

Merge Sort

The algorithm

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26th August 2013

Merge sort

Merge sort is a simple recursive algorithm to sort the elements of an array in increasing order.

Input Array A of length n

Output A sorted array R

```
1   if  $n == 1$ , return  $A$ 
2    $B = \text{MergeSort}A_{1,2,\dots,\lfloor n/2 \rfloor}$ 
3    $C = \text{MergeSort}A_{\lfloor n/2 \rfloor + 1, \lfloor n/2 \rfloor + 2, \dots, n}$ 
4   return  $\text{Merge } B, C$ 
```

Merge

Input Two sorted arrays A and B of length n and m respectively.

Output A sorted array C including all the elements of A and of B .

```
1       $i = 1 ; j = 1 ; k = 0$ 
2      while (  $i \leq n$  or  $j \leq m$  )
3           $k = k + 1$ 
4          if  $i > n$ ,
5               $C_k = B_j ; j = j + 1$ 
6          else if  $j > m$ ,
7               $C_k = A_i ; i = i + 1$ 
8          else if  $A_i \leq B_j$ ,
9               $C_k = A_i ; i = i + 1$ 
10         else
11              $C_k = B_j ; j = j + 1$ 
12     return  $C$ 
```