

Variables:

i - type of product

j - factory

k - stock

l - shop

c_{ij} - production cost of the product i on the factory j

p_{jk} - transportation cost from factory j to stock k for one unit of product (any type of product)

$capacity_k$ - capacity of the stock k

q_{kl} - transportation cost from stock k to the shop l for one unit of product (any type of product)

d_{il} - minimum quantity of the product i for the operation of the store l

x_{ij} - amount of product i produced on factory j

y_{ijk} - amount of products i transported from factory j to the stock k

z_{ikl} - amount of products i transported from the stock k to the shop l

$$\min \sum_i \sum_j c_{ij} \cdot x_{ij} + \sum_i \sum_j \sum_k p_{jk} \cdot y_{ijk} + \sum_i \sum_k \sum_l q_{kl} \cdot z_{ikl}$$

Constraints:

$$\sum_i \sum_j z_{ikl} \leq capacity_l \quad \forall k$$

$$\sum_i \sum_j y_{ijk} \leq capacity_k \quad \forall k$$

$$\sum_i x_{ij} = \sum_i \sum_k y_{ijk} \quad \forall j$$

$$\sum_j y_{ijk} = \sum_l z_{ikl} \quad \forall i, k$$

$$\sum_k z_{ikl} \geq d_{il} \quad \forall i, l$$