

DSA Assignment 3
Report for Q3

Note:

This data is based on 2 assumptions:

- 1) The data is printed at the very end of the linked list as the configuration was not specified in the document.
- 2) Each movement with the hash table is considered to be an operation, thus traversal of a N node linked list goes through N operations.
- 3) $A = 2$, $B = 7$

INP1.txt file:

No Of Inputs:12000

Note: These are the standard set of operations per function call, for large files with completely unique data. This trend is more or less identical to the below 4 files

Bucket No:	Insert Operations	Delete Operations	Search Operations
2	898.5564	1012.337	1030.6961
5	179.7644	202.797	207.676
10	179.7344	202.797	207.676
20	90.0059	101.649	104.499

INP2.txt file:

No. Of Inputs: 12000

Bucket No:	Insert Operations	Search Operations	Delete Operations
2	907.6672	1018.666	999.376
5	181.7691	204.432	200.041
10	181.7691	204.432	200.041
20	90.9785	102.843	100.445

INP3.txt

No. Of Inputs: 12000

Bucket No:	Insert Operations	Search Operations	Delete Operations
2	897.7509	1030.986	966.283
5	179.6705	207.287	199.643
10	179.6705	207.287	199.643
20	89.8734	104.459	100.214

INP4.txt

No. of inputs: 4000

Bucket No:	Insert Operations	Search Operations	Delete Operations
2	998.501	1001.4995	0
5	198.505	201.4995	0
10	198.505	201.4995	0
20	98.51	101.4995	0

INP5.txt

No of inputs: 3000

Note: The number of insert operations is halved when compared to the previous files as only half the buckets are being appended and accessed

Bucket No:	Insert Operations	Search Operations	Delete Operations
2	498.502	750.75	0
5	98.510	151.15	0
10	98.510	151.15	0
20	98.510	501.25	0

INP6.txt

No of inputs: 2020

Note: Numbers are very small as these input files have multiple repeating values, as observed in INP6 and INP7.

Bucket No:	Insert Operations	Search Operations	Delete Operations
2	10.5795	10.95	0
5	2.5045	3.35	0
10	2.5045	3.35	0
20	1.501	2.4	0

INP7.txt

No Of Inputs: 1010

Bucket No:	Insert Operations	Search Operations	Delete Operations
2	2.986	4.8	0
5	1	1.9	0
10	1	1.9	0
20	1	1.4	0

INP8.txt

No. Of Inputs: 1000000

Bucket No:	Insert Operations	Search Operations	Delete Operations
2	984.758026239	986.445698839	980.311563859
5	197.260532772	198.458021943	196.463198583
10	197.260532772	198.458021943	196.463198583
20	98.812729988	99.876053427	98.464567563

INP9.txt

No. Of Inputs: 1000000

Note: Comparing INP8 and INP9, INP9 has a lesser number of operations as multiple repeated inserts are done using INP9.

Bucket No:	Insert Operations	Search Operations	Delete Operations
2	50.50787142	51.796328322	50.429839947
5	10.493367966	11.533923108	10.484652488
10	10.493367966	11.533923108	10.484652488
20	5.500540583	6.514566982	5.498245999

INP10.txt

No. Of Inputs: 1000

Bucket No:	Insert Operations	Search Operations	Delete Operations
2	1.471311475	1.501953125	0
5	1	1.501953125	0
10	1	1.501953125	0
20	1	1.501953125	0

CONCLUSION:

- 1) As the number of inputs increases, time taken by the program increases.
- 2) As the number of buckets increases, collisions decrease and therefore all functions occur with a lesser number of operations.
- 3) Number of operations decreases if many repeated elements are inserted from the input file.

4) Number of operations for unique files average out to be almost the same, despite the number of inputs.

5) For $A = 2$ and $B = 7$ all inputs have the same number of operations when buckets are 5 or 10, because all the inputs are always stored in only 5 of the buckets in both cases.

All inputs are stored in either 1,2,3,4,0 in 5, while all inputs are stored in 1, 3, 5, 7, 9 in 10. As only 5 buckets are filled for any given input the number of operations in each case is the same for all input files.
