National University of Computer and Emerging Sciences

Lab - 11

For

Programming Fundamentals

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FAST School of Computer Science

Instructions:

Question#1

Maximum Subarray Sum

You are given an array of integers of size 15 and a subarray size 4. Your task is to find the subarray of size 4 with the largest sum.

A subarray is defined as a contiguous segment of the original array. For example, in the array [1, -3, 5, 2, 1, -2], the subarrays [5, 2, 1, -2] and [1, -3, 5, 2] are both contiguous subarrays.

Write a program that takes user input for the array elements and then efficiently determines the subarray of size 4 with the maximum sum. It should print both the sum itself and the elements of the subarray.

You have already done this task in a previous lab's manual, your task is to make your solution generic so that the user can give the size of the subarray (instead of it being fixed to 4). Your program would also consider the array as circular.

For example if the user gives a subarray of size 3.

Array
[1, 3, 4, 1, 5, 5, 32, 4, 65, 87, 123, 43, 54, 14, 15]

[14, 15, 1, 3], [15, 1, 3, 4], [54, 14, 15, 1] are also valid sub arrays (because the array is being treated as circular.

Question#2

Write a program to take input in an integer array of size 15, then find the minimum number in the array and replace it with -1 and print the arrray on screen, keep repeating this process untill all of the elements in the array have been replaced by -1.

Question#3

Write a C++ program that takes user input to initialize an integer array of size 15. The program should then print the occurrence frequency of each unique element in the array, without modifying the original array once it has been initialized by the user inputs. Ensure that repeated occurrences of the same element are not counted more than once.

Sample Input:

Enter 15 integers:
5 3 8 2 5 9 3 8 2 7 1 3 5 2 9

Sample Output:
Element 5 occurs 3 times

Element 3 occurs 3 times
Element 8 occurs 2 times
Element 2 occurs 3 times
Element 9 occurs 2 times
Element 7 occurs 1 time
Element 1 occurs 1 time

Question#4

Write a program to take input in an integer array of size 15, and then print out all the non-prime numbers on screen.