Data Structures: Rising Tides - 100 course points

Overview

In this assignment, you will see the effects of rising sea levels on various major cities around the world using 2-D arrays. You will practice array manipulation, referencing objects, the Weighted UnionFind algorithm, and the object-oriented programming (OOP) paradigm.

Implementation

Your goal is to create an effective visualizer of the impacts these increases in sea levels will have on various terrains. Below are the files provided:

- Driver: A tool to test your RisingTides implementation through a graphical user interface (GUI).

- GridLocation: Represents a cell or a location on the 2-D array.

- RisingTides: Contains all methods needed to construct the functioning visualizer.

- RisingTidesVisualizer: Converts terrain heights to RGB colors.

- Terrain: Driver dependency containing the heights of terrain and water sources.

- WeightedQuickUnionUF: Implementation of Weighted Quick-Union.

Methods to Implement

The RisingTides.java file includes the following methods for implementation:

- elevationExtrema: Finds the lowest and highest point in the terrain.

- floodedRegionsIn: Simulates sea level rise using the flood fill algorithm.

- isFlooded: Checks if a specific location is flooded.

- heightAboveWater: Calculates the visible height of a location above water.

- totalVisibleLand: Calculates the total number of visible land cells.

Example outputs from the visualizer for BayArea.terrain at various water heights.