CSCE 750, Homework 8

This optional assignment covers material from the lectures from Chapter 34 (in both the 3rd and 4th editions), in preparation for the final exam. Solutions to some of these problems will be posted shortly before the final exam. This homework is not to hand in.

Page 1055: Exercises 34.1-1, 34.1-6 [3rd ed. Pages 1060–1061: Exercise 34.1-1, 34.1-6]

Page 1060: Exercises 34.2-1, 34.2-3 [3rd ed. Page 1065: Exercises 34.2-1, 34.2-3]

Page 1071: Exercise 34.3-2 [3rd ed. Page 1077: Exercise 34.3-2]

Page 1080: Exercise 34.4-6 [3rd ed. Page 1086: Exercise 34.4-6]

NIT1: Show, using a reduction from VERTEX COVER, that CLIQUE is NP-hard. (The CLIQUE problem is defined in Section 34.5.)

NIT2: Consider this problem:

> **KARP-LETTERS:**
> *Instance:* A list of strings of varying lengths, consisting of upper- and lower-case letters.
> *Question:* Can one select a letter from each string without choosing both versions of any letter?[1]

> Either prove that KARP-LETTERS $\in$ P, or prove that KARP-LETTERS is NP-complete. (Hint: Only one of these options can be completed correctly.[2]) For an NP-completeness proof, you may reduce from any problem identified as NP-hard in the lecture or in either textbook.

Pages 1100–1102: Problem 34-3 [3rd ed. Pages 1103–1104: Problem 34-3]

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[1]For example, if the input strings are 'Abc', 'BC', 'aB', and 'ac', the correct answer is 'Yes', because we can choose 'A' from the first string, 'B' from the second, 'B' from the third, and 'c' from the fourth. If the strings are 'AB', 'a', and 'b', then the correct answer is 'No'.

[2]... unless P = NP.