

The worst case performance for the `in_order` sorting method is $O(n\log(n))$. In the case of a balanced tree, the n represents each element inserted, which then triggers the action of insertion, which is bounded by $\log(n)$.

The worst case performance for the `pre_order` method is $O(n\log(n))$. In the case of a balanced tree, the n is for each element inserted, which triggers the $\log(n)$ bounded action of insertion.

Similar to the other two, the worst case performance for the sorting method `post_order` is $O(n\log(n))$. In the case of a balanced tree, the n represents each item inserted, which then triggers the action of insertion, which is bounded by $\log(n)$. Like the other two sorts, the performance of the sorting method is $O(n\log(n))$.

Despite the order of the traversal varying depending on the type of sorting method, the performance is always $O(n\log(n))$.