6.5440: Algorithmic Lower Bounds, Fall 2023

Prof. Erik Demaine, Josh Brunner, Lily Chung, Jenny Diomidova

Problem Set 3

Due: Monday, September 25, 2023 at noon

Problem 3.1 [Planar dominating set]. Given an undirected graph $G = (V, E)$, a ***dominating set*** is a subset of vertices $S \subseteq V$ such that every other vertex $v \in V - S$ is adjacent to at least one vertex in S. The Planar Dominating Set problem is to decide, given a planar graph G and a positive integer k, whether G has a dominating set of size $\leq k$.

Planar Dominating Set is contained in NP. Show that it is NP-hard.