Quick Sort(n=10000)

|  |  |  |  |
| --- | --- | --- | --- |
| **Pivote\_type** | **Random** | **Sorted** | **Almost Sorted** |
| First Element | 0.000651 | 0.037379 | 0.001339 |
| Random Element | 0.000867 | 0.000427 | 0.000503 |
| Median pivot | 0.000853 | 0.024838 | 0.001959 |
| Median(n/4,m ,3n/4) | 0.000679 | 0.000146 | 0.000242 |

Quick Sort(n=100000)

|  |  |  |  |
| --- | --- | --- | --- |
| **Pivote\_type** | **Random** | **Sorted** | **Almost Sorted** |
| First Element | 0.007353 | 3.437090 | 0.022637 |
| Random Element | 0.010240 | 0.005018 | 0.005517 |
| Median pivot | 0.007511 | 1.474005 | 0.036644 |
| Median(n/4,m ,3n/4) | 0.007953 | 0.001792 | 0.002739 |

Quick Sort(n=1000000)

|  |  |  |  |
| --- | --- | --- | --- |
| **Pivote\_type** | **Random** | **Sorted** | **Almost Sorted** |
| First Element | 0.205832 |  |  |
| Random Element | 0.117768 | 0.057073 | 0.060375 |
| Median pivot | 0.220628 |  |  |
| Median(n/4,m ,3n/4) | 0.094004 | 0.020673 | 0.028601 |

Quick Sort(n=10000000)

|  |  |  |  |
| --- | --- | --- | --- |
| **Pivote\_type** | **Random** | **Sorted** | **Almost Sorted** |
| First Element | 2.418873 |  |  |
| Random Element | 1.385504 | 0.638367 | 0.700178 |
| Median pivot | 2.538813 |  |  |
| Median(n/4,m,3n/4) | 1.089468 | 0.246684 | 0.353983 |

Merge Sort

|  |  |  |  |
| --- | --- | --- | --- |
| **Pivot\_type** | **Random** | **Sorted** | **Almost Sorted** |
| **n = 10000** | 0.000932 | 0.000282 | 0.000343 |
| **n = 100000** | 0.011178 | 0.003269 | 0.003387 |
| **n = 1000000** | 0.188845 | 0.056393 | 0.060012 |
| **n = 10000000** | 2.037677 | 0.581828 | 0.613981 |

What is your observation? Which sort is faster and why?

Quick sort is faster when median (n/4, middle ,3n/4) pivot element is taken. It executes in very less time compared to other pivot elements. In merge sort, if elements are already in sorted order, then it executes faster compared to random and almost sorted orders.