Below is the comparison of time execution between the original Heap Sort and its variant in different n sizes: 10, 100, 1000, 2000, 5000, 8000, 10000, 20000, 50000, 100000, 500000.



In order to get a fair comparison, I recorded 100 times of each size of n and calculated the average.



Below is the graph showing relationship of these two algorithms.

As expected, since the variant algorithm is actually optimized based on the original Heap Sort by reducing some comparison tests in Max-Heapify, the time complexity of the original Heap Sort is higher than its variant. Although there is not much difference for small sizes of n, according to the graph even 20000, after the n gets bigger, the difference of two algorithm is shown. Also, the original Heap Sort is a upper bound time complexity of its variant.