Hashing Lab Write up
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I explored several methods in this lab: linear probing, quadratic probing, bucket hashing, and the linear quotient method. Each method helped me understand different ways to manage data efficiently.

First, I tackled linear probing. This was straightforward: if a slot was occupied, I simply moved to the next slot until I found an empty one. For example, if I wanted to insert the number 15 into a table of size 10 and the slot at index 5 was taken, I would check index 6, then 7, and so on. This method was easy to understand and implement but showed me that consecutive filled slots could slow things down.

Next, I moved on to quadratic probing. Instead of checking the next slot, I checked slots at increasing intervals (like 1, 4, 9). This helped spread out the data more evenly and reduced the clustering problem I saw with linear probing. Implementing this method was a bit more complex, but it taught me how mathematical functions can improve data management.

Bucket hashing was another interesting method. Here, each slot in the hash table could hold a list of elements. If two numbers hashed to the same index, both would be stored in a list at that index. This showed me how combining arrays and lists can handle collisions effectively.

The linear quotient method was the most challenging. It used a secondary hash function to determine the step size for probing. For instance, if a slot was occupied, I used the secondary function to calculate a new interval for the next probe. This method ensured a more even distribution of elements and minimized clustering. It required a deeper understanding of hash functions, pushing me to think critically.