

This assignment is **due on May 5**. You are allowed (even encouraged) to discuss these problems with your fellow classmates. All submitted work, must be *written individually* without consulting someone else's solutions.

Problem 1: Recall that the FLIP heuristic for MAX-CUT tries to move one node at a time from one side of the partition to the other, if this improves the cost of the solution. In class we showed that the heuristic has a locality ratio of exactly 2.

The k -FLIP heuristic is similar but each iteration we are allowed to move any k vertices around, while leaving the rest put. How much time we need to spend on each iteration? What is the locality ratio of this new heuristic?

Problem 2: Read chapter 12.3 of *Algorithm Design* by Kleinberg and Tardos on Hopfield networks. Explain briefly what is a Hopfield net and what is it used for. State the three components (\mathcal{F}, c, ϕ) of the local search algorithm that is used to find a stable configuration. Show that finding a stable configuration is PLS-complete.