MA162 Project Description
Spring 1999

In this project you will write a linear program, solve it using LINDO and then examine whether the solution of the mathematical problem is a reasonable solution to the problem that your linear program claims to model. The project will involve planning a diet by a linear program. This is a convenient problem to study since all of us have an opinion as to what is a good diet and the information needed to write the linear program is easily available.

The project: Using the information attached to this handout, write a linear program to determine the meal at McDonald's which meets certain nutritional requirements while minimizing the intake of fat or calories.

To set up your linear programs, you will need to decide which food items to include, which nutrients should be used as constraints and what you should use as your objective function.

After you formulate your linear program, type it into LINDO and solve it. Examine LINDO's solution and consider the following questions. Is it a reasonable meal? Why or why not? Can you give additional restrictions on your diet that were not incorporated into your linear program? Can you formulate these new restrictions as linear inequalities? After considering the above questions revise your linear program. Did the changes you made have the expected effect? Is the solution more realistic? This process of solution and revision could probably be continued without end. However, your time is limited and your instructor's due date is inflexible. Thus you should stop after one revision.

Structure: I ask that you work in groups of between 2 and 5 on this project. I expect that your report will consist of 2 to 7 handwritten pages and a few pages of LINDO printout.

Your report should outline the assumptions that go into the formulation of your original linear program, problems identified after examining your first solution and what you did to correct these problems. Your report should be self contained description of your work rather than a list of questions and answers. Be sure that your report clearly identifies the problems you find in your first linear program and how you attempt to correct these problems.

If you want to use the dual prices from LINDO in your discussion, you should note that in a minimization problem, the dual prices represent decrease in objective function divided by increase in right hand side. Thus the dual prices in a minimization problem will usually be negative.

Grading: You will be graded on 1) writing and clarity of presentation, 2) correct and reasonable formulation of the linear program 3) creativity. All members of a group will receive the same grade.

December 10, 1998