**PSG College of Technology**

**Department of AMCS II Sem M.Sc. DS / TCS / SS / CS**

**Data Structures Lab Problem Sheet 2**

**More Programs in Arrays**

Write a program using one dimensional / two dimensional arrays for each of the following:

1. Add and subtract following polynomials 5x 2 – 3xy + y, 2x 2 – y 2 + 5xy – x + y.
2. Given an integer array which contains numbers from 1 to 100 but one number is missing. Find the missing number.
3. An array contains n numbers ranging from 0 to n-2. There is exactly one number is repeated in the array. Find the duplicate number.
4. Given an integer array and a number, write a program to find all or some elements in array whose sum is equal to the given number. Array can contain both positive and negative integer.
5. Find intersection and union of two arrays.
6. Given two sorted arrays A and B, merge them into a single sorted array.
7. Check whether a given string is a palindrome or not.
8. Implement a dictionary of set of words.
9. Check whether a given matrix is a diagonal / tridiagonal / lower-triangular / upper-triangular matrix.
10. Find determinant of a matrix

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| **Sparse Matrix and its representations**  A [matrix](https://www.geeksforgeeks.org/data-structures/#Matrix) is a two-dimensional data object made of m rows and n columns, therefore having total m x n values. If most of the elements of the matrix have **0 value**, then it is called a sparse matrix. An example is shown on the left of the following figure. Representing a sparse matrix by a 2D array leads to wastage of lots of memory as zeroes in the matrix are of no use in most of the cases. Instead of storing zeroes with non-zero elements, we only store non-zero elements using **triples- (Row, Column, value).**  [Sparse Matrix Array Representation](https://media.geeksforgeeks.org/wp-content/uploads/Sparse-Matrix-Array-Representation1.png) |
| 1. Given a 2D array, check whether it is sparse or not. 2. Given a sparse matrix, display its triples representation. 3. Perform the following operations of two sparse matrices m1 and m2.  * Addition of m1 and m2 * Multiplying m1 and m2 * Transpose of m1 |