

Day –15

Python DSA

Merge Without Extra Space

<https://www.geeksforgeeks.org/problems/merge-two-sorted-arrays-1587115620/1>

Brutforce

```
def merge(arr1, arr2, n,m):  
    arr3= [0]*(n+m)  
    left =0  
    right =0  
    index=0  
    while left < n and right < m:  
        if arr1[left] <= arr2[right]:  
            arr3[index] = arr1[left]  
            left +=1  
            index +=1  
        else:  
            arr3[index] = arr2[right]  
            right +=1  
            index +=1  
    while left < n:  
        arr3[index]= arr1[left]  
        left +=1  
        index +=1  
    while right < m:
```

```

arr3[index] = arr2[right]
right +=1
index +=1
for i in range(n+m):
    if i<n:
        arr1[i] = arr3[i]
    else:
        arr2[i-n]= arr3[i]
arr1 = [1, 3, 5]
arr2 = [2, 4, 6]
n = 3
m = 3
merge(arr1, arr2, n,m)

```

TC - $O(n+m) + O(n+m)$

SC- $O(n+m)$

Optimal

```

class Solution:
    def mergeArrays(self, a, b):
        m = len(a)
        n = len(b)

        # Start from end of a and start of b
        left = m - 1

```

```
right = 0
```

```
# Swap if elements in wrong order
```

```
while left >= 0 and right < n:
```

```
    if a[left] > b[right]:
```

```
        a[left], b[right] = b[right], a[left]
```

```
        left -= 1
```

```
        right += 1
```

```
    else:
```

```
        break
```

```
# Sort both arrays again to restore sorted order
```

```
a.sort()
```

```
b.sort()
```

TC - $O(m \log m + n \log n)$

SC- $O(1)$