Algorithm Lab (Course Code: MC504)

Assignment - 3

Submission Deadline: Within class timing, (28/01/2022)
Total Marks: 30

Instructions:

- Proper indentation is mandatory.
- Program files must be compiled using linux gcc compiler.
- VERY IMPORTANT: You must add comments whenever necessary, to make the code understandable.
- Markings will be based on the correctness and soundness of the outputs. Marks will be deducted in case of plagiarism.
- Take inputs from users. Make necessary assumptions if required.
- ANSWER FILE: Source code: (file name) e.g. A3_Q1.c, A3_PP.c
- Compress all the source code in a single zip/rar file(e.g. Rollno_Name.zip) and Upload on Teams.
- Each source code file must contain your name and roll no as comments.

Q1.

You are given a string S of length N, Each character of the string is either 0 or 1. Now, you need to select the largest substring in which the count of 0 in the string is more than the count of 1. Print the maximum possible length of the subarray in the output.

Input

The first line contains an integer N as input.
The next line contains a string consisting of 0 and 1. The length of this string is exactly N.

Output

In the output print the length of the largest substring in which the count of 0 is more than 1.

Input	**Output**
6 011100	3

Explanation

The last three characters i.e. 100 form a substring of length 3 which is the largest substring possible in which 0 are more than 1.

Constraint

1 <= N <= 10^5.

Q2.

Implement the Merge sort algorithm in C. Take the input array to be of homogeneous numeric type. Input should be user defined.

Also comment on the time and space complexity of the algorithm.

Practice Problem (PP)

Given an array A[ ] you have to find the number of subarrays whose sum is an even number.

Example:

Input: A[]={1, 2, 2, 3, 4, 1}

Output: 9

Explanation:

{1, 2, 2, 3} Sum = 8

{1, 2, 2, 3, 4} Sum as = 12

{2} Sum as = 2 (At index 1)

{2, 2} Sum as Sum = 4

{2, 2, 3, 4, 1} Sum as = 12

{2} Sum as = 2 (At index 2)

{2, 3, 4, 1} Sum as = 10

{3, 4, 1} Sum as = 8

{4} Sum as = 4