Assignment 1 – 2XB3 L02
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Size of Dataset	**sortInsert**	**sortComparable**	**sortBinary**	**sortMergeTD**	**sortMergeBU**	**sortHeap**
2^4	0.048	0.048	0.042	0.04	0.042	0.041
2^6	0.053	0.05	0.044	0.042	0.043	0.042
2^8	0.061	0.055	0.047	0.045	0.045	0.043
2^{10}	0.067	0.058	0.048	0.046	0.047	0.045
2^{12}	0.111	0.110	0.081	0.048	0.05	0.051

3.1.1

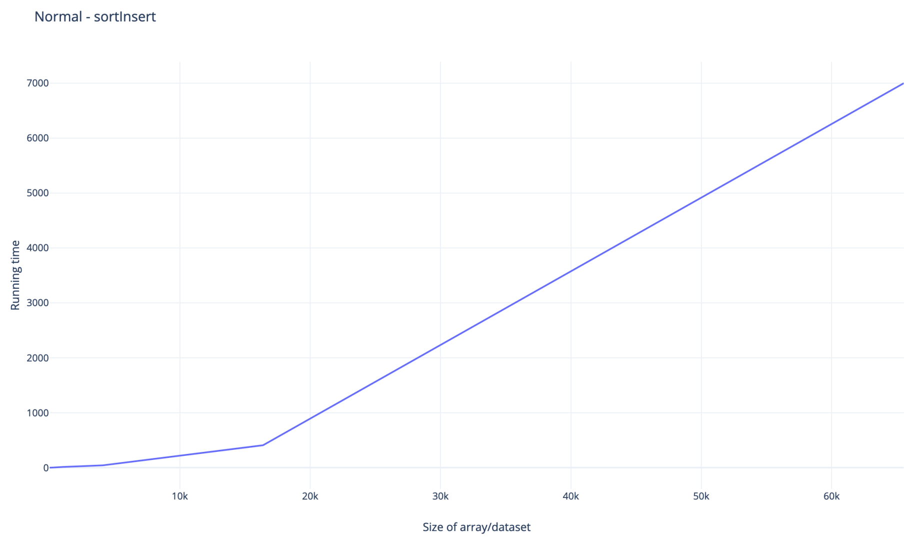
Common legend:

x-axis: size of database
y-axis: running time (ms)

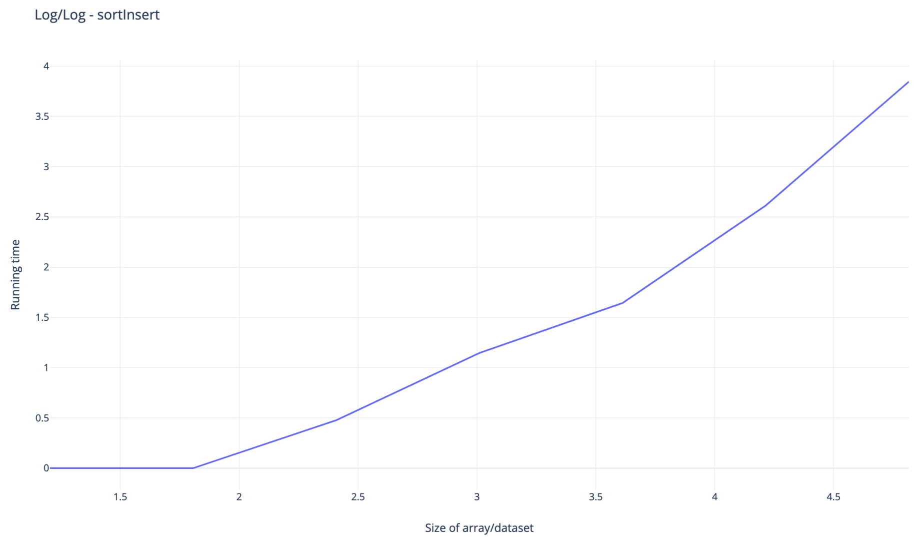
Note:

Included 2^{14} and 2^{16} size of array

sortInsert
Normal scale:

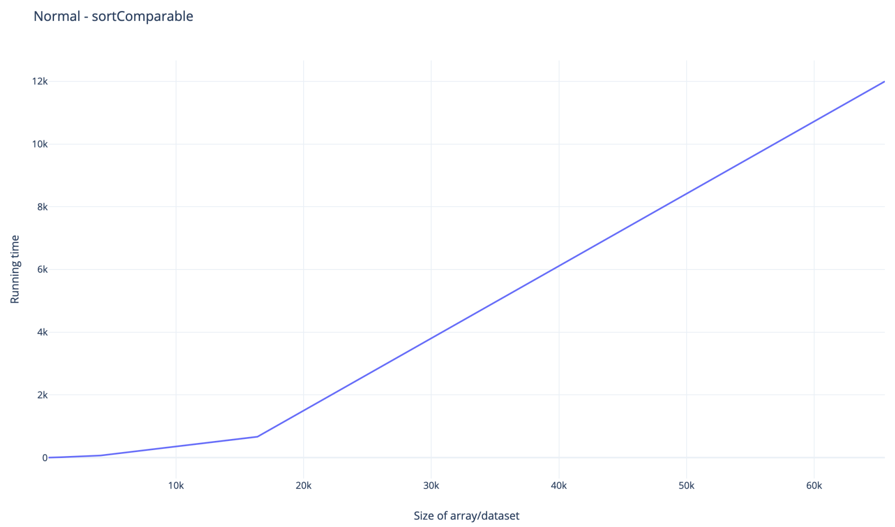


Log-Log scale:

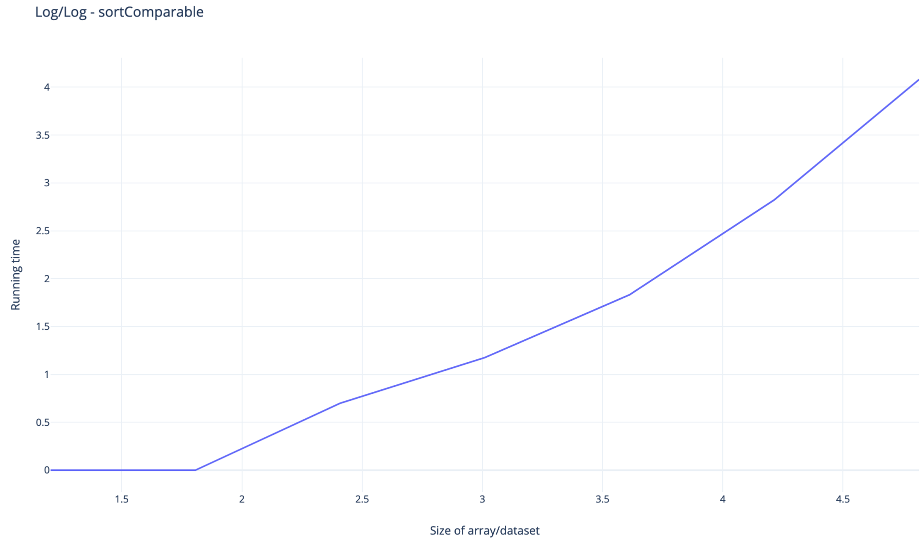


sortComparable

Normal scale:

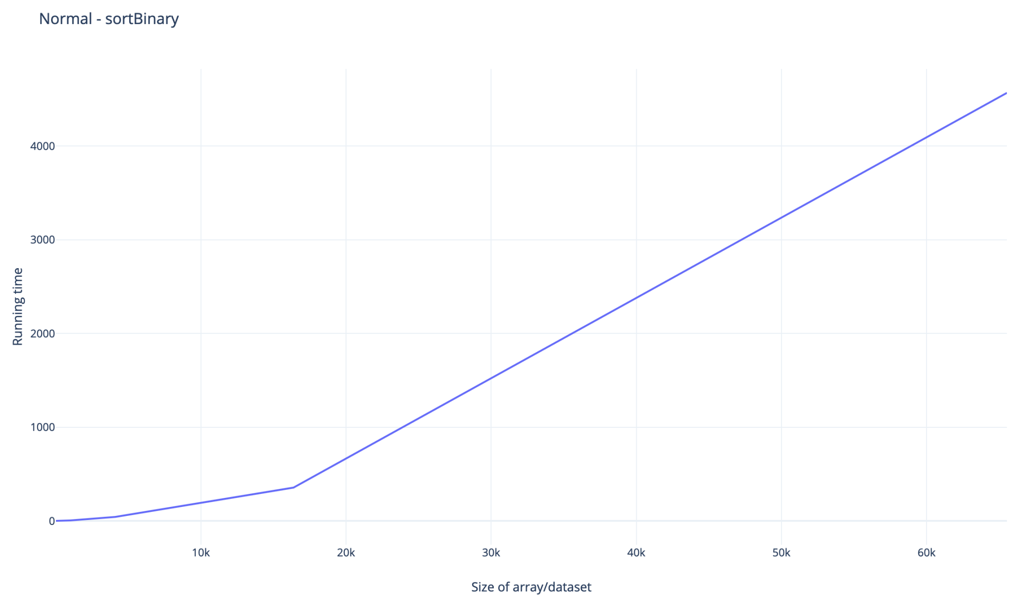


Log-Log scale:

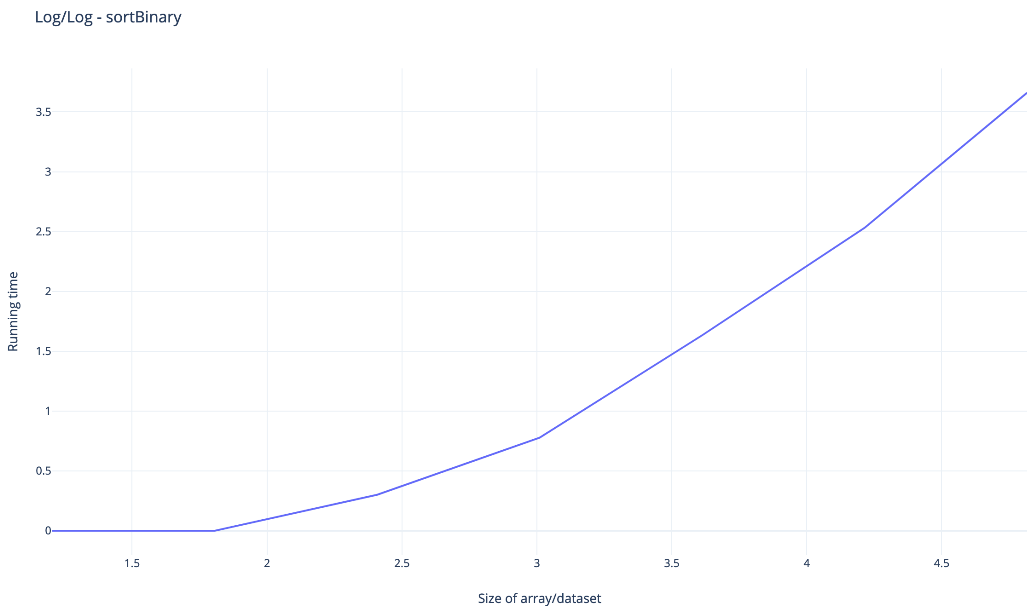


sortBinary

Normal scale:

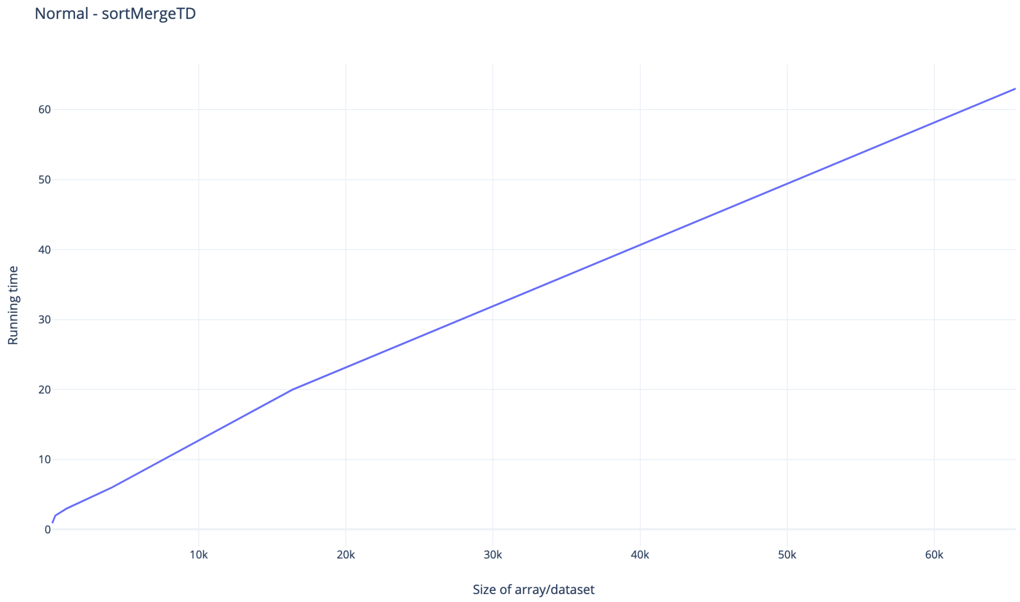


Log-Log scale:

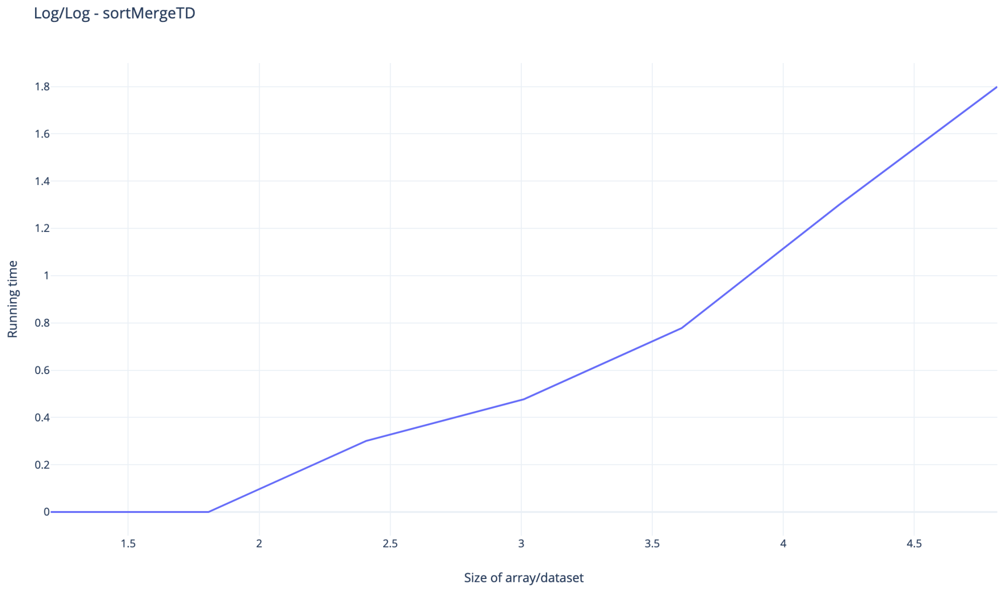


sortMergeTD

Normal scale:

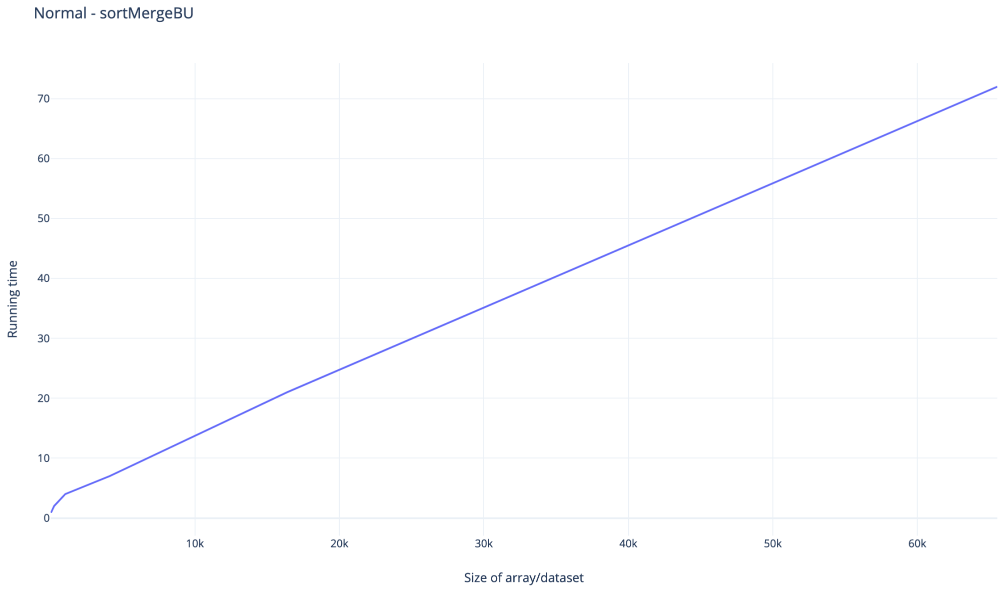


Log-Log scale:

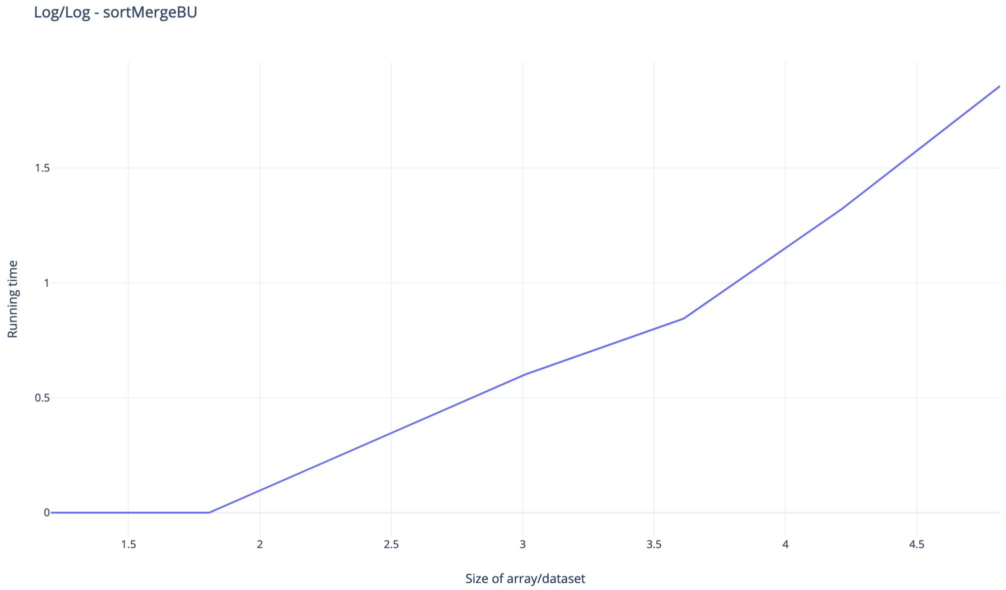


sortMergeBU

Normal scale:

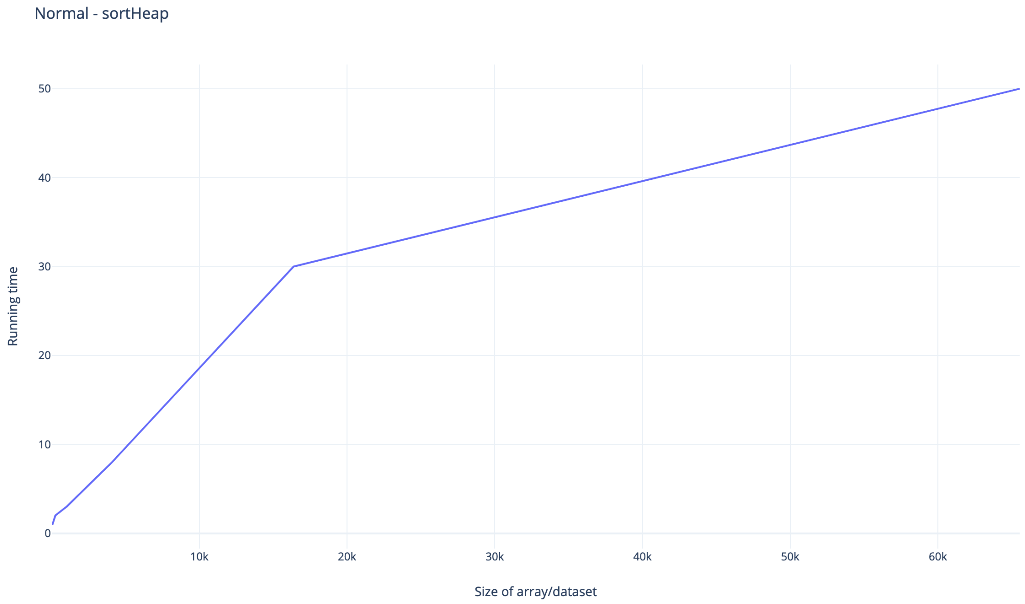


Log-Log scale:

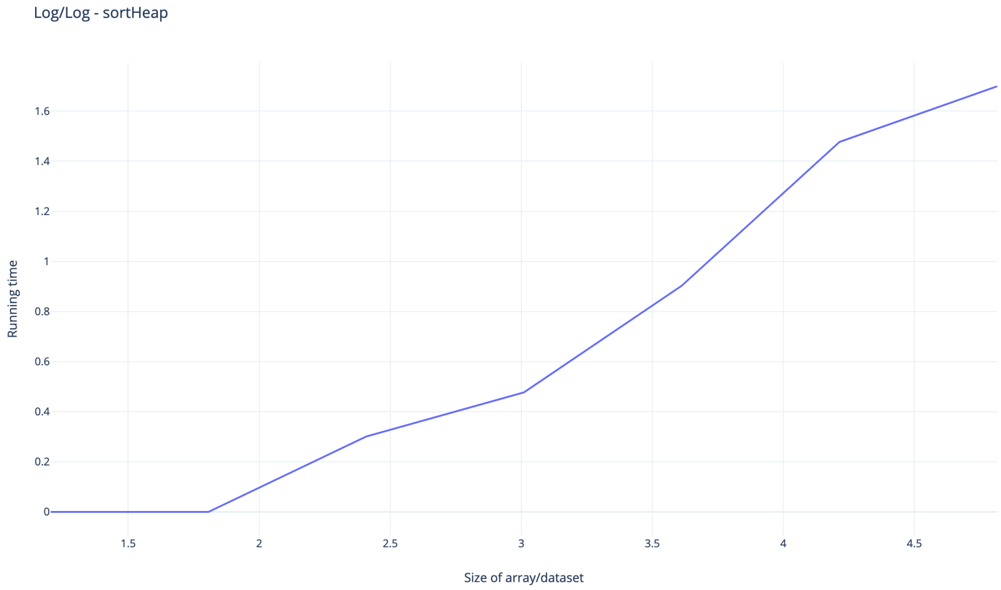


sortHeap

Normal scale:



Log-Log scale:



3.1.2

Based on the observation, the hypothesis for each method is different, as follows:
sortInsert: O(n)
sortComparable: O(n)
sortBinary: O(log n)
sortMergeTD: O(n*log n)
sortMergeBU: O(n*log n)
sortHeap: O(n*log n)

3.1.3

For array size of 2^{14} elements, expected running time would be:

sortInsert: 390ms
sortComparable: 710ms
sortBinary: 400ms
sortMergeTD: 16ms
sortMergeBU: 19ms
sortHeap: 25ms

For array size of 2^{16} elements, expected running time would be:

sortInsert: 6000ms
sortComparable: 14000ms
sortBinary: 4000ms
sortMergeTD: 70ms
sortMergeBU: 80ms
sortHeap: 70ms

3.1.4

For array size of 2^{14} elements, actual running time is:

sortInsert: 410ms
sortComparable: 666ms
sortBinary: 356ms
sortMergeTD: 20ms
sortMergeBU: 21ms
sortHeap: 30ms

For array size of 2^{16} elements, actual running time is:

sortInsert: 7000ms
sortComparable: 12000ms
sortBinary: 4568ms
sortMergeTD: 63ms
sortMergeBU: 72ms
sortHeap: 50ms