Lab 2. Task 1- preparation task
Template for answers

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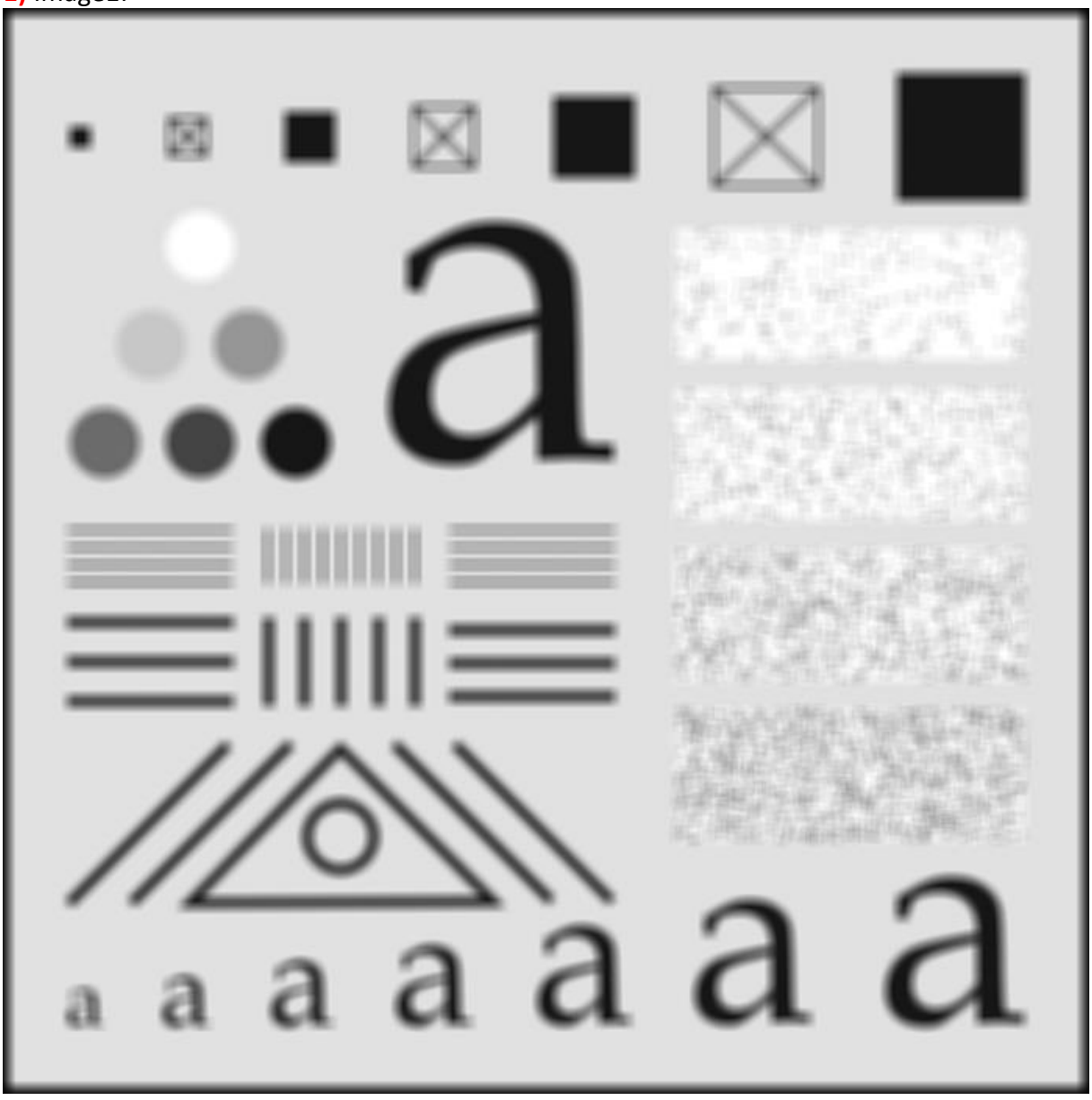
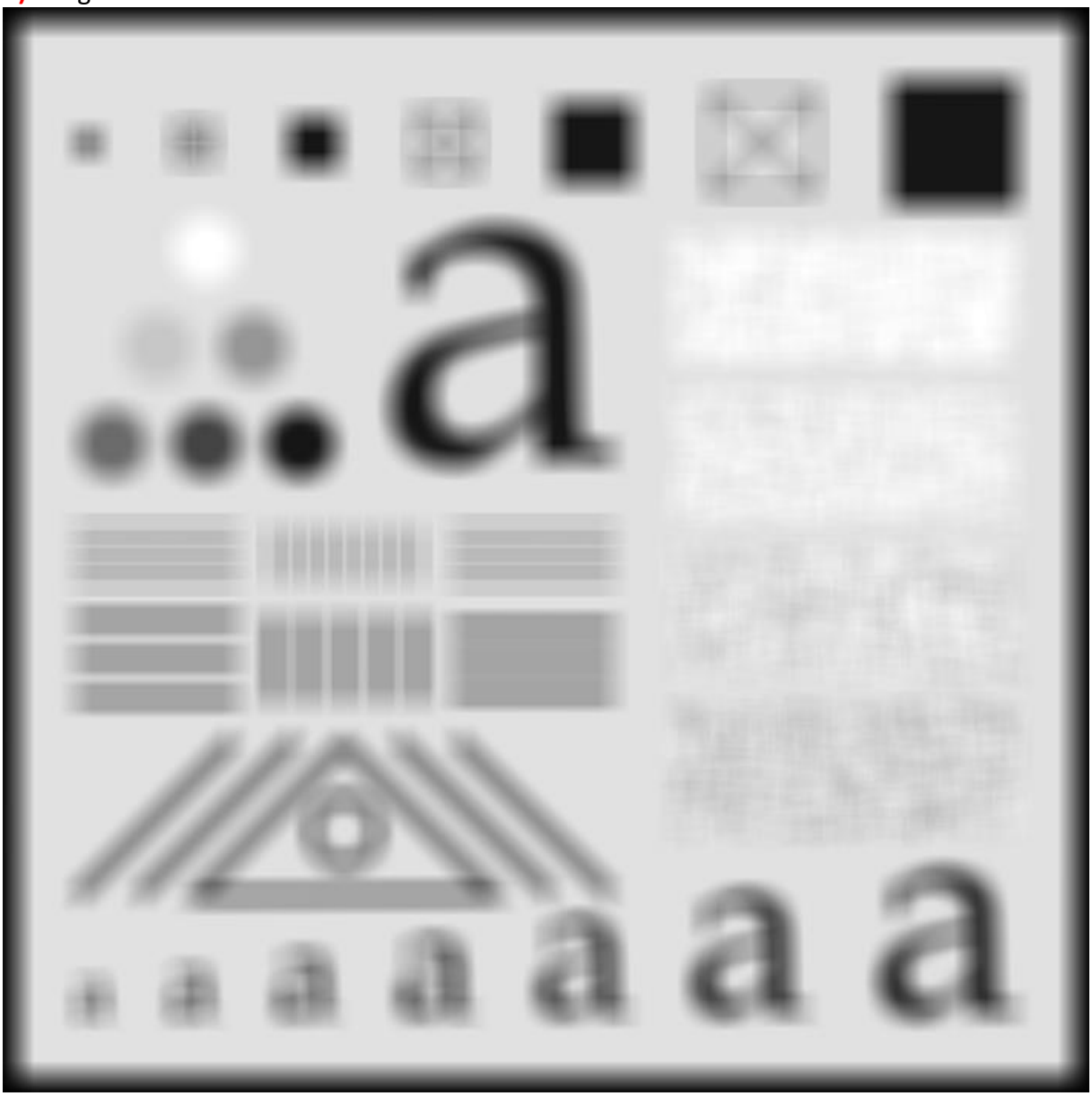
Version (in case you need to re-submit): 1

1) Testing different box filters

1) Image1:



2) Image2:



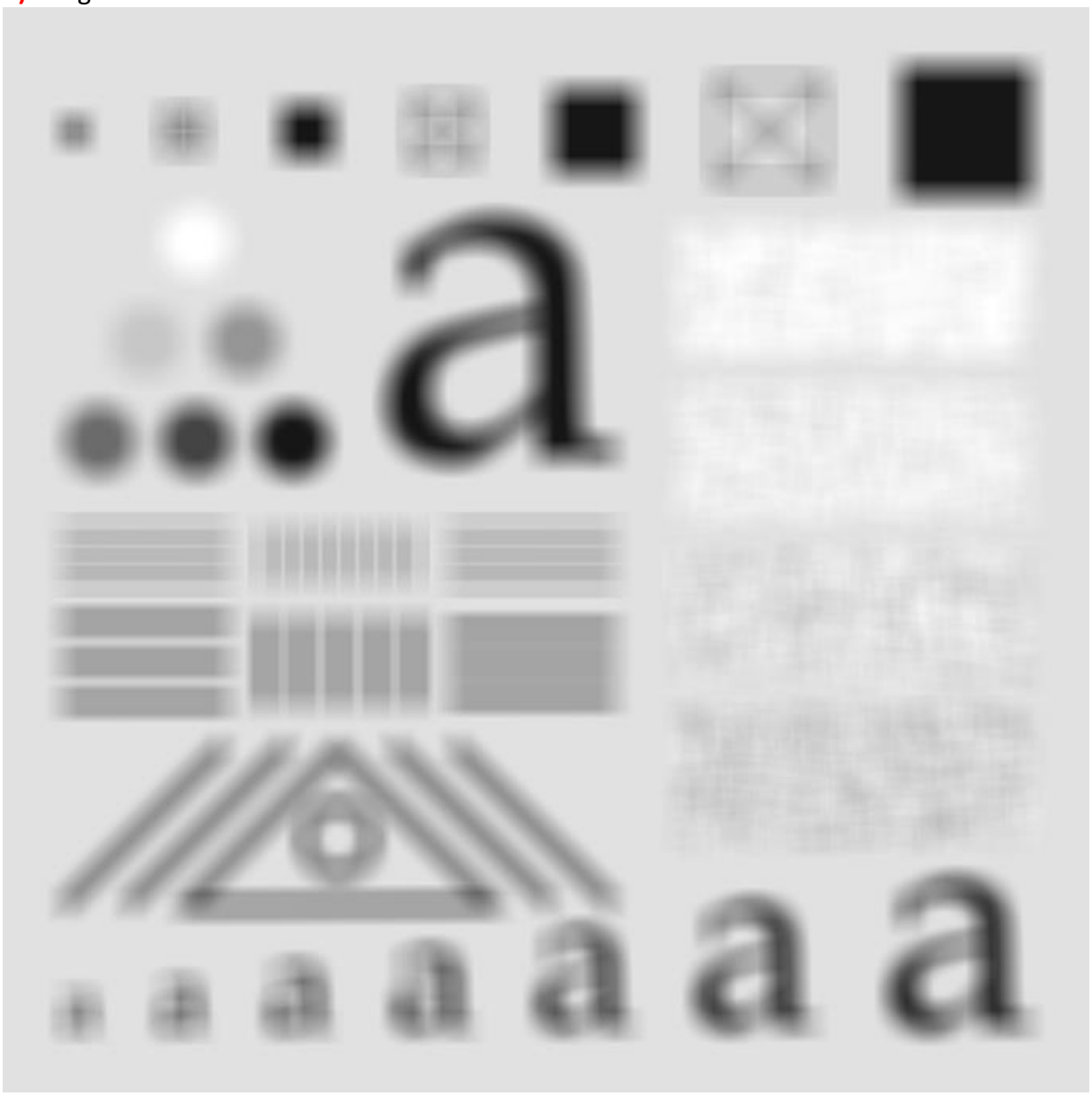
3) Does the 21×21 box filter have a lower or higher cutoff frequency than the 9×9 box filter? Explain why!

The 21x21 box filter has a lower cutoff frequency, because it uses a larger area using more of the surroundings; effectively blurring the image more than the 9x9 one.

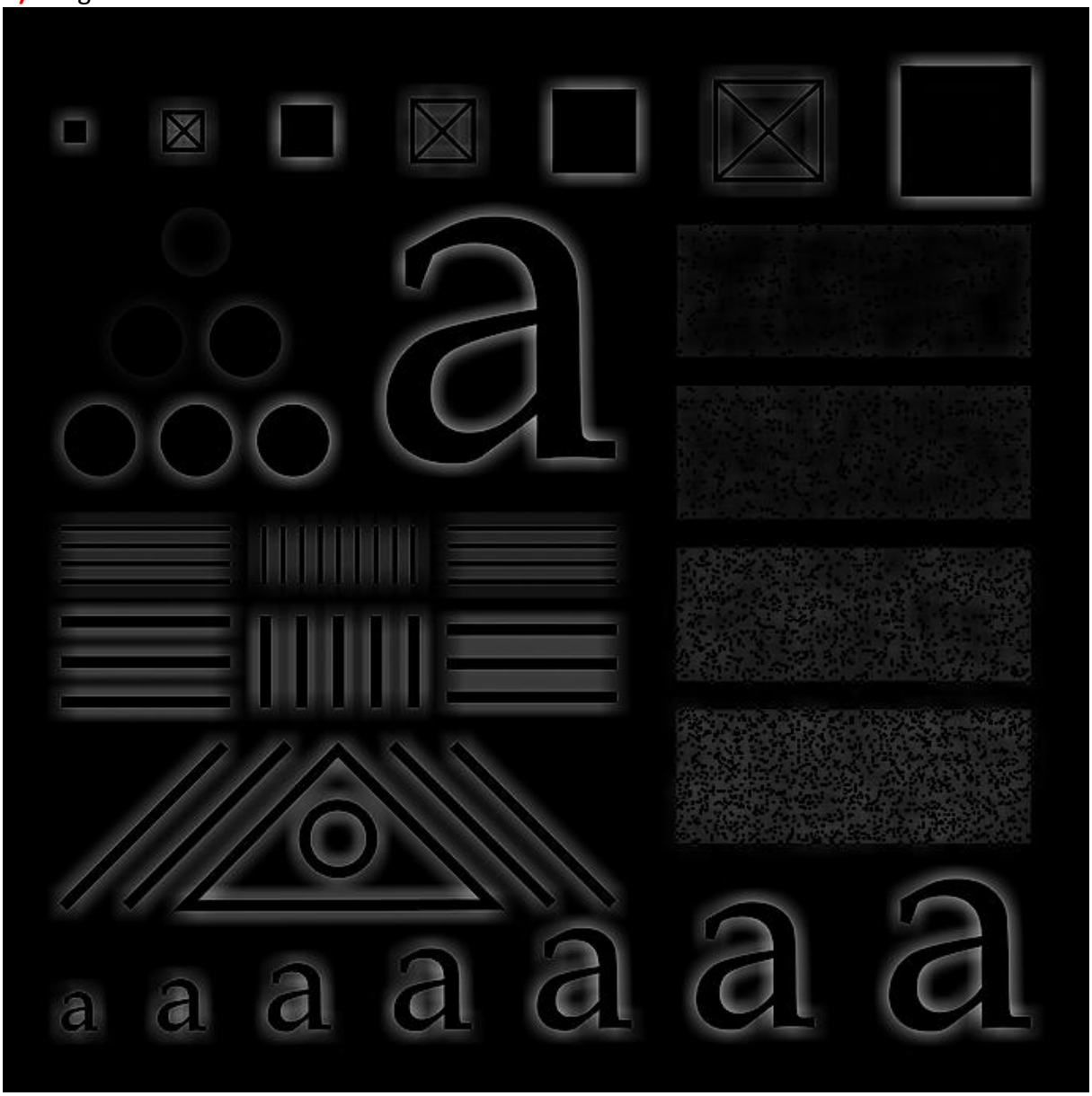
4) What is the reason for these dark borders in Image2?

“Zero padding” gives the values on the edge darker values because part of the filter is multiplied with zero effectively giving a lower final value.

5) Image3:



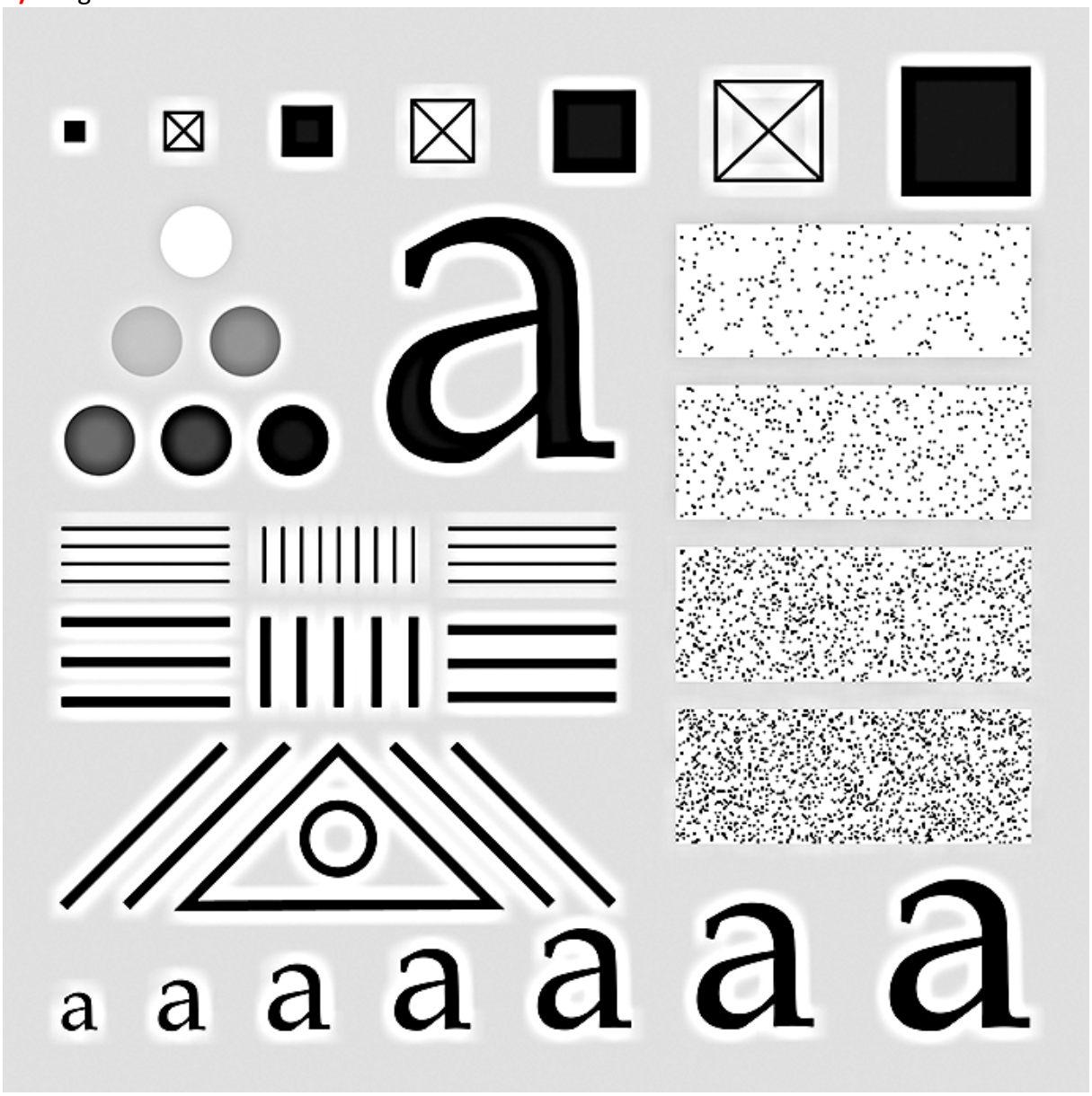
6) Image4:



7) Why is $Image4$ so dark? What is the average value of the pixel values in $Image4$? And why?

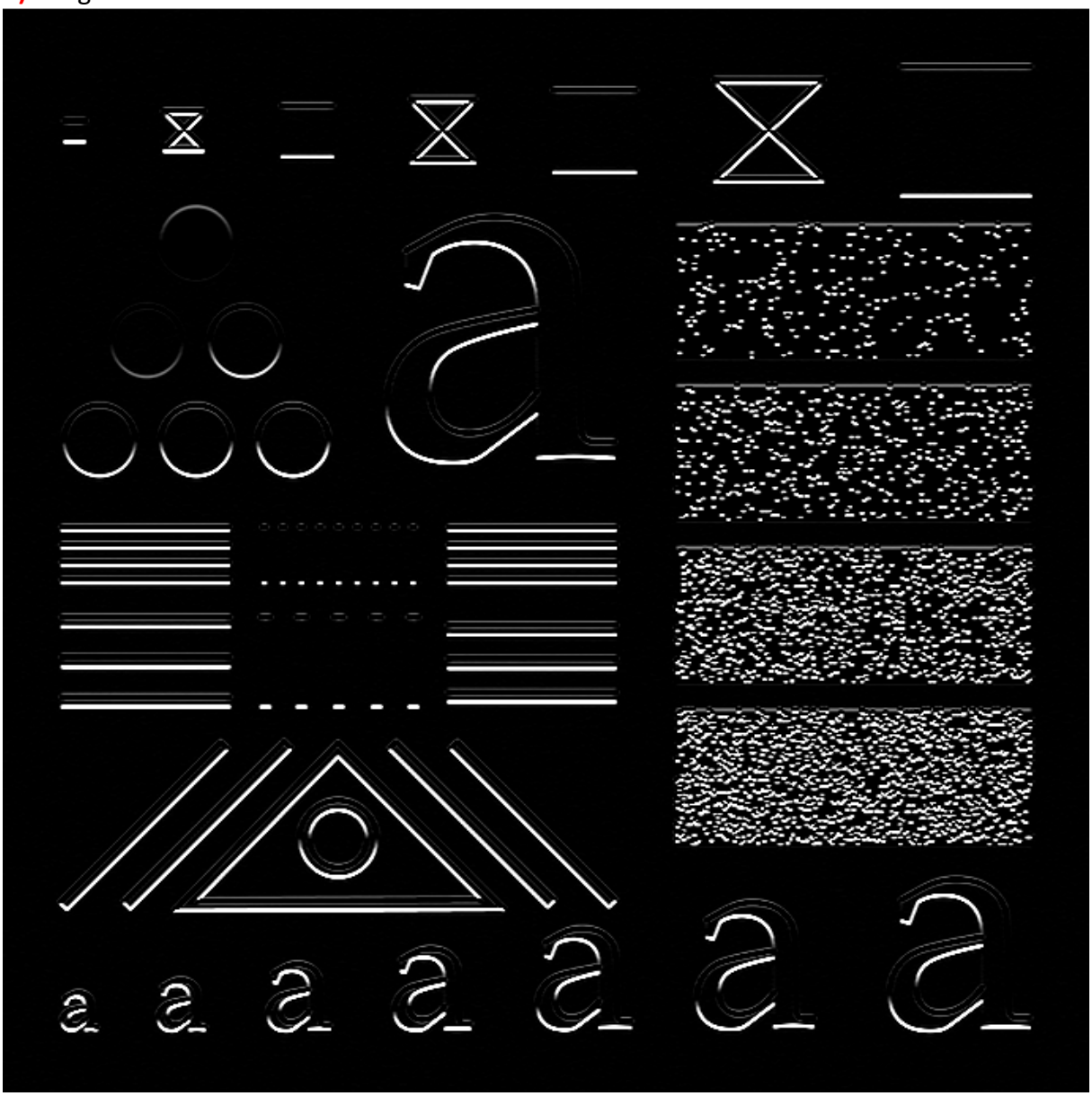
The image is darker because the highpass filter contains negative values that are being capped at 0 which is black. Manually calculating the average of the matrix, we get a sum of 0. We decided on manually calculating the sum since if you use MATLAB for this you will get small inaccuracies due to floating-point error, for example the average value calculated with MATLAB is: -8.8113e-18. Highpass filter = 1 – lowpass filter.

8) Image5:

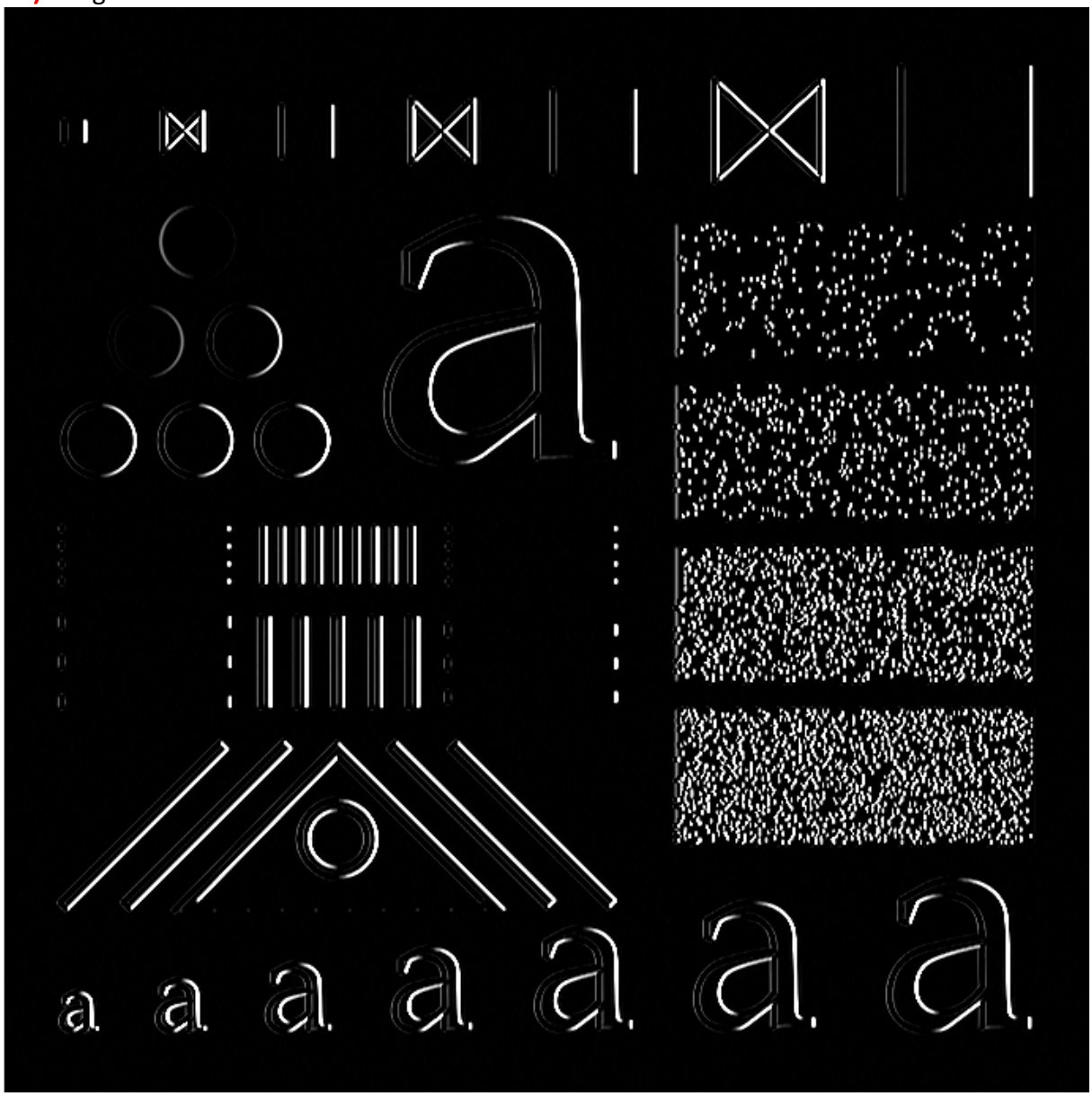


2) Testing Sobel filter kernels and gradient

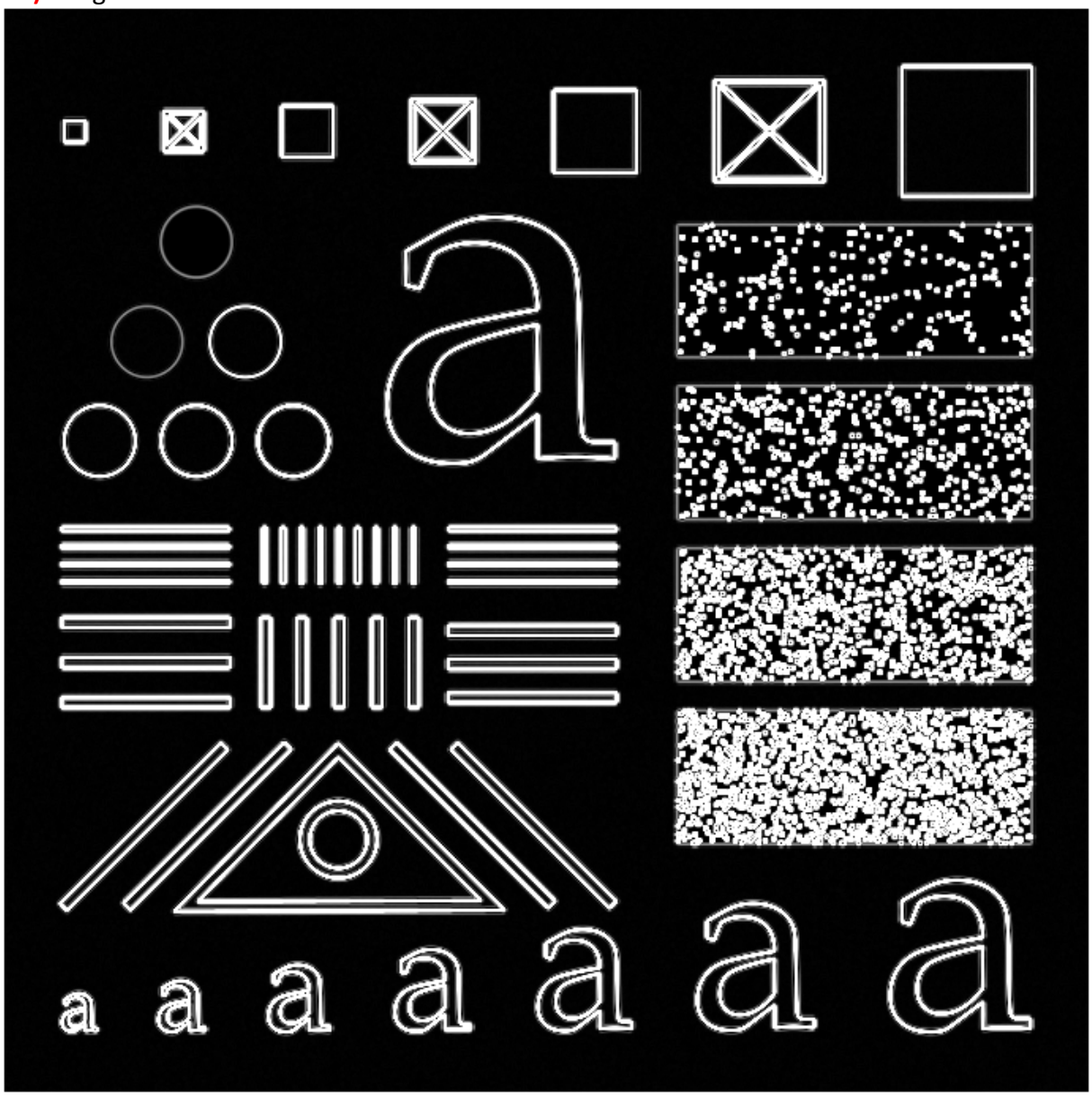
9) Image6:



10) Image7:



11) Image8:



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