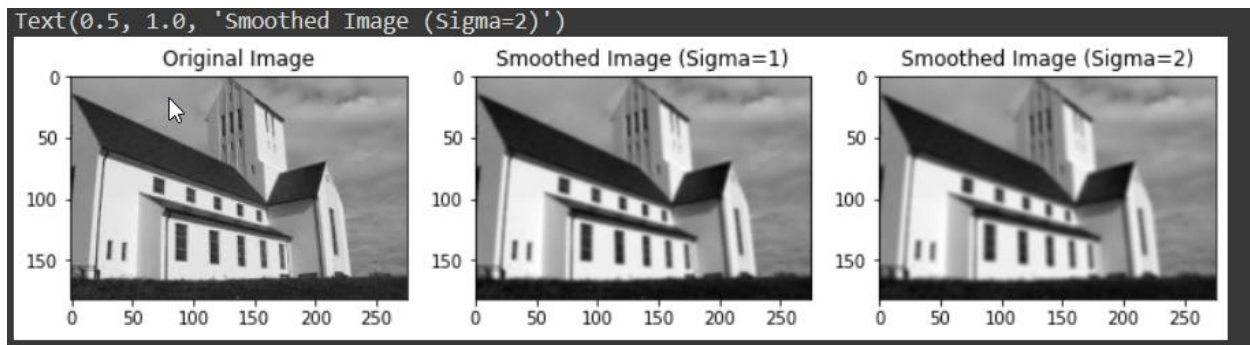
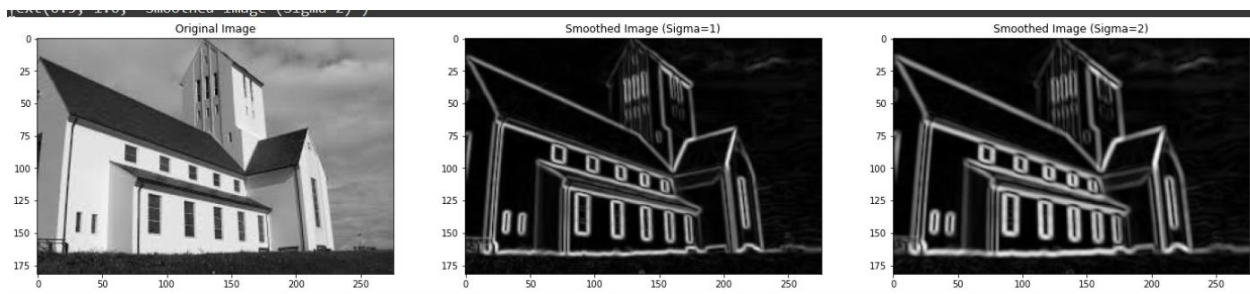


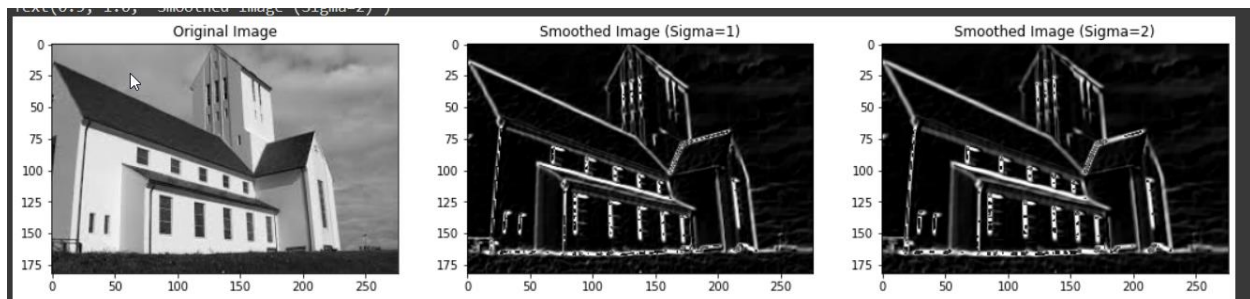
1a) Implement convolution process of smoothing Image 1 with a 5 x 5 Gaussian Filter with  $\sigma = 1$  and 2 , plot the corresponding output images (10%)



1b) Implement convolution process of convolving a 3 x 3 Sobel filters ( $S_x$  and  $S_y$ ) with the output images you obtained in step a. Plot the outputs of this process (10%).



1c) Implement convolution process of convolving Image 1 with  $\partial G \partial x$  and  $\partial G \partial y$  filters (5 x5 filters and for  $\sigma = 1$  and 2 (20%)



1d) The difference in result between the Sobel filters and derivative of gaussian filter is that the windows on the church are way more defined in the Sobel filter compared to the derivative of gaussian filter. The Sobel filter outlined most of the edges within the picture with clarity while the derivative of gaussian filter contain some noise that can be noted in the ground. Some of window edge is missing a swell and generally speaking the Sobel did a better job at detecting edge and displaying it with clarity.

Problem 2. Corner Detection (50%) Implement Harris Corner Detection algorithm step by step as explained in the class. Apply your script to detect corners in image 1. Plot the corner response map, and the non-maximum suppression output.

Black region are the detected corners. For the non-maximum suppression output, the white shown are the corners.

