Median of Two Sorted Arrays

Given two sorted array of integers of the same length, determine the median of the combined sorted array.  
  
Input: Two Arrays of Integers  
Output: Float

# Example

Input: [1, 12, 15, 26, 38], [2, 13, 17, 30, 45]

Output: 16

(because the median of [1, 2, 12, 13, 15, 17, 26, 30, 38, 45] equals 16)

# Constraints

Time Complexity: (Intermediate) O(N), (Advanced) O(log(N))  
Auxiliary Space Complexity: O(1).

# Solution

Intermediate:

1. Create two indices i and j and initiate them at zero
2. Similar to “merging two sorted arrays” compare to find the lower value between arr1[i] and arr2[j].
3. Increment up either i or j depending on which one is pointing to the lower value
4. Repeat for N elements.
5. Take the average of element N and element N-1 and return that value.

Advanced:

1. Find the median of both arrays separately

↓ ↓

[1, 12, 15, 26, 38], [2, 13, 17, 30, 45]

2. If the values are the same then, return that value

3. If the median of array 1 is smaller than array 2, apply “divide and conquer” to focus on the

larger half of array 1 and smaller half of array 2 (vice versa if the median of array 1 is larger).

4. Take the median of the new subarrays and repeat steps 1. through 3. until there are only 2 items in

each array

↓ ↓

[15, 26, 38], [2, 13, 17] (take upper half of arr1 and lower of arr2)

5. Finally, when there are only two items left in each array, get the **larger** of the first elements and

**smaller** of the second elements and return the average of those values (add them and divide by 2).

[15, 26], [13, 17] => (15+17)/2 = 16

# 

# Resources

http://www.geeksforgeeks.org/median-of-two-sorted-arrays/