CS19001: Programming and Data Structures Laboratory

DRC, SD, SB, CSE, IIT Kharagpur

March 19, 2025

Sorting and Searching

Programming Assignments

Complete and submit during lab

Assignment 1

1. Write a C program that reads an array of integers and defines a pointer *ptr* pointing to the array.

Write and call a function arrange() that takes the pointer and the size of the array as arguments and sorts the array in ascending order.

Use any sorting technique and print both the unsorted and sorted array from the main function.

Example:

Input Array: 35, 72, 8, 19, 26, 67, 87, 55, 4, 48

Output Array: 4, 8, 19, 26, 35, 48, 55, 67, 72, 87

Assignment 2

2. Write a C program which reads an array A[] of integers (assume that the integers are sorted either in ascending order or descending order) and another integer z.

Write a recursive C function for Ternary Search* to find out whether z occurs in the array or not.

Print the input array, the number to be searched and a proper message of your searching in the main program. Show your output both the cases (1) z occurs in the list and (2) z does not occur in the list.

* No marks will be given if you do Linear Search or Binary Search.

Contd.

Assignment 2 contd.

Sample run:

User enters input array in ascending / descending order.

The program prints the input array.

You enter the number to be searched.

The program either outputs

(1) the first location in the array where z occurs **OR**

(2) prints a message that z does not occur in the list.

Assignment 3

3. Write a C function int Merge (size1, size2, *ptr1, *ptr2) to merge two sorted arrays and return the resulting sorted arrays.

Here, size1 and size2 represent the number of elements of the two arrays and *ptr1, *ptr2 point to two given sorted arrays.

Write a Main program that reads the two sorted arrays with their sizes from the key board and merge them into one sorted array using the function Merge(). Print the input sorted arrays and the resulting sorted array after merging in the main function.

Example:

Two Input arrays:

A = (5, 11, 17, 33, 67, 98)

B = (2, 20, 21, 45, 76, 100)

Output Array: C = (2, 5, 11, 17, 20, 21, 33, 45, 67, 76, 98, 100)

Assignment 4 (Bonus)

4. Write a C program that will take an integer input say n, and will generate all the valid parenthesis sequences having n-left and n-right parenthesis.

for instance if n = 3 then the outputs are

Parenthesis: ((()))

Parenthesis: (()())

Parenthesis: (())()

Parenthesis: ()(())

Parenthesis: ()()()

Thank You