

CSCI 305, Homework # 7

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Due date: Midnight, Tuesday, May 29

Quadratic probing. This is problem 11-3 in the book.

Suppose that we are given a key k to search for in a hash table with positions $0, 1, \dots, m - 1$, and suppose that we have a hash function h mapping the key space into the set $\{0, 1, \dots, m - 1\}$. The search scheme is as follows:

1. Compute the value $j = h(k)$ and set $i = 0$.
2. Probe in position j for the desired key k . If you find it, or if this position is empty, terminate the search.
3. Set $i = i + 1$. If i now equals m , the table is full, so terminate the search. Otherwise, set $j = (i + j) \bmod m$ and return to step 2.

Assume that m is a power of 2.

- a. Show that this scheme is an instance of the general “quadratic probing” scheme by exhibiting the appropriate constants c_1 and c_2 for equation (11.5).
- b. Prove that this algorithm examines every table position in the worst case.