Hash Tables - Hash Table Analysis

Nada Basit and Mark Floryan

March 7, 2022

1 SUMMARY

The goal of this homework is to produce a report analyzing optimizations to your hash table implementation.

You will perform some experiment(s) by doing the following:

1. Experiment 1: Implement more than one of the collision resolution strategies shown in class. For each, count the number of collisions that occur and also record the time on various input to your word puzzle solver. Report which strategies had the most/fewest collisions, and how slow/fast the strategies were.

2. Experiment 2: Brainstorm and implement some kind of optimization to your hash table / word puzzle solver. Describe your optimization and how it works. Report how much faster it makes your word puzzle solver run compared to the best approach from experiment 1 above. How fast were able to make your code run?

3. **FILES TO DOWNLOAD:** None

4. **FILES TO SUBMIT:** HashTableAnalysis.pdf

1.1 REPORT

Summarize your experiment and your findings in a report. Make sure to adhere to these general guidelines:

- Your submission MUST BE a pdf document. You will receive a zero if it is not.

- Your document MUST be presented as if submitted to a professional publication outlet. You can use the template posted in the course repository or follow Springer's guidelines for conference proceedings.

- You should write your report as if it is original novel research.

- The grammar / spelling / professionalism of this document should be sound.

- When possible, do not use the first person. Instead of "I ran the code 60 times", use "The code was executed 60 times...".

In addition to the general guidelines above, please follow the following rough outline for your paper:

- **Abstract**: Summarize the entire document in a single paragraph

- **Introduction**: Present the problem, and provide details regarding the algorithms you implemented (Collision resolution strategies, optimizations, etc.).

- **Methods**: Describe your methodology for collecting data. How many executions, which inputs, when did the timer start/stop, etc.

- **Results**: Describe your results from your execution runs.

- **Conclusion**: Interpret your results. Which algorithm/approach was fastest in each situation? Did the fastest algorithm change? If so, why? Does the performance you see match the theoretical runtimes of the algorithms? Why or why not?

Lastly, your paper MUST contain the following things:

- A table (methods section) summarizing the experiments and how many execution runs were done in each group.

- At least one table (results section) summarizing the results of all of your experiments.

- Some kind of graph visualizing the results of the table from the previous bullet.