CompSci 261P Project #1: Hashing algorithms

In this project you are to implement several different hashing algorithms perform an empirical comparative analysis of their running times. The hashing algorithms to be implement are:

1. Linear hashing
2. Chained hashing
3. Cuckoo hashing
4. At least one additional algorithm.

For the empirical analysis, run the algorithms on a variety of test cases to determine the relative efficiencies of the algorithms as functions of various parameters, such as the number of elements and the load factor. How do your results compare with theoretical predictions of worst-case and amortized-time. You are encouraged to consider other factors as well. For example, if you generate your test cases randomly, you how do your choice of probability distribution and the distribution parameters affect your results?

Deliverables

1. A ZIP file that includes the following:
   - Source code (C, C++, Java, or Python) of your program that implements and experimentally tests the running times of the two algorithms For implementing the hashing algorithms, the only libraries you should use are dynamic arrays and linked lists.
   - The data used for any test cases or experiments
2. A Report (in PDF) that includes the following:
   - A pseudo-code/English description of each of the algorithms that you implemented and a theoretical analysis of the running times of the algorithms. This portion of the report should include pseudo-code summaries of the algorithms. It should also include reasons why you chose the particular additional algorithm(s) that you chose.
   - A comparative experimental analysis of the algorithms and conclusions drawn from the experiments. This portion of the report should include visual plots showing comparitive empirical performance of the algorithms for various types of inputs

Grading

- Code and documentation: 40%
- Experimental analysis: 60%

Final Note

- **Test your code throughly**. If we find bugs in your code, then not only will you lose points for the code and documentation, it calls into question your experimental analysis.