18. Given an array of integers nums, sort the array in ascending order and return it.You must solve the problem without using any built-in functions in O(nlog(n)) time complexity and with the smallest space complexity possible.

Program:

```
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)

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.extend(left[i:])
    result.extend(right[j:])

    return result

nums = [12, 4, 7, 1, 9, 3]
sorted_nums = merge_sort(nums)
print(sorted_nums)
```

Output: