

Insertion sort: $T(n) = \sum_{i=1}^{n-1} i = \frac{(n-1) \cdot n}{2} = O(n^2)$
Quicksort (avg time): $T(n) = 2 \cdot T(\frac{n}{2}) + O(n) = O(n \cdot \log_2(n))$