**Ex38 re-write problem algebraic model**

Parameters:

$$L:Total available labor hours, L=400 hours$$

$$M:Available days of shipping of each route, M=30 days$$

$$D\_{i} :Demand of product-i in this month, i\in \left\{1,2\right\} D\_{1} =10,D\_{2}=8$$

$SR\_{ij}:Days of shipping required by product-i shipped via route-j i,j\in \left\{1,2\right\} $

$$LR\_{ij}:Labor hours required by product-i shipped via route-j i,j\in \left\{1,2\right\}$$

$$C\_{ij}:Unit cost of shippnig product-i via route-j i,j\in \left\{1,2\right\} $$

$$R\_{ij}:Specific requiments of product-i shipped via route-j i,j\in \left\{1,2\right\}$$

Decision Variable:

$$X\_{ij}:Number of product-i shipped via route-j i,j\in \left\{1,2\right\} $$

Objective:

$$Minimize Total Cost=\sum\_{i=1}^{2}\sum\_{j=1}^{2}(x\_{ij}\*C\_{ij})$$

Constraints:

$$\left(1\right) \sum\_{i=1}^{2}(x\_{ij}\*SR\_{ij})\leq M for jϵ\left\{1,2\right\} Shipping days constraint$$

$$\left(2\right) \sum\_{i=1}^{2}\sum\_{j=1}^{2}(x\_{ij}\*LR\_{ij})\leq L Labor hours constraint$$

$$\left(3\right) \sum\_{j=1}^{2}x\_{ij}\geq D for iϵ\left\{1,2\right\} Production demand constraint$$

$$\left(4\right) X\_{ij} \geq R\_{ij} for i,jϵ\left\{1,2\right\} Requirements of shipping product-i via route-j $$

$$\left(5\right) X\_{ij}\geq 0 for i,jϵ\left\{1,2\right\} Non-negative$$