**Output:**

Selection sort:

Start Time : Sat Dec 19 11:04:25 2020

End Time : Sat Dec 19 11:04:25 2020

elapsed time: 0.00198391s

Insertion sort:

Start Time : Sat Dec 19 11:04:25 2020

End Time : Sat Dec 19 11:04:25 2020

elapsed time: 0.00115337s

Shell sort:

Start Time : Sat Dec 19 11:04:25 2020

End Time : Sat Dec 19 11:04:25 2020

elapsed time: 0.000230901s

Quick sort:

Start Time : Sat Dec 19 11:04:25 2020

End Time : Sat Dec 19 11:04:25 2020

elapsed time: 0.000209223s

Merge sort:

Start Time : Sat Dec 19 11:04:25 2020

End Time : Sat Dec 19 11:04:25 2020

elapsed time: 0.000278256s

**Time Differences Analysis**

The test has been performed with 1000 random numbers with 5 different sorting algorithm.

1. Insertion Sort

The algorithm will move the current element and into its appropriate position.

1. Selection Sort

The algorithm will choose an appropriate element for the current position and moves it.

1. Shell Sort

The generic high efficiency version of the insertion sorting.

1. Quick Sort

The algorithm picks a pivot element and moves small number before the pivot and bigger number after pivot element and recursively performs the same operation.

1. Merge Sort

The algorithm divides the array into two left and right parts, recursively reduces the parts to its single number and then sort it.

By comparing the results performed over 1000 elements, selection sort is the most slowest algorithm and the insertion sort is second slowest algorithm. Comparing to 1st two sorting, all other sorting algorithms are much faster. The most efficient algorithm is obviously the quick sort algorithm. Surprisingly the shell sort is faster than merge sort.