

Lab 8

Instructions: Implement a function to randomly sort an array of integers.

Objectives:

- Continued practice with integer arrays.
- Continued practice with functions/function calls.
- Continued practice with loops.

Task: Download the source file Lab8.c. This file contains several incomplete functions which should be filled in to meet the following specifications:

- `void swap(int arr[ARRAY_SIZE], int i, int j)`: Swaps the elements at positions `i` and `j` in array `arr`.
- `int isIncreasing(int arr[ARRAY_SIZE])`: Returns 1 if the elements in `arr` are increasing (each element is larger than the previous element), or 0 if they are not increasing.
- `void initArr(int arr[ARRAY_SIZE], int bound)`: Randomly fills `arr` with random integers from `[0...bound)`.
- `int randomSort(int arr[ARRAY_SIZE])`: Sorts the array according to the following procedure:
 - Pick two random array positions `i` and `j`.
 - Swap the elements at positions `i` and `j`.
 - Check if the array is now sorted using `isIncreasing`.
 - If the array is sorted, end the function.
 - If the array is still unsorted, continue randomly swapping elements.

`randomSort` should **return the number of swaps used** to sort the array.

Do not modify the main function. Once the above functions are correctly filled in, the program should run as follows:

<pre> /home/user/CIS190/Lab8\$./Lab8.out Array: 0 1 2 3 4 5 Running swap(arr, 1, 4). Array: 0 4 2 3 1 5 Running initArr(arr, 10). Array: 7 8 4 4 8 0 Running randomSort(arr). Array: 0 4 4 7 8 8 Swaps used: 1788 </pre>	<pre> /home/user/CIS190/Lab8\$./Lab8.out Array: 0 1 2 3 4 5 Running swap(arr, 1, 4). Array: 0 4 2 3 1 5 Running initArr(arr, 10). Array: 4 9 5 9 5 0 Running randomSort(arr). Array: 0 4 5 5 9 9 Swaps used: 353 </pre>
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Figure 1. Correct outputs for Lab8.c.

Submission details:

- Upload a compressed archive (e.g., .zip) containing `Lab8.c`.
- The archive should be named `Lab8_LastName`, where `LastName` is your last name.
- If you're on Linux, you can use the following command to create a .tar.gz archive from the terminal:

```
$ tar -czvf Lab8_LastName.tar.gz Lab8.c
```

where `LastName` is your last name.