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| **UNIVERSITY OF CENTRAL PUNJAB**  **FACULTY OF INFORMATION TECHNOLOGY**  **ITC - FINAL TERM Lab EXAM (Slot 1)**  **Fall 2021** |

**Instructions: Time: 130 Mins**

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| * **There are total 3 Questions.** * **Given example is one of the inputs to your program, but you have to design a solution that work on all cases possible.** * **Complete your exam in given time (120 min).** * **For every task create a separate .cpp file (Task1.cpp etc.), combine all task files in one folder (ITC\_F21\_yourID), zip/rar this folder. Submits this on the portal.** * **Plagiarism will never be tolerated in any case.** |

Task 1 (20 Marks)

Draw the following pattern on console with the help of loops, user will provide a number, used for both rows and columns. You have to design a solution that act according to the input. Keep some checks I mind.

[here number is 6, so there is total 6 rows and 6 columns in each row]

**1 & & & & &  
1 4 & & & &  
1 4 7 & & &  
1 4 7 10 & &  
1 4 7 10 13 &  
1 4 7 10 13 16**

Task 2 (20 Marks)

Write a C++ program in which you have to create an array of character type having size 20. Populate that array by taking input from user for all places, after that take another input of single character from user, and find this character in array. If you find this character in the given array [character may be available for more than one time], replace it with another character as an input from the user **[Make sure, this new character must not be present in the given array]**.

**Sample case:** User entered these values in an array: - **[You will have your entered values]**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A | s | @ | s | @ | z | P | O | L | M | n | # | @ | h | j | k | l | q | w | e |

Enter a char which you need to find : **@**

@ found at index 2:

Enter a new value to replace : !

It is replaced

@ found at index 4:

Enter a new value to replace : A

A already present in array enter a unique value:

M

M already present in array enter a unique value:

!

! already present in array enter a unique value:

$

It is replaced

@ found at index 12:

Enter a new value to replace : %

It is replaced

Final array is **[You can show this]**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A | s | ! | s | $ | z | P | 0 | L | M | n | # | % | h | j | k | l | q | w | e |

Task 3 (20 Marks)

Write a C++ program in which you need to take input of integer values [10 values at max, but user may end input by entering -99 at any time, this value is not considered as input). After taking input from user ask a new value, search that value and remove it from the array (all possible). At the end you have to display original and updated array as well.

**Sample 1:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 12 | 3 | 12 | 1 | 5 | 0 | 1 | 0 | 12 |

Enter a value for removal : 12

Original array:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 12 | 3 | 12 | 1 | 5 | 0 | 1 | 0 | 12 |

3 instances removed

Updated array:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 3 | 1 | 5 | 0 | 1 | 0 |  |  |  |

**Sample 2:**

User enter -99 after 5 [here last four places empty]

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 12 | 3 | 12 | 1 | 5 |  |  |  |  |

Enter a value for removal : 1

Original array:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 12 | 3 | 12 | 1 | 5 |  |  |  |  |

2 instances removed

Updated array:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | 3 | 12 | 5 |  |  |  |  |  |  |