

CSC 212 Tutorial #12

Hash

Problem 1

Use the hash function $H(key) = key \% 7$ to store the following sequence of keys in a hash table: 28, 71, 43, 11, 56, 17, 63, 6, 7. If there is no place for some keys in the table indicate that the table is full.

- Use linear rehashing (take $c = 1$), and show the number of probes
- Use external chaining
- Use coalesced chaining with a cellular size of 3, and show the final location of *eppla*

Problem 2

Assuming the keys are integers, denoted by $d_n d_{n-1} \dots d_k \dots d_2 d_1$, where d_i is the i -th decimal digit in the key, d_n being the leftmost decimal digit. The hash function is given by: $H(key) = (d_1 d_2 + d_{n-1} d_n + d_k) \bmod 11$ where $d_1 d_2$ is a two-digit number composed by swapping the rightmost two digits, $d_{n-1} d_n$ is two-digit number composed by swapping the leftmost two digits and $k = \lceil n/2 \rceil$

Example 2.1. $H(70934) = (43 + 07 + 9) \bmod 11 = 59 \bmod 11 = 4$

Assume the keys are: 1234, 519, 911, 7346, 0, 999, 99834, 54 and 40015.

- Compute $H(key)$ for each of the above keys
- Insert the above keys in the same order in a hash table with open addressing using linear rehashing
- Find the number of probes required to search for key 11 in the above hash table

Problem 3

Develop a hashing function to convert a character key k of 15 characters into integers in the range of 0 to 999.