Data Structures & Algorithms 2
Tutorial 5
HASHING

Exercise 1

Consider a hash table of size m = 1000 and a corresponding hash function h(k) = ⌊m (k A mod 1) ⌋ for A =$(\sqrt{5}-1)/2$. Compute the locations to which the keys 61, 62, 63, 64, and 65 are mapped.

NB : "k A mod 1" means the fractional part of kA = kA-⌊kA ⌋

Exercise 2

Given input {4371, 1323, 6173, 4199, 4344, 9679, 1989} and a hash function h(x) = x (mod () 10), show the resulting

1. separate chaining hash table
2. hash table using linear probing
3. hash table using quadratic probing
4. hash table with second hash function $h_2(x) = 7 - (x \bmod 7)$

Exercise 3

Show the result of rehashing the hash tables in Exercise 2

Exercise 4

What are the advantages and disadvantages of the various collision resolution Strategies?

Exercise 5

In the quadratic probing hash table, suppose that instead of inserting a new item into the location suggested by **findPos**, we insert it into the first inactive cell on the search path (thus, it is possible to reclaim a cell that is marked deleted, potentially saving space).

1. Rewrite the insertion algorithm to use this observation. Do this by having findPos maintain, with an additional variable, the location of the first inactive cell it encounters.
2. Explain the circumstances under which the revised algorithm is faster than the original algorithm. Can it be slower?