Problem Set 9

This problem set is due on Friday Apr 16, by 4:00pm.

Use the CS172 drop box.

Write your name and your student ID number on your solution. Write legibly. The description of your proofs should be as clear as possible (which does not mean long – in fact, typically, good clear explanations are also short.) Be sure to be familiar with the collaboration policy, and read the overview in the class homepage www.cs.berkeley.edu/~luca/cs172.

1. Show that NL is closed under star.

2. Sipser problem 8.8. Prove that the Acceptance problem for NFA is NL-complete. In addition, prove that the Acceptance problem for DFA is in L.

3. (a) Show that MAX-CLIQUE ∈ PSPACE.

(b) Explain why the following argument fails to show that MAX-CLIQUE ∈ coNP: To show that \( (G, k) \notin \text{MAX-CLIQUE} \), it suffices to demonstrate the existence of a larger clique in \( G \) of size greater than \( k \), so the NP algorithm for MAX-CLIQUE just guesses the larger clique.