AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH

Assignment Title:	Map Coloring
Assignment No:	02 Date of Submission: 11 December 2021
Course Title:	Design and Analysis of Algorithm
Course Code:	01562 Section:
Semester:	Fall 2020-21 Course Teacher: DR. M M MANJURUL ISLAM

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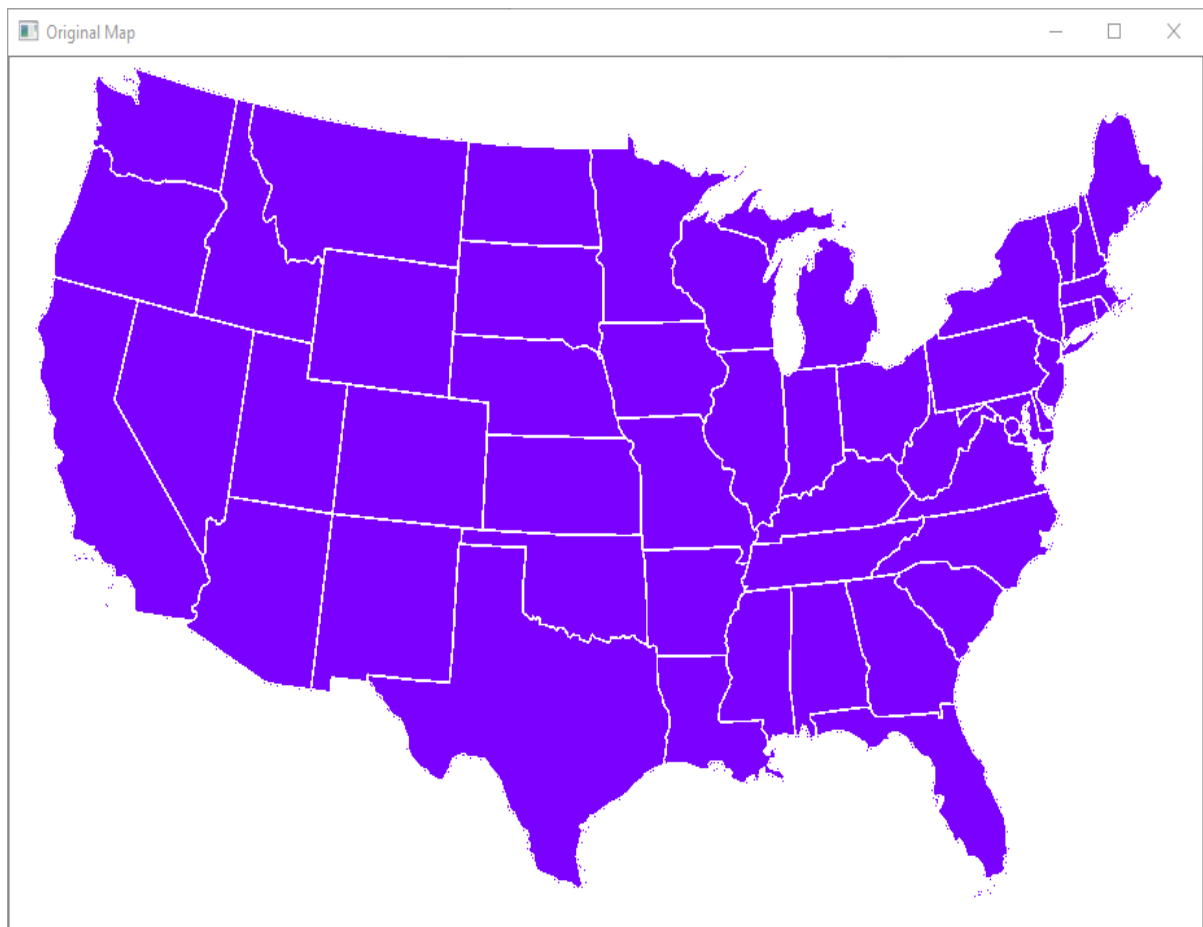

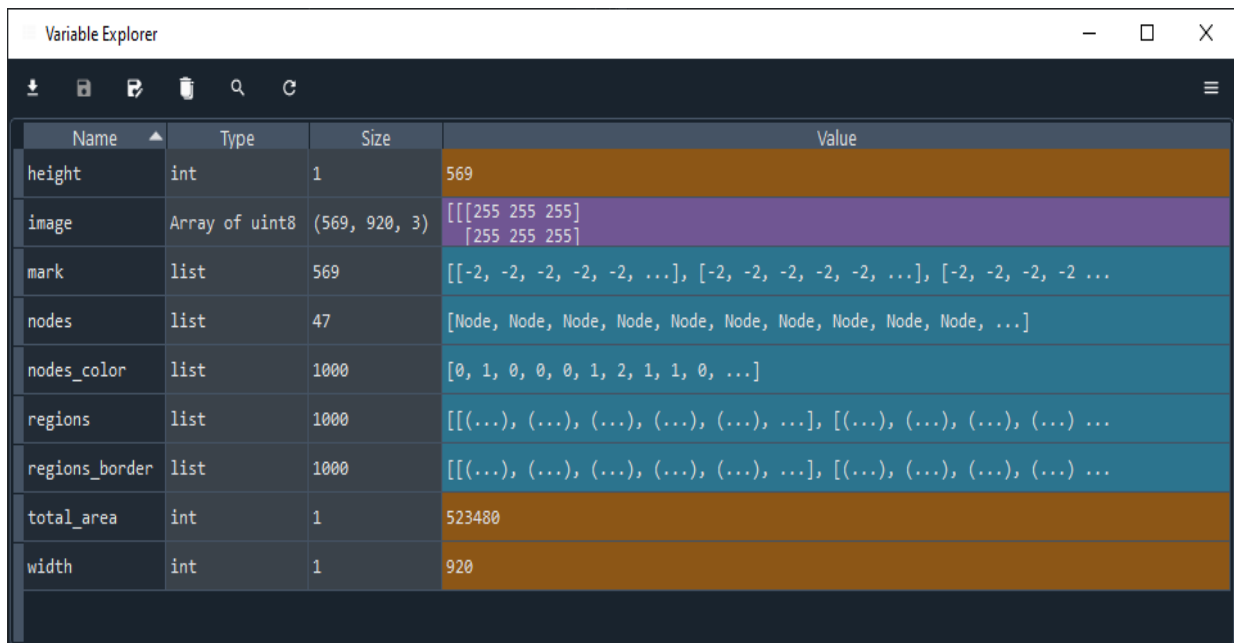| No	Name	ID	Program	Signature
1	Jakaria Islam Emon	21-92037-2	MSCS	

Map coloring, using four colors

Input Image of a MAP: (The input image background and borders should be white.)

Output Map: (This program gets a map image as an input and produces all possible valid colorings of that map using backtracking.)
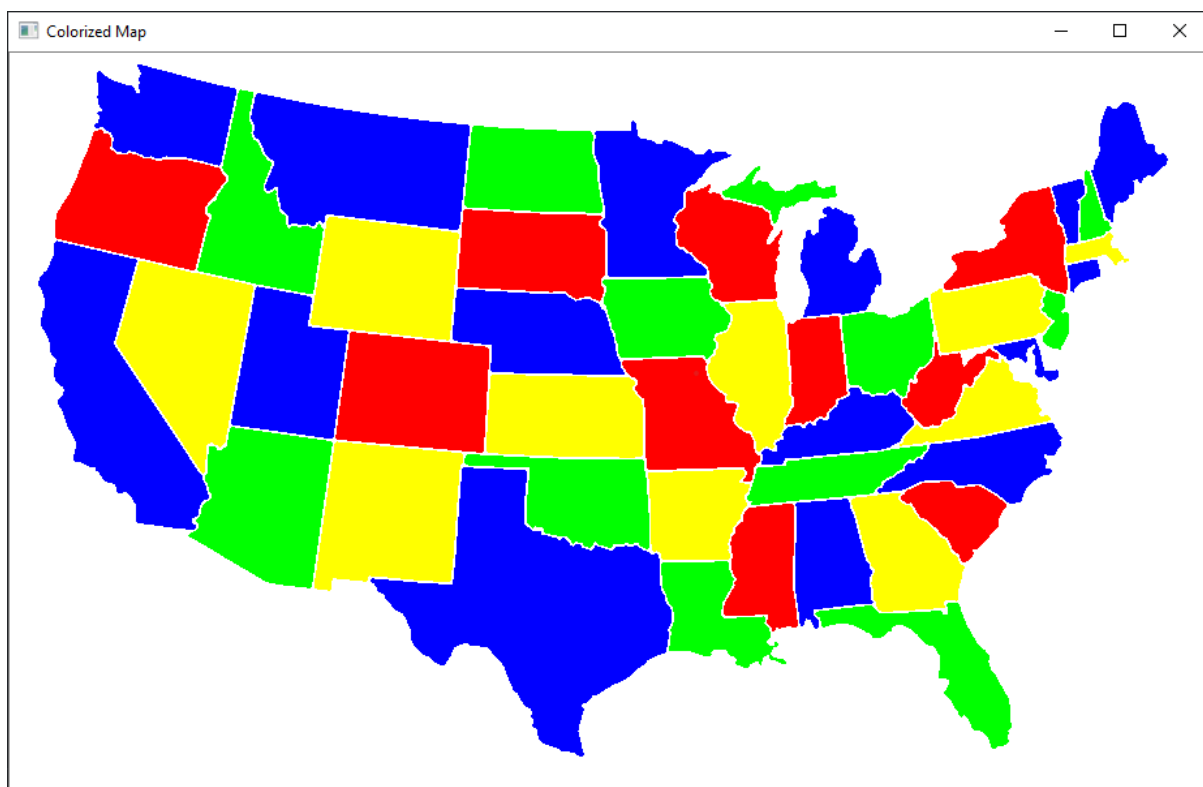
Variable explorer after running on USA.PNG file

Name	Type	Size	Value
height	int	1	569
image	Array of uint8	(569, 920, 3)	[[[255 255 255] [255 255 255]
mark	list	569	[[-2, -2, -2, -2, -2, ...], [-2, -2, -2, -2, -2, ...], [-2, -2, -2, -2 ...
nodes	list	47	[Node, Node, Node, Node, Node, Node, Node, Node, Node, Node, ...]
nodes_color	list	1000	[0, 1, 0, 0, 0, 1, 2, 1, 1, 0, ...]
regions	list	1000	[[(...), (...), (...), (...), (...), ...], [(...), (...), (...), (...) ...
regions_border	list	1000	[[(...), (...), (...), (...), (...), ...], [(...), (...), (...), (...) ...
total_area	int	1	523480
width	int	1	920

Algorithm

1. Detecting all non-white regions (e.g., provinces or states).

2. Converting the input map to a simple planar graph:

There will be a node for each region. Two nodes will be adjacent, if and only if their corresponding regions have a common border on the map.

3. Using backtracking for [coloring] that graph (it's a recursive function that produces all valid colorings).

4. Displaying all produced colorings on the given map.