

CS:5340 Homework 7

Due: Fri, 12/8

Notes: (a) Any problem numbers mentioned in the handout refer to problems in the textbook, by Arora and Barak. (b) It is possible that solutions to some of these problems are available to you via other theory of computation books or on-line lecture notes, etc. If you use any such sources, please acknowledge these in your homework *and* present your solutions in your own words. You will benefit most from the homework, if you seriously attempt each problem on your own first, before seeking other sources. (c) As mentioned in the syllabus, it is okay to form groups of two in solving and submitting homework solutions. But, my advice from (b) still applies: you will benefit most from the homework, if you seriously attempt each problem on your own first, before seeking help from your group partner. (d) Discussing these problems with any of your classmates is okay, provided you and your classmates are not being too specific about solutions. In any case, make sure that you take no written material away from these discussions *and* (as in (b)) you present your solutions in your own words. When discussing homework with classmates please be aware of guidelines on “Academic Dishonesty” as mentioned in the course syllabus.

1. Problem 6.1 (a).
 2. Problem 6.3. Once you have described the language prove that it is indeed in $P_{/poly}$ and not in P .
 3. Problem 6.4.
 4. Problem 6.5. The solution to this problem appears in this paper: “Circuit-size lower bounds and non-reducibility to sparse sets,” R. Kannan, *Information and Control*, Vol 55, 1982. You are welcome to read the relevant proof in this paper and write the solution in your own words.
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