

The previous challenges covered [Insertion Sort](#), which is a simple and intuitive sorting algorithm with a running time of  $O(n^2)$ . In these next few challenges, we're covering a *divide-and-conquer* algorithm called [Quicksort](#) (also known as *Partition Sort*). This challenge is a modified version of the algorithm that only addresses partitioning. It is implemented as follows:

### Step 1: Divide

Choose some pivot element,  $p$ , and partition your unsorted array,  $arr$ , into three smaller arrays: *left*, *right*, and *equal*, where each element in *left*  $< p$ , each element in *right*  $> p$ , and each element in *equal*  $= p$ .

For example: Assume  $arr = [5, 7, 4, 3, 8]$

The pivot is at  $arr[0] = 5$

$arr$  is divided into *left*  $= \{4, 3\}$ , *equal*  $= \{5\}$ , and *right*  $= \{7, 8\}$ .

Putting them all together, you get  $\{4, 3, 5, 7, 8\}$ . Another valid solution is  $\{3, 4, 5, 8, 7\}$ .

Given  $arr$  and  $p = arr[0]$ , partition  $arr$  into *left*, *right*, and *equal* using the *Divide* instructions above. Then print each element in *left* followed by each element in *equal*, followed by each element in *right* on a single line. Your output should be space-separated and does not have to maintain ordering of the elements within the three categories.

### Function Description

Complete the `quickSort` function in the editor below. It should return an array of integers as described above.

`quickSort` has the following parameter(s):

- $arr$ : an array of integers where  $arr[0]$  is the pivot element

### Input Format

The first line contains  $n$ , the size of the array  $arr$ .

The second line contains  $n$  space-separated integers describing  $arr$  (the unsorted array). The first integer (corresponding to  $arr[0]$ ) is your pivot element,  $p$ .

### Constraints

- $1 \leq n \leq 1000$
- $-1000 \leq arr[i] \leq 1000$  where  $0 \leq i < n$
- All elements will be unique.

### Output Format

On a single line, print the partitioned numbers (i.e.: the elements in *left*, then the elements in *equal*, and then the elements in *right*). Each integer should be separated by a single space.

### Sample Input

```
5
4 5 3 7 2
```

### Sample Output

```
3 2 4 5 7
```

### Explanation

$arr = [4, 5, 3, 7, 2]$  Pivot:  $p = arr[0] = 4$ .

*left*  $= \{\}$ ; *equal*  $= \{4\}$ ; *right*  $= \{\}$

$arr[1] = 5 > p$ , so it's added to *right*.

*left*  $= \{\}$ ; *equal*  $= \{4\}$ ; *right*  $= \{5\}$

$arr[2] = 3 < p$ , so it's added to *left*.

*left*  $= \{3\}$ ; *equal*  $= \{4\}$ ; *right*  $= \{5\}$

$arr[3] = 7 > p$ , so it's added to *right*.

*left*  $= \{3\}$ ; *equal*  $= \{4\}$ ; *right*  $= \{5, 7\}$

$arr[4] = 2 < p$ , so it's added to *left*.

*left*  $= \{3, 2\}$ ; *equal*  $= \{4\}$ ; *right*  $= \{5, 7\}$

We then print the elements of *left*, followed by *equal*, followed by *right*, we get: 3 2 4 5 7.

You don't need to maintain ordering, so another valid solution would be 2 3 4 5 7.