# Analysis of Quick Sort Variants | Lab07

# Experiment Design

# Experiment Results

## Quicksort using Naïve Pivot

|  |  |  |  |
| --- | --- | --- | --- |
| Items | Ascending | Random | Descending |
| 100 | 0.000 | 0.000 | 0.000 |
| 1000 | 0.000 | 0.000 | 0.000 |
| 10000 | 0.132 | 0.000 | 0.140 |
| 20000 | 0.540 | 0.000 | 0.560 |
| 40000 | 2.184 | 0.010 | 2.256 |
| 80000 | 8.752 | 0.020 | 9.010 |
| 160000 | 34.968 | 0.040 | 36.058 |

## Quicksort using Median of Three Pivot

|  |  |  |  |
| --- | --- | --- | --- |
| Items | Ascending | Random | Descending |
| 100 | 0.000 | 0.000 | 0.000 |
| 1000 | 0.000 | 0.000 | 0.000 |
| 10000 | 0.000 | 0.000 | 0.000 |
| 20000 | 0.000 | 0.000 | 0.000 |
| 40000 | 0.000 | 0.010 | 0.000 |
| 80000 | 0.016 | 0.020 | 0.010 |
| 160000 | 0.040 | 0.050 | 0.028 |

## Quicksort using Random Pivot

|  |  |  |  |
| --- | --- | --- | --- |
| Items | Ascending | Random | Descending |
| 100 | 0.000 | 0.000 | 0.000 |
| 1000 | 0.000 | 0.000 | 0.000 |
| 10000 | 0.132 | 0.000 | 0.140 |
| 20000 | 0.540 | 0.000 | 0.560 |
| 40000 | 2.182 | 0.010 | 2.250 |
| 80000 | 8.742 | 0.020 | 9.008 |
| 160000 | 34.958 | 0.040 | 36.058 |

# Conclusion

Notes:

Naïve:

* Ascending and Descending is worst case
* Random is best case

Random:

* Same

Median of three

* Unstable sorting algorithm

Worst pivot:

* First or last value in already sorted list

Best pivot

* Median value