Assignment-1 (Introduction to Data Structures)

1. Given an array $arr[\ ]$ of N positive integers. Write a program to find the maximum value of $(j - i)$ such that $arr[i] <= arr[j]$.

   Sample Input:

   Enter the length of array: 9

   Enter the elements of array: 34, 8, 10, 3, 2, 80, 30, 33, 1

   Sample Output:

   Maximum $(j - i)$ is 6

2. Write a program that takes a 2D square array as input, rotates the array anti-clockwise by 90 degrees, and then prints the rotated array. Additionally, after the rotation, your program should find and print the longest decreasing sub-array for each row in the rotated array.

   Sample Input:

   Enter the number of rows: 5

   Enter the array elements:

   9 9 3 2 7

   8 9 2 3 6

   7 8 1 2 8

   5 4 2 3 3

   1 3 0 6 1

   Sample Output:

   Rotated array is:

   7 6 8 3 1

   2 3 2 3 6

   3 2 1 2 0

   9 9 8 4 3

   9 8 7 5 1

   Longest decreasing subarray in row 1: 8 3 1

   Longest decreasing subarray in row 2: 3 2

   Longest decreasing subarray in row 3: 3 2 1

   Longest decreasing subarray in row 4: 9 8 4 3

   Longest decreasing subarray in row 5: 9 8 7 5 1

3. Write a program to represent the cost of a particular stock on different days of a week of 7 days using a 1D array. The program should then find the maximum net profit that can be made in a week by buying and selling the stocks on different days. However, there is a constraint that you must buy the stock on day 1, regardless of its price.

Sample Input:

Enter the prices: 90 190 250 300 45 560 690

Sample output:

Maximum possible profit is: 855

[**Explanation:** Buy the share in day 1 and sell it in day 4, profit = 300-90. Again, buy the product in day 5 and sell in day 7, profit = 690-45. So, the net profit is: 210+645 = 855]