Module 2 Assignment

First Scenario:

1. The decision variables are listed as below:
   X_1 （Collegiate model backpack） X_2 （Mini model backpack）
   Two j: 1 2
2. The objective function:
   MaxZ = 32 X_1 + 24 X_2

3. The constraints:
   $3X_1 + 2X_2 \leq 5000$

   $X_1 \leq 1000$
   $X_2 \leq 1200$

   $45\ X_1 + 40\ X_2 \leq 40 \times 35 \times 60$

4. The full mathematical formulation for this LP problem:

   $3X_1 + 2X_2 \leq 5000$

   $45\ X_1 + 40\ X_2 \leq 40 \times 35 \times 60$

   $X_1 \leq 1000$ $X_2 \leq 1200$

   $X_1 \geq 0$ $X_2 \geq 0$

   MaxZ = 32 X_1 + 24 X_2

Second Scenario:

1. The decision variables are listed as below:
   X (Large) Y (Medium) Z (Small)
   three plant: 1, 2, 3
   X_1 Y_1 Z_1(plant 1) X_2 Y_2 Z_2 (plant 2) X_3 Y_3 Z_3 (plant 3)

2. The linear programming model formulation:
   $20\ X_1 + 15\ Y_1 + 12Z_1 \leq 13000$

$20\ X_2 + 15\ Y_2 + 12Z_2 \leq 12000$
$20\ X_3 + 15\ Y_3 + 12Z_3 \leq 5000$

$X_1 + Y_1 + Z_1 \leq 750$
$X_2 + Y_2 + Z_2 \leq 900$
$X_3 + Y_3 + Z_3 \leq 450$

$X_1 + X_2 + X_3 \leq 900$
$Y_1 + Y_2 + Y_3 \leq 1200$
$Z_1 + Z_2 + Z_3 \leq 750$

$X_j \geq 0, \quad Y_j \geq 0, \quad Z_j \geq 0 \qquad j=1, 2, 3$

$MaxZ = 420(X_1 + X_2 + X_3) + 360(Y_1 + Y_2 + Y_3) + 300(Z_1 + Z_2 + Z_3)$