

C Review Exercise 1 (Simple Sorting)

Topics: C programming language
Sorting

Goals: Upon successful completion of this tutorial you should be able to:

1. Open and read a C stream file
2. Create and sort a C static array using a simple sort

Related text sections:

C Review Exercise 1 Instructions

This tutorial is designed to help you review your C programming skills. The program you develop for this exercise will be used for future tutorial exercises.

Internal sorting techniques are frequently described as simple or advanced. Simple sorting techniques include the Exchange (bubble), Insertion, and Selection sorts. Advanced techniques include Quicksort and Mergesort.

For this tutorial, you are to write a C program which uses one of the simple sorting techniques to sort a set of integers into ascending order. For C tutorial exercise 2 you will use one of the advanced sorting techniques to sort the same set of integers into descending order.

The sorts you are to implement will depend on the number you draw in class.

1. Exchange and Mergesort
2. Exchange and Quicksort
3. Insertion and Mergesort
4. Insertion and Quicksort
5. Selection and Mergesort
6. Selection and Quicksort

The documentation in your program should clearly indicate and describe the simple sort being implemented. Your program should use 1 or more nested functions.

Input: Your C program should read a text file containing a number of integer values. The file name should be accepted as a command line argument. *The first value in the file is the number of integers to be sorted.* The remaining values are the values to be sorted.

Output: The console output of your C program should be a sorted list of values. Consecutive values in the sorted output list should be separated by a single space.

Sample Input:

```
8 1 4 23 -45 61 28 0 2
```

Sample Output:

```
-45 0 1 4 2 23 61 28
```

C Review Exercise 2 (Advanced Sorting)

Topics: Recursion
C parameter passing

Goals: Upon successful completion of this tutorial you should be able to:

1. Sort a C static array using a recursive advanced sort

Related text sections:

C Review Exercise 2 Instructions

Next week we will start using the functional language Scheme. One of the most powerful characteristics of the functional language paradigm is the ability to implement algorithms that employ recursion. For this tutorial, as a review of recursion, you are to add the implementation of a recursive, descending sort to the C program you created for C tutorial 1.

The recursive sort you are to implement will depend on the number you drew in class for tutorial 1.

1. Exchange and Mergesort
2. Exchange and Quicksort
3. Insertion and Mergesort
4. Insertion and Quicksort
5. Selection and Mergesort
6. Selection and Quicksort

The documentation in your program should clearly indicate and describe the recursive sort being implemented.

Input: Your C program should read a text file containing a number of integer values. The file name should be accepted as a command line argument. The first value in the file is the number of integers to be sorted. The remaining values are the values to be sorted.

Output: The console output of your C program should be a sorted list of values. The values should first be sorted into ascending order using your simple sort and then into descending order using your advanced sort. Each sort should start with a copy of the original list read from the file. Consecutive values in each sorted output list should be separated by a single space. The two lists of sorted values should be separated by one blank line.

Sample Input:

```
8 1 4 23 -45 61 28 0 2
```

Sample Output:

```
-45 0 1 2 4 23 61 28
```

```
61 28 23 4 2 1 0 -45
```

To turn in: A listing of your well formatted and documented C program. Copy your program to ~tiawatts/cs460drop as *your_last_name.c* and ask me to test it.