Report on Assignment-3

1. Reading Student records.

The Student records are read from a text-file namely “records.txt”, which contains the Address, date of birth, department, gender. The line number will be assigned as the roll No.

Please specify the path of the file in the variable “*fRecordFileName*” as per the system.

2. Cases for Invalid Input:
   a. Negative rollNo.
   b. Character strings.
   c. Out of bound integers.
   d. File does not exits.

3. Prime Number – Since the prime number should be greater than the largest possible key, hence '101' is choosen.

Problem – 1 (Perfect Hashing)

1. The universal hash parameters are to be selected at random.
2. Insert all the records (roll No, data) into the table upfront.
3. User may only Search for a record (using the RollNo. as key) in the Menu-driven program.

Problem – 2(Simple Uniform Hashing with Chaining)

1. The universal hash parameters are to be selected at random.
2. No inserting of records in the table upfront as was in the above case.
3. Menu-driven program to provide functionality for Insert, Search & Delete.

Problem – 3(Statistical analysis of Search times)

1. The statiscal analysis can be done using the above two sourceCodes by changing some boolean values.

```
final static boolean MENU_DRIVEN_PROGRAM = false;
final static boolean STATISTICAL_ANALYSIS_PROGRAM = true;
```

2. The following parameters can be changed to verify both successful and unsuccessful results.

STDS_ENTRIES_INSTANT : Number of student entries in the Hash table at particular instant.
NUM_STATISTICAL_ITERATIONS : Number of iterations for statistical analysis.

Problem-3 Results -
1. Perfect Hashing:

The number of probes for either successful and unsuccessful is always 2. Hence , O(1) memory accesses to perform a search in worst case.

2. Simple Uniform hashing with chaining:
Theoritical formulae -

Successful Search : $\theta(2+\propto/2-\propto/2n)$, $\propto$ - Load factor (n/m)
Unsuccessful Search : $\theta(1+\propto)$

Case: (Avg. no. Probes per operation)
a. 100 students entered into the hash-table of 25 slots, (all successful searches)
Theoritical result: 3.98
Experimental result : 3.5125

Verified as the formulae is θ - approximated.