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IT

DS. Assignment

Q1 Insertion Sort.

Algorithm →

```
insert (int a[], size)
{
for ( i → size).
j = a[i];
c = j - 1;
while c > 0 && a[c] > j;
    a[c+1] = a[c];
    c--;
endwhile;
a[c+1] = j;
end for
}
```

Insertion Sort is an "In Place Sorting"

Space Complexity = O(1).

Time complexity = O(n).

Q2 Quick Sort → Basically it Divides & Sort

Time Complexity.

① Best Case $T(n) = O(n \log n)$.

② Avg Case $T(n) = O(n \log n)$.

③ Worst Case $T(n) = O(n^2)$.

Bubble Sort

Time complexity

For n elements (n-1) comparisions are done.

$$T(n) = 1 + 2 + \ldots + (n-1)$$

$$= \frac{n(n-1)}{2} = \frac{n^2 - n}{2}$$

$$\Rightarrow O(n^2)$$

→ Both Quick Sort & Bubble Sort are In-Place Algo's.

→ Bubble Sort is relevant for small size.

→ Merge Sort $T(n) = O(n \log n)$

→ Insertion Sort $T(n) = O(n^2)$.