Algorithms and Data Structures for Data Science
lab_hash

CS 277
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February 24, 2023
Mini-Project 1 Graded

Average Score: 74% overall

   Autograde - 97%

   Proposal - 81%

   Visualization - 60%
Exam 1 Retake next week!

March 1 — March 3

No make-up retakes. No extensions.

There will be a programming question. It will not be hand graded.
Learning Objectives

Implement multiple forms of hashing

Determine collision frequency and run-time differences in hashing
Separate Chaining
Collision Handling: Linear Probing

\[ S = \{ 16, 8, 4, 13, 29, 11, 22 \} \]
\[ |S| = n \]
\[ h(k) = k \mod 7 \]
\[ |Array| = m \]

\[ h(k, i) = (k + i) \mod 7 \]

Try \( h(k) = (k + 0) \mod 7 \), if full...
Try \( h(k) = (k + 1) \mod 7 \), if full...
Try \( h(k) = (k + 2) \mod 7 \), if full...
Try ...
Collision Handling: Double Hashing

\[ S = \{ 16, 8, 4, 13, 29, 11, 22 \} \quad |S| = n \]

\[ h_1(k) = k \mod 7 \]

\[ h_2(k) = 5 - (k \mod 5) \]

\[ h(k, i) = (h_1(k) + i \cdot h_2(k)) \mod 7 \]

Try \( h(k) = (k + 0 \cdot h_2(k)) \mod 7 \), if full…

Try \( h(k) = (k + 1 \cdot h_2(k)) \mod 7 \), if full…

Try \( h(k) = (k + 2 \cdot h_2(k)) \mod 7 \), if full…

Try …
Coding the lab

1) Make sure you understand how to use each hash function

2) Work out how to code each of the collision strategies

3) After you figure out how to build the hash table, work out find.

Tip: Make sure you don’t go out of bounds!

Tip: Read the instructions for double hash carefully!