Quick sort (in place sorting algorithm)

Avg time complexity ≈ $O(n \log n)$

Quick sort - In place
Bubble sort - In place
insertion sort - In place
merge sort - Out of place
↳ It take $O(n)$ extra space

Quick sort is also based on divide and conquer algorithms just like merge sort.

* The worst case time complexity of Quick sort is $O(n^2)$

↳ This occurs when maximum element is selected as the pivot element and is present at the extreme in the array. [Merge sort is (out of place) sorting algorithm.]

Unlike merge sort which has worst case T.C. ≈ $O(n \log n)$

Bubble sort (in place sorting algorithm)

In it we see that ≈ $n + (n-1) + (n-2) + (n-3) + \dots 1$

which is ≈ $\frac{n(n+1)}{2}$

So, time complexity would be $O(n^2)$ similar to Insertion sort (But it is also a in place algorithm)