Array

(Any five assignments)

1. Write a program in C to reverse the contents of the elements of an integer array.
2. Write a program in C to read n number of values in an array. After that, count the total number of duplicate elements in that array. Then copy the elements except the duplicate elements of that array into another array and display this array in reverse order.
3. Write a menu-driven program for accepting values in two square matrix of 3x3 dimension and generate their sum, difference and product.
4. Write a program to find the range of a set of integers entered by the user. Range is the difference between the smallest and biggest number in the list.
5. Write a C program which accepts ten integers from user and prints them in ascending order. Use array to store the integers.
6. Write a C program which accepts number obtained by five students in five subjects. Print the total marks obtained by all the students. Also determine the highest total marks.
7. Write a C program which accepts roll numbers of ten students and marks obtained by them in five subjects and prints the names of the students who have obtained highest and second highest marks subject wise. **[OPTIONAL]**
8. Write a C program which accepts a matrix and prints its transpose.
9. Write a C program to replace a square matrix by its transpose without using a second matrix. **[OPTIONAL]**
10. Consider the following procedure:

    i. Take as input any four-digit number, using at least two different digits. (Leading zeros are allowed.)

    ii. Arrange the digits in descending and then in ascending order to get two four-digit numbers, adding leading zeros if necessary.

    iii. Subtract the smaller number from the bigger number. Let the difference be the new four digit number.

    iv. Go back to step ii.

    The above process, known as Kaprekar's routine, will always reach a fixed point (Known as Kaprekar Constant). Write a C-Code to implement the algorithm given above and find out the

constant number. Also create an output file 'output.dat' in the working folder and write the following with appropriate format for each step of iteration: The 4-digit number, the larger number, the smaller number and the difference of the larger and the smaller number.

Note:

A. The fixed point is achieved when in two consecutive steps the same number is obtained

B. In C the binary arithmetic operation m%n gives the remainder when m is divided by n

[OPTIONAL]

11. Write a program which takes some numbers and computes the standard deviation of them.

Formulas: For a set of n values, $x_1, x_2, \ldots x_n$, the average or mean is given by

$$\bar{x} = \frac{\sum x_i}{n}$$

The standard deviation is given by: $s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{(n-1)}}$

[OPTIONAL]