Problem 1 [11.5 points]

As a partner in a prestigious consulting firm, you are tasked with a unique and challenging project that requires a diverse and experienced team. Your firm prides itself on delivering top-tier consulting services while upholding the values of diversity and inclusion in its workforce.

You are currently preparing for a high-profile project that will require a dynamic approach, blending different perspectives and skills. To this end, you must assemble a team of four associates from a pool of eight candidates. As shown in the table below, each candidate brings a unique set of skills and experiences, represented by their years of experience in the field. Additionally, their gender and citizenship (US or Non-US) add further dimensions to the diversity of the team.

a) [7 points] You would like to maximize the total experience of the team, but in addition, for diversity reasons, you would like to have 2 male and 2 female members, as well as 2 US and 2 non-US members. Please construct and solve a binary optimization model that selects the optimal team.

Associate	Experience	Gender	US
1	2	F	Yes
2	3	F	No
3	4	M	Yes
4	2	M	No
5	1	F	No
6	3	M	Yes
7	1	M	Yes
8	4	F	No

b) [4.5 points] In addition to the requirements in part (a), there are some further constraints:

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

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

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

Please show what additional constraints you need to add to the model of part (a) to accommodate these requirements. Add these constraints to your model and resolve to obtain an optimal solution.