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MP1 Report
Computer Vision
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In this MP, the task was to determine the number of connected components in an image using the sequential labeling algorithm covered in class. This problem was to be solved on three sample images, each having a different layouts and number of connected components.

I approached solving this problem as we did in class. I created a function that steps through each pixel, and if the reached pixel is white, it checks two previously visited pixels – the pixel to the left and the pixel above. If either or both of these previous pixels are white as well, the current pixel is assigned the lower value label between. If only one of the previous pixels is white or both previous pixels have the same label, then that is the extent of what is done at the current pixel. If both previous pixels are white and they have different labels, then these two labels are tracked as being the same.

The challenges that I ran into while implementing this were (1) determining the labels used and (2) figuring out how to track equivalent labels.

1. I started with the lowest label value at 50 and incremented upwards by 10 each time a new label was created, so when mapped the labels could be visually differentiable
2. I tracked the connected component labels in a list of sets. Sets each started with one label as the value, and as labels were combined into the same connected components, I would merge the sets into one new bigger set.

My function performed well on the three images, correctly identifying the number of connected components:

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the number of connected components in the face image is 6
the number of connected components in the gun image is 4
the number of connected components in the test image is 1
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