Hashing

Objective

The objective of this lab is to understand hashing implementation using open addressing technique that includes linear probing and quadratic probing.

Task

Implement hash table for dictionary using open addressing technique. Follow good hash function properties. First apply linear probing and analyze the number of collision, next, apply quadratic probing and analyze the number of collision. Finally understand the big O of insertion, deletion and search operations in the hash table of dictionary.

Procedure

- Create an array to build a hash table. When collision occurred rehash the word using open addressing techniques. No duplicate keys are allowed.
- Analyze which method is more suitable for dictionary words with minimum collision. Count collisions for each word to compare both the methods (linear and quadratic) for the same dictionary.

```
import java.io.*;

public class HashingOpenAdd {

      String[] Table;
      HashingOpenAdd(int s){
            Table=new String [s+(s/3)];
            // table size should be a prime number and 1/3 extra.
      }
      public int strToInt(String v){
            // convert string into integer
      }
      public int Hash(int sum){
            //compute hash value by taking mod on sum value
      }
      public int Rehash(int sum, int i){
            // first test linear probing on whole dictionary words, then Quadratic
probing and
            // understand the changes in number of collision in each method
      }
      public void insert(String v){
            // call strToInt(v) and save return value in sum.
            // call Hash(sum) and save return value in sum
            // if (no collision on hash value) then place word
            //else call rehash function until empty cell found
            // also compute number of collisions on insertion of each word
      }
      public boolean search (String v) {
            // search word in a hash table
```

```
                return false;
        }
        public boolean delete (String v) {
                // delete word from hash table
        }
        public String displayTable() {
                // display hash table
        }

        public static void main(String args[]){
                HashingOpenAdd H=new HashingOpenAdd(35000);
                try{
                        FileInputStream fstream = new FileInputStream("Dictionary.csv");
                        DataInputStream in = new DataInputStream(fstream);
                        BufferedReader br = new BufferedReader(new
InputStreamReader(in));
                        String strLine;
                        while ((strLine = br.readLine()) != null){
                                String[] word=strLine.split(",");
                                H.insert(word[0]);
                        }
                        in.close();
                }
                catch (Exception e){
                        System.err.println("Error: " + e.getMessage());
                }
        }
}
```