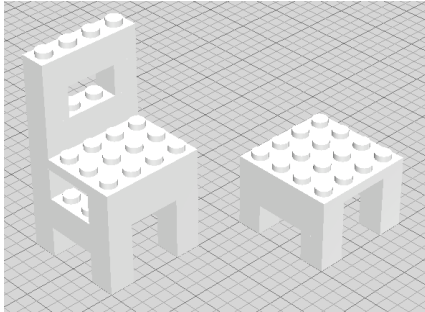


The Monochromatic Furniture Company

The following is an extension of “LEGO my Simplex” [Pendegraft (1997) ORMS Today 24(1):8].

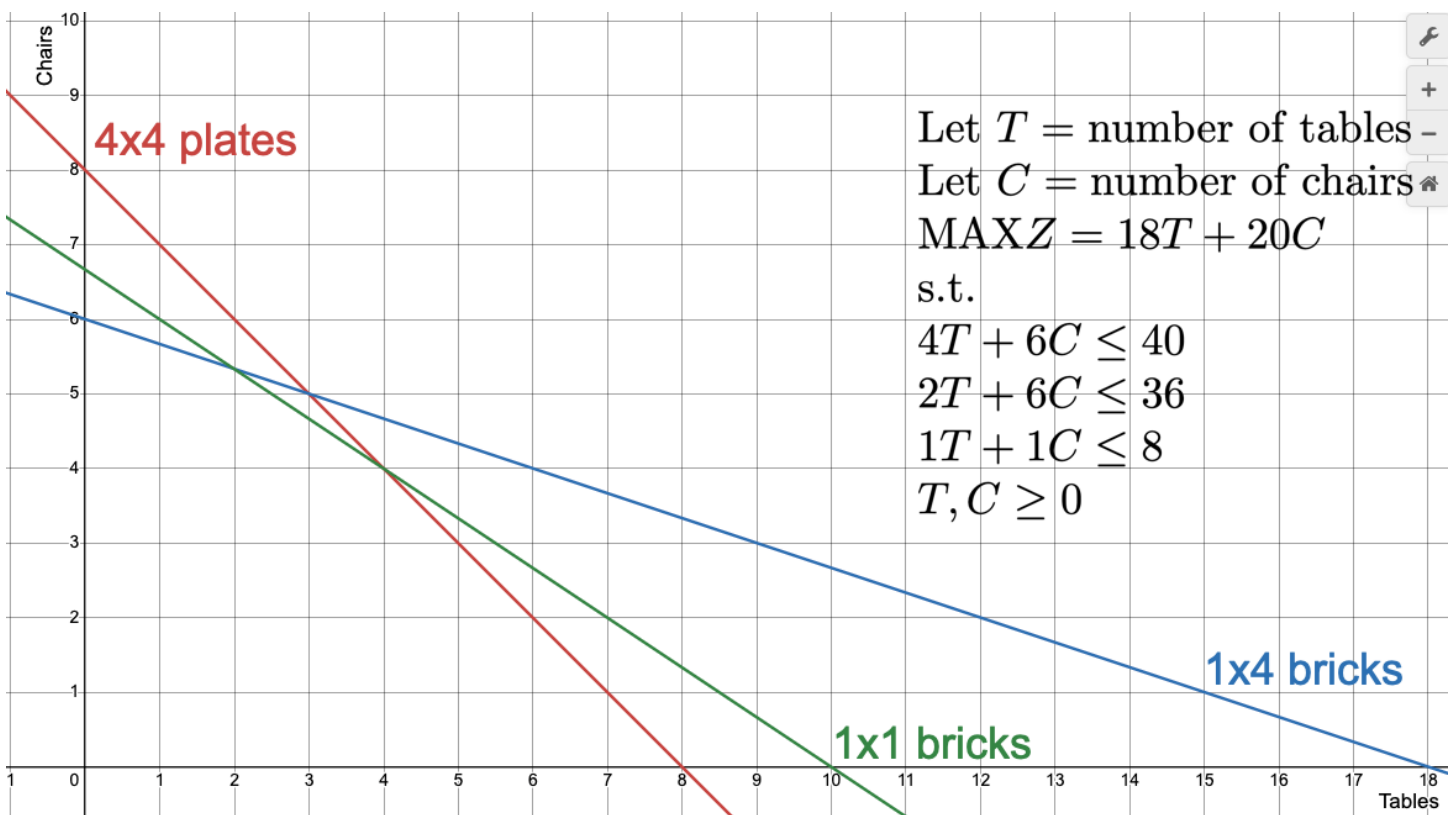


Here at the **Monochromatic Furniture Company** (MFC) we manufacture two products: Tables and Chairs.

A table requires one 4x4 plate, two 1x4 bricks, and four 1x1 bricks, while a chair requires one 4x4 plate, six 1x4 bricks, and six 1x1 bricks.

MFC has eight plates, thirty six 1x4 bricks, and forty  1x1 bricks on hand. The profit contribution for a table is \$18 and \$20 for a chair.

Normally, we'd spent some time formulating this problem into a linear programming model and answering naïve questions like “what is the maximum number of chairs that can be manufactured – why?”. For the purposes of this workshop, we'll skip those steps...



What is the profit maximizing mix of tables & chairs to produce?

What is the value of the objective function at optimality?

There is an analog device in this room that will let you check your answer...

Ludic Elements I • Escape Rooms in the Quants Classroom

In an escape room, players solve puzzles to escape from a locked room. The “BreakOut Box” is essentially the opposite – players solve a number of puzzles to break **into** a locked box. The BreakOut Box started as an open source project and I first learned about it from Dr. Scott Nicholson (Director, Game Design and Development Program at Wilfrid Laurier University).

The idea is simple. A box is locked with a number of locks. Players (students) are given problems to solve and the solution to those problems will open a lock. Once all the problems are solved, the box is opened and the players are rewarded – I usually give out candy.



In my kit I have a number of 3- and 4- digit combination locks. If I need decimal places for a value, I will put a wee piece of masking tape with a • on it for where the decimal point goes. I usually include another piece of tape with the puzzle key so students aren't left to try their solution value on five identical looking locks. Some puzzles – like word locks – typically don't have an identifier. Physical keys can be hidden in the room, a UV flashlight can reveal hidden clues in text, and directional locks are also a fun addition – if the puzzle design permits. There is a countdown timer as well to add to the pressure to solve the problems!

Activity Ideas **1** — PivotTables.

Set-up — a dark wizard has locked out all of Professor Dumbledore's grade book! Using PivotTables alone against a locked spreadsheet of blackened cells, teams of students must determine things like Ginny Weasley's GPA, the class average for Gryffindor students in the History of Magic class, the standard deviation (SD) of the house with the highest SD in Potions class, the name of the professor voted #1 by students, and the name of the Ravenclaw student with the highest grade in Charms class.

Activity Ideas **2** — Linear Programming (LP) Problems.

Set-up — I divide the class into four and they're given textbook LP problems. I'm using James Evans' *Business Analytics* 3rd ed. They'll get 30 minutes to come up with an LP solution using Excel to Q13.8 Bangs Leisure Chairs, Q13.9 Morton Supply Co., Q13.24 Rosenberg Land Development, and Q13.26 Martinez Model Car Co. If the Bangs team gets done, they have to help out the Rosenberg team (say). Eventually the entire class is trying to solve the last remaining problem to open the box. I debrief the problems whilst the class eats candy.