

程序代写代做 CS编程辅导



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Assignment Project Exam Help

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13. Let BR = pounds of Brazilian beans purchased to produce Regular  
BD = pounds of Brazilian beans purchased to produce DeCaf  
CR = pounds of Colombian beans purchased to produce Regular  
CD = pounds of Colombian beans purchased to produce DeCaf

Type of Bean	Cost per pound (\$)
Brazilian	$1.10(0.47) = 0.517$
Colombian	$1.10(0.62) = 0.682$

$$\text{Total revenue} = 3.60(\text{BR} + \text{CR}) + 4.40(\text{BD} + \text{CD})$$

$$\text{Total cost of beans} = 0.517(\text{BR} + \text{BD}) + 0.682(\text{CR} + \text{CD})$$

$$\text{Total production cost} = 0.80(\text{BR} + \text{CR}) + 1.05(\text{BD} + \text{CD})$$

$$\text{Total packaging cost} = 0.25(\text{BR} + \text{CR}) + 0.25(\text{BD} + \text{CD})$$

Total contribution to profit = (total revenue) - (total cost of beans) - (total production cost)

∴ Total contribution to profit =  $2.033BR + 2.583BD + 1.868CR + 2.418CD$

Regular % constraint

0  
DeCaf %  
0  
Pounds of Regular:  $BR + CR = 1000$

Pounds of DeCaf:  $BD + CD = 500$

The complete linear program is

Max  $2.033BR + 2.583BD + 1.868CR + 2.418CD$

s.t.

$$\begin{aligned} 0.35BR + 0.75CR &= 0 \\ 0.60BD - 0.40CD &= 0 \\ BR + CR &= 1000 \\ BD + CD &= 500 \\ BR, BD, CR, CD &\geq 0 \end{aligned}$$

The optimal solution is  $BR = 750$ ,  $BD = 200$ ,  $CR = 250$ , and  $CD = 300$ .

The value of the optimal solution is \$3238.15

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17. a. Let  $FM$  = number of frames manufactured

FP = number of frames purchased  
 SM = number of supports manufactured  
 SP = number of supports purchased  
 TM = number of straps manufactured  
 TP = number of straps purchased

Min  $38SM + 15SP + 6.5TM + 7.5TP$   
 s.t.  
 $3.4SM + 0.8TM \leq 21,000$   
 $2.2SM \leq 25,200$   
 $3.1SM + 1.7TM \leq 40,800$   
 $SM \geq 5,000$   
 $SM + SP \geq 10,000$   
 $TM + TP \geq 5,000$   
 $FM, FP, SM, SP, TM, TP \geq 0.$

Solution:

	Manufacture	Purchase
Frames	5000	0
Supports	3692	7308
Straps	0	5000

b. Total Cost = \$368,076.91

c. Subtract values of slack variables from minutes available to determine minutes used. Divide by 60 to determine hours of production time used.

Constraint	Slack	Hours used
Cutting:	0	350 hours
Milling:	(25200 - 9623) / 60 = 259.62	259.62 hours
Shaping:	(40800 - 18300) / 60 = 375	375 hours

d. Nothing, there are already more hours available than are being used.

e. Yes. The current purchase price is \$51.00 and the reduced cost of 3.577 indicates that for a purchase price below \$47.423 the solution may improve. Resolving with the coefficient of  $FP = 45$  shows that 2714 frames should be purchased.

The optimal solution is as follows:

OPTIMAL SOLUTION

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Optimal Objective Value

261500.00000



TM

TP

Value	Reduced Cost
2285.71429	0.00000
2714.28571	3.57692
10000.00000	0.00000
0.00000	0.00000
0.00000	1.15385
5000.00000	0.00000

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Constraint	Slack/Surplus	Dual Value
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1	0.00000	-2.69231
2	3171.42857	0.00000
3	7714.28571	0.00000
4	0.00000	47.42308
5	0.00000	15.00000
6	0.00000	7.50000

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