**Problem Assignment:** You’re the MSBA program director and you break the incoming class into 3 teams. You inform the class know that there are 6 projects available and that each team must take on 2 projects. You tell them to discuss with their team and rate the projects from 1-10 with 10 being their favorite. Now you must determine which project to assign to each group to maximize the satisfaction of the groups. You get the following results:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Preferences | Project 1 | Project 2 | Project 3 | Project 4 | Project 5  | Project 6 |
| **Group 1** | 5 | 5 | 9 | 9 | 8 | 8 |
| **Group 2** | 7 | 4 | 5 | 6 | 4 | 5 |
| **Group 3** | 9 | 8 | 8 | 4 | 4 | 9 |

**Discussion:** The goal is to maximize the satisfaction of the groups when assigning the projects. Our strategy is to create a binary decision variable on whether to assign a project to a group.

**Mathematical Model:**

Parameters:

$$i ϵ 1,2,3 \left( i: Index for groups\right)$$

$$j ϵ 1,2,..6 \left( j: Index for projects \right)$$

$$A\_{ij} : Rating given by group i for project j$$

$M : Number of projects assigned to each group ;M=2$

**Decision Variables:**

$$x\_{ij} :Whether group i assigned project j$$

**Objective:**

$$Maximize total satisfaction points=\sum\_{j=1}^{6}\sum\_{i=1}^{3}\left(x\_{ij}\*A\_{ij}\right)$$

**Constraints:**

$$\sum\_{j=1}^{6}x\_{ij}\leq M ; for i ϵ\left\{1,2,3\right\} \left(1\right) Sections assigned to each professor $$

$$\sum\_{i=1}^{3}x\_{ij}\leq 1 ; for j ϵ\left\{1,2,..6\right\} \left(2\right) Each section is assigned to atleast 1 professor$$

$x\_{ij}ϵ \left\{0,1\right\} \left(3\right) Binary Constraint$

Excel Solution:

