Final Project

Topic Selection Due: January 30, 2020

Paper and Code Due: March 13, 2020

Overview

Any student interested in exploring some facet of Algorithms more thoroughly has the option of completing a project instead of the final exam. The topic can be almost anything, but should be related to algorithm complexity and must involve implementing one or more algorithms or data structures.

Topic Selection Guidelines

As a general guideline your project needs to involve the empirical analysis of algorithms or data structures to solve some problem. The exact topic selection is intentionally left quite open, and I would really like you to choose something that you find interesting. Some examples are included below, and you are welcome to select one of those if they sound like something you would enjoy implementing and experimenting with.

Examples

- Implement two or more approximation algorithms for the travelling salesman problem and see what sorts of inputs they perform best on as well as how close to optimal they get in practice.

- Experiment with a variety of opimization techniques for negamax search. Try alpha-beta pruning and using symmetries to reduce the size of the search space.

- Compare treaps and skip lists to some deterministic self-balancing trees and determine how close to balanced they are as well as how well they perform.

Requirements

Some general guidelines for what should be included in the paper are included here, but some exceptions can be made depending on the exact topic chosen. This should be treated as just a general guideline and not an exact set of requirements. Your target audience for your paper should be your peers in the graduate program.

- An explaination of the problem you chose and why.

- A brief description of the algorithms you selected. If the algorithms aren't covered in class you should consider including some well formatted pseudocode as well.

- A description of your experimental procedure and what steps you took to prevent things like garbage collection and other running processes from corrupting your results.

- Details about what experiments you performed and why you chose them. It is worth mentioning here that your program should take several seconds to run on the largest inputs. Anything less than that is generally too small to provide meaningful results.

- Properly labelled graphs showing your results.

- Well fomatted citations using either ACM or IEEE.

If you are not completely confident in your writing skills I strongly encourage you to visit the writing center and have them review your paper. `https://www.pdx.edu/writing-center/`

Submission Instructions

Topic Selection   Your topic selection must include the following:

- The problem or data structures you intend to focus on.

- A list of the algorithms you're planning to implement.

- The programming language you're going to be using.

- A rough outline of what you're planning to do to compare those algorithms.

Submit your topic selection by email to me at dleblanc@pdx.edu before midnight on the day it's due with the subject `CS 584 Topic Selection`.

Project Submission   You must submit a 7-10 page paper which describes the topic you chose, the algorithms that you implemented, what steps you took to compare them, and your results. You will also need to provide a zip file containing your source code, or a link to your git repository. Do not include any compiled code in your submission. Submit your project by email to me at dleblanc@pdx.edu before midnight on the day it's due with the subject `CS 584 Final Project`.