E0 249 : Homework 3

Instructions

- All problems carry equal weight.
- You are forbidden from consulting the internet. You are strongly encouraged to work on the problems on your own.
- You may discuss these problems with your group (at most 3 people including you). However, you must write your own solutions and list your collaborators for each problem.

1. (Vazirani) Problems 19.2 and 19.3.
2. Give a $O(\log n)$ approximation algorithm for the expansion of a graph.
3. Given a graph $G = (V, E, w)$, let $OPT = \min_{S \subset V : |S| = n/2} w(E(S, V \setminus S))$. Give an algorithm to compute a set $S \subset V$ satisfying $cn \leq |S| \leq (1-c)n$ and $w(E(S, V \setminus S)) = O(\log n) \cdot OPT$, for some fixed constant $c \in (0, 1/2]$. What is the largest value of c your algorithm can guarantee?
4. Give an algorithm that takes a metric (V, d), and computes a least distortion ℓ_2-embedding of it.