

Final Assignment (Section28_520193)

Problem1.

(a)

Decision Variables:

x_i : Associates

- binary variable
- $i = 1, 2, 3, 4, 5, 6, 7, 8$

Objective Function:

$E(x_i)$ = the total experience of the team

- maximize $E(x_i) = 2 \cdot x_1 + 3 \cdot x_2 + 4 \cdot x_3 + 2 \cdot x_4 + 1 \cdot x_5 + 3 \cdot x_6 + 1 \cdot x_7 + 4 \cdot x_8$

Constraints(assumptions):

1. the sum of males: $x_3 + x_4 + x_6 + x_7 = 2$
2. the sum of females: $x_1 + x_2 + x_5 + x_8 = 2$
3. the sum of US citizens: $x_1 + x_3 + x_6 + x_7 = 2$
4. the sum of non-US citizens: $x_2 + x_4 + x_5 + x_8 = 2$

Optimal Solution:

- Total experience of the team: 14
- Team members: x_2, x_3, x_6, x_8

(b)

Additional constraints (assumptions)

#1) If Associate 1 is chosen, then Associate 3 cannot be chosen.

$$x_1 + x_3 \leq 1$$

#2) If Associate 2 is chosen, then Associates 6 and 7 need to be chosen.

$$x_2 - x_6 \leq 0$$

$$x_2 - x_7 \leq 0$$

#3) Associates 5 and 8 dislike each other and should not be chosen together.

$$x_5 + x_8 \leq 1$$

Optimal Solution:

- Total experience of the team: 11
- Team members: x_1, x_4, x_6, x_8