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COMPUTER ENGINEERING

COE 512 [RELIABILITY AND MAINTAINABILITY]

CLASS-WORK

SOLUTION TO NUMBER ONE

The given variables

$w_i$  = number of workers during  $i$ th month;  $w_0 = 30$

$x_i$  = number of Carpets made during  $i$ th month

$O_i$  = number of Carpets made by overtime in month  $i$

$h_i, f_i$  = number of workers hired and fired, respectively, at beginning of month  $i$ .

$s_i$  = number of Carpets stored at end of month  $i$ ,  $s_0 = 0$

There are 12 variables

Constraints

$w_i, x_i, O_i, h_i, f_i, s_i \geq 0, i = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12$

Total number of Carpets made consists of regular production plus overtime made per month.

$$x_i = 20w_i + O_i$$

number of workers

$$w_i = w_{i-1} + h_i - f_i$$

number of Carpets

$$s_i = s_{i-1} + x_i - d_i$$

Limited overtime (S)

$$O_i \leq 0.1w_i$$

The objective function is to minimize the total cost

$$\text{Min } 2000 \sum_i w_i + 320 \sum_i h_i + 400 \sum_i f_i + 8 \sum_i s_i + 180 \sum_i O_i$$

QUESTION TWO SOLUTION

KEYBOARD PRODUCTION

Kansas 15

Mexico 8

KEYBOARD CONSUMPTION

New York 10

California 13

KEYBOARD TRANSPORTATION

• \$ NEW YORK (\$)

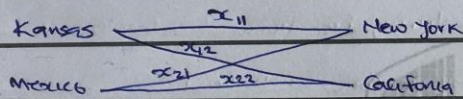
CALIFORNIA (\$)

MEXICO 4 ( $a_{21}$ )

1 ( $a_{22}$ )

KANSAS 2 ( $a_{11}$ )

3 ( $a_{12}$ )



Constraint of Production

$$x_{11} + x_{12} \leq 15$$

$$x_{21} + x_{22} \leq 8$$

Constraint of Consumption

$$x_{11} + x_{21} \leq 10$$

$$x_{12} + x_{22} \leq 13$$

$$\text{Min } Z = a_{11}x_{11} + a_{12}x_{12} + a_{21}x_{21} + a_{22}x_{22}$$

$$= 2x_{11} + 3x_{12} + 4x_{21} + x_{22}$$

N.U.E.S.A

ABUAD ENGINEERING