National Institute of Technology, Calicut
Department of Computer Science and Engineering
CS2094 – Data Structures Lab
Assignment-2(Main Batch)

Policies for Submission and Evaluation

You must submit your assignment in the moodle (Eduserver) course page, on or before the submission deadline. Also, ensure that your programs in the assignment must compile and execute without errors in Athena server. During evaluation your uploaded programs will be checked in Athena server only. Failure to execute programs in the assignment without compilation errors may lead to zero marks for that program.

Your submission will also be tested for plagiarism, by automated tools. In case your code fails to pass the test, you will be straightaway awarded zero marks for this assignment and considered by the examiner for awarding F grade in the course. Detection of ANY malpractice regarding the lab course will also lead to awarding an F grade.

Naming Conventions for Submission

Submit a single ZIP (.zip) file (do not submit in any other archived formats like .rar or .tar.gz). The name of this file must be ASSG<NUMBER>_<ROLLNO>_<FIRSTNAME>.zip (For example: ASSG2_BxxyyyyCS_LAXMAN.zip). DO NOT add any other files (like temporary files, input files, etc.) except your source code, into the zip archive.

The source codes must be named as ASSG<NUMBER>_<ROLLNO>_<FIRSTNAME>_<PROGRAM-NUMBER>.<extension> (For example: ASSG2_BxxyyyyCS_LAXMAN_1.c). If there is a part *a* and a part *b* for a particular question, then name the source files for each part separately as in ASSG2_BxxyyyyCS_LAXMAN_1b.c.

If you do not conform to the above naming conventions, your submission might not be recognized by some automated tools, and hence will lead to a score of 0 for the submission. So, make sure that you follow the naming conventions.

Assignment Questions

1. Given two sorted file "in1.txt" and "in2.txt" of integers, merge them into a single sorted file "out.txt" using merge procedure of merge sort.

Note : Read content from files "in1.txt" and "in2.txt" which consist of integers separated by space and write the output to file "out.txt"

in1.txt

3 10 28 35

in2.txt

2 11 24 30

out.txt

2 3 10 11 24 28 30 35

2. Write a C program to sort the array of integers using Quick sort.

Sample Input:

7

15 5 11 3 2 25 7

Sample Output:

2 3 5 7 11 15 25

Input Explanation:

First line reads array size (N).
Second line reads N integers separated by single space.

Output Explanation:

Single line output, with N integers sorted in ascending order separated by single space.

3. Write a program to implement Heap sort to sort given array of integers in descending order.

Sample Input:

5
25 6 40 17 55

Sample Output:

55 40 25 17 6

Input Explanation:

First line reads number of integers to be sorted (N).
Second line reads N integers separated by single space.

Output Explanation:

Single line output, with N integers sorted in descending order separated by single space.

4. a) Write a program to sort integers using modified bubble sort which bubble in both directions. The first pass moves up the array and second

moves down. This alternating pass continues until no more passes are necessary.

Sample Input:

5
25 6 40 17 55

Sample Output:

6 17 25 40 55

Input Explanation:

First line reads number of integers to be sorted (N). Second line reads N integers separated by single space.

Output Explanation:

Single line output, with N integers sorted in ascending order separated by single space.

4. b) Write a C program that takes two integer arrays S and T of length n and check whether T is sorted version of the S in O(n). Print 1 if T is sorted version of S, otherwise print -1.

Sample Input:

5
4 3 5 2 3
2 3 3 4 5

Sample Output:

1

Input Explanation:

First line reads number(N). Second line reads N integers separated by single space, content of S.

Third line reads N integers separated by single space, content of T.

Output Explanation:

1 (if T is sorted version of S) or -1 (otherwise)

Hint: You may use extra space O(n)