

19F-0269 Design & Analysis of  
4B Algorithm  
Usama & (RED)3

Merge sort :-

3, 44, 38, 5, 47, 15, 36, 26, 27, 2, 46, 4,  
19, 50, 48, 43, 33, 34, 25, 1

Solution :-

- Putting the array into half :-

[3, 44, 38, 5, 47, 15, 36, 26, 27, 2] → ①

[46, 4, 19, 50, 48, 43, 33, 34, 25, 1] → ②

- Now split and merge these two arrays  
separately :-

- Consider Array ① :-

[3, 44, 38, 5, 47, 15, 36, 26, 27, 2]

- Split this array into half :-

[3, 44, 38, 5, 47] → ③ [15, 36, 26, 27, 2] → ④

- Now splitting and merging these two  
arrays separately :-

Consider Array ③ :

[3, 44, 38, 5, 47]

[3, 44] , [38, 5, 47]

[3] [44] , [38] [5, 47]

[3, 44] , [38] [5] [47]

[3, 44] ; [5, 38, 47]

- Now merging them together and sort them :

[3, 5, 38, 44, 47] → ③a

- Now consider Array ④ :

[15, 36, 26, 27, 2]

[15, 36] , [26, 27, 2]

[15, 36] , [26] [27, 2]

[15] [36] , [26] [27] [2]

[15, 36] , [2, 26, 27]

[2, 15, 26, 27, 36] - ④a

- Now that array ③a and array ④a are sorted separately, merge and sort them together Now :



$[3, 5, 38, 44, 47]$  ,  $[2, 15, 26, 27, 36]$

- After merging and merging:

$[2, 3, 5, 26, 27, 36, 38, 44, 47] \rightarrow \textcircled{5}$

- Now consider array  $\textcircled{2}$ :

$[46, 4, 19, 50, 48, 43, 33, 34, 25, 1]$

- Split the array into half:

$[46, 4, 19, 50, 48] \rightarrow \textcircled{6}$

$[43, 33, 34, 25, 1] \rightarrow \textcircled{7}$

- Now split and merge these arrays separately:

- consider array  $\textcircled{6}$ :

$[46, 4, 19, 50, 48]$

$[46, 4]$  ,  $[19, 50, 48]$

$[46]$   $[4]$  ,  $[19]$   $[50, 48]$

$[4, 46]$  ,  $[19]$   $[50, 48]$

$[4, 46]$  ,  $[19, 48, 50]$

$[4, 19, 46, 48, 50] \rightarrow \textcircled{6A}$

- Now consider array (4):  
[43, 33], [34] [25, 1]

[33] [43], [34] [25] [1]

[33] [43], [1, 25, 34]

[1, 25, 33, 34, 43] → (7A)

- merge and sort array (6A) and array (7A)

[1, 4, 19, 25, 33, 34, 43, 46, 48, 50] → (8)

- Now merge and sort Array (5) and (8):

- After merging and sorting:

[1, 2, 3, 4, 5, 15, 19, 25, 26, 27, 33, 34, 36,  
38, 43, 44, 46, 47, 48, 50]

↳ Sorted Array  
After merge sorting.

↓  
Answer.