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Assignment 1

a. The decision variables for this case are the two backpack products, the Collegiate(X1) and the Mini(X2). It is to decide what quantities of X1 and X2 should be produced weekly based on the available material, labor hours, and sales forecast.

b. The objective function for this case is to maximize the profit by producing optimum amounts of products X1 and X2 (i.e., the Collegiate and the Mini)

   Maximize: 32(X1) + 24(X2), where unit profit for x1 and x2 are $32 and $24 respectively.

c. The constraints in this problem are related to:
   - maximum available nylon per week (5000 sq. ft);
   - required labor hours per product (0.75 for X1, 0.67 for X2);
   - maximum labor hours per week (40 for each employee, and there are 35 employees);
   - maximum sales forecasts (1000 for X1, 1200 for X2)

d. Mathematical formulation for this LP problem is:

   Maximize Z: 32(X1) + 24(X2)

   S.T :

   3(X1) + 2(X2) <= 5000

   0.75(X1) + 0.67(X2) <= 1400

   X1 <= 1000

   X2 <= 1200