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Batch:- A1

SORTING MECHANISM

1. Write a python code to sort the elements using Insertion Sort.

In [1]:
```
def insertion_sort(arr):
    n = len(arr)
    for i in range(1, n):
        value = arr[i]
        pos = i
        while pos > 0 and value < arr[pos-1]:
            arr[pos] = arr[pos - 1]
            pos -= 1
        arr[pos] = value

arr = []
p = int(input("Enter number of elements: "))
for i in range(0, p):
    ele = int(input())
    arr.append(ele)

print("Unsorted array:", arr)
insertion_sort(arr)
print("Sorted array:", arr)
```

```
Enter number of elements: 5
12
23
4
1
27
Unsorted array: [12, 23, 4, 1, 27]
Sorted array: [1, 4, 12, 23, 27]
```

2. Write a python code to sort the elements using Quick Sort.

In [2]:
```
def partition(arr, low, high):
    pivot = arr[high]
    i = low - 1
    for j in range(low, high):
        if arr[j] <= pivot:
            i = i + 1
            arr[i], arr[j] = arr[j], arr[i]
    arr[i+1], arr[high] = arr[high], arr[i+1]
    return i+1
```

```
def quickSort(arr, low, high):
    if low < high:
        pi = partition(arr, low, high)
        quickSort(arr, low, pi-1)
        quickSort(arr, pi+1, high)

arr = []
p = int(input("Enter number of elements: "))
for i in range(0, p):
    ele = int(input())
    arr.append(ele)

print("Unsorted array:", arr)
quickSort(arr, 0, len(arr)-1)
print("Sorted array:", arr)
```

```
Enter number of elements: 5
12
23
4
1
27
Unsorted array: [12, 23, 4, 1, 27]
Sorted array: [1, 4, 12, 23, 27]
```

3. Write a python code to sort the elements using Merge Sort.

In [3]:

```
def merge(left, right):
    result = []
    i = j = 0
    while i < len(left) and j < len(right):
        if left[i] < right[j]:
            result.append(left[i])
            i += 1
        else:
            result.append(right[j])
            j += 1
    result += left[i:]
    result += right[j:]
    return result

def merge_sort(arr):
    if len(arr) <= 1:
        return arr
    mid = len(arr) // 2
    left = merge_sort(arr[:mid])
    right = merge_sort(arr[mid:])
    return merge(left, right)

arr = []
p = int(input("Enter number of elements: "))
for i in range(0, p):
    ele = int(input())
    arr.append(ele)
print("Unsorted array:", arr)
arr = merge_sort(arr)
print("Sorted array is: ", arr)
```

```
Enter number of elements: 5
12
23
4
1
27
Unsorted array: [12, 23, 4, 1, 27]
Sorted array is:  [1, 4, 12, 23, 27]
```