Homework 1 ISYE 3133 – Wataru Tamura, Hanxiong Wu, Zhehao Shen

a) **Data:** $R_q$ = { [(1,1),(1,2),(1,3),(2,1)], [(2,2),(2,3)], [(1,4),(1,5),(2,5)], [(1,6),(2,6)], [(2,4),(3,4)], [(3,1),(4,1)], [(3,2),(3,3),(4,3)], [(4,4),(5,4)], [(3,5),(3,6),(4,5)], [(4,6),(5,5),(5,6)], [(4,2),(5,1),(5,2)], [(6,1),(6,2)], [(5,3),(6,3)], [(6,4),(6,5),(6,6)] } for all q = [1,2,3,4,5,6,7,8,9,10,11,12,13,14]

**Variables:** i = row, j = column, k = number value

**i, j, k** = [1,2,3,4,5,6]

$\mathbf{x_{ijk}}$ = {1 if $x_{ij}$ = k, 0 otherwise}

$\mathbf{y_{ij}}$ = number in cell (i,j)

**w** = continuous variable, sum for each region

**Objective:** max 0

s.t. $y_{ij} = \sum_{k=1}^{6} x_{ij}*k$, for all i, j = [1,2,3,4,5,6]

$\sum_{k=1}^{6} x_{ijk} = 1$ for all i, j = [1,2,3,4,5,6]

$\sum_{j=1}^{6} x_{ijk} = 1$ for all i, k = [1,2,3,4,5,6]

$\sum_{i=1}^{6} x_{ijk} = 1$ for all j, k = [1,2,3,4,5,6]

$\sum_{(i,j)\in R_q} y_{ij} = w$ for all q = [1,2,3,4,5,6,7,8,9,10,11,12,13,14]

i, j, k, $y_{ij}$ ,w ≥ 0, and $x_{ijk}$ ϵ {0,1}