CSC 212 - Data Structures

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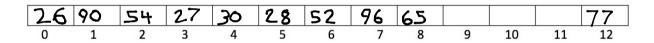
Hashing in-class exercises

Exercise 1

Consider a hash table of size 13, and assume open addressing with linear probing

a. Show what the hash table will look like after the following items are added in the order shown.

26 54 77 90 27 30 28 52 96 65



b. What's the load factor of the hash table after the values above are added?

c. If any of the values cause a collision, indicate which.

d. How many comparisons are needed to find 65 in the table? Briefly explain.

9 comparisons are required to reach the open dressed value of 65, as it's hashed slot is [0] but was placed at [8].

e. How many comparisons are needed to determine that 104 is not in the table? Briefly explain.

10 comparisons; sequential search would end at an empty slot.

f. What's the hash value computed for the string "dog"? Show your work.

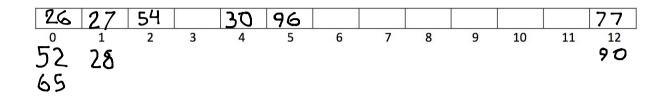
Exercise 2

Suppose chaining is used as the method for collision resolution.

Part A

a. Show what the hash table will look like after the following items are added in the order shown.

26 54 77 90 27 30 28 52 96 65



b. How many comparisons are needed to find 65 in the table?

c. How many comparisons are needed to determine that 104 is not in the table? Briefly explain.

It would compare only the hashed index, that being [0], and the two other values within that slot.

Exercise 3

- a. Consider a hash table with a load factor of 0.8. What's the average number of comparisons for a successful search assuming open addressing with linear probing?
- b. What's the average number of comparisons for a unsuccessful search given the same assumptions?



$$\frac{1}{2}\left(1+\frac{1}{1-68}\right)$$

$$\frac{1}{2}\left(1+\frac{1}{0.2}\right)$$

$$\frac{1}{2}\left(1+\frac{5}{0.2}\right)$$

$$\frac{1}{2}\left(\frac{1+5}{0.2}\right)$$

$$\frac{1}{2}\left(1+\frac{1}{1-68}\right)$$

$$\frac{1}{2}\left(1+\frac{1}{1-68}\right)$$

$$\frac{1}{2}\left(1+\frac{1}{5}\right)^{2}$$

$$\frac{1}{2}\left(1+\frac{5}{2}\right)$$

$$\frac{1}{2}\left(1+25\right)$$

$$\frac{1}{2}\left(26\right)$$

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