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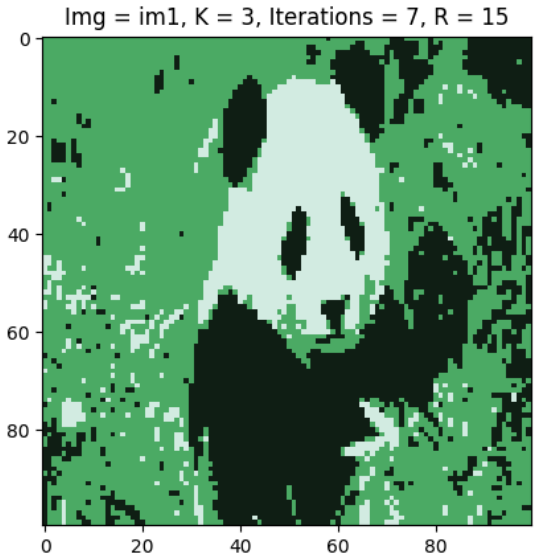
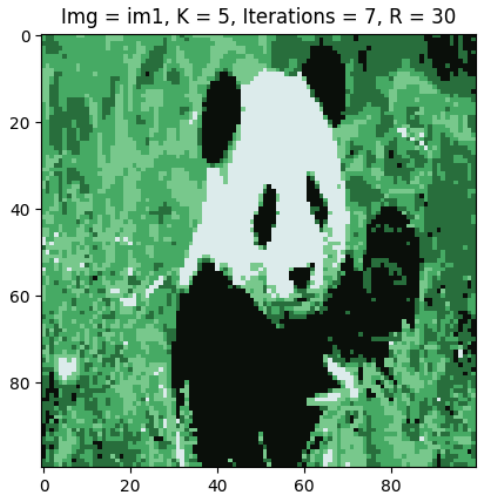
ECE 1395
Homework 9

Image 1

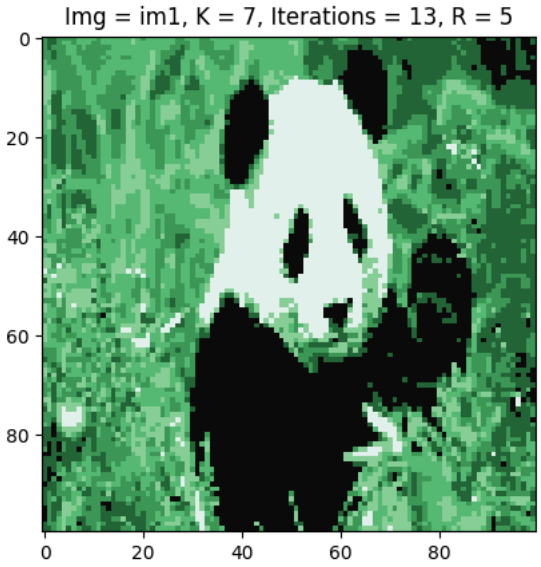
Image 1 in its original form very clearly has three main colors: green, black, and white. As such, three clusters yielded the best results.



Here, the image is clearly divided into the three colors mentioned. Increasing the number of clusters to five creates more visible definition between the individual plant components.



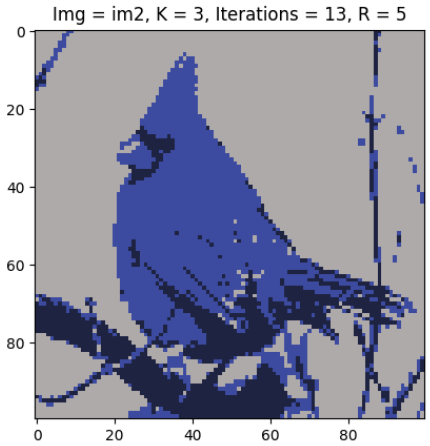
Further increasing the number of clusters to seven yields very minimal differentiation from the previous image.



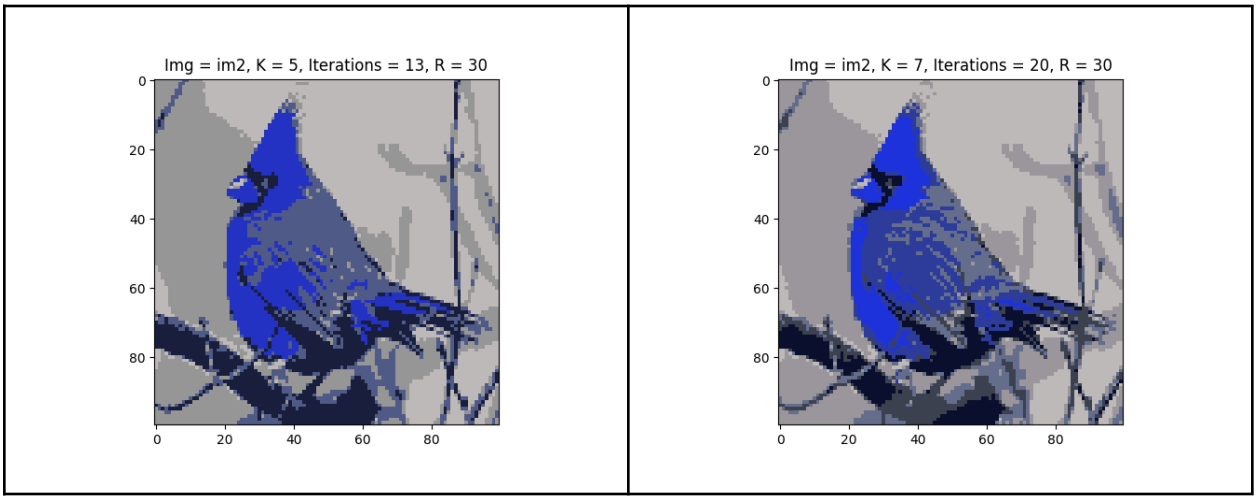
Varying the number of iterations and restarts for this image yields minimal differentiation as well, due to the intrinsic simplicity and clear clustering of the image.

Image 2

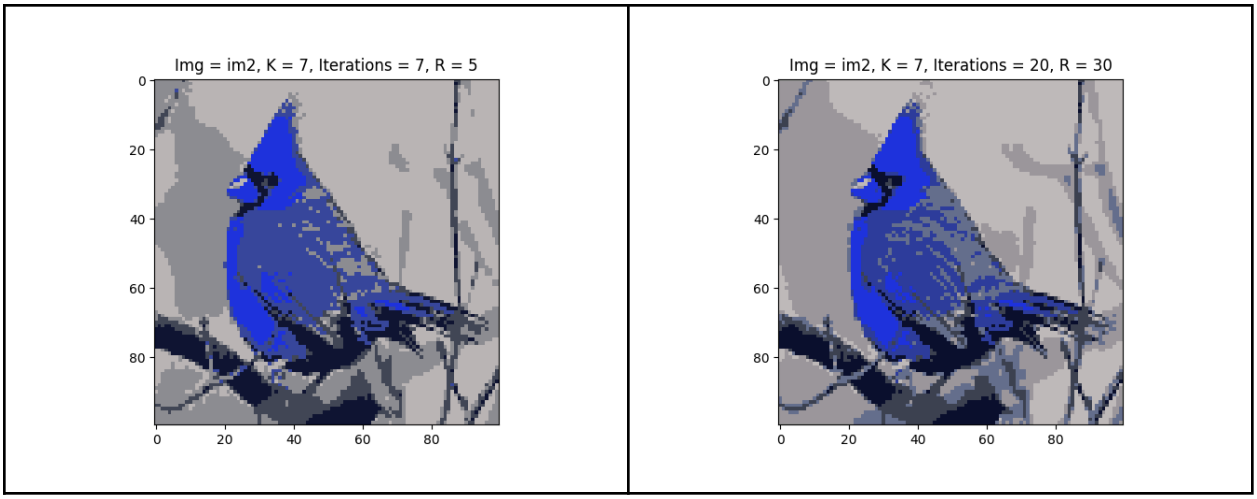
This image yielded similar results to the first one. This image also has three distinct colors: red, black, and white. There was one problem with the code that I could not fix, which was that it would recolor the bird in the image to blue. This was probably due to the JPG having a higher color bit depth than Python could handle. This did not seem to affect the problem.



Adding more clusters provides more definition to the bird's feathers and other features in the picture.



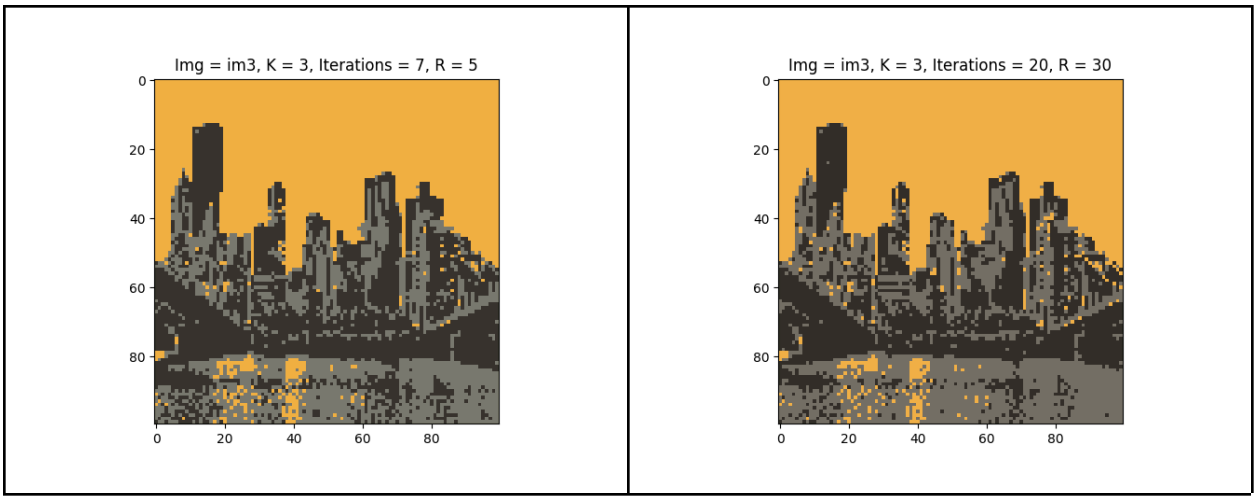
This picture also seemed to benefit from increasing iterations and restarts.



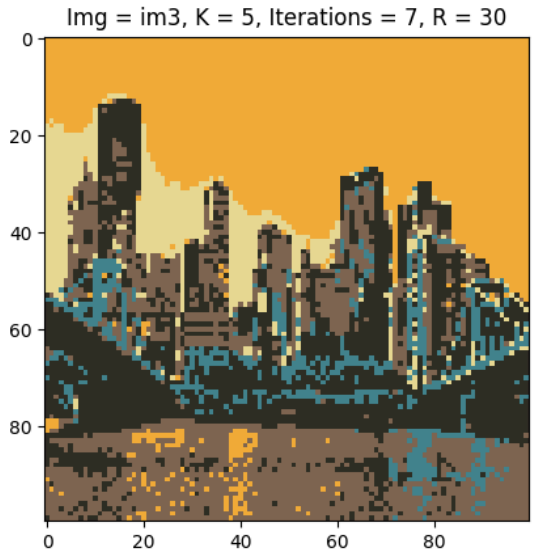
This is especially clear in the bottom left of the image, where the branch is clearly separated from the background on the right.

Image 3

This image was the most complex and benefitted from increasing the number of clusters. Unlike the other images, it has many colors and features, including buildings, the sky, trees, and bridges. However, changing the number of restarts and iterations had extremely minimal effect.

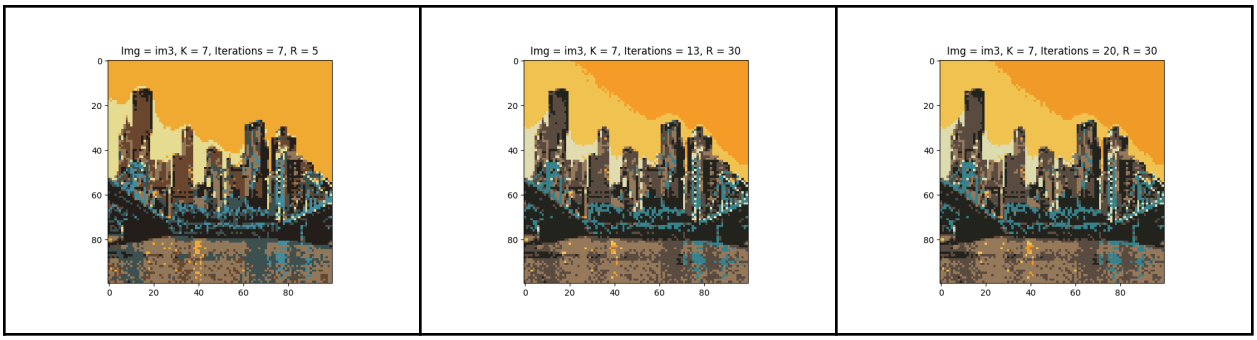


Increasing the clusters to five brought more definition to the result.



Here, it has colored the trees in the foreground blue, but it has also colored the buildings. Using this, we can somewhat differentiate the trees and buildings from the rest of the image, but this is not very useful.

Increasing the clusters to seven yields interesting results. In some cases, it chooses to separate the sky into three clusters. Other times, it only separates the sky into two clusters and chooses something else to group into its own cluster.



Here, it is slightly better at separating the trees from the buildings but does not separate the bridges very well. Ideally, we would want the sky only to have one cluster, but none of the trials accomplished this.