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**Report**

**Exercise 1**

1. To binarize the image we used imbinarize function with ‘Global’ method, because this way we obtained good image.

a) **First part** of the exercise where we are looking for the match of **only white pixels** was not complicated and the only thing we needed to do is the erosion of the mask, from which we obtained white pixel where the mask matches the imageText

Description automatically generated

On the first picture we can see the white pixels that represent the matching mask white pixels.

1. For the **second part** where we were**also looking for exact** **location of black pixels** we needed to reverse the image so black pixels would be white and white black and also reverse the mask. Then we eroded this mask to the reversed image but we got locations on the reversed image. But we could not just reverse the solution because the locations would disapear so we substracted original image that we dilated because we could not get the matching pixel sometimes and this way we got a solution for black pixels. Then we used logical statement where we only take the same matchings for black and white pixels and found the final matches.

A picture containing text

Description automatically generated

The *Subtracting image* is dilated by one pixel, because we can see on the *Matching difference* picture that we found some matches where the red pixels (Matching pixels) are outside of the letters and if we don’t dilate the image than we delete these points because the background is now white so 1 and the letters are black so zero, so 1-1 is zero where the 1-0 is zero. This way we also created some negative -1 pixels so we change all negative valuses to zero and then we display the results.

Text

Description automatically generated

Where we can see that we only found 2 locations on the bottom (better to see in .mlx file)

3) For the**last part** where we did **not consider parts of the mask** we applied the same process as in the second part, but the pixels that we did not cosider in the mask were always zero. This way we found the solutions for both masks.