BILKENT UNIVERSITY

CS 202

HW-4

İREM SEVEN

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Text File that used in experiments:

```
I 20
I 56
I 2
I 13
I 23
R 23
I 25
I 14
S 13
S 24
I 10
I 9
S 76
I 34
S 23
R 56
I 298
R 98
S 13
R 34
R 23
S 65
R 3
R 22
I 21
I 22
I 23
S 23
I 18
```

Discussion:

In this experiment, different data values have been used to measure average number of probing with different types of collusion resolution.In Linear probing, it is expected that hash table to be more clustered than the other solutions. As the load factor increases the difference between resolution types have become more significant where linear probing tented to have higher average number of probings than the others.
On the other hand when the table size is increased since the load factor decreases the difference between them have become lower.

Considering the experiment, Hash Table size has been set as 17 and some operations have applied with random numbers where each key number is unique. Since the numbers given as random the results for average probes were little different than it is expected. This could result of the given numbers placament during insertion into hash table. Which resulted quadratic and linear resolutions average number of probes become closer to each other. Thus, it can be concluded that the numbers inserted are significantly important for calculating average number of probes. Since, it affects clustering strongly. Also, load factor in this setting was 12/17 which is nearly 0.7. Theoretically, linear hashing would give 2.2007 successful and 6.287 unsuccesfull number of average probes. For, quadratic and double it would be expected to have 1.7339 successful and 3.401 unsuccesfull number of average probes. For quadratic and double hashing similar results were achieved in the experiment. Also, double probings' successful probing number were lower than the others which fits the expected result.

For Linear Hashing:

```
23 inserted
23 found after 1 probes
18 inserted

0:
1: 18
2: 2
3: 20
4: 21
5: 22
6: 23
7:
8: 25
9: 9
10: 10
11: 298
12:
13: 13
14: 14
15:
16:
Avg no of successful probes: 1.83333
Avg no of unsuccessful probes: 3.41176
```

For Quadratic Hashing:

```
3 not removed
22 not removed
21 inserted
22 inserted
23 inserted
23 found after 1 probes
18 inserted

0: 18
1: 298
2: 2
3: 20
4: 21
5: 22
6: 23
7:
8: 25
9: 9
10: 10
11:
12:
13: 13
14: 14
15:
16:
Avg no of successful probes: 1.83333
Avg no of unsuccessful probes: 3.47059
```

For Double Hashing:

```
23 inserted
23 found after 1 probes
18 inserted

0:
1: 18
2: 2
3: 20
4: 21
5: 22
6: 23
7:
8: 25
9: 9
10: 10
11:
12:
13: 13
14: 14
15:
16: 298
Avg no of successful probes: 1.66667
Avg no of unsuccessful probes: -1
```