**Network Models – Assignment (Properties)**

Problem Rewritten by Jill Nguyen

**Model:**

Parameters:

$R\_{ij }$: Revenue received from investor$ i for property j, where$$i,j\in \left(1, 2, 3, 4\right)$

*Decisions:*

$x\_{ij }$*: Whether property* $j is sold to investor i,$$ where .$$i,j\in \left(1, 2, 3, 4\right)$

*Objective: Maximize revenue*

$max\sum\_{ij}^{} x\_{ij }$ *\**$ R\_{ij }$

*Constraints:*

$\sum\_{i}^{}x\_{ij }\leq 1 \left(1\right)$ *A property can be sold to maximum 1 investor*

$\sum\_{j}^{}x\_{1j}\leq 2 ($*2) Investor 1 can purchase a maximum of 2 properties*

$\sum\_{j}^{}x\_{ij }\leq 1 $*(3) Demand of destination j must be satisfied,* $ i\in \left(2, 3, 4\right)$*. Investors are willing to purchase at most 1 property*

$x\_{ij }\in \left(0,1\right)$ *(4) Binary variable for assignments*

**Optimal Solution:**

A maximum revenue of $805,000 can be attained by selling the properties to the investors as shown below.



**Sensitivity Report:**

It is optimal to:

* sell property 1 to investor 4
* sell property 2 to investor 2
* sell property 3 to investor 3
* sell property 4 to investor 1

This solution gives a maximum profit of $805,000.

Reduced cost: The amount which be decrease from the total profit if the lower bound is increased.

Shadow price: The amount which would be added to total profit if there is an additional investor to buy and an additional property to sell.



