Math-484 Homework #8 (Practical application of linear programming)

I will finish the homework before 11am Oct 23. I will type the solution (means not hand written).

Story: Your lecturer wishes to save some money because he wants to buy a nice new digital camera. He thinks that he may save on food. Suppose that he is your customer and he will pay you in credits needed to pass MATH-484, if he will be happy with your result. Like any other customer, he does not really know what he wants. He wants to save money, eat enough of the basic nutrients. His weight is 165lb after dinner and he is around 30 years old.

How to do it:

- Considered nutrients (un)saturated fat, calories, fibers, iron, salt, proteins, and carbs.

- Find out what is recommended daily intake of the nutrients for his body weight and age.

- Go to your favorite shop(s) (Walmart, Meijer's, Schnuks, Aldi, County Market, Target, . . . , McDonalds, other Fast Food - these are the shops where the lecturer is willing to go shopping) and pick at least 20 different kinds of food. *(Not* $19\times$ *cookies! Give some variety, at most 4 items from Fast Food chains.)*

- Summarize what is the amount of the nutrients in each of the food.

- Formulate a linear program (LP) for finding a diet for time of one year such that:

  - the cost of food is minimized
  - he gets at least recommended daily intake (salt times 1.4 recommended daily intake)

- Solve (LP) using some solver - for example `http://apmonitor.com`.

- Summarize the results. Write, what is the cost for the whole year as well as for just one day.

- Solve the diet problem for yourself too! (change recommended daily intakes to your body and age, solve resulting (LP), summarize results)

More notes - provide references (http links) to anything you are using. Include also the formulation of (LP) which you were using as an input for your solver. It is assumed that the homework will be typed. If the output of the solver is that the program has no solution, then you did not formulate the program correctly or you require some constraint like say salt is at least 5mg but no food has salt.
Bon Appétit!