

Lab 10 Hashing

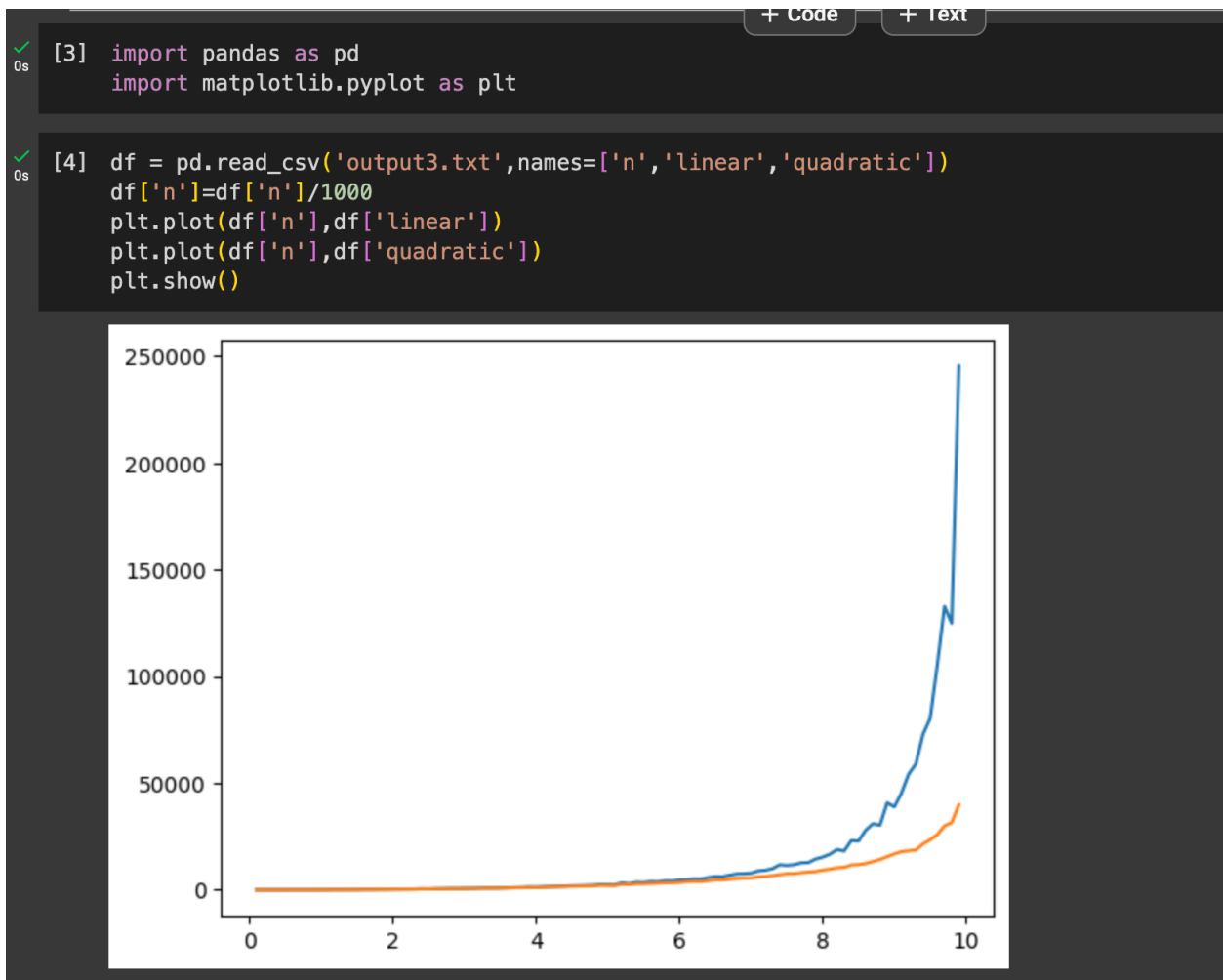
Plotting Collision Frequency vs. Load Factor in Open Address Hashing

Objective: In this lab, you will explore the relationship between collision frequency and load factor in open address hashing using linear and quadratic probing methods.

Instructions:

1. **Understanding Open Address Hashing:**
 - Review the concept of open address hashing, including linear and quadratic probing methods.
 - Understand how collisions occur and how they are resolved in each probing method.
2. **Implementing Hash Table:**
 - Use the code provided in the lecture class for implementing a hash table data structure with open address hashing.
 - Ensure your implementation includes functions for inserting data into the hash table and calculating load factor.
3. **Generating Data:**
 - Vary the size of the dataset from 100 to 9900 random (increased by 100) integers to insert into a hash table.
 - The hash table is fixed by the size of buckets to 10000 and record the number of collisions that occur during insertion.
4. **Calculating Load Factor:**
 - Calculate the load factor for each number of data. Load factor is defined as the ratio of the number of elements stored in the hash table to the size of the hash table.
5. **Plotting Collision Frequency vs. Load Factor:**
 - Plot a line chart with load factor on the x-axis and collision frequency on the y-axis.
 - Plot separate lines for linear probing and quadratic probing methods.
6. **Analysis:**
 - Analyze the plotted data and observe the relationship between load factor and collision frequency for both linear and quadratic probing methods.
 - Discuss any differences or similarities observed between the two probing methods.

Submission: Submit your chart and analysis in a pdf file.



The blue one is linear probing while the orange one is quadratic probing. Linear probing checks each slot one by one which can lead to clusters of filled slots while quadratic probing spreads out more evenly. So, linear probing tends to have much more collisions.