COMPUTER VISION
#MP1
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Description:
The task of this homework was to label the given binary image. We used the 4 neighbor approach to solve this problem by sequentially labeling a binary image. There are three main parts to this solution, one is recognizing the label that need to be assigned the each pixel, second is merging labels of pixels belonging to the same object using the E table method and third is the size filter that uses a threshold to eliminate label of small areas (that are below a threshold no. of pixels).

Algorithm:
Given a pixel of value 1, we check if its upper and left pixel label are both are the same another pixel of the same label is found, if both are different and neither of the labels are zero the two labels represent the same object, hence they are equivalent, if both the labels are different but one of the labels is zero the given pixel has the same non zero label, in any other case a new label is found. In the case of two different non zero labels the smaller value is taken and all the labels with the other values are replaced with the smaller label.
For noisy images with smaller insignificant white objects in the image, a size filter is used to remove these from being labeled. If a labeled area is less than a certain threshold amount of pixels, it is discarded as background.

Result Analysis:
The resulting images are similar to the original image, however if there are multiple labels the corresponding area in the labeled image has a different shade of gray representing a different label. Each object has its own shade of gray starting from white. Due to the size filter the smaller objects are black as they are recognized as part of the background.