# Space-Invariant Blurring

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- `gauss_blur.py`: Given a value of sigma returns the blur kernel of size $\lceil 6\sigma + 1 \rceil \times \lceil 6\sigma + 1 \rceil$ with normalized values
- `convolve.py`: Takes in the image and the kernel, then zero pads the image and then convolved the zero padded image with the kernel to produce the final output in the same size as that of the original image

## 1 Results

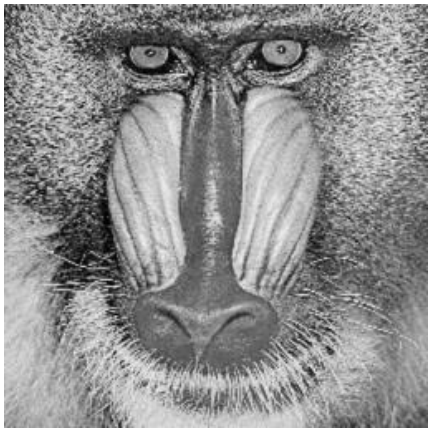

Figure 1: Original Image

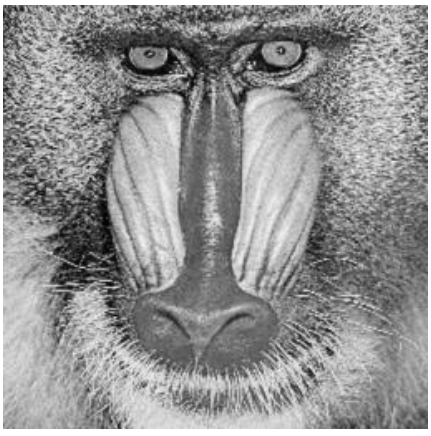

Figure 2: $\sigma = 0.0$

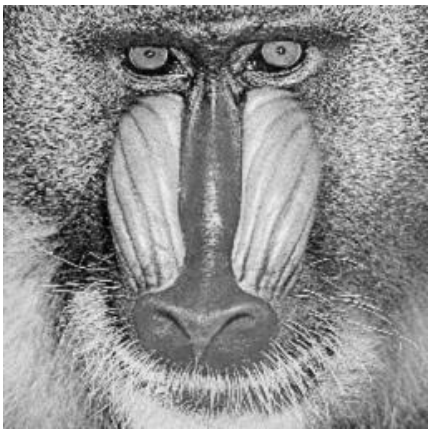

Figure 3: $\sigma = 0.3$

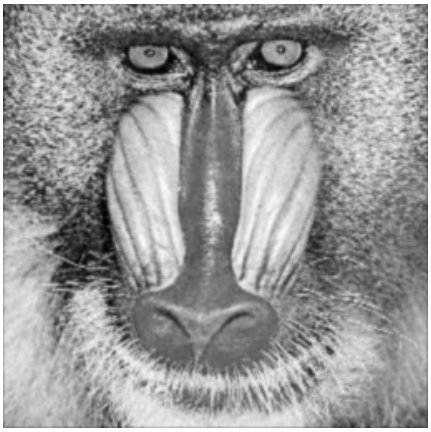

Figure 4: $\sigma = 0.6$

Figure 5: $\sigma = 1.0$

Figure 6: $\sigma = 1.2$

Figure 7: $\sigma = 1.6$

## 2 Observations

- $\sigma = 0$ is the same as the original image as we are convolving with a dirac delta
- With an increase in $\sigma$ value the image gets more blurred out, and also the size of the blur kernel increases
- For larger values of $\sigma$ we notice a black border around the final image, this is due to the effect of zero padding and with large blur kernel due to large $\sigma$