```java
import java.util.List;

/**
 *  Creates a Hash Table
 *
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 *  @date    2016-04-12
 */

public class HashTable {

    /**
     *  Create an object of the HashTable class.
     */

    private int MaxSize;
    private int[][] HTable;
    private String Probe;
    private int Function;
    private int Bucket;
    private int Modulo;
    private int CollisionCount, CollisionNum, InvalidData;
    private int c1 = 3;
    private int c2 = 1;
    public HashTable()
    {
        CollisionCount = 0;
        CollisionNum   = 0;
        InvalidData    = 0;
    }

    public void RunHashTable(List<Integer> Items, int size, int bucket, String probe, int function, int modulo)
    {
        System.out.println("\nEntered Hash Table method.");
        Probe    =  probe;
        Function = function;
        Bucket   = bucket;
        MaxSize  = size;
        Modulo   = modulo;
        System.out.println("Bucket Size: " + Bucket + " Probe Type: " + Probe + " Modulo: " + modulo);
        HTable = new int[MaxSize][Bucket];
        for (int key : Items)
        {
            insert(key, hash(key));
        }
        printHashTable();
    }

    /** Function to get hash code of a given Key **/
    private int hash(int Key)
    {
        if (Function == 1)
        {
            return Key % Modulo;
        }
        else if (Function == 2)
        {
```

```
58              return (Key^2) % Modulo;
59          }
60          else
61          {
62              System.out.println("Invalid Value for Hash Function.");
63              return 0;
64          }
65      }
66
67      /** Function to insert Key-value pair **/
68      private void insert(int Key, int Hash)
69      {
70          int HashVal = Hash;
71          int value;
72          boolean flag = false;
73          for(int i=0; i<MaxSize; i++)
74          {
75              if (Probe == "Linear")
76              {
77                  value = (HashVal + i) % MaxSize;
78              }
79              else if (Probe == "Quadratic")
80              {
81                  value = (HashVal + c1*i + c2*i*i) % MaxSize;
82              }
83              else
84              {
85                  System.out.println("Invalid Value for Probe.");
86                  return;
87              }
88              for (int k=0; k<Bucket; k++)
89              {
90                  if (HTable[value][k] == 0)
91                  {
92                      HTable[value][k] = Key;
93                      return;
94                  }
95                  else
96                  {
97                      if (flag == false)
98                      {
99                          flag = true;
100                         CollisionCount++;
101                     }
102                     CollisionNum++;
103                 }
104             }
105         }
106         InvalidData++;
107         return;
108     }
109
110     /** Function to print HashTable **/
111     private void printHashTable()
112     {
113         int counter = 0;
114         boolean flag;
115         int count;
116         System.out.println("\nHash Table: ");
```

```
117         if (Bucket == 1)
118         {
119             count=4;
120         }
121         else
122         {
123             count=5;
124         }
125 
126         for (int i = 0; i < MaxSize; i++)
127         {
128             flag = false;
129             for (int j = 0; j < Bucket; j++)
130             {
131                 if (counter == count)
132                 {
133                     if (flag==false)
134                     {
135                         System.out.println(" Index: " + i + " Value: " + HTable[i]
    [j]);
136                         flag = true;
137                     }
138                     else
139                     {
140                         System.out.println(" Value: " + HTable[i][j]);
141                     }
142                 }
143                 else
144                 {
145                     if (flag==false)
146                     {
147                         System.out.print(" Index: " + i + " Value: " + HTable[i][j]);
148                         flag = true;
149                     }
150                     else
151                     {
152                         System.out.print(" Value: " + HTable[i][j]);
153                     }
154                 }
155                 counter++;
156                 if (counter == count+1)
157                 {
158                     counter = 0;
159                 }
160             }
161         }
162         System.out.println("Number of Collision: " + CollisionCount);
163         System.out.println("Total Number of Collision: " + CollisionNum);
164         System.out.println("Data not inputed into Hash Table: " + InvalidData);
165     }
166 }
```