Merge Sort Algorithm in Python

ddas.tech/merge-sort-algorithm/

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Approach 1:

- Divide the array into two parts (left array and right array)
- Keep dividing recursively till there is only 1 element left in the left and right array.
- Start merging the left and right array into sorted array comparing elements of the two arrays and progressively incrementing the counter.

```
def mergeSort(data):
    if len(data) == 1:
        return data
    mid = len(data) // 2
    leftArray = data[:mid]
    rightArray = data[mid:]

    mergeSort(leftArray)
    mergeSort(rightArray)

#     At this point the array would be completely broken down
    i = 0
    j = 0
    k = 0


    while i < len(leftArray) and j < len(rightArray):
        if leftArray[i] < rightArray[j]:
            data[k] = leftArray[i]
            i = i + 1
        else:
            data[k] = rightArray[j]
            j = j+1
        k = k + 1


    while i < len(leftArray):
        data[k] = leftArray[i]
        k = k+1
        i = i+1

    while j < len(rightArray):
        data[k] = rightArray[j]
        j = j+1
        k = k+1

    return data

print(mergeSort([100,200,300,30,40,60]))
```

Approach 2

```
def mergeSort2(data):
    if len(data) == 1:
        return data
    mid = len(data) // 2
    leftArray = data[:mid]
    rightArray = data[mid:]

    mergeSort(leftArray)
    mergeSort(rightArray)

    return mergedData(leftArray,rightArray)

def mergedData(leftArray,rightArray):
    data = []
    i = 0
    j = 0

    while i < len(leftArray) and j < len(rightArray):
        if leftArray[i] < rightArray[j]:
            data.append(leftArray[i])
            i += 1
        else:
            data.append(rightArray[j])
            j += 1

    while i < len(leftArray):
        data.append(leftArray[i])
        i = i+1

    while j < len(rightArray):
        data.append(rightArray[j])
        j = j+1

    return data


print(mergeSort2([100,200,300,30,40,60]))
```

Merge two sorted lists

```
def merge(data1, data2):
    mergedData = []
    i = 0
    j = 0
    while i < len(data1) and j < len(data2):
        if data1[i] < data2[j]:
            mergedData.append(data1[i])
            i += 1
        else:
            mergedData.append(data2[j])
            j += 1

    while (i < len(data1)):
        mergedData.append(data1[i])
        i += 1
    while (j < len(data2)):
        mergedData.append(data2[j])
        j += 1

    return mergedData


print(merge([1,3,5,7],[2,4,6,8]))
```