8. Develop a python program to demonstrate the Transportation problem using Modi method (Initial solution can be of any method) in Linear Programming.

**PRE SESSION-8**

**Problem :**

A firm has 3 factories - A, E, and K. There are four major warehouses situated at B, C, D, and M. Average daily product at A, E, K is 30, 40, and 50 units respectively. The average daily requirement of this product at B, C, D, and M is 35, 28, 32, 25 units respectively. The transportation cost (in Rs.) per unit of product from each factory to each warehouse is given below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Warehouse** | | | | | |
| **Factory** | **B** | **C** | **D** | **M** | **Supply** |
| **A** | 6 | 8 | 8 | 5 | 30 |
| **E** | 5 | 11 | 9 | 7 | 40 |
| **K** | 8 | 9 | 7 | 13 | 50 |
| **Demand** | 35 | 28 | 32 | 25 |  |

The problem is to determine a routing plan that minimizes total transportation costs.

**IN SESSION-8**

**Problem 1:**

The Sunrise Coffee company has three plants located throughout a state with production capacity 7, 10 and 18 gallons. Each day the firm must furnish its four retail shops D1, D2, D3, & D4 with at least 5, 8, 7, and 15 gallons respectively. The transportation costs (in Rs.) are given below.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Plant** | **D1 D2 D3** | | | | **D4**  12 | **Supply** | **D3** | **D4** | **Supply** |
| **P1** | 19 | 30 | 50 | 7 |
|  | **P2** | 70 | 30 | 40 | 60 | 10 |
|  | **P3** | 40 | 10 | 60 | 20 | 18 |
| **Requirement** |  | 5 | 8 | 7 | 15 |  |
|  |  |  |  |  |  |

The economic problem is to distribute the avaiSESSIONle product to different retail shops in such a way so that the total transportation cost is minimum.

**POST SESSION-8**

**Problem 1:**

The XYZ Sawmill Company’s CEO asks to see next month’s log hauling schedule to his three sawmills. He wants to make sure he keeps a steady, adequate flow of logs to his sawmills to capitalize on the good lumber market. Secondary, but still important to him, is to minimize the cost of transportation. The harvesting group plans to move to three new logging sites. The distance from each site to each sawmill is in Table. The average haul cost is $2 per mile for both loaded and empty trucks. The logging supervisor estimated the number of truckloads of logs coming off each harvest site daily. The number of truckloads varies because terrain and cutting patterns are unique for each site. Finally, the sawmill managers have estimated the truckloads of logs their mills need each day. All these estimates are in Table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Logging site | **Distance in miles** | | **Supply** | | |
| Mill A | Mill B Mill C |  |  |  |
| **1** | 8 | 15 50 |  | 20 |  |
| **2** | 10 | 17 20 |  | 30 |  |
| **3** | 30 | 26 15 |  | 45 |  |
| **Demand** | 30 | 35 30 |  |  |  |