Class on Transportation

A *transportation problem* is one in which the objective for minimization is the cost of transporting a certain commodity from a number of origins to a number of destinations. Although the transportation problem can be
solved using the regular simplex method, but write separate program to get the initial BFS.

Suppose that there are m origins and n destinations. Let a_i be the amount of a commodity available at origin i (i = 1, 2, . . . , m) and b_j be the amount required at destination j (j = 1, 2, . . . , n). Let c_{ij} be the cost per unit of transporting the commodity from origin i to destination j.

Write different modules to obtain BFS with (i) matrix minima, (ii) north-west corner and (iii) VAM.

Problem 1: A scooter production company produces scooters at the units situated at various places (called origins) and supplies them to the places where the depot (called destination) are situated. Here the availability as well as requirements of the various depots are finite and constitute the limited resources. Please see the following:

Depot / Unit	B_1	B_2	B_3	B_4	Stock
A_1	c_{11}=2	c_{12}=3	c_{13}=5	c_{14}=1	a_1=8
A_2	c_{21}=7	c_{22}=3	c_{23}=4	c_{24}=6	a_2=10
A_3	c_{31}=4	c_{32}=1	c_{33}=7	c_{34}=2	a_3=20
Requirement	b_1=6	b_2=8	b_3=9	b_4=15	= =38

Test whether the following allocation is optimal

Depot / Unit	B_1	B_2	B_3	B_4	Stock
A_1	6(2)	2(3)	×	×	8
A_2	×	6(3)	4(4)	×	10
A_3	×	×	5(7)	15(2)	20
Requirement	6	8	9	15	38

Do it manually first then check it with the program.
If it is not then find the optimal solution.

Problem 2: find the optimal allocation of the following

W→ F ↓	W_1	W_2	W_3	W_4	Factory Capacity
F_1	19	30	50	10	7
F_2	70	30	40	60	9
F_3	40	8	70	20	18
Warehouse Requirement	5	8	7	14	34