Homework 2

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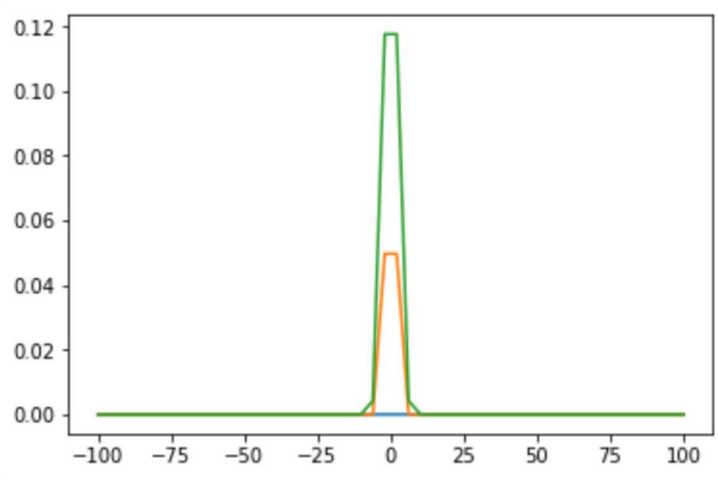
Question 1

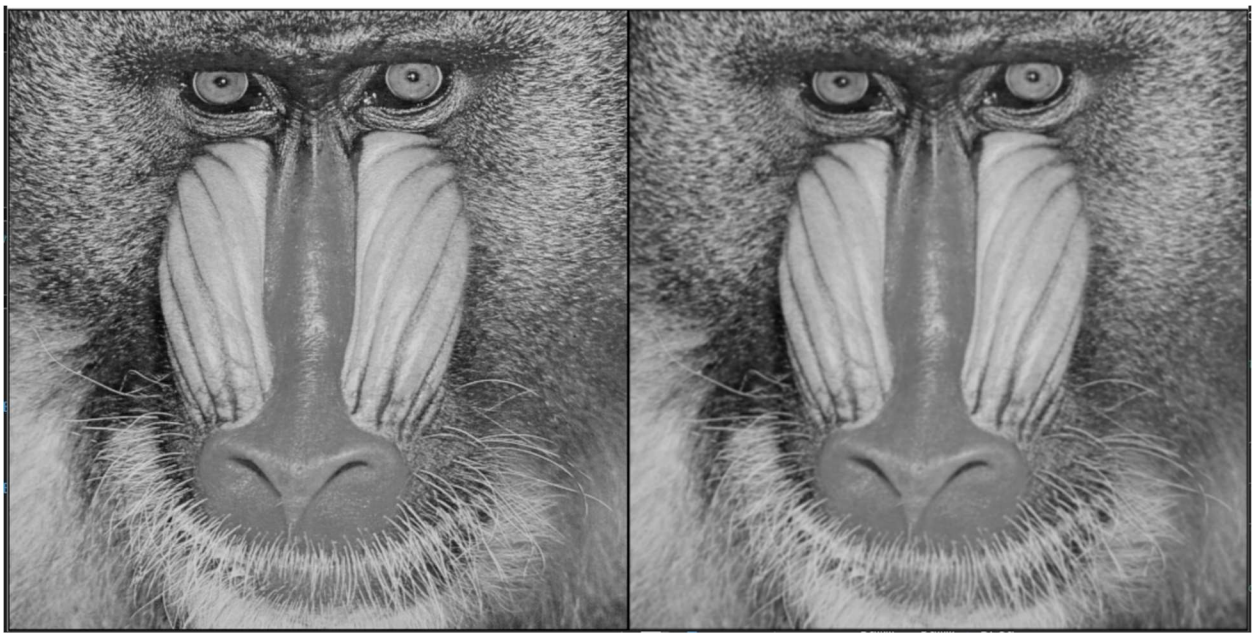
First, I created a Gaussian function for the mathematical calculation. Then I called the function for each different variance and created a plot. Finally, I showed the plot.



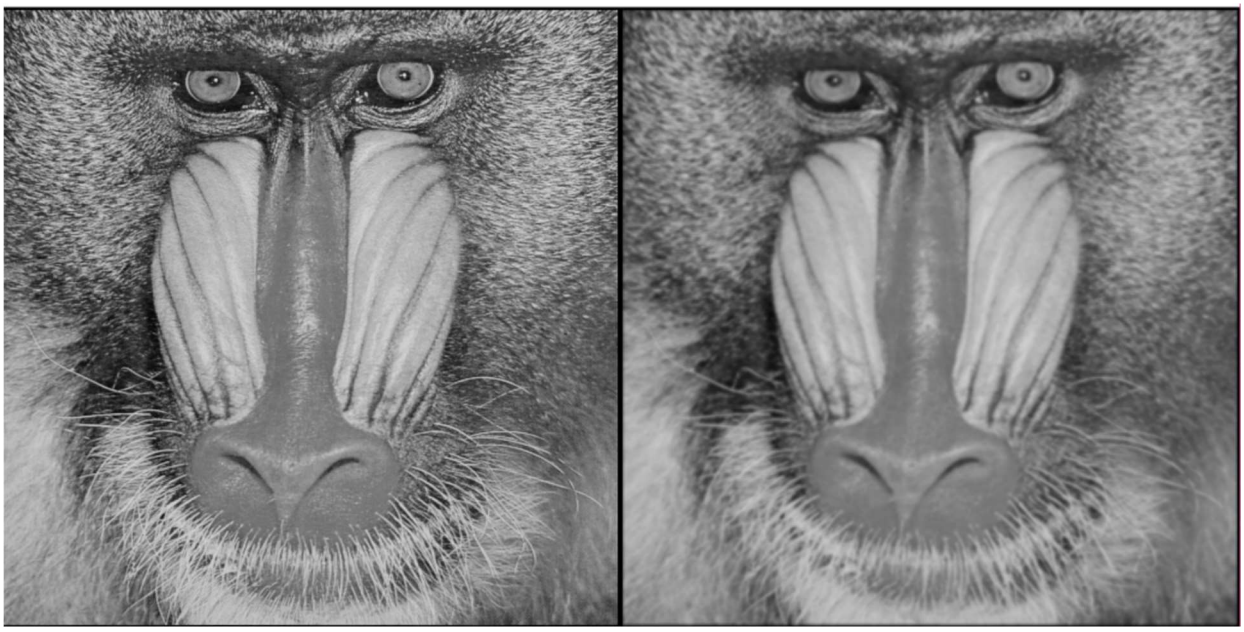
In graph we can observe that as variance increase the result is also increase. The green line is σ^2=5.0, the yellow line belongs to σ^2=1.0, finally the blue line is σ^2=0.1.

Question2

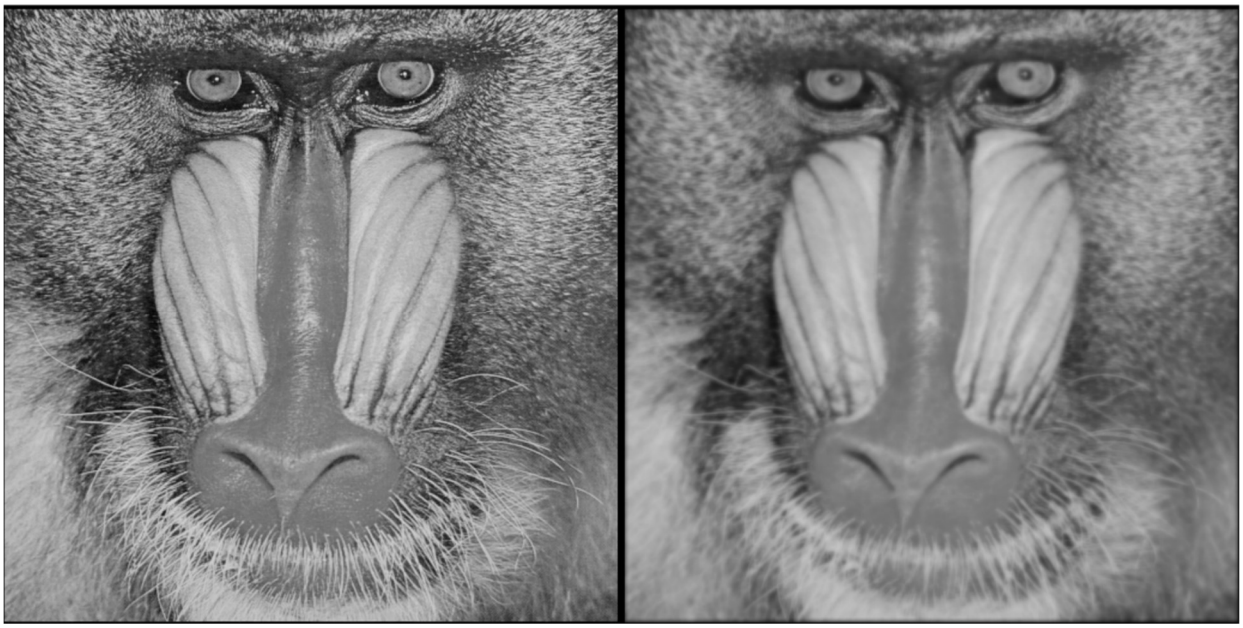
The first image is the original image the second image is blurred with the normalized Gaussian kernel.



3x3 Kernel



5x5 Kernel



7x7 Kernel

We can observe that as the size of kernel increase the image gets more blurred. But this blur more balanced when we compare to mean filter.

Question 3

I used 3 different values for alpha while I sharpen: 0.1, 0.5, 2.0 in same order that images appear. The kernel size also differs while I sharpen the images.

3x3 Kernel

5x5 Kernel

7x7 Kernel

3x3 Kernel

5x5 Kernel

7x7 Kernel

It can be observed that as alpha changes sharpening effect also changes dramatically. When alpha is bigger than 1 image gets blurred. We can also observe that we detect edges better as the kernel size increases.

Question 4

I removed salt and pepper by different sizes of kernel. Salt and pepper increases for every 3 image.

3x3 Kernel

5x5 Kernel

7x7 Kernel

3x3 Kernel

5x5 Kernel

7x7 Kernel

3x3 Kernel

5x5 Kernel

7x7 Kernel

We can observe that when we increase the kernel size the salt and pepper decreases but also the quality of the picture decreases.