OCTOBER 13, 2020

INTERACTIVE REGION GROWING
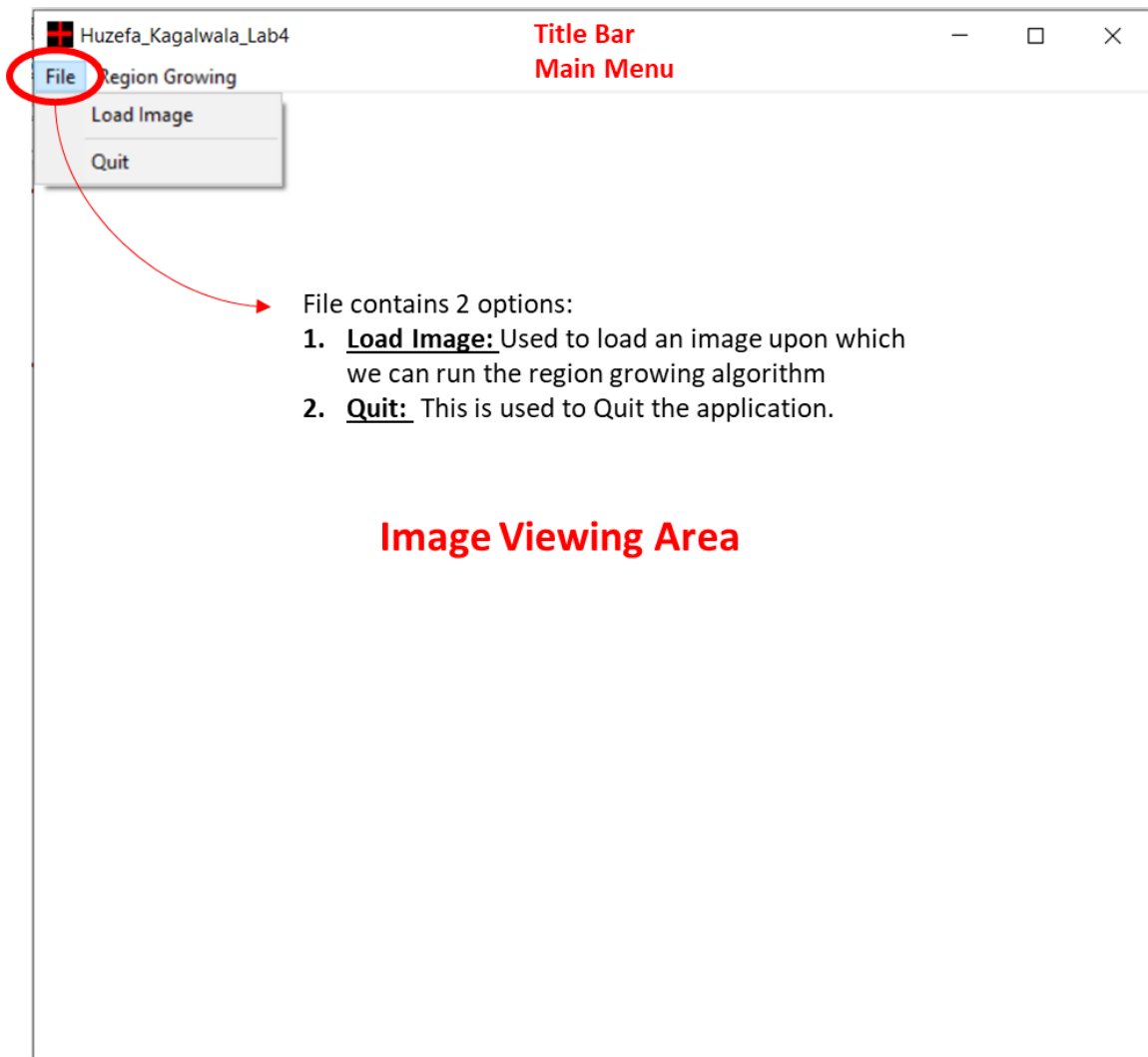## ECE 6310, HW04
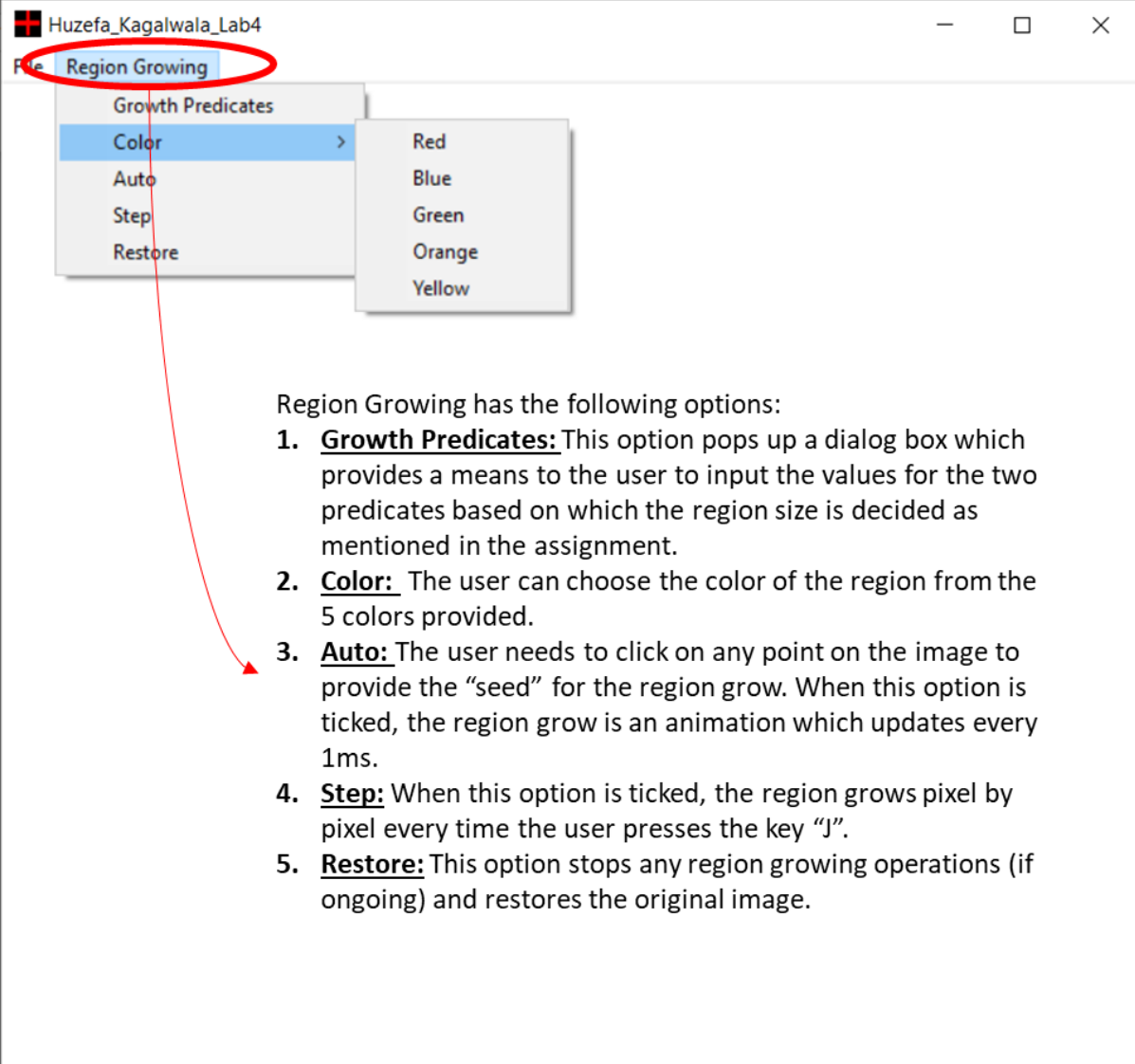
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Part1:

Menu Options

Ans:

In this assignment, we were asked to create a GUI to demonstrate interactive region growing. The following screenshots show the basic layout of the application.
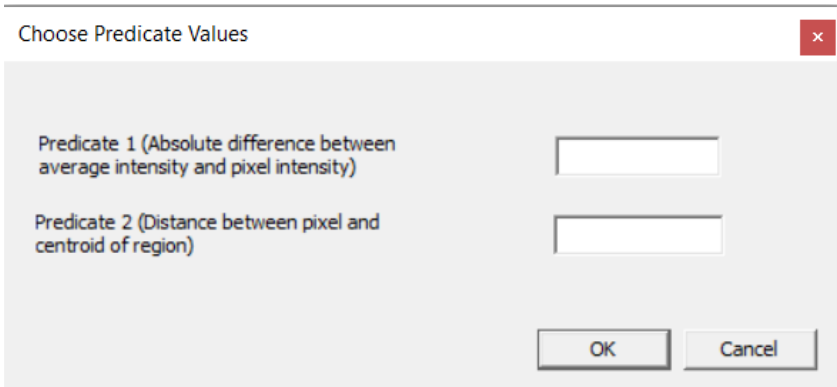
Region Growing has the following options:

1. **Growth Predicates:** This option pops up a dialog box which provides a means to the user to input the values for the two predicates based on which the region size is decided as mentioned in the assignment.
2. **Color:** The user can choose the color of the region from the 5 colors provided.
3. **Auto:** The user needs to click on any point on the image to provide the "seed" for the region grow. When this option is ticked, the region grow is an animation which updates every 1ms.
4. **Step:** When this option is ticked, the region grows pixel by pixel every time the user presses the key "J".
5. **Restore:** This option stops any region growing operations (if ongoing) and restores the original image.

The dialog box which opens on clicking "Growth Predicates" is:

Part2:

Entirely filled regions

Ans: Following images show entirely filled regions in different colors, with multiple regions too.
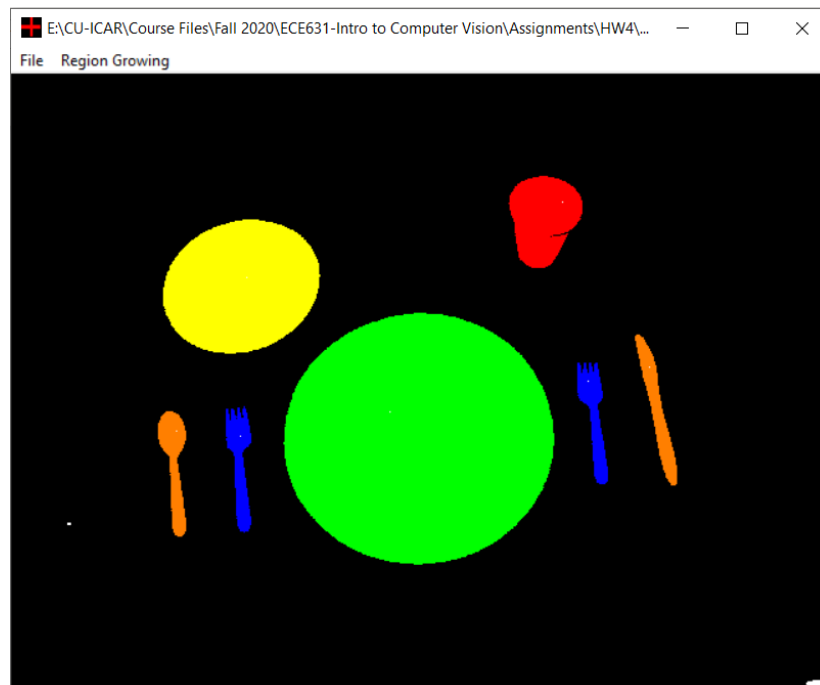
Part3:

Different predicate conditions

Ans:

Case 1:

First, we will observe the effects of changing the values of Predicate 1. This condition calculates the difference in intensity between the pixel under test and the average intensity of the region. We will use "bridge.ppm", to demonstrate this, as it has lot of pixel variations. If the value of Predicate 1 is low, we will get smaller regions as we tolerate only small variations, and we will get relatively larger regions if the converse is true.
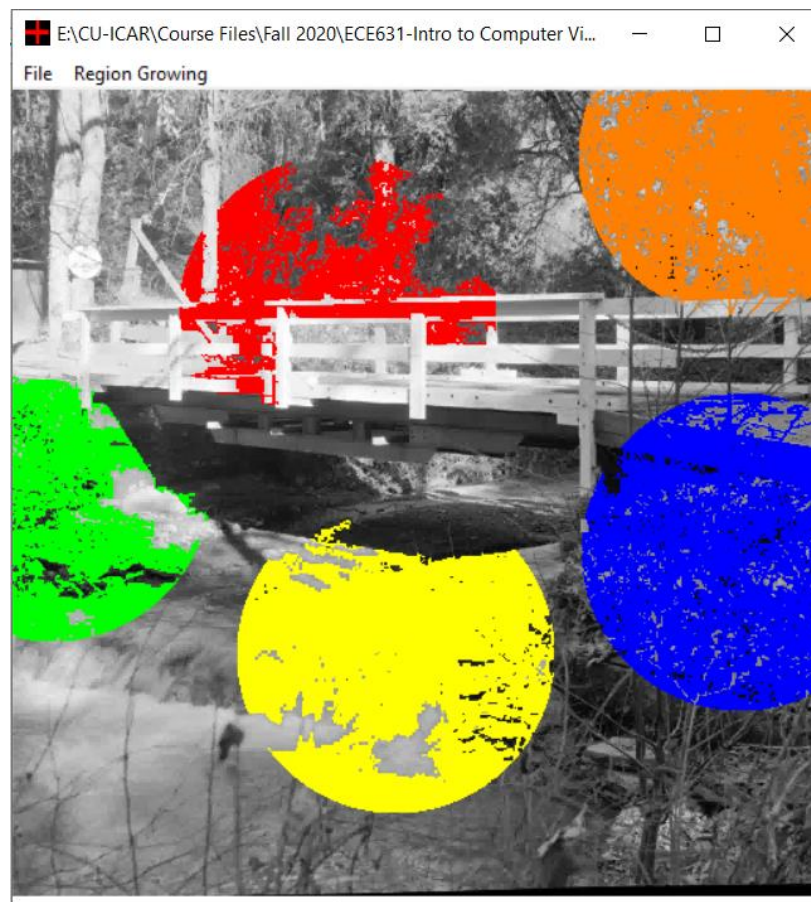
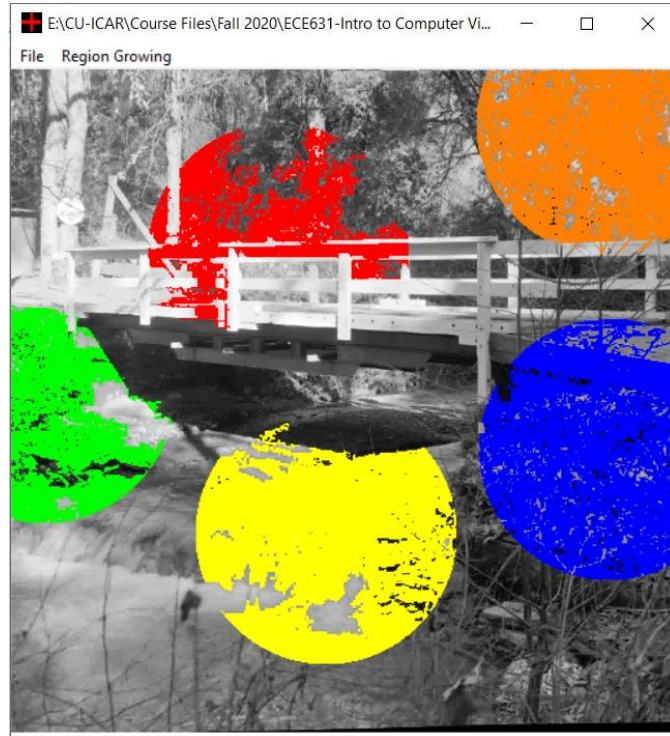**Predicate 1: 50, Predicate 2: 100**
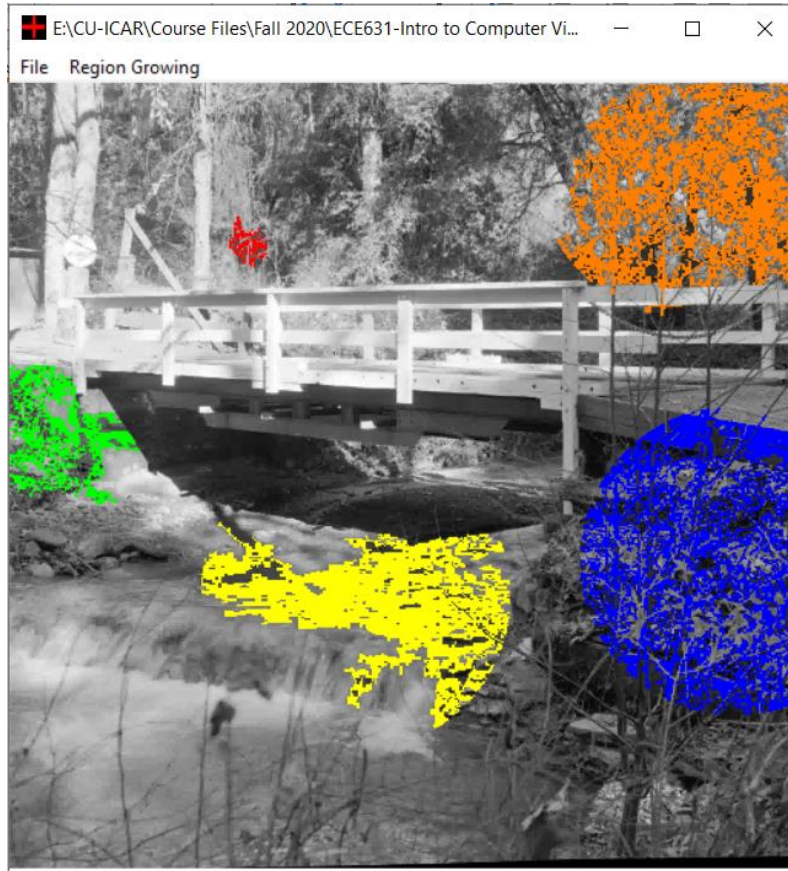
Predicate 1: 20, Predicate 2: 100

As expected, when the value decreases, the region becomes smaller or sparser.

Case 2:

Now, we will observe the effects of changing the values of Predicate 2. This condition calculates the distance between the centroid of the region (the pixel which acts as the seed) and the pixel under test to get added in the region. As is evident, the size of the region will be small for a small value of Predicate 2 and vice versa.

Predicate 1: 50, Predicate 2: 100

Predicate 1: 50, Predicate 2: 50

As expected, when the value decreases, the region becomes smaller.

Part4:

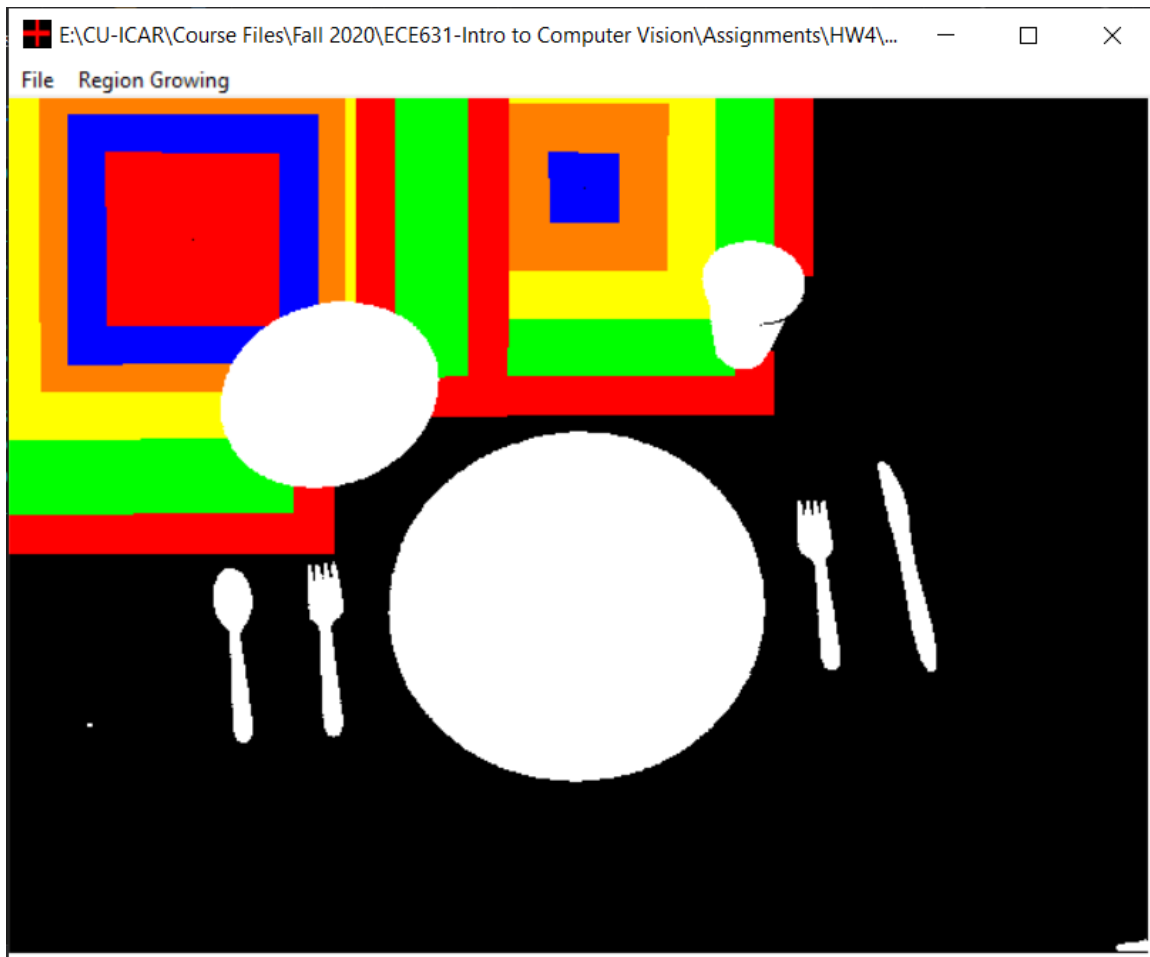**Multiple Region Grows**

Ans:

All the screenshots provided have multiple region grows.

Part5:

Multiple colors in a single region grow

Ans:

As, we can see from the image, multiple region grow threads were initiated, and upon changing color through the menu bar, the color of the region grow also changed.