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M.Tech (CS)

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Paper contains Quick Sort.

# Quick Sort

Pivot  
↓

3 1 4 1 5 9 2 6 5 3 5 8 9  
 $i \leftarrow \text{swap} \rightarrow j$

3 1 2 1 5 9 4 6 5 3 5 8 9  
 $i \quad j \quad i \quad j$

Because  $i > j \rightarrow \text{swap}$

1 1 2 3 5 9 4 6 5 3 5 0 9

Pivot  
↓

5 9 4 6 5 3 5 8 9  
 $i \leftarrow \text{swap} \rightarrow j$

5 3 4 6 5 9 5 8 9  
 $i \quad j \quad i \quad j$

Because  $i > j \rightarrow \text{swap}$

4 3 5 6 5 9 5 8 9  
 ↓ Pivot

4 3  
 $i \quad j \quad i$

$i > j \rightarrow \text{swap}$

3 4

$\boxed{6}$     5    5    9    8    9  
           j    i

$i > j \rightarrow \text{swap}$

Diagram illustrating the partitioning step of Quick Sort. The array is [5, 5, 6, 9, 8, 9]. The pivot is 6. Elements less than the pivot (5, 5) are moved to the left, and elements greater than the pivot (9, 8, 9) are moved to the right, resulting in the array [5, 5, 6, 9, 8, 9].

**Pivot**

8 9

$i > j$

8 9 → Swap

Sorted

1 1 2 3 3 4 5 5 5 6 8 9 9



# Write a program to implement Quick sort by Python language used.

```
def Pivot_Loc[List1, first, last]:  
    Pivot = List1[first]  
    left = first + 1  
    right = last  
    while True:  
        while left <= right and List1[left] <= Pivot:  
            left = left + 1  
        while left <= right and List1[right] >= Pivot:  
            right = right - 1  
        if right < left:  
            break  
        else:  
            List1[left], List1[right] = List1[right], List1[left]  
    List1[first], List1[right] = List1[right], List1[first]  
    return right
```

```
def quick_sort(list1, first, last):  
    if first < last:  
        p = pivot_loc(list1, first, last)  
        quick_sort(list1, first, p-1)  
        quick_sort(list1, p+1, last)
```

```
# main
```

```
list1 = []
```

```
n = int(input("Enter list length"))  
print("Enter numbers:")
```

```
for i in range(n):  
    data = int(input())
```

```
list1.append(data)
```

```
quick_sort(list1, 0, n-1)
```

```
print(list1)
```