Merge Sort

Recursive sorting algorithm
Merge function used with recursion

Input: ① array of integers to be sorted
② starting index (usually 0)
③ starting end index (usually array length-1)

Output: sorted input array
↳ start to end values be in non-decreasing order 1 2 3 4 (sorted) 4 1 3 2 (not sorted)

* Assume array of length 1 is sorted

Steps: ① Sort the first half of the input array (used midpoint)
② Sort the second half of the array
③ Merge the sorted halves of the input array
④ Stop ~~merging~~ when the ~~merged~~ input array is sorted

integer

1	4	2	5	3
0	1	2	3	4

$$mid = \frac{\text{start index} + \text{end index}}{2}$$

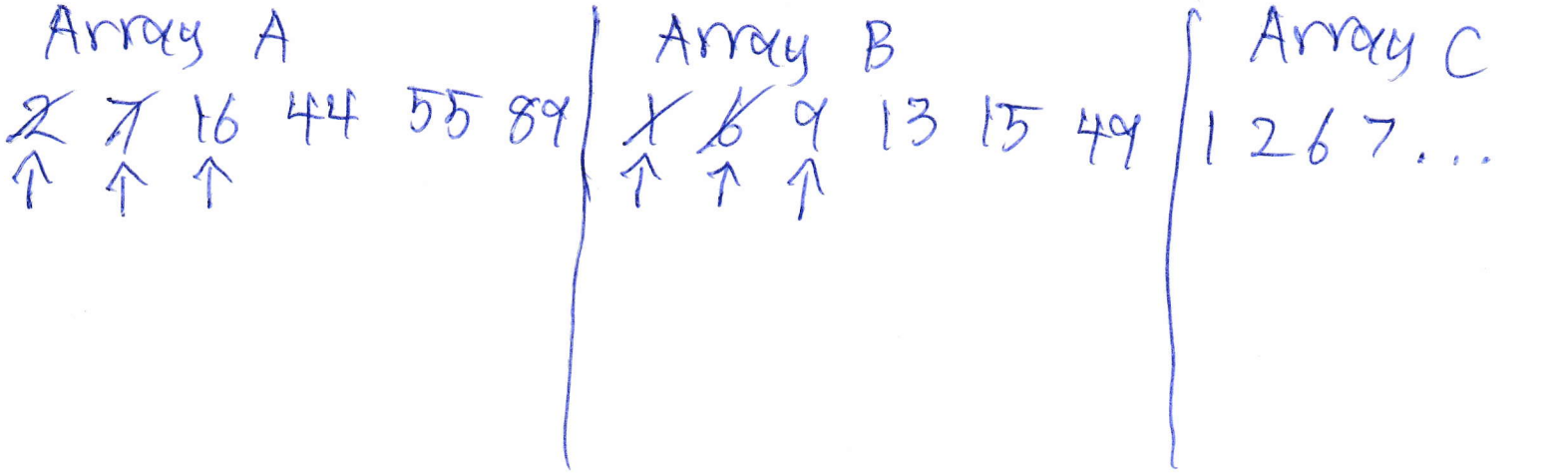
$$mid = \frac{4+0}{2} = 2$$

Merge Function

Combine subarrays into one array; values are sorted when subarrays are being combined

Steps:

1. Find the smallest values in each subarray
2. Compare the smallest values in each subarray
3. Place smallest value from a subarray in leftmost position of the larger (new) array
4. Find new minimum value in subarray which had placed minimum value
5. Repeat steps until all values from each subarray are in the larger array in sorted order



Example of Merge Sort