MA 162: Finite Mathematics
Fall 2014

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October 15, 2014

Announcements:

- Final Simplex Homework due next Tuesday at 6pm.
- Exam #2 next Monday, 5-7pm. Same rooms as last time.

CalJuice is making three different blends of juice: pineapple-orange (PO), orange-banana (OB), and pineapple-orange-banana (POB). Each carton of PO requires 8 oz of pineapple and 8 oz of orange. Each carton of OB requires 12 oz of orange and 4 oz of banana. Each carton of POB requires 4 oz pineapple, 8 oz orange, and 4 oz banana pulp. The company has allotted 16000 oz of pineapple, 24000 oz of orange, and 5000 oz of banana for the initial run. The company also stipulates that the production of POB juice should not exceed 800 cartons. The profit on PO juice is $1.00 per carton, on OB juice is $0.80 per carton, and on POB is $0.90 per carton. How many cartons of each blend should the company produce to maximize its profit? What is the largest profit it can realize? Are there any concentrates left over?

How can we use technology to do the Simplex algorithm?

What you need:

1. a computer

2. a spreadsheet program (Microsoft Excel or a spreadsheet in Google Drive will suffice)

3. knowledge of the Simplex Algorithm

Doing the Simplex Algorithm Step-by-Step.

1. Enter the initial Simplex table into your spreadsheet.

2. Determine the pivot position using your knowledge of the algorithm.

3. Apply the necessary row operations by entering formulas in the spreadsheet.

4. Continue this process until the algorithm is finished.

Doing the Simplex Method all at once

This can be done in Microsoft Excel in the following way:

1. Load the Solver Add-in (these instructions are for the 2013 version):

   - Click "File" and then "Options".

   - Click "Add-ins", then in the Manage box select "Excel Add-ins".

   - Click "Go".

   - Check the "Solver Add-in" box and click "Ok".

Doing the Simplex Method all at once

2. Enter the necessary formulas for the objective function and constraints.

3. Click on the "Solver" option under the Data tab.

4. Enter the correct cells into the objective function, the constraints, and the box telling Excel which variables can be changed.

5. Choose "Simplex LP" as the solving method.

6. Click "Solve".

Technology exercise

Maximize $P = 2x + 4y + 3z + 5w$ subject to

$$
\begin{array}{rcrcrcrcr}
x & - & 2y & + & 3z & + & 4w & \leq & 8 \\
2x & + & 2y & + & 4z & + & 6w & \leq & 12 \\
3x & + & 2y & + & z & + & 5w & \leq & 10 \\
2x & + & 8y & - & 2z & + & 6w & \leq & 24
\end{array}
$$

and $x \geq 0$, $y \geq 0$, $z \geq 0$, $w \geq 0$.