MSBA 250 — Applied Business Analytics

University of the Pacific
Spring 2024
Homework Assignment Set 5 Solutions

Problem 1:

Define x_1= number of permanent operators
x_2= number of temporary operators

Minimize $Z = 46x_1 + 15x_2$ (labor cost, $)
subject to

$$14x_1 + 12x_2 \geq 300 \text{ (claims)}$$
$$x_1 + x_2 \leq 40 \text{ (workstations)}$$
$$0.5x_1 + 2.3x_2 \leq 25 \text{ (defective claims)}$$
$$x_1, x_2 \geq 0$$

Problem 2:

The optimal solution is:
$x_1^* = 0, x_2^* = 8.$
The optimal objective value is:
$z^* = 15x_2^* + 9x_2^* = 15 \times 0 + 9 \times 8 = 72$

Problem 3:

$x_i = 1$ if store i is open; $x_i = 0$ if store i is not open

Maximize $Z = 127x_1 + 83x_2 + 165x_3 + 96x_4 + 112x_5 + 88x_6 + 135x_7 + 141x_8 + 117x_9 + 94x_{10}$
subject to

$$x_1 + x_3 \leq 1$$
$$x_1 + x_2 + x_4 \leq 1$$
$$x_4 + x_5 + x_6 \leq 1$$
$$x_6 + x_7 + x_8 \leq 1$$
$$x_6 + x_9 \leq 1$$
$$x_8 + x_{10} \leq 1$$
$$x_9 + x_{10} \leq 1$$
$$x_i = 0 \text{ or } 1 (i=1,2,\ldots,10)$$

Problem 4:
Analysis and discussion should be logical and comprehensive.