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INST 354

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### LAB 7

Oakton Manufacturing makes two types of rocking chairs known as the Big and Small models. Each chair requires four legs and two rockers but differing numbers of wooden dowels. Each Big chair requires four short dowels and eight long dowels while each Small chair requires eight short dowels and four long dowels. Each Big chair contributes \$10 in profit while each Small chair contributes \$12. The company has 900 legs, 400 rockers, 1,200 short dowels, and 1,056 long dowels available. The company wants to maximize its profit.

Decision Variable

Materials

Big Rocking Chair = B

Legs (Material 1) , Rockers (Material 2)

Small Rocking Chair = S

Long Dowels (Material 3), Short Dowels (Material 4)

A) Build a table that shows the capacity usage breakdown and profit contribution of the two products.

	Product	
Materials	Big rocking chair	Small rocking chair
Legs	4	4
Rocker	2	2
Long dowel	8	4
Short dowel	4	8
Profit	\$10	\$12

B) Formulate a linear optimization model for this problem. (Such as the model on slide 16 of the "8.2" slides – that slide is not numbered, but it's the one after slide 15.)

Objective Function = Max.  $10B + 12S$

Constraints =

S.t.(Subject to)  $4B + 4S \leq 900$  - Material 1 (Legs)

$2B + 2S \leq 400$  - Material 2 (Rocker)

$8B + 4S \leq 1,056$  - Material 3 (Long dowel)

$4B + 8S \leq 1,200$  - Material 4 (Short dowel)

$B + S \geq 0$

(c) Build a spreadsheet representation of the model, and then solve it using Solver.

	A	B	C	D	E	F	G	H
1								
2		Big rocking chair	Small rocking chair		Created by Sang Hwa Lee			
3	Production	76	112	Total profit				
4	Unit Profit	\$10	\$12	\$2,104				
5								
6	Constraints			Used	Inequality	Available		
7	Material 1 (Legs)	4	4	752	<=	900		
8	Material 2 (Rocker)	2	2	376	<=	400		
9	Material 3 (Long dowel)	8	4	1056	<=	1,056		
10	Material 4 (Short dowel)	4	8	1200	<=	1,200		
11								
12								
13								

Total Profit = \$ 2,104

Production amount : Big rocking chair = 76, Small rocking chair = 112