

Assignment 4

```
def bubble_sort(arr):
    n = len(arr)
    for i in range(n):
        for j in range(0, n-i-1):
            if arr[j] > arr[j+1]:
                arr[j], arr[j+1] = arr[j+1], arr[j]

def selection_sort(arr):
    n = len(arr)
    for i in range(n):
        min_idx = i
        for j in range(i+1, n):
            if arr[j] < arr[min_idx]:
                min_idx = j
        arr[i], arr[min_idx] = arr[min_idx], arr[i]

def insertion_sort(arr):
    for i in range(1, len(arr)):
        key = arr[i]
        j = i-1
        while j >= 0 and key < arr[j]:
            arr[j+1] = arr[j]
            j -= 1
        arr[j+1] = key

def merge_sort(arr):
    if len(arr) > 1:
        mid = len(arr)//2
        L = arr[:mid]
        R = arr[mid:]

        merge_sort(L)
        merge_sort(R)

    i = j = k = 0

    while i < len(L) and j < len(R):
        if L[i] < R[j]:
            arr[k] = L[i]
            i += 1
        else:
```

```
    arr[k] = R[j]
    j += 1
    k += 1
```

```
while i < len(L):
    arr[k] = L[i]
    i += 1
    k += 1
```

```
while j < len(R):
    arr[k] = R[j]
    j += 1
    k += 1
```

```
def quick_sort(arr):
    if len(arr) <= 1:
        return arr
    pivot = arr[len(arr) // 2]
    left = [x for x in arr if x < pivot]
    middle = [x for x in arr if x == pivot]
    right = [x for x in arr if x > pivot]
    return quick_sort(left) + middle + quick_sort(right)
```

```
# Example usage:
arr = [64, 25, 12, 22, 11]
bubble_sort(arr)
print("Bubble Sorted array is:", arr)
```

```
arr = [64, 25, 12, 22, 11]
selection_sort(arr)
print("Selection Sorted array is:", arr)
```

```
arr = [64, 25, 12, 22, 11]
insertion_sort(arr)
print("Insertion Sorted array is:", arr)
```

```
arr = [64, 25, 12, 22, 11]
merge_sort(arr)
print("Merge Sorted array is:", arr)
```

```
arr = [64, 25, 12, 22, 11]
print("Quick Sorted array is:", quick_sort(arr))
```

OUTPUT:

Bubble Sorted array is: [11, 12, 22, 25, 64]

Selection Sorted array is: [11, 12, 22, 25, 64]

Insertion Sorted array is: [11, 12, 22, 25, 64]

Merge Sorted array is: [11, 12, 22, 25, 64]

Quick Sorted array is: [11, 12, 22, 25, 64]