Please enter your name and uID below.

Name:

uID:

Collaborators, if any, and how you collaborated:

Submission notes

- Due at 11:59 pm (midnight) on Thursday, Dec 8th.
- Solutions must be typeset using one of the template files. For each problem, your answer must fit in the space provided (e.g. not spill onto the next page) *without* space-saving tricks like font/margin/line spacing changes.
- Upload a PDF version of your completed problem set to Gradescope.
- Teaching staff reserve the right to request original source/tex files during the grading process, so please retain these until an assignment has been returned.
- Please remember that for this problem set, you are allowed to collaborate in detail with your peers, as long as you cite them. However, you must write up your own solution, alone, from memory. If you do collaborate with other students in this way, you must identify the students and describe the nature of the collaboration. You are not allowed to create a group solution, and all work that you hand in must be written in your own words. Do not base your solution on any other written solution, regardless of the source.

2. (Course policies: 55pts)

   There are two written problems. The first should be completed on Canvas here. This is the second problem.

   Professor Martin tries to make his students happy. Next semester, his plan is to pass out a questionnaire listing a number of possible course policies. Every student is asked to respond to each possible course policy with one of "strongly favor", "mostly neutral", or "strongly oppose". Each student may respond with "strongly favor" or "strongly oppose" to *at most five questions*.

   Each student is happy if (but only if) Professor Martin adopts at least one course policy that the student feels strongly about (e.g. adopts a policy they are strongly favoring, or does not adopt a policy they are strongly opposing). Professor Martin's goal is to develop an algorithm that, given a questionnaire and list of student responses, determines whether it's possible to make all students happy or not.

   Either describe and analyze a polynomial-time algorithm for this problem, or prove that it is NP-hard via a reduction from some problem we've discussed in class or on homework.

You may use a second page, if you'd like, but it shouldn't be necessary.