# Programming Assignment

Implement the LH addressing assignment for a given level and a given split pointer.

```
def address(key, level, split):
      """ Calculates the address of a record with hash of key
          key for a given level and split pointer
      """
    ...
```

For level 7 and split pointer 22 insert 10,000 random records (represented by random 32-bit numbers) into an LH structure with $2^7 + 22 = 150$ buckets. Calculate the number of of records per individual bucket. Repeat 100 times, and determine the average number of records per bucket plus their 99% confidence intervals.

For the latter, you create an output file (separated with tabs) of the form

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 42 | 30 | 29 | 29 | 38 | 43 | 37 | 39 | 43 | 44 | 43 | 32 | 39 |
| 31 | 50 | 32 | 46 | 38 | 40 | 33 | 47 | 30 | 45 | 31 | 35 | 34 |

where the first row contains the counts of Bucket 0, the second row the counts for Bucket 1, etc. Thus, each row would contain 100 values. Unless you want to process the rows via Python, you then copy the whole table of 150 rows into Excel, calculate the means of each row and the T-confidence with an alpha-value of 0.01. You then display the lower and upper limits of the confidence interval. What are the theoretical values? Compare with them. Note: to illustrate the behavior of LH, we should display the observed standard deviation, not the confidence interval.

EXTRA CREDIT: Display using matplotlib with error bars.