

Assignment Instructions: Module 4 - Solve LP Model Using R

Purpose

The purpose of this assignment is to solve a linear programming problem using R libraries and assist you in meeting the following module outcome:

- Formulate a problem in a manner that can be solved using R libraries.
- Represent a problem in a manner that can be solved using R libraries.
- Interpret the output from optimization routines.
- Interpret the output from a LP solution.

Directions

Consider the problem from a previous assignment.

The Weigelt Corporation has three branch plants with excess production capacity. Fortunately, the corporation has a new product ready to begin production, and all three plants have this capability, so some of the excess capacity can be used in this way. This product can be made in three sizes--large, medium, and small--that yield a net unit profit of \$420, \$360, and \$300, respectively. Plants 1, 2, and 3 have the excess capacity to produce 750, 900, and 450 units per day of this product, respectively, regardless of the size or combination of sizes involved.

The amount of available in-process storage space also imposes a limitation on the production rates of the new product. Plants 1, 2, and 3 have 13,000, 12,000, and 5,000 square feet, respectively, of in-process storage space available for a day's production of this product. Each unit of the large, medium, and small sizes produced per day requires 20, 15, and 12 square feet, respectively.

Sales forecasts indicate that if available, 900, 1,200, and 750 units of the large, medium, and small sizes, respectively, would be sold per day.

At each plant, some employees will need to be laid off unless most of the plant's excess production capacity can be used to produce the new product. To avoid layoffs if possible, management has decided that the plants should use the same percentage of their excess capacity to produce the new product.

Management wishes to know how much of each of the sizes should be produced by each of the plants to maximize profit.

Solve the problem using `lpsolve`, or any other equivalent library in R.

Requirements

All due dates are included in the Assignment Schedule.

General Submission Instructions

All work must be your own. Copying other people's work or from the Internet is a form of plagiarism and will be prosecuted as such.

- Upload an R markdown file, along with any required .lp files to your git repository. Name your file Username_#.ext, where Username is your Kent State User ID (the part before @), and # is the Assignment number.
- Note that the R markdown file allows you to add text, comments, and output as part of the file. So, all documentation should be part of the file. You can read about the R markdown file syntax [here](#), or download the cheat sheet [directly](#).

Provide the link to your git repository for the assignment.