**N = 1000003**

**Table 1: Performance of separate chaining in various load factors**

|  |  |  |
| --- | --- | --- |
|  | **Before deletion** | **After deletion** |
| **Load factor** | **Avg search time** | **Avg search time** |
| 0.4 | 0.000024112ms | 0.000024212ms |
| 0.5 | 0.000024776ms | 0.000024048ms |
| 0.6 | 0.000024103ms | 0.000029960ms |
| 0.7 | 0.000024376ms | 0.000024210ms |
| 0.8 | 0.000024132ms | 0.000024036ms |
| 0.9 | 0.000024441ms | 0.000024214ms |

**Table 2: Performance of linear probing in various load factors**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Before deletion** | | **After deletion** | |
| **Load factor** | **Avg search time** | **Avg number of probes** | **Avg search time** | **Avg number of probes** |
| 0.4 | 0.000106233ms | 1.017325000 | 0.000154158ms | 1.023950000 |
| 0.5 | 0.000098716ms | 1.018000000 | 0.000167672ms | 1.030700000 |
| 0.6 | 0.000094157ms | 1.015650000 | 0.000320733ms | 1.028983333 |
| 0.7 | 0.000094149ms | 1.017900000 | 0.000159389ms | 1.031114286 |
| 0.8 | 0.000090817ms | 1.016925000 | 0.000137396ms | 1.033587500 |
| 0.9 | 0.000086648ms | 1.015900000 | 0.000144253ms | 1.034077778 |

**Table 3: Performance of quadratic probing in various load factors**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Before deletion** | | **After deletion** | |
| **Load factor** | **Avg search time** | **Avg number of probes** | **Avg search time** | **Avg number of probes** |
| 0.4 | 0.000119695ms | 1.018400000 | 0.000194198ms | 1.030575000 |
| 0.5 | 0.000118732ms | 1.014860000 | 0.000156922ms | 1.027440000 |
| 0.6 | 0.000102843ms | 1.016400000 | 0.000133777ms | 1.029066667 |
| 0.7 | 0.000092627ms | 1.016400000 | 0.000122873ms | 1.030542857 |
| 0.8 | 0.000125640ms | 1.017237500 | 0.000128285ms | 1.034462500 |
| 0.9 | 0.000089400ms | 1.017766667 | 0.000170953ms | 1.032744444 |

**Table 4: Performance of double hashing in various load factors**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Before deletion** | | **After deletion** | |
| **Load factor** | **Avg search time** | **Avg number of probes** | **Avg search time** | **Avg number of probes** |
| 0.4 | 0.000117300ms | 1.016275000 | 0.000275560ms | 1.025900000 |
| 0.5 | 0.000108238ms | 1.015060000 | 0.000193026ms | 1.026920000 |
| 0.6 | 0.000108328ms | 1.015500000 | 0.000183743ms | 1.029066667 |
| 0.7 | 0.000103790ms | 1.017385714 | 0.000136309ms | 1.030914286 |
| 0.8 | 0.000105370ms | 1.018787500 | 0.000171067ms | 1.033937500 |
| 0.9 | 0.000098340ms | 1.018200000 | 0.000145479ms | 1.031988889 |

**Table 5: Performance of various collision resolution methods in load factor 0.4**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Before deletion** | | **After deletion** | |
| **Method** | **Avg search time** | **Avg number of probes** | **Avg search time** | **Avg number of probes** |
| Separate chaining | 0.000024112ms | N/A | 0.000024212ms | N/A |
| Linear Probing | 0.000106233ms | 1.017325 | 0.000154158ms | 1.02395 |
| Quadratic Probing | 0.000119695ms | 1.0184 | 0.000194198ms | 1.030575 |
| Double Hashing | 0.000117300ms | 1.016275 | 0.000275560ms | 1.0259 |

**Table 6: Performance of various collision resolution methods in load factor 0.5**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Before deletion** | | **After deletion** | |
| **Method** | **Avg search time** | **Avg number of probes** | **Avg search time** | **Avg number of probes** |
| Separate chaining | 0.000024776ms | N/A | 0.000024048ms | N/A |
| Linear Probing | 0.000098716ms | 1.018 | 0.000167672ms | 1.0307 |
| Quadratic Probing | 0.000118732ms | 1.01486 | 0.000156922ms | 1.02744 |
| Double Hashing | 0.000108238ms | 1.01506 | 0.000193026ms | 1.02692 |

**Table 7: Performance of various collision resolution methods in load factor 0.6**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Before deletion** | | **After deletion** | |
| **Method** | **Avg search time** | **Avg number of probes** | **Avg search time** | **Avg number of probes** |
| Separate chaining | 0.000024103ms | N/A | 0.000029960ms | N/A |
| Linear Probing | 0.000094157ms | 1.01565 | 0.000320733ms | 1.028983 |
| Quadratic Probing | 0.000102843ms | 1.0164 | 0.000133777ms | 1.029067 |
| Double Hashing | 0.000108328ms | 1.0155 | 0.000183743ms | 1.029067 |

**Table 8: Performance of various collision resolution methods in load factor 0.7**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Before deletion** | | **After deletion** | |
| **Method** | **Avg search time** | **Avg number of probes** | **Avg search time** | **Avg number of probes** |
| Separate chaining | 0.000024376ms | N/A | 0.000024210ms | N/A |
| Linear Probing | 0.000094149ms | 1.0179 | 0.000159389ms | 1.031114 |
| Quadratic Probing | 0.000092627ms | 1.0164 | 0.000122873ms | 1.030543 |
| Double Hashing | 0.000103790ms | 1.01738571 | 0.000136309ms | 1.030914 |

**Table 9: Performance of various collision resolution methods in load factor 0.8**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Before deletion** | | **After deletion** | |
| **Method** | **Avg search time** | **Avg number of probes** | **Avg search time** | **Avg number of probes** |
| Separate chaining | 0.000024132ms | N/A | 0.000024036ms | N/A |
| Linear Probing | 0.000090817ms | 1.016925 | 0.000137396ms | 1.033588 |
| Quadratic Probing | 0.000125640ms | 1.017238 | 0.000128285ms | 1.034463 |
| Double Hashing | 0.000105370ms | 1.018788 | 0.000171067ms | 1.033938 |

**Table 10: Performance of various collision resolution methods in load factor 0.9**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Before deletion** | | **After deletion** | |
| **Method** | **Avg search time** | **Avg number of probes** | **Avg search time** | **Avg number of probes** |
| Separate chaining | 0.000024441ms | N/A | 0.000024214ms | N/A |
| Linear Probing | 0.000086648ms | 1.0159 | 0.000144253ms | 1.034078 |
| Quadratic Probing | 0.000089400ms | 1.01776667 | 0.000170953ms | 1.032744 |
| Double Hashing | 0.000098340ms | 1.0182 | 0.000145479ms | 1.031989 |