IE407 - Homework 3

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1 Simplex Method

1.1 Formulation

Decision Variables

$$s = \text{Amount of } \textbf{Sweet Corn} \text{ used in the mix (grams)}$$
$$b = \text{Amount of } \textbf{Barbeque} \text{ used in the mix (grams)}$$

Constraints

$s + b = 100$	Weight of the package
$0.015 \cdot s + 0.035 \cdot b \geq 0.025$	Protein
$4 \cdot s + 6 \cdot b \leq 5.6$	Calories
$s, b \geq 0$	Non-negativity

Objective Function

$$\text{Minimize Total Cost} = 0.5 \cdot s + 0.7 \cdot b$$

1.2 Solution

1.2.1 Convert to Standard Form

$$
\begin{array}{rllllll}
z = 0.5 \cdot s & + 0.7 \cdot b & & & & \\
s & + b & & & = & 100 \\
0.015 \cdot s & + 0.035 \cdot b & - e_1 & & = & 0.025 \\
4 \cdot s & + 6 \cdot b & & + s_1 & = & 5.6 & s, b, e_1, s_1 \geq 0
\end{array}
$$

This is a system of equations of 3 equations and 4 variables.

1.2.2 Finding a Basic Feasible Solution

Initial Basic Feasible Solution:

- Basic Variables: s_1, b, s, z

- Non-basic Variables: e_1

For this initial basic feasible solution, $s = 50, b = 50, s_1 = 60, e_1 = 0, z = 60$