

Agoyi Isaac Otuozie

15/ENG02/002

COE 512 Classwork 2

- 1)
- $w_n = 30$  employees (number of employees in  $n$ th month)
  - $x_n = 20 + O_n$  carpets (number of carpet in  $n$ th month)
  - $h_n =$  number of hired workers in month  $n$
  - $f_n =$  number of fired workers in month  $n$
  - $O_n =$  total number of carpets produced overtime
  - $S_n =$  total number of carpets stored.

but  $w_n, x_n, h_n, f_n, O_n, S_n \geq 0$   
 $\therefore n = 1, \dots, 12$

Total number of carpet made in a month  $\Rightarrow$  overtime production  
+ individual production

$$\therefore x_n = 20w_n + O_n$$

Total number of workers (considering hiring and firing factors)  
 $w_n \Rightarrow w_n + h_n - f_n$

Total number of carpets stored for the month (considering demand in a month)  $S_n = S_n + x_n - d_n$

~~over~~  
To minimize the total cost, we have:

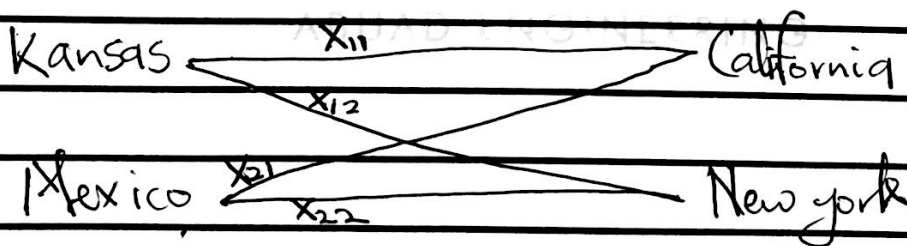
$$\min = 2000 \sum_n w_n + 320 \sum_n h_n + 400 \sum_n f_n + 8 \sum_n S_n + 180 \sum_n O_n$$

2)

Production location	Number of keyboards produced
Kansas	15
Mexico	8

Consumption location	Number of keyboards consumed
California	13
New York	10

	Cost of transportation	
	California	New York
Kansas	3	2
Mexico	1	4



Constraints

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

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

$$x_{11} + x_{21} \leq 13$$

$$x_{12} + x_{22} \leq 10$$

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

$$\text{Min } Z = 3x_{11} + 2x_{12} + x_{21} + 4x_{22}$$

$$\text{Use } x_{11} = x_1$$

$$x_{12} = x_2$$

$$x_{21} = x_3$$

$$x_{22} = x_4$$

$$\therefore Z = 3x_1 + 2x_2 + x_3 + 4x_4$$

$$x_1 + x_2 + s_1 = 15$$

$$x_2 + x_3 + s_2 = 8$$

$$x_1 + x_3 + s_3 = 13$$

$$x_2 + x_4 + s_4 = 10$$