

DSA Assignment - 3

Question 3

1. in1.txt

No of Buckets	Average Search Operations	Average insert Operations
2	515	448
5	206	179
10	103	89
20	51	44

2. in2.txt

No of Buckets	Average Search Operations	Average insert Operations
2	509	453
5	203	181
10	101	90
20	51	45

3. in3.txt

No of Buckets	Average Search Operations	Average insert Operations
2	516	448
5	206	179
10	103	89
20	52	44

4. in4.txt

No of Buckets	Average Search Operations	Average insert Operations
2	500	499
5	200	199
10	100	99
20	50	49

5. in5.txt

No of Buckets	Average Search Operations	Average insert Operations
2	250	499
5	150	99
10	50	99
20	25	49

6. in6.txt

No of Buckets	Average Search Operations	Average insert Operations
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2	5	4
5	2	1
10	1	1
20	1	1

7. in7.txt

No of Buckets	Average Search Operations	Average insert Operations
2	2	1
5	1	1
10	1	1
20	1	1

8. in8.txt

No of Buckets	Average Search Operations	Average insert Operations
2	492	491
5	197	196
10	98	97
20	49	48

9. in9.txt

No of Buckets	Average Search Operations	Average insert Operations
2	25	24
5	10	9
10	5	4
20	3	2

10. in10.txt

No of Buckets	Average Search Operations	Average insert Operations
2	1	1
5	1	1
10	1	1
20	1	1

- After observing the above data, we are able to see that irrespective of the number of the input file the no of operations required for Searching an Element or Inserting an element is minimum for the case where we have used 20 buckets
- This is because when we use less number of buckets, more items are stacked into each bucket and inside a bucket, all the elements are in stored in a linked list , which makes searching or accessing an element more time consuming($O(N)$) (N is the number of items in a bucket)
- When we increase our bucket count, we can divide the data into more groups and we can access these groups in $O(1)$ time complexity.
- And when we use more buckets, the number of elements in a bucket also decreases thus decreasing the time complexity.