Quiz 01

COSC 373: Distributed Algorithms, Spring 2022

Instructions. This quiz is open book and open note—you may freely use your notes, lecture notes, or textbook while working on it. You may *not* consult any living resources such as other students or web forums. The quiz should be submitted through Gradescope by 5:00pm on Friday, March 4th.

Affirmation. I attest that that work presented here is mine and mine alone. I have not consulted any disallowed resources while taking this quiz.

Name: _____

Signature: _____

Background. In class, we described two algorithms for finding matchings between students and internships: the Gale-Shapley algorithm (which finds a *stable* matching) and a maximal matching algorithm.

Question 1. Describe a stable matching instance (i.e., a set of students, internships, and rankings) for which the matching found by the maximal matching algorithm is not stable. *(Hint: this is possible with 3 students and 3 internships.)*

Question 2. Find a stable matching instance with 3 students and 3 internships in which the maximal matching algorithm produces a perfect matching (i.e., all students/internships are matched), but for which any stable matching only matches 2 students/internships. *(Hint: this is only possible with incomplete preference lists.)*