|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FINAL AVERAGES:** | **Insert** | **Search (Present)** | **Search (Not Present):** | **Delete** |
| Unordered List | 0.0107811 | 11.8722 | 34.9988 | 6.25287 |
| Sorted List | 5.80944 | 21.4744 | 46.8349 | 9.84679 |
| STL List | 0.0455206 | 15.6299 | 45.1096 | 10.6472 |
| BST Tree | 0.0364651 | 0.041419 | 0.0192146 | 0.0340811 |
| MAP | 0.0925985 | 0.0684342 | 0.0708167 | 0.093073 |
| Unordered MAP | 0.0463955 | 0.0234598 | 0.0276015 | 0.0225477 |
| HashTable\_Multiplication | 0.0356147 | 9.27523 | 0.0130257 | 5.23329 |
| HashTable\_Division | 0.0242755 | 0.051241 | 0.00978865 | 0.055047 |
| HashTable\_LinearProbing | 0.280112 | 0.105844 | 3.02558 | 0.228815 |
| HashTable\_QuadraticProbing | 0.0168643 | 0.00968581 | 0.0634151 | 0.0132172 |
| HashTable\_Doublehashing | 0.120759 | 0.0384664 | 0.00384652 | 0.0997798 |
|  |  |  |  |  |

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**Problem Statement:**

In the program we are comparing the time taken by each ADT to Insert, Search (present values), Search (Not present values) and Delete.

In this program I have taken 10 observations using random values and then shuffling those values, all these observations were taken using 25000 values.

**Observations:**

The average of those 10 observations was calculated in the program and the result is as follow:

**Graphs:**

**Max Time Taken for Insertion by ADT:**

Sorted list took the max time that was 5.80944 sec on average, so it is not suitable for the systems where there are frequent insertions, less traversals and deletions.

**Min Time Taken for Insertion by ADT:**

Unsorted list took minimum time that was 0.0107811 secs on average, so it is most suitable where there are frequent insertions, less traversals and deletions.

**Max Time Taken for Searching values present by ADT:**

Sorted list took max time that was 21.4744 secs on average. So, it is not a best choice for traversing.

**Min Time Taken for Searching values present by ADT:**

Hash table with open addressing and quadratic probing took minimum time that was 0.00968581 secs on average, it is a good choice for traversing.

**Max Time Taken for Searching values not present by ADT:**

Sorted list took the most time that was 46.8349 secs, if the domain is huge then it is inefficient in that case to use sorted list.

**Min Time Taken for Searching values not present by ADT:**

Hash table with open addressing and double hashing took minimum time that was 0.00384652 secs on average, so even if the domain is huge it wont be much of a problem to get the results quickly.

**Max Time Taken for Deletion by ADT:**

STL list took the max time that was 10.6472 sec on average, so it is not suitable for the systems where there are frequent deletions, less traversals and insertions.

**Min Time Taken for Deletion by ADT:**

Hash table with open addressing and quadratic probing took minimum time that was 0.0132172 secs on average, so it is suitable where there are less insertions and traversals and more deletions.