CS-263: Design and Analysis of Algorithms Laboratory

LAB Assignment I

Course Instructor: Dr. Dibyendu Roy Due: Oct 02, 2023, 11:59 pm

Instructions: Code must be written in C language and it must be well commented. Submission of code in any other file extension (.pdf, .docx etc) will not be considered. The file name of your code will be YOUR ROLL-NO.c

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Implement the following sorting problem using the Merge sort algorithm. Here we use a different ordering $<_o$ between two integers. Let $a_1a_2 \dots a_k$ and $b_1b_2 \dots b_k$ be two integers of k digits. Here $a_1a_2 \dots a_k <_o b_1b_2 \dots b_k$ if $a_i < b_i$ for the last i where a_i and b_i differ. As per this newly defined ordering the following follows: $12 <_o 13 <_o 23 <_o 14 <_o 24 <_o 34 <_o 15 <_o 25 <_o 35 <_o 45$.

1. Let n and m be two positive integers (input to your code). These two integers can be large (may be of 20 bits).
2. Here n is the number of m digit integers which will be considered in your code. Thus n and m are considered in such way that we can have valid computations.
3. Consider n many random m digit integers. This is generated randomly inside your code. Store these n integers inside an array A and print the array.
4. Sort the array A using Merge sort algorithm where our new defined ordering $<_o$ will be used to determine the ordering of the integers.
5. Print the final sorted array.