**ECS60 Programming Homework 1 Write Up**

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**Time for ADT for each File**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| File | ADT# | Time#1 | Time#2 | Time#3 | mean |
| File1 | 1 | 0.060276 | 0.053819 | 0.053532 | 0.055875667 |
| File2 | 1 | 73.9704 | 73.377 | 73.3614 | 73.5696 |
| File3 | 1 | 0.041992 | 0.038394 | 0.037542 | 0.039309333 |
| File4 | 1 | 48.4649 | 48.1956 | 48.211 | 48.2905 |
| File1 | 2 | 0.039841 | 0.037563 | 0.03751 | 0.038304667 |
| File2 | 2 | 342.878 | 342.126 | 342.818 | 342.6073333 |
| File3 | 2 | 0.053573 | 0.048772 | 0.048758 | 0.050367667 |
| File4 | 2 | 172.607 | 208.42 | 207.857 | 196.2946667 |
| File1 | 3 | 0.032802 | 0.032232 | 0.03198 | 0.032338 |
| File2 | 3 | 0.031091 | 0.030581 | 0.030425 | 0.030699 |
| File3 | 3 | 0.032102 | 0.031483 | 0.030575 | 0.031386667 |
| File4 | 3 | 0.035066 | 0.03411 | 0.032606 | 0.033927333 |
| File1 | 4 | 0.045851 | 0.045568 | 0.045576 | 0.045665 |
| File2 | 4 | 0.036368 | 0.036213 | 0.036305 | 0.036295333 |
| File3 | 4 | 0.036665 | 0.036206 | 0.036199 | 0.036356667 |
| File4 | 4 | 0.039455 | 0.038634 | 0.038752 | 0.038947 |
| File1 | 5 | 0.033876 | 0.033224 | 0.032675 | 0.033258333 |
| File2 | 5 | 0.033023 | 0.03238 | 0.032099 | 0.032500667 |
| File3 | 5 | 0.033741 | 0.03297 | 0.032127 | 0.032946 |
| File4 | 5 | 0.035637 | 0.034635 | 0.034414 | 0.034895333 |
| File1 | 6 | 0.143875 | 0.146164 | 0.148562 | 0.146200333 |
| File2 | 6 | 0.111638 | 0.109829 | 0.112652 | 0.111373 |
| File3 | 6 | 0.128556 | 0.125547 | 0.126286 | 0.126796333 |
| File4 | 6 | 0.317571 | 0.32901 | 0.33372 | 0.326767 |

**Time complexity for ADT for each file**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| File | ADT# | individual  insertion | individual  deletion | entire  insertions | entire  deletions | entire  file |
| File1 | 1 | O(1) | NA | O(N) | NA | O(N) |
| File2 | 1 | O(1) | O(N) | O(N) | O(N^2) | O(N^2) |
| File3 | 1 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File4 | 1 | O(1) | O(N) | O(N) | O(N^2) | O(N^2) |
| File1 | 2 | O(1) | NA | O(N) | NA | O(N) |
| File2 | 2 | O(1) | O(N) | O(N) | O(N^2) | O(N^2) |
| File3 | 2 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File4 | 2 | O(1) | O(N) | O(N) | O(N^2) | O(N^2) |
| File1 | 3 | O(1) | NA | O(N) | NA | O(N) |
| File2 | 3 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File3 | 3 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File4 | 3 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File1 | 4 | O(1) | NA | O(N) | NA | O(N) |
| File2 | 4 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File3 | 4 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File4 | 4 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File1 | 5 | O(1) | NA | O(N) | NA | O(N) |
| File2 | 5 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File3 | 5 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File4 | 5 | O(1) | O(1) | O(N) | O(N) | O(N) |
| File1 | 6 | O(logN) | NA | O(NlogN) | NA | O(NlogN) |
| File2 | 6 | O(logN) | O(logN) | O(NlogN) | O(NlogN) | O(NlogN) |
| File3 | 6 | O(logN) | O(logN) | O(NlogN) | O(NlogN) | O(NlogN) |
| File4 | 6 | O(logN) | O(logN) | O(NlogN) | O(NlogN) | O(NlogN) |