Activity 1. Answer the following questions.

Briefly explain how your algorithm works.

Texto

Descripción generada automáticamente

This greedy algorithm consists of two different methods. The first one is setColor(ArrayList<String> used, Country country) which iterates through the colors array checking for the smallest color that is not contained in the arraylist given as parameter. This means that it colors the selected country with the lowest color available.

The second method, which It’s the main greedy algorithm. This method iterates through the countries array and obtains the colors of its neighbors, then based on that it calls the method mentioned before, in order to set the color of the country.

How many colors did you need to use to solve the problem?

The algorithm is not efficient so It needed 5 different colors which are:

Rojo, Azul, Verde, Amarillo and Negro.

May the number of colors change if you use a different order for the countries to be processed by your algorithm?

Yes, it will directly affect the number of colors, as the algorithm analyzes in order every country. Therefore, it can be reduced or augmented depending on how the array is given

How many colors would be used in an optimal solution at most?

It would require at most 4 colors, as the 4-color theorem asserts.

What is the time complexity of your algorithm? Briefly explain it.

It is a O(n^3) complexity. This is due to the greedyColoring() having two loop fors nested, making it a O(n^2). However nested to that the method setColor() has a complexity of O(n) and it is nested. So that means that the total complexity is O(n^2)\*O(n) = O(n^3)

Texto

Descripción generada automáticamente