

PSG COLLEGE OF TECHNOLOGY, COIMBATORE -641004
DEPARTMENT OF COMPUTER APPLICATIONS
I SEMESTER MCA
23MX16 C PROGRAMMING LABORATORY
PROBLEM SHEET 4 – ARRAYS

1. Consider an array of numbers from 1 to N . In this array, one of the numbers gets duplicated and one is missing. Write a C program to find out the duplicated number. Condition: Using only one loop and without any extra memory.
2. Write a program for printing the elements of a two-dimensional array (not necessarily square) in each of the following orders:
 - a. To-and-fro row-major order. B. Diagonal-major order. c. Spiral order.

Notice that the diagonal-major order makes enough sense for square matrices. For general $m \times n$ matrices, take the length of each diagonal to be m and treat the elements as organized in a wrap-around fashion. For example, consider the 4×5 matrix:

| | | | | |
|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 |

The listing of its elements in the to-and-fro row-major order is:

1 2 3 4 5 10 9 8 7 6 11 12 13 14 15 20 19 18 17 16

The listing of the elements in the diagonal-major order is:

1 7 13 19 2 8 14 20 3 9 15 4 10 5 16 11 17 5 6 12 18

The listing of the elements in the spiral order is:

1 2 3 4 5 10 15 20 19 18 17 16 11 6 7 8 9 14 13 12 7

3. Search an element in an array where difference between adjacent elements is 1. Given an array where difference between adjacent elements is 1, write C program search for an element in the array and return the position of the element (return the first occurrence).
4. Find maximum average subarray of k length Given an array with positive and negative numbers, find the maximum average subarray of given length.

Input: $\text{arr}[] = \{1, 12, -5, -6, 50, 3\}$, $k = 4$

Output: Maximum average subarray of length 4 begins at index 1.

Maximum average is $(12 - 5 - 6 + 50)/4 = 51/4$

Deadline: 10.09.2025