

Merge Sorting

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

```
arr = [4, 7, 1, 3, 9, 2, 8, 5, 6]
```

```
sorted_arr = merge_sort(arr)
```

```
print(sorted_arr)
```

Output: [1, 2, 3, 4, 5, 6, 7, 8, 9]