:

Serving Size: 112g

Calories per Serving: 120

Cost/Serving: ~\$1.87

Oikos Triple Zero Nonfat Greek Yogurt:

Serving Size: 150g

Calories per Serving: 90

Cost/Serving: \$1.49

Ninja AI Output:

To set up the linear programming problem, we first need to convert the nutritional values to grams and calculate the weekly requirements.

Weekly Nutritional Requirements

Component	Max/Min	Daily Amount	Weekly Amount
Sodium	Maximum	5,000 mg	35,000 mg
Energy	Minimum	2,000 kcal	14,000 kcal
Protein	Minimum	50 g	350 g
Vitamin D	Minimum	20 mcg	140 mcg

Calcium	Minimum	1,300 mg	9,100 mg
Iron	Minimum	18 mg	126 mg
Potassium	Minimum	4,700 mg	32,900 mg

Since 1 milligram (mg) is equal to 0.001 grams (g), we can convert the weekly requirements as follows:

Component	Max/Min	Weekly Amount (g)
Sodium	Maximum	35 g
Energy	Minimum	14,000 kcal
Protein	Minimum	350 g
Vitamin D	Minimum	0.14 g
Calcium	Minimum	9.1 g
Iron	Minimum	0.126 g
Potassium	Minimum	32.9 g

Food Items with Nutritional Values

We need to collect the nutritional values for each food item. Since the values are not provided, we will assume some typical values for each food item. Please note that these values may vary depending on the specific product and brand.

Food Item	Serving Size (g)	Calories per Serving	Cost per Serving	Sodium (g)	Protein (g)	Vitamin D (g)	Calcium (g)	Iron (g)	Potassium (g)
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Whole Grain Pasta	56	180	\$0.25	0.005	10	0.001	0.02	0.002	0.2
Traditional Pasta Sauce	136	70	\$0.56	0.01	2	0.001	0.01	0.002	0.4
White Rice	45	160	\$0.14	0.001	2	0.001	0.01	0.002	0.1
Ground Turkey	112	120	\$1.87	0.02	25	0.001	0.02	0.001	0.3
Oikos Triple Zero Nonfat Greek Yogurt	150	90	\$1.49	0.01	15	0.001	0.2	0.002	0.4

Now, we can use Python PuLP to set up and solve the linear programming problem.

Results:

Step-by-step review:

- 1) Created a prompt that was comprehensive and provided the details I believed the LLM generator needed.
- 2) Requested an outcome that would provide me the answers I needed to finish the study.
- 3) Reviewed the results

Conversation: I noticed that the LLM generator not only understood the assignment, but curated tables and then data dictionaries for me in the code. I did not need to nudge it in different directions. However, I did notice that the system automatically assigned values to nutritional values that I had not provided. For example, I did not provide the nutritional facts in the initial prompt, but it automatically provided Vitamin D values to each food item. Since these were incorrect, I needed to go back and provide the correct amounts for each nutrient. This did provide me with an optimal outcome.

My Thoughts on LLMs Completing the Assignment: While I do believe that this assignment was simple enough for the LLM Generator to assist with, it missed minor facts and made assumptions about the data without requesting additional information or context. This could be problematic for more complex programs and problems than linear programming problems provide.