CL-2001

Data Structures

Lab # 1

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| Objectives:  * Arrays  1. Insertion 2. Searching 3. Sorting  * Pointers * Pointer to Function * DMA |

**Note: Carefully read the following instructions (*Each instruction contains a weightage*)**

1. There must be a block of comments at start of every question's code by students; the block should contain brief description about functionality of code.
2. Comment on every function about its functionality.
3. Use understandable name of variables.
4. Proper indentation of code is essential.
5. Make separate .cpp files for all tasks and use this format **22F-1234\_Task1.cpp.**
6. First think about statement problems and then write/draw your logic on copy.
7. After copy pencil work, code the problem statement on C++ compiler.
8. Make a Microsoft Word file and paste all of your C++ code with all possible screenshots of every **task output in MS word and submit .cpp file with word file**.
9. Please submit your file in this format **22F-1234\_L1**.
10. Do not submit your assignment **after the deadline**.
11. **Do not copy code from any source otherwise you will be penalized with negative marks.**

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| **Problem: 1 |** |

Write a program that takes 10 numbers as input from the user; the number must be of three digits ranging between 100 to 999 in a random order. Write a C++ program to store the numbers in array name numArray[]. Write a function

1. Sort() Sort the array in an ascending order
2. Search() Find specific value and return it.

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| **Problem: 2 |** |

Implement a function that finds common elements in two arrays. You can assume that the sets are stored using arrays. So if array1 = {1,2,3,4,5,6,3,2} and array2 is {1,3,5,7}, then array3 should be {1,3,5}. Note array3 should not have any duplicate elements. You have to:

* Think of all the functions that are required for this problem. Each function should perform its dedicated task. So plan them out before implementing them.
* Main should only have a set of function calls

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| **Problem: 3 |** |

Use a **new** keyword to make **floPtr** point to a dynamic array of 10 cells of type float. Write a loop to fill floPtr with user define values. Using Print function to print values stored in floPtr. Also store the number in text file using floPtr.

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| **Problem: 4 |** |

Write a C++ program where you have two integer variables

int firstvalue = 5, secondvalue = 15;

and four pointers

int \* p1, \* p2, \*\*p3, \*\*p4;

Use p3 and p4 to store the address of p1 and p2

You have to perform the following steps

• // p1 = address of firstvalue

• // p2 = address of secondvalue

• // p3 = address of firstpointrer

• // p4 = address of secondpointer

• // value pointed by p1 = 10

• // value pointed by p2 = value pointed by p1

• *// p1 = p2 (address of pointer is copied or not)*

• // p3 =p4 (check address of pointer is copied or not)

• // value pointed by p1 = 20

• // print firstvalue, secondvalue

And comment like above after each step. Also write a function by passing pointer primaryCheck() that returns true if sum of firstvalue and secondvalue is prime otherwise return false.

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| **Problem: 4 |** |

Write a C++ program to build a matrix that has a different number of elements in each row (different Number of columns in each row) using a two-dimensional dynamic array.

Your program must contain two functions. One for filling the elements into your two-dimensional array and other for printing that array or matrix.

Example:

1 2 3 4 5

2 3 4

1 2 3 4 5 6 7 8

2 3