Assignments are due on the due date before class and have to include this cover page. Plagiarism in assignment answers will not be tolerated. By submitting their answers to this assignment, the authors named above declare that its content is their original work and that they did not use any sources for its preparation other than the class notes, the textbook, and ones explicitly acknowledged in the answers. Any suspected act of plagiarism will be reported to the Faculty’s Academic Integrity Officer and possibly to the Senate Discipline Committee. The penalty for academic dishonesty may range from failing the course to expulsion from the university, in accordance with Dalhousie University’s regulations regarding academic integrity.
**Question 1 (10 marks)** You are organizing a soccer match. Since you are a group of friends and you have played together many times before, each of your friends knows how well they play on the same team with everybody else. As a result, each of your friends, \( x \), expresses the following type of preferences about every other friend \( y \):

- I (\( x \)) would rather not play on the same team with \( y \).
- I (\( x \)) really want to play on the same team with \( y \).

\( x \) may also choose not to express any preference about playing on the same team with \( y \) if he/she does not care either way.

You have to answer the following question: Is there a way to form two teams so that

1. all your friends' preferences are satisfied and
2. there are at least 11 people on each team.

Develop an algorithm that allows you to answer the above question. Your algorithm should run in \( O(n + m) \) time, where \( n \) is the number of your friends and \( m \) is the number of preferences that were expressed. Argue briefly that the algorithm is correct and that its running time is indeed \( O(n + m) \).

**Hint:** Remember we are currently talking about graph algorithms in class. Testing bipartiteness is the right starting point for thinking about this question.