

The University of Texas at Dallas
 CS 5V81: Implementation of Data Structures and Algorithms
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Short Project 09 – Report

A. Results of Algorithms over n:

n (M: Million)	insertionSort()	mergeSort1()	mergeSort2()	mergeSort3()
1M	T: Inf* M: Inf	T: 158	T: 136	T: 107
		M: 13 / 154	M: 27 / 113	M: 27 / 113
2M		T: 337	T: 343	T: 239
		M: 56 / 134	M: 23 / 105	M: 23 / 105
4M		T: 773	T: 677	T: 569
		M: 78 / 117	M: 260 / 283	M: 260 / 283
8M		T: 1692	T: 1481	T: 1295
		M: 126 / 154	M: 581 / 628	M: 581 / 628
16M		T: 3674	T: 3111	T: 2793
		M: 139 / 234	M: 1282 / 1322	M: 1282 / 1322
32M		T: 7681	T: 6673	T: 6048
		M: 625 / 929	M: 1597 / 1816	M: 1355 / 1929
64M		T: 16766	T: 14221	T: 12475
		M: 744 / 1135	M: 1721 / 1929	M: 1721 / 1929
128M		T: 33781	T: 29780	T: 27254
		M: 1344 / 1753	M: 1476 / 1653	M: 1476 / 1653
256M		T: OME	T: OME	T: OME
		M: OME	M: OME	M: OME

T: Time in milliSeconds

M: Memory in MBs

Inf: Infinite Time

OME: Out of Memory Error

***NOTE:**

1. For insertionSort(), we executed for 1M and got T: 349689 mSecs which is to be considered as Infinity as per the instructions from Professor.

2. insertionSort(): *numTrials* = 5, all mergeSort() algorithms: *numTrials* = 100

B. Calculating best Threshold values = {T2 and T3} for each mergeSort2() and mergeSort3():
For fixed $n = 1$ million.

We executed for $T_2, T_3 = \{9, 19, 29, \dots, 99\}$ and got respective minimum Time values.

Then for T_2 , as 79 and 99 had second smallest Time values, we then executed for $T_2 = [89-5, 89+5]$.

Similarly for T_3 , as range [69, 79] looks more promising than [89, 99], we then executed for $T_3 = [69, 79]$.

T2	T (mSec)	T2	T(mSec)
9	626	84	602
19	627	85	636
29	625	86	621
39	606	87	612
49	605	88	616
59	608	90	629
69	611	91	612
79	604	92	610
89*	595	93	599
99	604	94	605

T3	T(mSec)	T3	T(mSec)
9	135	69	122
19	138	70	125
29	136	71	123
39	128	72	123
49	127	73	123
59	135	74	123
69	122	75*	121
79	125	76	123
89	126	77	122
99	122	78	122

Hence, for fixed $n = 1$ million and $numTrials = 100$, we can infer that $T_2 = 89$ and $T_3 = 75$ gives best results for threshold values in mergeSort2() and mergeSort3() respectively.