

Instructions

Rules for Completing the Problem

When solving this problem you may only reference course artifacts, including the lecture notes and recordings, textbook, and any notes/solutions you have handwritten during the course and prior to the quiz. Communicating with others (whether inside or outside of class) or finding solutions online is considered cheating and is grounds for receiving an F grade for the class.

Submitting your work

Submit a single file with your handwritten solution to the appropriate drop box by 10:00 am. Make sure you provide your name and SID in the upper-right corner of your solution.

Late submissions

Should you submit after the dropbox deadline, solutions received no later than 10 minutes after the deadline will lose 20% of the earned points. Solutions received between 11 and 20 minutes after the deadline will lose 50% of the points. All other late submissions will not be graded.

Problem 3

The decision problem **Half Clique** takes as input a graph $G = (V, E)$ and decides if G has an $(n/2)$ -clique, where $n = |V|$. Provide a polynomial-time functional reduction from **3SAT** to **Half Clique**. Hint: make use of the reduction given in lecture.

- First provide a high-level description of the reduction in one or more sentences. (10 pts)
- Prove that the reduction can be computed in polynomial time. (5 pts)
- Prove that a positive instance of **3SAT** maps to a positive instance of **Half Clique**. (5 pts)

- d. Prove that a negative instance of **3SAT** maps to a negative instance of **Half Clique**. (5 pts)