CIS 192 Final Project Proposal Yizheng He

Project Name: Optimal Consumption Calculator

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The Idea: one of the most basic problems in economics is to optimize the consumption given a constraint on one's budget. Basically each consumer has a constraint due to his income and a unique utility function describing his preference among different goods. To optimize his consumption (or to maximize his utility), economists use Lagrange multiplier to calculate the desired consumption level of different goods. As I am taking an Economics class this semester, I did similar calculations for hundreds of times and thus would like to write a python script that can do the calculation for me. Also, I want to plot the result on a coordinate to illustrate the result.

Tasks in the Project:

1, Take input functions from the terminal. Users will be asked in the terminal to type in the constraint functions and utility functions. The program will be able to parse these string inputs and convert them to mathematical functions;

2, Calculate the optimal consumption level. I will use the NumPy and SciPy modules to build the Lagrange multiplier and calculate the result.

3, Plot the result. I will use the Matplotlib library to plot the result.

Challenges of the Project:

Two main difficulties lie in this project: one is to build the Lagrange multiplier and solve the result. For this specific problem, the results also need to make sense in the real world. For instance, since people cannot consume at negative levels, corner cases need to be checked. The other challenge is to understand the input from the terminal. I will first implement everything with numbers as parameters and if I still have time I may make it work with letters as parameters.