

CSE 5314 Lab Assignment 1

Due March 9, 2004

Goals:

1. Understanding of the k-server problem.
2. Understanding of three approaches to the *offline* solution of the k-server problem: assignment problem (minimum-weight bipartite matching), dynamic programming, and minimum-cost maximum flow.
3. Coordination with several classmates on a small software *integration* project.

Requirements:

1. Provide a project notebook for your prototype:
 - a. Description of functionality (user's guide).
 - b. Source code.
 - c. Test cases.
 - d. Evaluation of the three approaches, especially the time and space required.
 - e. Diary of your group's progress.

Reuse of existing code is *encouraged*, but be sure that appropriate *credit* is given for all code and test cases.

Coordination with other groups requires prior approval.

2. Provide project files as a tar or zip.
3. Demonstration (team interview).

Getting Started:

1. You should work in a group of 3-4 students. Report the composition of your group no later than February 3.
2. Understand the *metrics* that are frequently considered in discussions of the k-server problem.
3. Decide how ambitious your user interface will be. Using text files alone is possible, but will be tedious for the user and for testing. Some use of graphics for preparation of input cases and presenting results is encouraged, but a tightly-integrated interface is not expected.
4. Reference [100] (and its conference version, 1st Symposium on Discrete Algorithms, 1990) discuss the first and third algorithmic approaches. Reference [256] discusses the second approach.
5. Knuth's *GraphBase* code for the Hungarian method for the assignment problem is available from <http://reptar.uta.edu/NOTES5311/hungarian.c>.
6. The notes on *Advanced Combinatorial Algorithms* by S.O. Krumke, available from <http://www.zib.de/krumke>, includes an excellent section on minimum-cost flows.