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**ECE D**

### **Question 1:** **Reverse a List**

Problem Statement:

Given an array of integers, reverse the given array in place using an index and loop rather than a built-in function.

Example

arr = [1, 3, 2, 4, 5]

Return the array [5, 4, 2, 3, 1] which is the reverse of the input array.

Function Description

Complete the function reverseArray in the editor below.

reverseArray has the following parameter(s):

int arr[n]: an array of integers

Return

int[n]: the array in reverse order

Constraints

$1 \leq n \leq 100$

$0 < arr[i] \leq 100$

Input Format For Custom Testing

The first line contains an integer,  $n$ , the number of elements in arr.

Each line  $i$  of the  $n$  subsequent lines (where  $0 \leq i < n$ ) contains an integer,  $arr[i]$ .

Sample Input For Custom Testing

5

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1 3 2 4 5 Sample Output 54231 Explanation The input array is [1, 3, 2, 4, 5], so the reverse of the input array is [5, 4, 2, 3, 1].

```
35 int* reverseArray(int arr_count, int *arr, int *result_count) {  
36     *result_count = arr_count;  
37     for(int i = 0; i<arr_count/2; i++){  
38         int temp =arr[i];  
39         arr[i] = arr[arr_count-i-1];  
40         arr[arr_count-i-1] = temp;  
41     }  
42     return arr;  
43 }  
44 }  
45 }
```

	Test	Expected	Got	
✓	int arr[] = {1, 3, 2, 4, 5}; int result_count; int* result = reverseArray(5, arr, &result_count); for (int i = 0; i < result_count; i++) printf("%d\n", *(result + i));	5 4 2 3 1	5 4 2 3 1	✓

## Question 2:

## Maximize the Value

Rearrange an array of integers so that the calculated value  $U$  is maximized. Among the arrangements that satisfy that test, choose the array with minimal ordering. The value of  $U$  for an array with  $n$  elements is calculated as:

$U = \text{arr}[1] \times \text{arr}[2] \times (1 \div \text{arr}[3]) \times \text{arr}[4] \times \dots \times \text{arr}[n-1] \times (1 \div \text{arr}[n])$  if  $n$  is odd (or)

$U = \text{arr}[1] \times \text{arr}[2] \times (1 \div \text{arr}[3]) \times \text{arr}[4] \times \dots \times (1 \div \text{arr}[n-1]) \times \text{arr}[n]$  if  $n$  is even

The sequence of operations is the same in either case, but the length of the array,  $n$ , determines whether the calculation ends on  $\text{arr}[n]$  or  $(1 \div \text{arr}[n])$ . Arrange the elements to maximize  $U$  and the items are in the numerically smallest possible order.

Example:  $\text{arr} = [5, 7, 9, 21, 34]$

To maximize  $U$  and minimize the order, arrange the array as  $[9, 21, 5, 34, 7]$  so  $U = 9 \times 21 \times (1 \div 5) \times 34 \times (1 \div 7) = 183.6$ . The same  $U$  can be achieved using several other orders, e.g.  $[21, 9, 7, 34, 5] = 21 \times 9 \times (1 \div 7) \times 34 \times (1 \div 5) = 183.6$ , but they are not in the minimal order.

Function Description: Complete the function `rearrange` in the editor below.

`rearrange` has the following parameter(s): `int arr[n]`: an array of integers

Returns: `int[n]`: the elements of `arr` rearranged as described

Constraints:  $1 \leq n \leq 105$ ,  $1 \leq \text{arr}[i] \leq 109$

Input Format For Custom Testing: The first line contains an integer,  $n$ , the number of elements in `arr`. Each line  $i$  of the  $n$  subsequent lines (where  $1 \leq i \leq n$ ) contains an integer, `arr[i]`.

Sample Input For Custom Testing

STDIN Function ----- 4 → arr[] size n = 4 1 → arr = [1, 2, 3, 4] 2 3 4 Sample Output 2 3 1 4

Explanation  $U = 2 \times 3 \times (1 \div 1) \times 4 = 24$ . All other arrangements where  $U = 24$  are numerically higher than this array, e.g.  $[2, 3, 1, 4] < [3, 4, 1, 2]$ .

```
29 char* cutThemAll(int lengths_count, long *lengths, long minLength) {
30     long t=0, i =1;
31     for(int i=0; i<=lengths_count-1; i++){
32         t += lengths[i];
33     }
34     do{
35         if(t-lengths[lengths_count-i-1] < minLength){
36             return "Impossible";
37         }
38         i++;
39     }while(i<lengths_count-1);
40     return "Possible";
41 }
42
43
```

	Test	Expected	Got	
✓	long lengths[] = {3, 5, 4, 3}; printf("%s", cutThemAll(4, lengths, 9))	Possible	Possible	✓
✓	long lengths[] = {5, 6, 2}; printf("%s", cutThemAll(3, lengths, 12))	Impossible	Impossible	✓