CS 375 Design and Analysis of Algorithms
Spring 2013
Project
Due dates: See the document below.

Remember to include the following statement in your readme.txt file. "I/We have done this assignment completely on my/our own. I/We have not copied it, nor have I/we given my/our solution to anyone else. I/We understand that if I/we am involved in plagiarism I/we will have to sign an official form that I/we have cheated and that this form will be stored in my/our student's records. I/We also understand that I/we will receive a grade of **0 for this project**."

Introduction

This course requires that each student give an oral presentation about a project to the class. This project assignment is designed to fulfill this requirement. This assignment serves three purposes. First, it provides the students with an opportunity to practice the important skill of presenting material to an audience. Second, the students may be exposed to additional algorithms that for a lack of time are not covered during regular lectures. Third, the students can gain additional insight about a wide range of algorithms through more in-depth investigation.

Project Team

Each project should be done preferably by a team of two students although one-person team is permitted. The students of each team will be asked to explain their individual contribution, and to evaluate the performance of the other team member (a form will be provided). The presentation will be divided among the two members of the team.

Projects

Each team will select its own project to work on. Each project is to implement an algorithm and investigate certain aspects/behavior of the algorithm. The algorithm could be one of those already covered in the lectures or an algorithm not covered in the lectures but is described in the textbook (including the Exercises/Problems parts of the textbook). However, it cannot be one of those algorithms already implemented in one of the programming assignment.

Some algorithms may have parameters/alternative components. For example, for "digit" in Radix-sort may different lengths in terms of the number of bits, and there are different ways to perform the Partition component in Quicksort. You may test the algorithm with different parameter values or components to see how the algorithm behaves in terms of running time. You may also try different inputs (such as different lengths, different types, sorted/random/reversely sorted, etc.) to see how your algorithm behave. Testing/experimenting with your algorithm is part of the requirement for this project.

Some algorithms can be fine-tuned to make them more efficient. For example, for dynamic programming algorithms, some entries in the table(s) used need not be computed and sometimes

the procedures for the 3rd and 4th steps can be combined. You can also consider improving an algorithm as part of your investigation.

Presentation

Each team will give a 10-15-minute presentation about the project in a lab class. Your presentation should cover the following aspects:

1. Problem statement. Be clear about what problem your algorithm tries to solve. Use an example to illustrate the problem if possible.
2. The basic idea of the algorithm.
3. The pesudocode of the algorithm.
4. Your understanding of the algorithm. What are interesting features of this algorithm? What is its time complexity?
5. Implementation of the algorithm. What language is used? What data structure is used?
6. Dataset(s) used in testing the algorithm. Why select such dataset(s)?
7. The results of your testing/experimenting/investigation of the algorithm.
8. Concluding remarks.

Due Dates

1. April 18: Inform the instructor and TA by email the member(s) of your team and the project topic (the algorithm) your team plan to implement and investigate.
2. April 29. Each team should drop in the drop box for the project:
   a. A serious draft of your presentation slides.
   b. A working program.
   c. For teams of 2, two files called <member's name>.txt in which a team member explains his/her contribution and evaluates the performance of other team member.
   d. A preferred presentation date: 5/2/13 or 5/9/13. The instructor and the TA will try to accommodate your preference as much as possible.

Evaluation

The evaluation will be based on:
1. The overall evaluation provided by the students in the class (forms will be provided). Very important issues will be: (60%)
   a. Was the goal of the algorithm clearly defined?
   b. Was the main idea of the implementation clearly explained?
   c. Were the slides helpful?
2. The quality of the slides (20%)
3. The quality of the implementation (code) of the algorithm (20%)