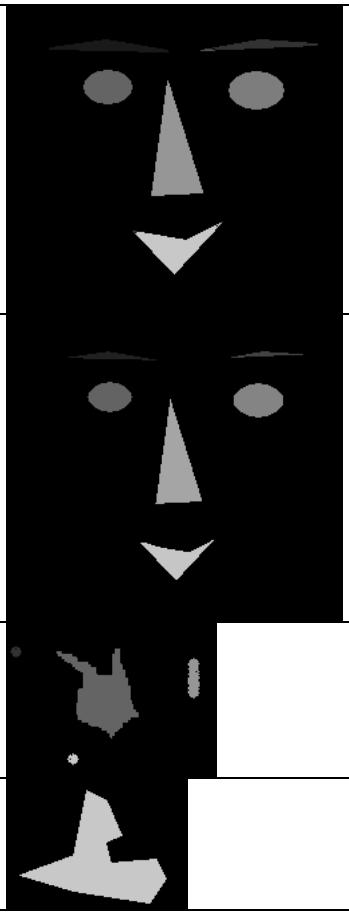
MP#1 Connect Component Labeling

Attached is a Python implementation of connected component labeling, a technique for analyzing and identifying the connected regions of an image. The code first opens an image file using the PIL library, converts it to a numpy array, and creates an array of zeros with the same dimensions as the input image.

The algorithm iterates through the pixels of the input image and assigns labels to the connected regions. If a pixel is True, the algorithm checks its neighbors to determine its label. If the neighbor pixels have the same label, the pixel is assigned the same label. If the neighbor pixels have different labels, the algorithm merges the labels of those pixels and assigns the merged label to the current pixel. If a pixel has no neighbors with labels, the algorithm assigns a new label to the pixel.

The algorithm also tracks the connected sets using a list of sets. Each set contains the labels of the connected regions that are merged. After all pixels have been processed, the algorithm assigns colors to the labels based on the sets. Finally, the algorithm saves the resulting image with the labels and colors to a file.

Name	**Result**	**Components**
Face_old		8
Face		6
Gun		4
Test		1