**Merge Sort Report**

CS6301.g42

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The running times for different data sizes and algorithms are shown below. These running times represent averages taken over several runs of each algorithm for each data size.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Alg.***  ***Size*** | **MergeSort**  V1  (milliseconds) | **MergeSort**  V2  (milliseconds) | **MergeSort**  V3  (milliseconds) | **MergeSort**  V4  (milliseconds) |
| 0.1 M | 3099 | 20 | 24 | 20 |
| 0.5 M | n/a | 88 | 73 | 66 |
| 1 M | n/a | 177 | 135 | 131 |
| 5 M | n/a | 922 | 735 | 727 |
| 10 M | n/a | 1801 | 1456 | 1420 |

Table Average Running Time of different version of MergSort

Basically, the first version cannot work when the data size is larger than 0.5M. Version 2, Version 3 and Version 4 works relatively well. Version 2 and Version 3 has little different while the data size is small. However, when the data size achieves 10M, Version 2 need quite more time than Version 3.

There is another more interesting point. From a quick glance we can see the version 3 and version 4 finish their task almost at the same time. However, according to the pseudo code, version 4 should be much faster than version 3 due to no array copy operation. One possible reason is maybe the arraycopy() methods is an optimized copy methods that cost less time than naïve copy method.