UU Intra University Programming Contest 2024 (Editorial)

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A. Word Reversal

Simple implementation problem. You need to store words in a vector and print the vector in reverse order.

C++ solution: click here!
Python solution: click here!

Tags: ***String, Implementation***.

B. Binary One Frequency

Look at the constraints! Create a 2D vector that stores the count of set bits from 1 to 60. Sort the given array and store the count of set bits of each element in the 2D vector. Indices of that vector are the count of set bits. For each query, you will be given the left and right ranges and the count of set bits. Now apply Binary search on the indices of count bits to find the number of elements in the array of the same number of set bits.

C++ solution: click here!

Tags: ***Vectors, Binary Search, Bit Manipulation, Ranged Base Query.***

C. Contiguous Subarray Sum

Create an array containing the prefix sum of the array. Take ans = 0, Search for the sum from the last to the beginning of the prefix sum array. If the sum is found then

ans = index + 1. Check for another corner case(if ans = 0) using the two-pointer method start i and j from the 0th index and increase j check
if(prefix[j] - prefix[i] == k) then take the maximum of ans and (j-i).
if(prefix[j]-prefix[i] > k) then only increase i. Run the loop till j<n.
This is how you will get the longest subarray possible.

C++ solution: click here!
Python solution: click here!

Tags: ***Vectors, Prefix Sum, Two Pointers***.

D. Sphenic Number

Look at the constraints! Find the first thousand prime numbers. Then simple brute-force approach, Count the possible primes[i]*primes[j]*primes[k]<=n (where i starts from 0, j = i+1 and k = j+1)

Use the Sieve of Eratosthenes to find the primes.

C++ solution: click here!
Python solution: click here!

Tags: ***Number Theory, Brute Force***.

E. The Great Festival of Harmony

Create an adjacent matrix. Take a boolean flag and mark it true. Check if locations in Sunlight Valley are connected then mark false. The same check for locations in the Moonshadow Forest if connected mark false.
Print yes if mark true else no.

C++ solution: click here!
Python solution: click here!

Tags: ***Graph Theory, Implementation, Data Structures.***

F. Vowel Counting

Easiest problem in the contest so far! Count the vowels in the string.

C++ solution: click here!
Python solution: click here!

Tags: ***String Manipulation, Implementation.***

G. The Potion Master's Challenge

Very interesting problem you need to find nCr. But it's not easy. You have to use *Modular multiplicative inverse.*
To solve the problem you can read this blog
https://codeforces.com/blog/entry/78873

C++ solution: click here!
Python solution: click here!

Tags: ***Maths, Number Theory, DP, Implementation.***

Repository link: https://github.com/NerdPotatoo/UU_IUPC_2024_Solution
Let me know if any of the links do not work.