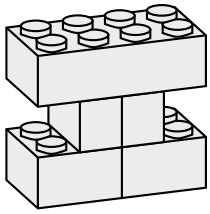
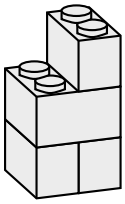
Lego Furniture
A Hands-On Game about Optimization

You have been hired by a company that makes and sells two products, which must look *exactly* as depicted below:



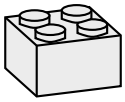
The Brickell bench



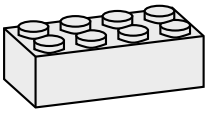
The Wynwood chair

Your supplier can provide you with the following parts, up to the quantities indicated, and for the costs shown below:

Up to 18, \$1 each



Up to 10, \$2 each



Up to 4, \$4 each

If each bench sells for \$40 and each chair sells for \$21, what is the most profitable collection of benches and chairs that can be made with the available parts?

Additional Questions for Discussion:

How do you know for sure that your solution is the best possible?

What assumptions or simplifications from a real-life situation were made while solving this problem?

Say you decided on a solution and purchased all the necessary parts (no returns allowed). What if your supplier now offers to sell you an additional 2×1 for \$1? Would you buy it? How about two additional, or three, or four additional 2×1's for \$1 each? What if they lowered the price to \$0.75 each?

You were originally asked for the most profitable collection of benches and chairs. What if you were asked for the *best* collection, where "best" can be defined in any way you want? What other definitions of best would you use? What would the corresponding new solutions be?

What if there were many more products and parts? Can you see how complexity quickly grows and becomes too much for humans to process by hand?

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If you do not have access to actual Lego bricks in the quantities and shapes required in the previous page, cut the pieces below with a pair of scissors and play the game just the same!