

Due: Friday, September 25th (drop box, 1 p.m.)

Reading

If you haven't already, please read the Preface.

For Wednesday, September 16th, Chapter 1.

For Friday, September 18th, to Chapter 2, Section 3.

For Wednesday, September 23rd, to the end of Chapter 2.

For Friday, September 25th, Chapter 3. However for Sections 3.3 and 3.4 it is enough to understand the statement of the results, rather than the details of the proofs.

Assignment exercises to hand in

1. Chapter 1, problem 1.

2.-5. Chapter 2, problems 1, 8, 9 and 16.

Note that you can use the on-line pivot tools from Vanderbei's homepage to check your calculations.

6. Generate a random simplex problem with 4 rows and 4 columns using Vanderbei's simplex pivoting tool. Solve the problem by creating a spreadsheet and using the Solver function in Microsoft Excel. To submit your answer to this question, print the final spreadsheet and, list in writing the contents of any cells that have formulae in them along with the information entered into the "solver parameters" window.

Hints: Solver is an "Add-in" to Excel, it is not installed by default. So you may have to install it by going to Excel Options and then Add-Ins. Once installed it appears in the Data menu.

7. Consider the following scheduling problem for a factory that operates 24 hours per day, 7 days per week. In a given day, there are requirements for the total number of employees that must be at the plant. These are given in the following table:

Hours	Employees needed
12 a.m. to 4 a.m.	8
4 a.m. to 8 a.m.	10
8 a.m. to 12 p.m.	16
12 p.m. to 4 p.m.	21
4 p.m. to 8 p.m.	18
8 p.m. to 12 a.m.	12

Employees can work either 8-hour or 12-hour shifts, starting at the times stated above; the 12-hour shifts can only start at 12 a.m./p.m. or 8 a.m./p.m. Those working the 8-hour shifts cost the company \$50 per hour, and those working 12-hour shifts cost the company \$60 per hour. How should the company staff the plant so as to minimize labour costs? Formulate the problem as a linear program, and solve the linear program using Excel or another solver software that you prefer.

Some other exercises you should try

8. Chapter 1, problem 2.

9. Those of you who have taken Math 208W will have some experience with problem formulation. To practise problem formulation you are encouraged to try some examples from other sources, such as the course reserve

textbooks in the library. Rader's book does this particularly well, and is the source of question 7 in this assignment.

Formulation problems are also available on the Web, such as the following solved problems authored by J.E. Beasley: <http://people.brunel.ac.uk/~mastjjb/jeb/or/lpmore.html>.

10. Try as many of the simplex problems (2.1 through 2.11) as you need to get comfortable with the method. You can generate more using the on-line tool mentioned in Problem 2.12. It is also worthwhile to think about Problems 2.17 and 2.18.