

Analysis of Algorithms

CS 375, Fall 2018

Homework 18

Due **AT THE BEGINNING OF CLASS** Monday, December 3

- **Reading Assignment:**

- From your textbook (Levitin), please read Chapter 11 (you can skip Sections 11.2 and 11.4).
 - Also, from CLRS, please read Chapter 34.
- Please note that any exercise from CLRS (rather than from Levitin) will be explicitly marked below as “CLRS Exercise,” and I will give a page number on which the exercise can be found in the CLRS 3rd edition (electronically available through Colby’s library). Exercise numbers not marked as being from CLRS are from Levitin, as usual.
 - *A general note:* When writing up your homework, please write neatly and explain your answers clearly, giving all details needed to make your answers easy to understand. Graders may not award credit to incomplete or illegible solutions. Clear communication *is* the point, on every assignment.

Exercises

1. Exercise 11.3.2. Please explain all of the steps in the reasoning behind your answer—a well-worded short paragraph (a few sentences, maybe a bit more) could be sufficient.
2. Exercise 11.3.7. For both parts, when outlining the requested algorithm, it is not necessary to provide pseudocode or a best-possible complexity bound—a brief description of the algorithm in English could be sufficient, and it is only essential to show that the algorithm is polynomial time (*poly-time*, for short).
3. Exercise 11.3.9. (You do not need to re-do the reduction presented in the course lecture notes!)
4. Show that the INDEPENDENT SET problem, introduced in Exercise 11.3.9, is NP-Complete. (Be sure to include all relevant steps and details in your answer!) In your answer, you may use the results of Exercise 11.3.9, and you may assume that VERTEX COVER and CLIQUE are NP-Complete.