CSE 102: Data Structure and Algorithms
End-Sem Lab Exam
Set 3: MM 10

Instructions

- Students are supposed to attempt **only one of the following questions**
- Make sure that your code compiles. **Zero marks will be given if the code doesn't compile.**
- Name your CPP file as "**<roll No>.cpp.**" Please submit only your .cpp files.
- Your final submission should be the fully executable code. You may/may not copy the sample code provided.
- We will be running all submissions through AI-sensitive Plag detection tools.

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1. Number of Islands

Given an m x n 2D binary grid representing a map of '1's (land) and '0's (water), return the number of islands. An island is surrounded by water and is formed by connecting adjacent lands horizontally or vertically. You may assume all four grid edges are surrounded by water.

You can use vectors from STL.

Input Format

- The first line of the input contains the two integers m & n representing the number of rows and number of columns
- Next, m lines contain n space-separated integers.

Output Format

Output number of islands

Example 1

__Input__:

```
4 5
1 1 0 0 0
1 1 0 0 0
0 0 1 0 0
0 0 0 1 1
```

__Output__:

```
3
```

Example 2

__Input__:
3 6
1 1 1 1 1 1
1 1 1 1 1 1
1 1 1 1 1 1

__Output__:
1

Constraints

- The grid only contains integers 0 and 1.
- m and n are positive integers.

OR

2. Convert Sorted List to Height-Balanced Binary Search Tree

Given an array where the elements are sorted in ascending order, convert it to a height-balanced binary search tree. Return the height of the final tree.

You can use vectors from STL.

Input Format

- The first line of the input contains the integer `n,` the number of elements of the sorted array.
- The second line contains `n` space-separated integers.

Output Format

- Pre-order Traversal of the final tree

Example

__Input__:
6
-10 -3 0 5 9 15

__Output__:
0 -10 -3 9 5 15

Constraints

- n is a positive integer