Homework 1

Marius-Mihai Budurean

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1 Problem Description

The pancakes bakery produces three kinds of pancakes (P_1 - normal crepe, P_2 - American pancakes, P_3 - Pathiri) that can be sold with chocolate, blueberry and cheese.

In a normal day, the bakery can't process more than 720 chocloate pancakes, 330 blueberry pancakes, 500 cheese pancakes.

The profits of the various kinds of pancakes (in Euro), depending on the type and topic:

Pancakes	Daily Production	Chocolate Price	Blueberry Price	Cheese Price
P_1 normal crepe	300	€8	€10	€12
P_2 American pancakes	350	€15	€12	€8
P_3 Pathiri	400	€8	€9	€15

How to maximize the total sales profit?

2 Variables

- $x_1 \rightarrow P_1$ with chocolate
- $x_2 \rightarrow P_1$ with blueberry
- $x_3 \rightarrow P_1$ with cheese
- $y_1 \rightarrow P_2$ with chocolate
- $y_2 \rightarrow P_2$ with blueberry

- $y_3 \rightarrow P_2$ with cheese
- $z_1 \rightarrow P_3$ with chocolate
- $z_2 \rightarrow P_3$ with blueberry
- $z_3 \rightarrow P_3$ with cheese

3 Profit Maximize Function

$max(8x_1 + 10x_2 + 12x_3 + 15y_1 + 12y_2 + 8y_3 + 8z_1 + 9z_2 + 15z_3)$

4 System

$$\begin{cases} x_1 + y_1 + z_1 & \leq 720 \\ x_2 + y_2 + z_2 & \leq 330 \\ x_3 + y_3 + z_3 & \leq 500 \\ x_1 + x_2 + x_3 & \leq 300 \\ y_1 + y_2 + y_3 & \leq 350 \\ z_1 + z_2 + z_3 & \leq 400 \\ x_i, y_i, z_i & \geq 0, i \in \{1, 2, 3\} \end{cases}$$