|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Array type and Time Complexity** | **Selection Sort(microsecond)** | **Bubble Sort(microsecond)** | **Bubble Sort with Swap counting(microsecond)** | **Insertion Sort(microsecond)** | **Quick Sort(microsecond)** | **Merge Sort(microsecond)** |
| **100 array elements** | **29** | **65** | **66** | **23** | **13** | **301** |
| **1000 array elements** | **2309** | **5264** | **4978** | **1430** | **142** | **11101** |
| **10000 array elements** | **2000224** | **565168** | **569594** | **123718** | **1589** | **1143168** |
| **100 almost sorted array elements** | **32** | **39** | **40** | **9** | **9** | **308** |
| **1000 almost sorted array** | **2328** | **2791** | **3058** | **292** | **148** | **11761** |
| **10000 almost sorted** | **203132** | **442032** | **477227** | **124377** | **3441** | **1105976** |
| **100 sorted array** | **32** | **28** | **29** | **5** | **20** | **218** |
| **1000 sorted array** | **2383** | **2330** | **2292** | **18** | **1528** | **11100** |
| **10000 sorted array** | **196554** | **200981** | **200077** | **88** | **82049** | **1085856** |
| **Best Case** | **Ω(n^2)** | **Ω(n)** | **Ω(n)** | **Ω(n)** | **Ω(n log(n))** | **Ω(n log(n))** |
| **Average Case** | **θ(n^2)** | **θ(n^2)** | **θ(n^2)** | **θ(n^2)** | **θ(n log(n))** | **θ(n log(n))** |
| **Worst Case** | **O(n^2)** | **O(n^2)** | **O(n^2)** | **O(n^2)** | **O(n^2)** | **O(n log(n))** |

Conclusion:

The result of experiment with 6 different kind of sorting algorithms and 9 different array input type are as follow:

1. For the array of size 100, the Quick Sort perform fastest and Merge Sort is slowest.
2. For the array of size 1000, the Quick Sort perform fastest and Merge Sort is slowest.
3. For the array of size 10000, the Quick Sort perform fastest and Merge Sort is slowest.
4. For the array of size 100 almost sorted, the Quick Sort and Insertion Sort perform fastest and Merge Sort is slowest.
5. For the array of size 1000 almost sorted, the Quick Sort perform fastest and Merge Sort is slowest.
6. For the array of size 10000 almost sorted, the Quick Sort perform fastest and Merge Sort is slowest.
7. For the array of size 100 sorted, the Insertion Sort performs fastest and Merge Sort is slowest.
8. For the array of size 1000 sorted, the Insertion Sort performs fastest and Merge Sort is slowest.
9. For the array of size 10000 sorted, the Insertion Sort performs fastest and Merge Sort is slowest.

Base on the result of time consuming of each algorithms, Merge Sort is the slowest on each array input type. The Insertion Sort is fastest on the Sorted array input types and Quick Sort is fastest on the rest 6 of array input types.