Offline 6
Hashing

Implementation must be done in C/C++

You need to implement a Hash class having the following properties:

1. The class must have three public methods Insert, Search, Delete. These methods will perform insert, search, delete operations on the hash table. The length of the hash table will be 10000.
2. The data will be kept as a key-value pair in the hash table. You need to insert 10000 randomly generated 5 character length unique words (words can be meaningful or meaningless) into the hash table. The words will be used as the key of the hash table. You need to insert those words into the hash table one by one. If your word generator generates duplicate words, you have to discard those duplicate words. The sequence number will be used as the value of the key-value pair.

Example:
Suppose you generator generated 5 following words.

VISIT
DIGIT
VISIT
BOOKS
FACES

The key-value pair will be
(VISIT, 1)
(DIGIT, 2)
(BOOKS, 3)
(FACES, 4)

You have to discard the 2nd visit since it has already been included in the table. You can do it by setting a condition at the beginning of the insert method.

Hash Function: You need to use 3 standard hash functions (Hash1, Hash2, and Hash 3) of your own/ from any good literature where you must try to avoid collisions as much as possible. We are expecting that 60% key will point to unique hash values (at least 6000 unique hash values for 10000 entries)

Collision resolution: For collision resolution you need to implement two methods:

1. Linear probing
2. Chaining method

Report Generation:

For report generation you have to generate 10000 five character length unique words following exactly the method previously described and search each word in the hash table. The search results must be presented in console in the following format.

Here Search time is the total time required searching 10000 words.
Number of collision is the number of occurrences when Hash1/2/3 will generate already generated hash values for different words.

	Hash1	Hash2	Hash3
Linear probing	Search time and number of collisions	Search time and number of collisions	Search time and number of collisions
Chaining	Search time and number of collisions	Search time and number of collisions	Search time and number of collisions

[note: the length of the hash table, number of words and character length must not be hard coded. We may change it during evaluation]