System Programming - Homework 1 (Due November 6, 2019, Wednesday)

Write a function in the NASM assembly language that will implement the "Counting Sort" algorithm on an array of positive integers.

The function should take the array of positive integers and their count as input parameters and return the sorted array.There may be more than one of each integer in the array.

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Example:
Input array:  2 0 0 3 2 3 3 4 0 2 0 0 3
Sorted array: 0 0 0 0 0 2 2 2 3 3 3 3 4
```

Also implement a C function which reads the numbers to be sorted from a file into an array, passes the array and its size as parameters to the assembly function, gets the sorted array from the assembly function and displays it. The name of the input file will be given as a command line parameter to the C program. The file may contain any number of positive integers.

Students will work in groups of two on this project. Each member of the group is expected to know every detail about the project. Apart from the implementation details of the project, there will also be questions about the Counting Sort algorithm in general.

It is not recommended that you write the Counting Sort function in C and convert it to Assembly by disassembling it. Although it is not forbidden, you will be expected to be able to explain in detail every compiler-getenerated instruction. If you cannot explain your code in detail, you will not be able to get any points.