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**CSE117 Problem Solving with C**

**Handout - Lab Session - 6**  
**One-dimensional Arrays**

**Objective:**

- To be able to define arrays in C.
- To be able to store, process and retrieve data from arrays.
- To be able to use the classic approaches to search and sort the data in the array.

**Pre-Lab:** Go through the concepts of arrays. Write the algorithm and flowcharts for all the exercise problems given in this handout.

**During Lab:** Solve all the exercise problems. You should work on the additional set of programs only after completing this week's tasks.

**Post Lab:** Take the quiz.

**Read 8.1,8.2,8.5 & 8.6 in the \*textbook.**

**Lab Exercises**

Design algorithm, flow chart, and program using the data requirements given for the exercise problems and try all the test cases.

***Exercise 1: Array Sum***

Write a program that reads  $n$  numbers from the user at the keyboard and stores them in an array. The program should then find their sum and average.

Sample Test Cases	Input	Output
Test Case 1	Enter the size of the array: 5 Enter elements in the array: 10 20 30 40 50	Sum = 150 Average = 30.00
Test Case 2	Enter the size of the array: 4 Enter elements in the array: -10 -20 -30 -40	Sum = -100 Average = -25

**Exercise 2: Array Swapping**

Write a program that reads in two arrays of integers from the users and swap the arrays.

Sample Test Cases	Input	Output
Test Case 1	Enter the size of the arrays : 5 Enter elements in the first array: 10 20 30 40 50 Enter elements in the second array: 60 70 80 90 100	Swapped arrays First array 60 70 80 90 100 Second array 10 20 30 40 50
Test Case 2	Enter size of the array: -5	Invalid input. Please enter a positive number

**Exercise 3: Largest number in the array**

Write a program that reads n integers from the user at the keyboard and stores them in an array. The program should then find the largest integer.

Sample Test Cases	Input	Output
Test Case 1	Enter the size of the array: 5 Enter elements in the array: 10 20 30 40 50	Largest number = 50
Test Case 2	Enter the size of the array: 6 Enter elements in the array: -10 -20 -30 -40 -50 -60	Largest number = -10

**Exercise 4: Second largest number in the array**

Write a program that reads n integers from the user at the keyboard and stores them in an array. The program should then find the largest integer.

Sample Test Cases	Input	Output
Test Case 1	Enter the size of the array: 5 Enter elements in the array: 10 20 30 40 50	Largest number = 40
Test Case 2	Enter the size of the array: 6 Enter elements in the array: -10 -20 -30 -40 -50 -60	Largest number = -20

**Exercise 5: Linear Search**

Write a program that reads n integers from the user at the keyboard and stores them in an array. The program should then use linear search to find the specific value entered by the user. If the value is found, print the index at which it is found, otherwise print not found.

Sample Test Cases	Input	Output
Test Case 1	Enter size of the array: 5 Enter elements in the array: 10 20 30 40 50 Enter a value to be searched: 30	30 found at index 2
Test Case 2	Enter size of the array: 6 Enter elements in the array: -10 -20 -30 -40 -50 -60 Enter a value to be searched: -30	-30 found at index 2
Test Case 3	Enter size of the array: 5 Enter elements in the array: 10 20 30 40 50 Enter a value to be searched: 60	60 not found in the array
Test Case 4	Enter size of the array: 6 Enter elements in the array: -10 -20 -30 -40 -50 -60 Enter a value to be searched: -70	-70 not found in the array

#### **Exercise 6: Bubble Sort**

Write a program that reads n integers from the user at the keyboard and stores them in an array. The program should then sort the array in ascending order using bubble sort algorithm and print out the sorted list.

Sample Test Cases	Input	Output
Test Case 1	Enter the number of elements : 5 Enter elements in the array: 23 46 5 18 39	The sorted list is 5 18 23 39 46
Test Case 2	Enter the number of elements : -5	Invalid input. Please enter a positive number.

**\*Textbook :** B. A. Forouzan and R. F. Gilberg —Cengage Learning , Computer Science: A Structured Programming Approach Using C|| Third Edition.