**Hypothesis**

With value k = 50, the speed of Hybrid Sort (Tim Sort) will be optimized.

**Methods**

Source code: https://github.com/Euclid0192/CSE431-HW5-Q12.git

**Results**

**A graph with numbers and a chart

Description automatically generated with medium confidence**

After running the experiment, trying arrays with size from n = 1 to n = 2000 and from k = 1 to k = 100, we see that the difference between the performance of Merge Sort and Tim Sort is indistinguishable from each other, but both are better than Insertion Sort.

**Discussion**

The result from the experiment has proved my hypothesis to be incorrect. It’s quite surprising that Hybrid Sort does not make the performance any better than Merge Sort for a wide range values of k, which could be used to generalize to all k.

**Conclusions**

There are no specific values of k that make Tim Sort optimal than Merge Sort.