Operating Systems Lab (CS 470):

Lab 2: Create a C/C++ program under Linux/MacOS to sort integer numbers.

Overview

Sorting is an important concept in programming. There are multiple algorithms to perform such operations such as BubbleSort, QuickSort, RadixSort, MergeSort, HeapSort, etc.

Instructions

Write a C/C++ program under Linux/MacOS which reads its input from a plain text file (containing positive integer numbers separated by one or multiple separator character). The input filename and the separator character should be provided as command line arguments. The software should read the numbers from the text file and sort them. The sorting should use the concept of *divide et impera* and processes (see *fork()*). The result should be printed on the screen and the intermediate sorting parts should also be traceable in the computer screen. For each process the process id, the input and the output should be provided.

Notes

- The father process should split the data into 2 consequent parts, which will be later considered by two child processes for sorting. Each child processes will do the same to initiate another 2 child process to do the sorting on the new data. The process continues until the list of numbers is sorted
- Each time the parent process is responsible to merge the partial results provided by the children.
- For each intermediate sorting operation a separate process should be lunched considering fork()!
- Due to the sensitive nature of fork() the algorithm might not work for a large amount of numbers.
- The input file (see format description above) will be provided by the testing person.
- Example for file formats: 1,32,12,3 or 1;32;12;3 or 1 32 12 3 or 1-32-12-3.

Rubric

Task	**Points**
Error handling	2
Sorting the data	5
Print intermediate results	2
Print the final result (sorted numbers)	1