
CSL 356: Analysis and Design of Algorithms**Instructor:** Ragesh Jaiswal

1. Discuss homework-4.
2. Consider the following problem:

CLIQUE: Given a graph G and an integer k , determine whether G has a *clique* of size at least k . A clique in a graph is a subset of vertices such that all pair of vertices in the subset are connected with an edge.

Show that INDEPENDENT-SET \leq_p CLIQUE.

3. Consider the following problem:

MAX-INDEPENDENT-SET-SEARCH: Given a graph G find an independent set of G with maximum cardinality.

Recall, in the lecture, we showed that MAX-INDEPENDENT-SET \leq_p INDEPENDENT-SET. The MAX-INDEPENDENT-SET problem was the following: given a graph G , find the size of the maximum independent set of G .

Show that MAX-INDEPENDENT-SET-SEARCH \leq_p INDEPENDENT-SET.

4. (*2-SAT*) Recall, we said in the lecture that 2-SAT is easy. Design an efficient algorithm for solving the 2-SAT problem. Why doesn't ideas for solving the 2-SAT problem extend to the 3-SAT problem.
5. (*Search 3-SAT*) Suppose you are given an algorithm A for solving the 3-SAT problem. Can you use this algorithm to design another algorithm that finds a satisfying assignment if there exists one?
6. Consider the following problem:
CLIQUE-AND-IS: Given a graph G and an integer k , determine if there is a clique of size at least k in G and an independent set of size at least k in G .