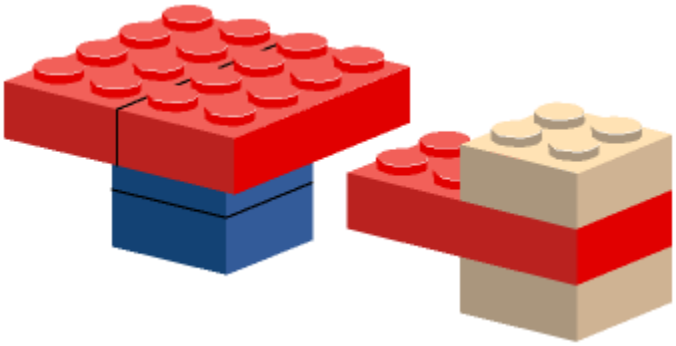
Building Lego Furniture

A Linear Programming Problem



We can use Legos to model production in a furniture factory. The company produces only tables and chairs. A table consists of two large and two small Lego pieces, while a chair consists of one large and two small pieces. The resources available are twelve large and sixteen small pieces.

Profit for a table is $16 and for a chair is $10. Your task is to select a product mix to maximize the company's profits using the available resources.

Using the Legos in your bag, construct combinations of table and chairs and compute the profit for each combination.

Combinations (tables, chairs)	Number of pieces not used	Profit P = 16t + 10c
(6 tables, 0 chairs)		P = 16(6) + 10(0) = 96

Which combination gives the most profit?

Mathematical Solution

1. 

Let t =
c =

2. 

Objective Function

The equation represents the goal of either maximizing profit or minimizing cost.

Profit = _____t + _____c

3.

Constraints

Limitations created by scarce resources (time, equipment, etc.). They are expressed algebraically by inequalities in terms of the decision variables.

Lego piece	Number of large blocks needed per table × number of tables	Number of small blocks needed per chair × number of chairs	Number of Lego pieces available
large			
small			

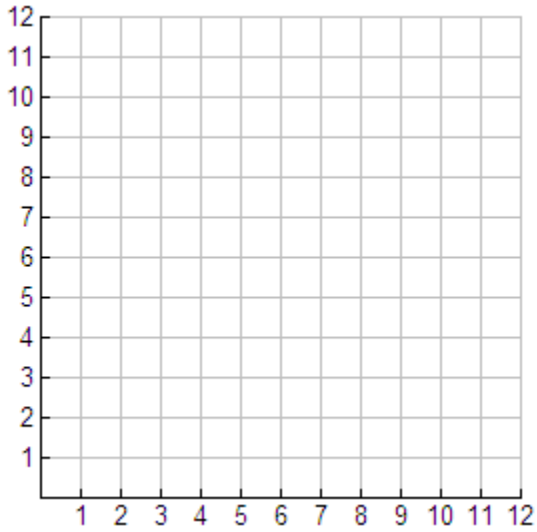
Constraints: _____ _____

_____ _____

4.

Feasible Region

Area containing all the points that satisfy the constraints.



Graph the feasible region.

5.

Corner points	Profit

The Corner Principle

The optimal solution will always lie on a corner of the feasible region.

6. To maximize the profit how many tables and how many chairs should be produced?

Adapted from "Lego of My Simplex" by Norman Pendegraft appearing in *OR/MS Today* – February 1997 – Issues in Education: Volume 24 Number 1, p.128