

1)

I copied the original image to a new image with padding included. Then looped through this image and created another image by summing 3x3(or other sized) squares and dividing them to a value depending on filter size.

3x3 – 5x5 – 9x9 – 15x15 examples are below:

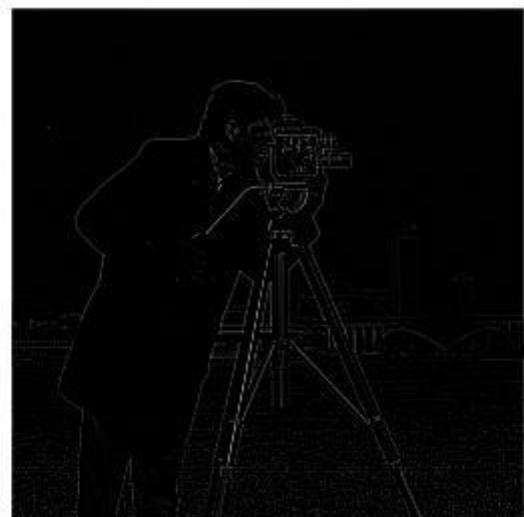




2)

I subtracted BW values of filtered image from the original image and set the result as subtracted image by using two simple for loops.

3x3- 15x15 examples are below:



3)

Shifted image by changing coordinates values.

1 pixel:



5 pixels:



4)

Added subtracted image to the original image and created the sharpened image.

3x3:



15x15:

