

Day 1: Quartiles

Objective

In this challenge, we practice calculating *quartiles*. Check out the [Tutorial](#) tab for learning materials and an instructional video!

Task

Given an array, *arr*, of *n* integers, calculate the respective first quartile (Q_1), second quartile (Q_2), and third quartile (Q_3). It is guaranteed that Q_1 , Q_2 , and Q_3 are integers.

Example

arr = [9, 5, 7, 1, 3]

The sorted array is [1, 3, 5, 7, 9] which has an odd number of elements. The lower half consists of [1, 3], and its median is $\frac{1+3}{2} = 2$. The middle element is 5 and represents the second quartile. The upper half is [7, 9] and its median is $\frac{7+9}{2} = 8$. Return [2, 5, 8].

arr = [1, 3, 5, 7]

The array is already sorted. The lower half is [1, 3] with a median = $\frac{1+3}{2} = 2$. The median of the entire array is $\frac{3+5}{2} = 4$, and of the upper half is $\frac{5+7}{2} = 6$. Return [2, 4, 6].

Function Description

Complete the *quartiles* function in the editor below.

quartiles has the following parameters:

- *int arr[n]*: the values to segregate

Returns

- *int[3]*: the medians of the left half of *arr*, *arr* in total, and the right half of *arr*.

Input Format

The first line contains an integer, *n*, the number of elements in *arr*.
The second line contains *n* space-separated integers, each an *arr[i]*.

Constraints

- $5 \leq n \leq 50$
- $0 < arr[i] \leq 100$, where *arr[i]* is the *i*th element of the array.

Sample Input

STDIN	Function
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```
9 arr[] size n = 9
3 7 8 5 12 14 21 13 18 arr = [3, 7, 8, 5, 12, 14, 21, 13, 18]
```

Sample Output

```
6
12
16
```

Explanation

$arr_{sorted} = [3, 5, 7, 8, 12, 13, 14, 18, 21]$. There is an odd number of elements, and the middle element, the median, is **12**.

As there are an odd number of data points, we do not include the median (the central value in the ordered list) in either half:

Lower half (L): 3, 5, 7, 8

Upper half (U): 13, 14, 18, 21

Now find the quartiles:

- Q_1 is the *median(L)*. So, $Q_1 = \frac{5+7}{2} = 6$.
- Q_2 is the *median(X)*. So, $Q_2 = 12$.
- Q_3 is the *median(U)*. So, $Q_3 = \frac{14+18}{2} = 16$.