

### Comparing MSD and LSD Radix Sorts

N	LSD	MSD
100	53	43
200	146	114
300	266	207
400	596	367
500	797	479
600	883	626
700	965	771
800	1066	944
900	1211	1173
1000	1342	1367
2000	3301	4451
4000	11886	17136
6000	26161	38185
8000	46507	68082

**Figure 1.** Time Comparisons for MSD and LSD Radix sorts. Based on 1 test.

Figure 1 shows an expected trend that LSD and MSD Radix sorts are very similar for smaller N, but when N increases, the fact that this form of MSD Radix sort sorts each bucket really shows its weakness. The sort is at best  $O(N \log N)$ , which is much slower at higher N than LSD Radix sort, which doesn't sort each bucket. Worst case for LSD is  $O(MN)$  where M is the max number of digits, while worst case for MSD is  $O(N \log N)$  because the sort of the buckets bogs it down. In most normal cases M will be small enough, even at high N to outperform an  $O(N \log N)$  algorithm.