# 1806ICT Programming Fundamentals

## Arrays and Character Arrays (Strings)

1.  Write a program that reads in the count of array elements and the actual array elements (all of which are integers). The program then prints out the minimum and maximum values in the given array.

    Sample Run:

    | Input | Output |
    |---|---|
    | 3 4 8 5 | Min = 4, Max = 8 |
    | 5 14 2 5 13 9 | Min = 2, Max = 14 |

2.  Write a program that reads in the count of array elements and the actual array elements (all of which are integers). Say that a "clump" in the given array is a series of 2 or more adjacent elements of the same value. Your program will print out the number of clumps in the given array.

    Sample Run:

    | Input | Output |
    |---|---|
    | 6 1 2 2 3 4 4 | 2 |
    | 5 1 1 2 1 1 | 2 |
    | 7 1 1 1 1 1 1 1 | 1 |

3.  Write a program that reads in 20 integer numbers, each of which is between 1 and 10, inclusive. Use an array to store the numbers as they are being read in, if and only if that number is not a duplicate of a number already read. Print out the array containing non-duplicate numbers.

    Sample Run:

    | Input | Output |
    |---|---|
    | 1 2 3 4 5 6 7 8 9 10 9 8 7 6 5 4 3 2 1 2 | 1 2 3 4 5 6 7 8 9 10 |
    | 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 | 1 2 |

4.  Write a program in C to count total number of alphabetic characters, digits and special characters in a given string.

5.  Write a program in C to find the frequency of characters.

6.  Write a program that reads in the count of array elements and the actual array elements (all of which are integers). Find the number of indexes in the array such that the sum of elements at lower indexes is equal to the sum of elements at higher indexes. For example given an array {-7, 1, 5, 2, -4, 3, 0}, one of such indexes is index 3 because
    $$-7 + 1 + 5 = -4 + 3 + 0$$
    Given the same array, another of such indexes is index 6 because
    $$-7 + 1 + 5 + 2 - 4 + 3 = 0$$
    Therefore, the number of such indexes in the given array would be 2.

7.  Write a program that performs the multiplication of two matrices of the same size. An example showing the multiplication of two matrices is given below:

    $$\begin{pmatrix} 3 & 6 & 1 \\ 2 & 1 & 4 \\ 5 & 2 & 3 \end{pmatrix} \begin{pmatrix} 4 & 1 & 3 \\ 2 & 5 & 5 \\ 1 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 29 & 36 & 45 \\ 14 & 15 & 23 \\ 27 & 21 & 34 \end{pmatrix}$$

    Use two 2-D arrays to store the elements for the two matrices.