

# Programming Questions by Topic

## Arrays

- Write a program to reverse an array.
- Sort an array of 0s, 1s, and 2s without using a standard sorting algorithm.
- Write a program to find the maximum profit from stock prices. Allow only one buy and one sell transaction, where the buy must occur before the sell. If no profit is possible, return 0.
- Write a program to find the majority element in an array. The majority element appears more than  $n/2$  times.
- Write a program to find the sum of squares of special elements in an array. An element is special if its 1-based index divides the length of the array. Take input for the array, identify such elements, and print the sum of their squares.
- Write a program to find two numbers in a sorted array whose sum equals a given target.

## Matrix

- Write a program to multiply two 3x3 matrices.
- Write a program to transpose a matrix.

## Sorting and Searching

- Implement Bubble Sort.
- Implement Selection Sort.
- Implement Binary Search to find an element in a sorted array.

## Recursion

- Write a program to print Factorial of a number using recursion.

## Mathematical / Algorithmic

- Write a program to count how many prime numbers exist below a given number  $n$ .
- Write a program to generate Pascal's Triangle up to  $n$  rows. Use a 2D array to store and display the triangle values. Each element should be the sum of the

two elements above it, and every row should start and end with 1.

## Stack

- Write a program for creating a Stack using arrays. Write functions for implementing push and pop operations on the stack.
- Implement a stack using linked list.
- Write a program to simulate a bookstore counter using a stack. Allow operations to push (add) and pop (remove) books, where the most recently added book is removed first. Display the current stack after each operation.

## Queue

- Write a program for creating a Queue using arrays. Write functions for implementing insertion and deletion operations on the Queue.
- Write a program for creating a Circular Queue using arrays. Write functions for implementing insertion and deletion operations on the Circular Queue.

## Linked List

- Write a program for creating a Linked List. Write functions for implementing insertion and deletion operations on the Linked List.