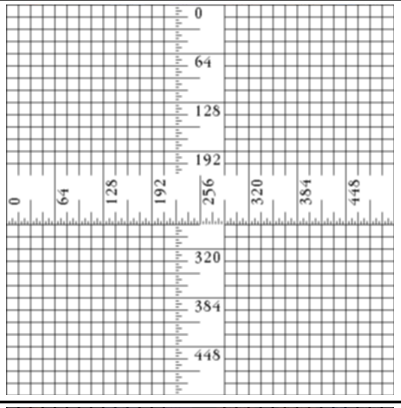
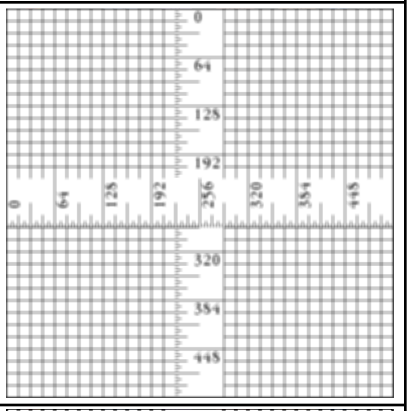
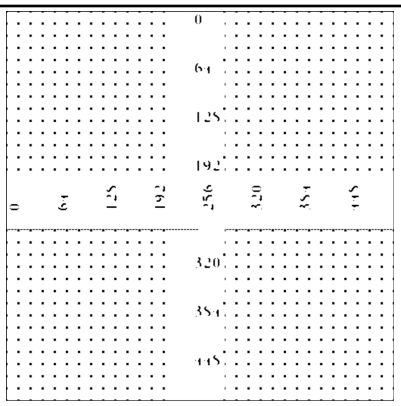
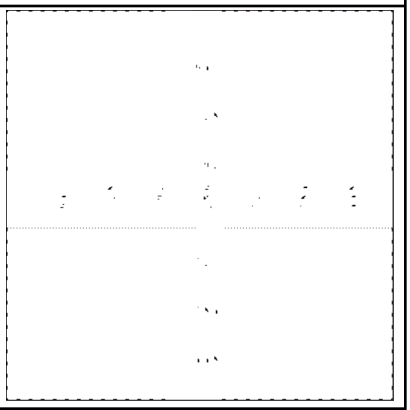
Name: Sahas Marwah
Roll Number: 2020237
Assignment 1

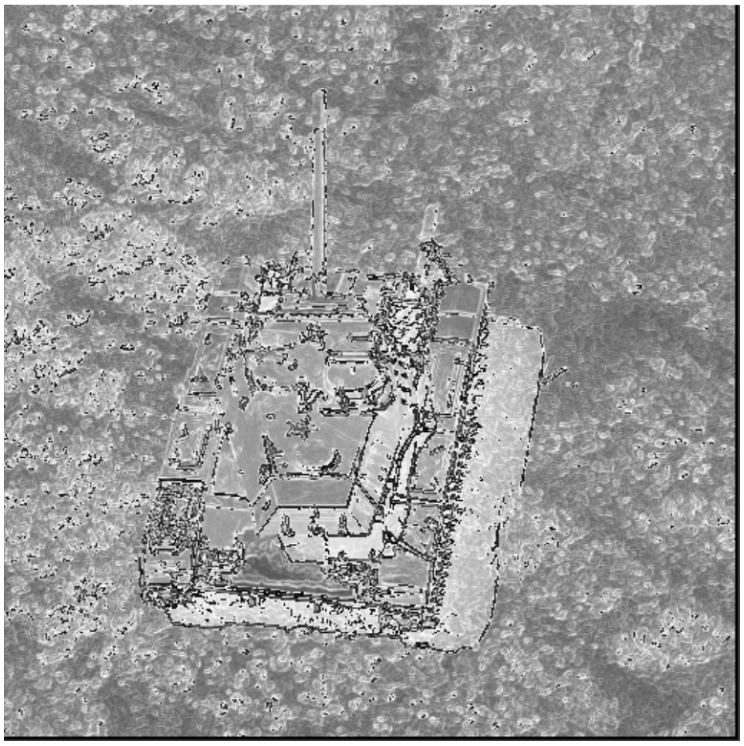
	Kernel Size 3x3	Kernel Size 5x5
Mean Filter		
Median Filter		

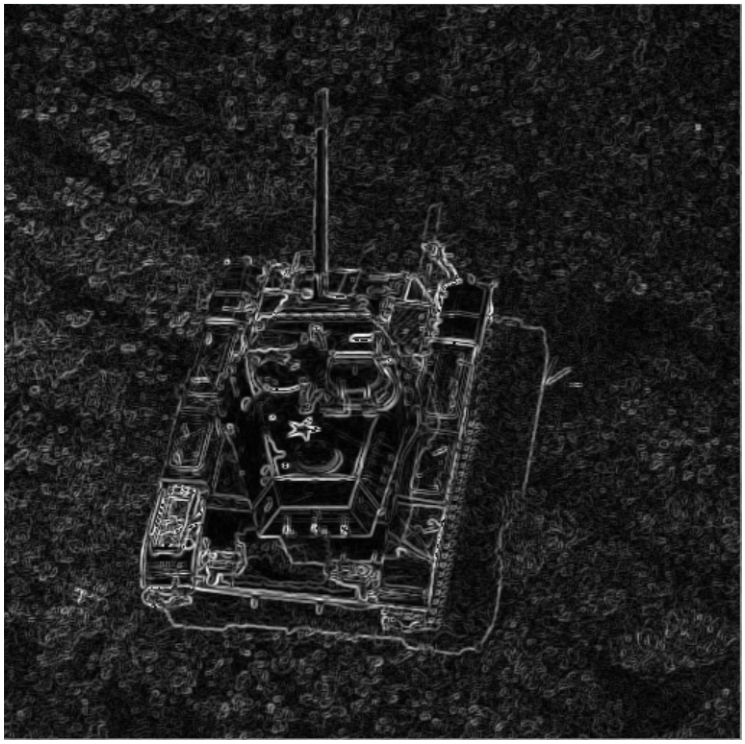
Q: Which of these two filters preserves the edges better and why?

A: Both mean and median filters look at a particular pixel's surrounding pixels to decide whether they are similar to them. As in the name, the mean filter replaces the particular pixel with the mean of the convolved part. On the other hand, the median filter is a better way to take the average as it has less variance.

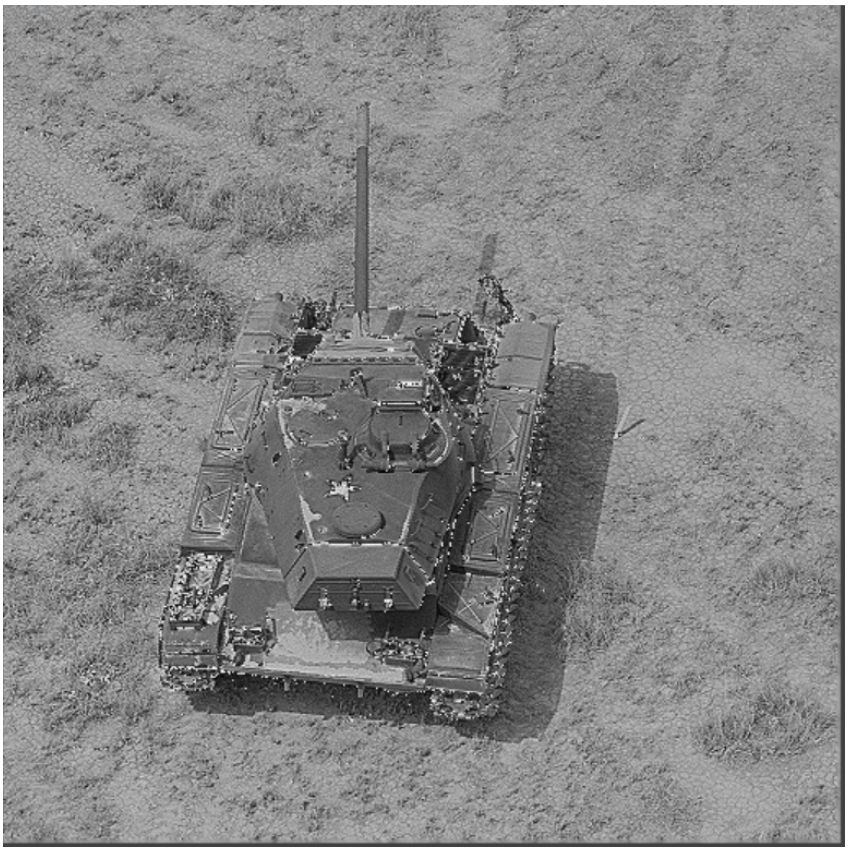
Hence, the **median filter is better at preserving sharp edges and the intersection of lines**. But, as we see in the above table, the **overall image is slightly blurred but better preserved in the mean filter**.

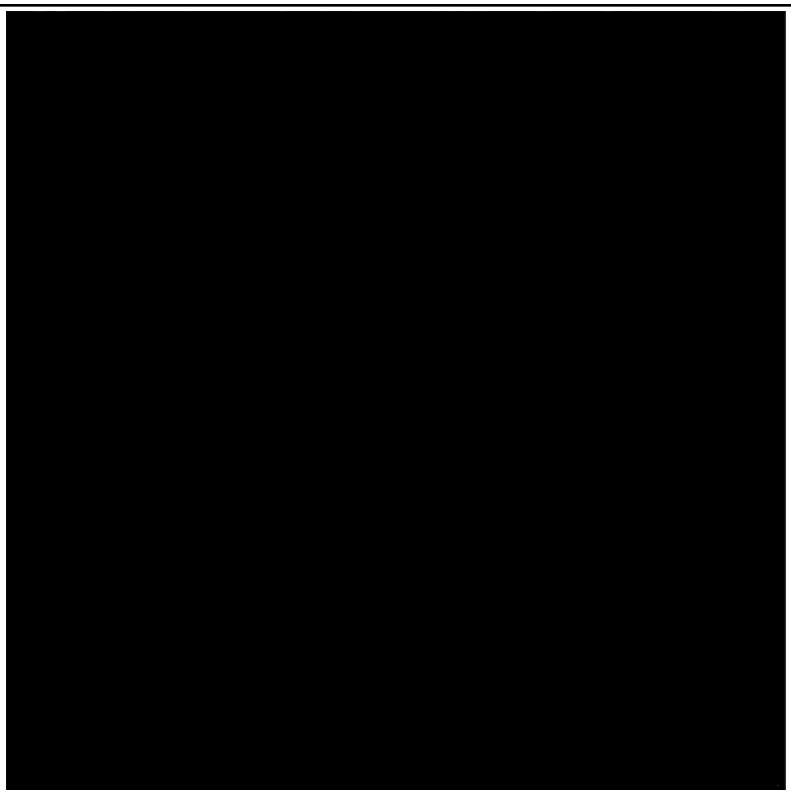
First Order	
Robert's (2x2) Edge detection	
After adding edges	

Sobel's (3x3) Edge detection	
After adding edges	

Prewitt's (3x3) Edge detection	
After adding edges	

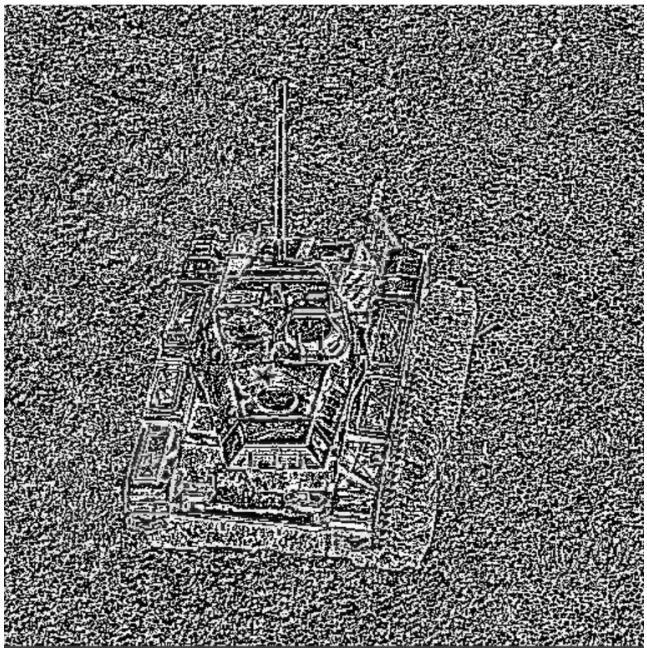
Second Order	
Laplacian Edge detection	
After adding edges	

Laplacian (Composite) Edge detection	
After adding edges	

Laplacian of Gaussian Edge detection	
After adding edges	

As an extra thing, I **compared almost all images from the cv2 library**. My observation was that the edges detected images had a lot of noise in my images. This may be due to nonefficient code.

One other Sharpening technique I used was **Unsharpeneing**, in that the basic pseudocode is Unsharp Image = Image + wtfactor*(Image - Blurred)


Unsharpened Image - Image


Unsharpened Image

All matrices and filters are implemented in the python files attached in the zip folder.