Homework 7
CSc 72700: Analysis of Algoritms
CUNY Graduate Center, Fall 2001

Due Wednesday, 5 December 2001

See the guidelines on the webpage for details about submitting homework. (If turning your homework in electronically, you can mail it directly to the grader at: `ivm3@columbia.edu`.)

Practice Problems

The problems in this section **are not to be submitted**. They are to help you understand the material, and some will appear on exams.

- Poly Calls to Poly-time Algorithm: 36.1-6 on p 924 (in the second edition, 34.1-5 on p 978).
- Listing Vertices in Ham. Cycle: 36.2-3 on p 928 (in the second edition, 34.2-3 on p 983).
- $P \subseteq co - NP$: 36.2-9 on p 929 (in the second edition, 34.2-9 on p 983).
- Hamiltonian Path: 36.5-1 on p 960 (in the second edition, 34.5-1 on p 1017).
- Longest-simple-cycle: 36.5-6 on p 961 (in the second edition, 34.5-7 on p 1017).

Graded Problems

These problems will be graded and should be submitted, following the guidelines on the webpage.

1. Subgraph-isomorphism problem
   36.5-1 on p 960 (in the second edition, 34.5-1 on p 1017).

2. Bonnie and Clyde
   Problem 34-2, p 1018, in second edition:
   Bonnie and Clyde have just robbed a bank. They have a bag of money and want to divide it up. For each of the following scenarios, either give a polynomial-time algorithm, or prove that the problem is NP-complete. The input in each case is a list of n items in the bag, along with the value of.

   (a) There are n coins, but only 2 different denominations: some couns are worth x dollars, and some are worth y dollars. They wish to divide the money exactly evenly.

(b) There are n coins with an arbitrary number of different denominations, but each denomination is a nonnegative integer power of 2, i.e., the possible denominations are 1 dollar, 2 dollars, 4 dollars, etc. They wish to divide the money exactly evenly.

(c) There are n checks, which are, in an amazing coincidence, made out to "Bonnie or Clyde." They wish to divide the checks so that they each get the exact same amount of money.

(d) There are n checks as in part c), but this time they are willing to accept a split in which the difference is no greater than 100 dollars.