



**YILDIZ TEKNİK ÜNİVERSİTESİ
ELEKTRİK-ELEKTRONİK FAKÜLTESİ
BİLGİSAYAR MÜHENDİSLİĞİ BÖLÜMÜ**








GÖRÜNTÜ İŞLEME

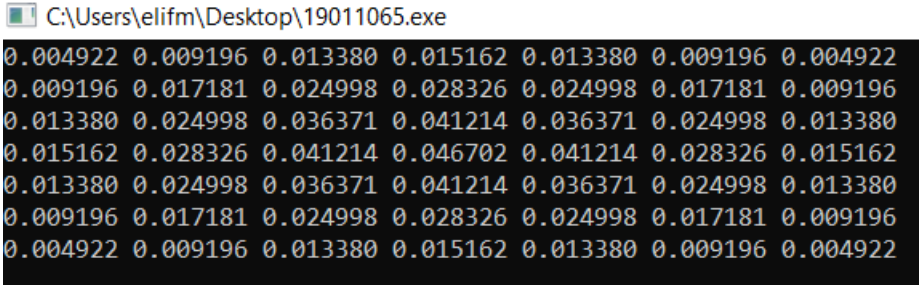
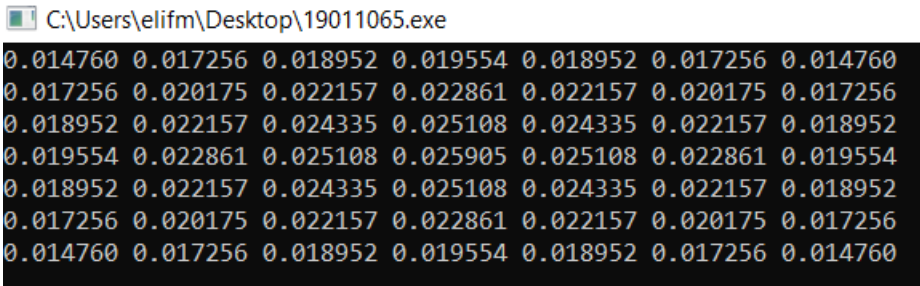
ÖDEV - 1

Öğr. Üyesi: Prof. Dr. Mine Elif KARSLIGİL


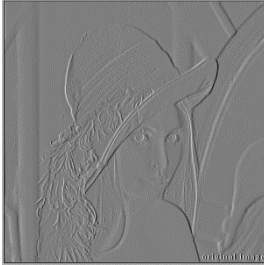


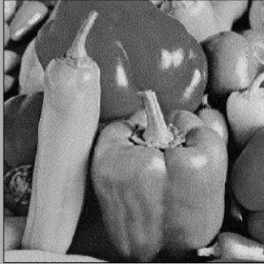
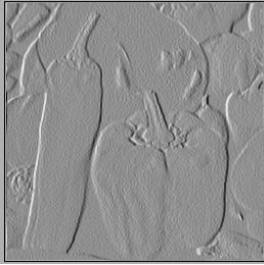
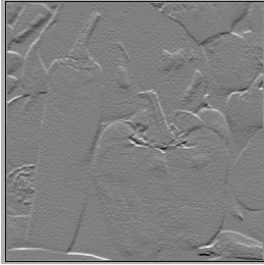



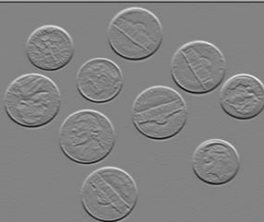
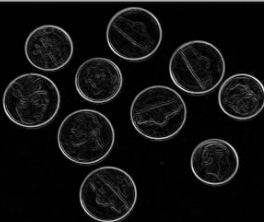
Hazırlayan: 19011065 Elif Mertoğlu

1-) Gauss Filtreleri
















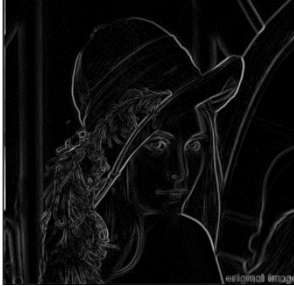
<p>3x3</p> <p>$\sigma = 1.0$</p>	 C:\Users\elifm\Desktop\19011065.exe <pre>0.075114 0.123841 0.075114 0.123841 0.204180 0.123841 0.075114 0.123841 0.075114</pre>
<p>3x3</p> <p>$\sigma = 2.0$</p>	 C:\Users\elifm\Desktop\19011065.exe <pre>0.101868 0.115432 0.101868 0.115432 0.130801 0.115432 0.101868 0.115432 0.101868</pre>
<p>3x3</p> <p>$\sigma = 4.0$</p>	 C:\Users\elifm\Desktop\19011065.exe <pre>0.108797 0.112250 0.108797 0.112250 0.115813 0.112250 0.108797 0.112250 0.108797</pre>
<p>5x5</p> <p>$\sigma = 1.0$</p>	 C:\Users\elifm\Desktop\19011065.exe <pre>0.002969 0.013306 0.021938 0.013306 0.002969 0.013306 0.059634 0.098320 0.059634 0.013306 0.021938 0.098320 0.162103 0.098320 0.021938 0.013306 0.059634 0.098320 0.059634 0.013306 0.002969 0.013306 0.021938 0.013306 0.002969</pre>
<p>5x5</p> <p>$\sigma = 2.0$</p>	 C:\Users\elifm\Desktop\19011065.exe <pre>0.023247 0.033824 0.038328 0.033824 0.023247 0.033824 0.049214 0.055766 0.049214 0.033824 0.038328 0.055766 0.063191 0.055766 0.038328 0.033824 0.049214 0.055766 0.049214 0.033824 0.023247 0.033824 0.038328 0.033824 0.023247</pre>
<p>5x5</p> <p>$\sigma = 4.0$</p>	 C:\Users\elifm\Desktop\19011065.exe <pre>0.035204 0.038664 0.039891 0.038664 0.035204 0.038664 0.042464 0.043812 0.042464 0.038664 0.039891 0.043812 0.045203 0.043812 0.039891 0.038664 0.042464 0.043812 0.042464 0.038664 0.035204 0.038664 0.039891 0.038664 0.035204</pre>
<p>7x7</p> <p>$\sigma = 1.0$</p>	 C:\Users\elifm\Desktop\19011065.exe <pre>0.000020 0.000239 0.001073 0.001769 0.001073 0.000239 0.000020 0.000239 0.002917 0.013071 0.021551 0.013071 0.002917 0.000239 0.001073 0.013071 0.058582 0.096585 0.058582 0.013071 0.001073 0.001769 0.021551 0.096585 0.159241 0.096585 0.021551 0.001769 0.001073 0.013071 0.058582 0.096585 0.058582 0.013071 0.001073 0.000239 0.002917 0.013071 0.021551 0.013071 0.002917 0.000239 0.000020 0.000239 0.001073 0.001769 0.001073 0.000239 0.000020</pre>

7×7 $\sigma = 2.0$	
7×7 $\sigma = 4.0$	

2-) Orijinal Görüntülere Sobel Filtresi Uygulanması

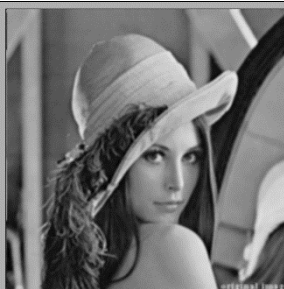
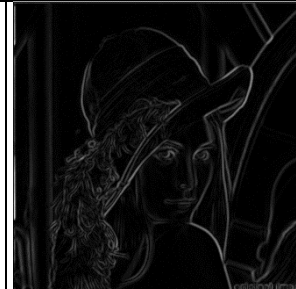
Orijinal	Sobel-x	Sobel-y	Sobel-xy
			
			
			

3-)Bulanıklaştırılmış Görüntülere Sobel Filtresi Uygulanması

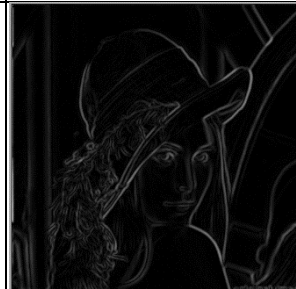
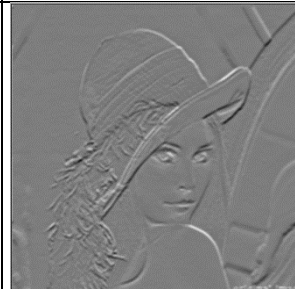
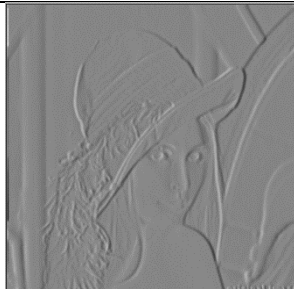
GAUSS	SOBEL-X	SOBEL-Y	SOBEL-XY
 $3 \times 3 \sigma = 1.0$			
 $3 \times 3 \sigma = 2.0$			
 $3 \times 3 \sigma = 4.0$			
 $5 \times 5 \sigma = 1.0$			



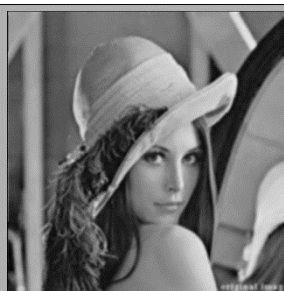
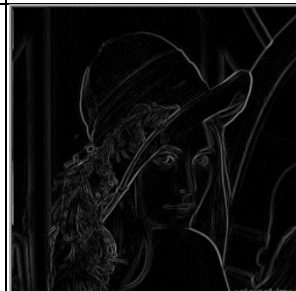
5x5 $\sigma = 2.0$



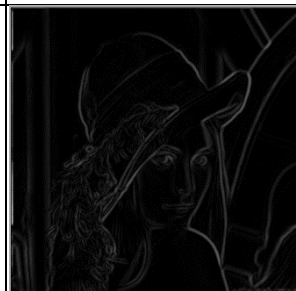
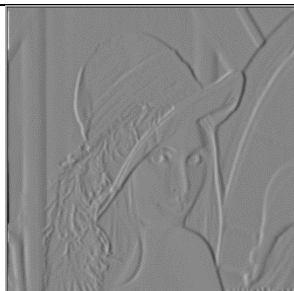
5x5 $\sigma = 4.0$


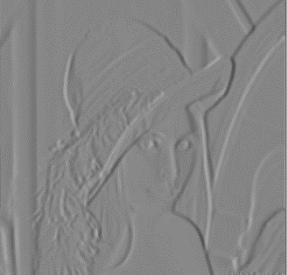


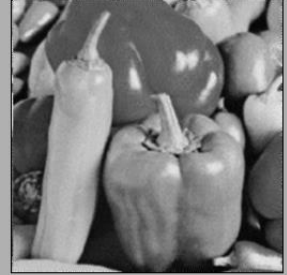
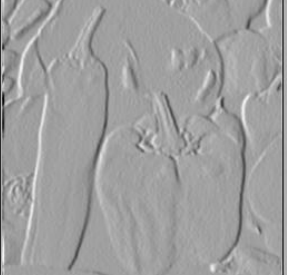
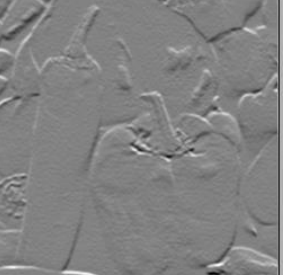
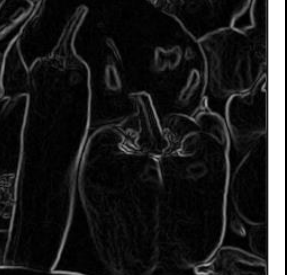
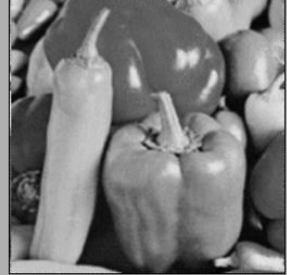
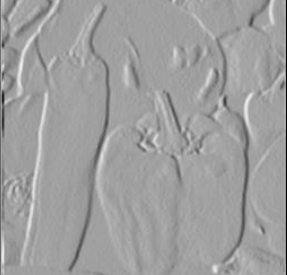
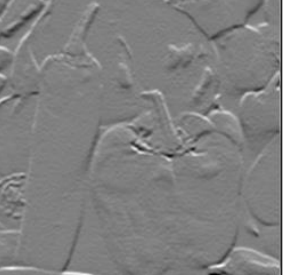
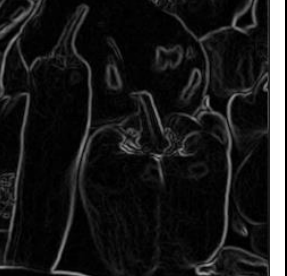
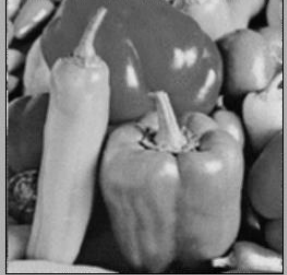
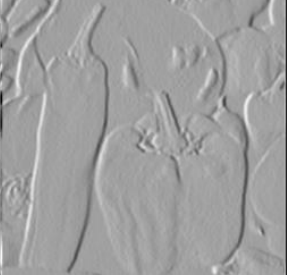
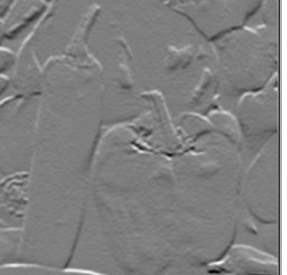
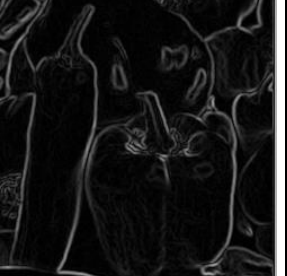


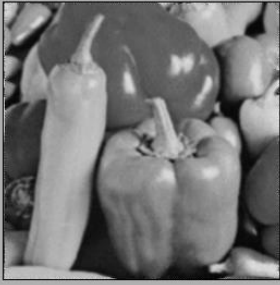
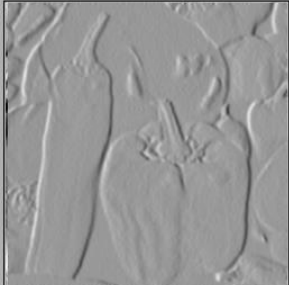
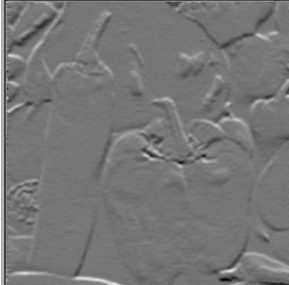
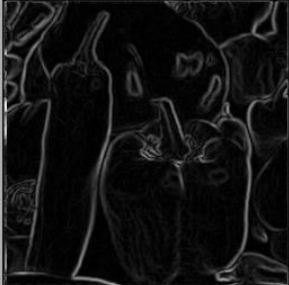

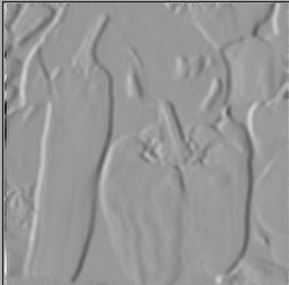
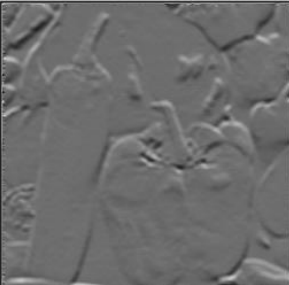


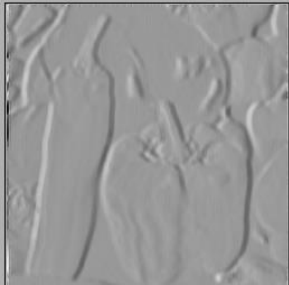
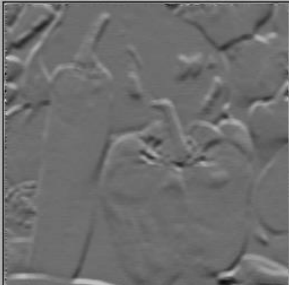

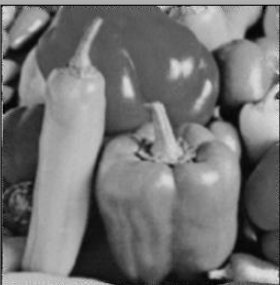
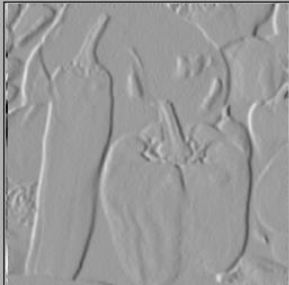
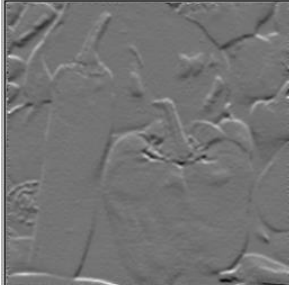

7x7 $\sigma = 1.0$


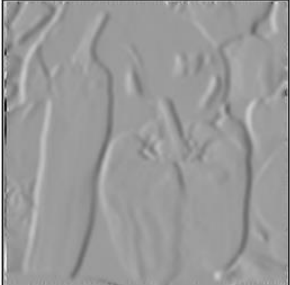
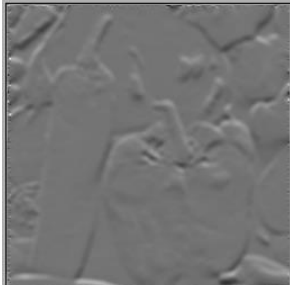


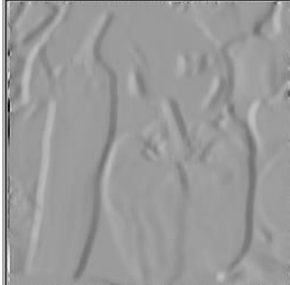
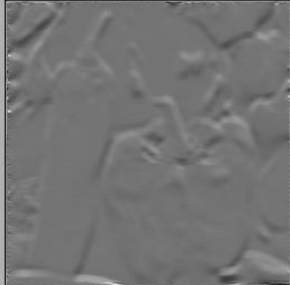



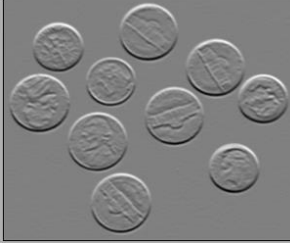
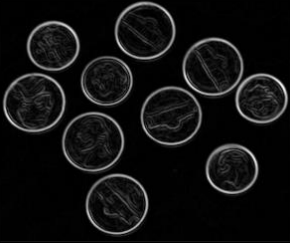


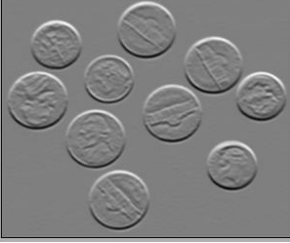





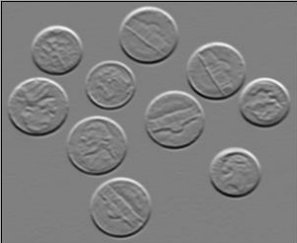



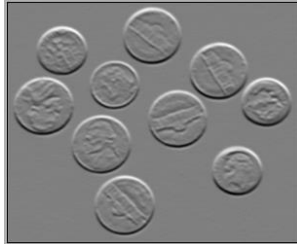

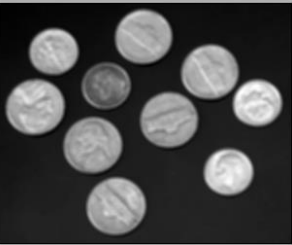


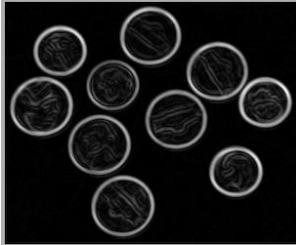



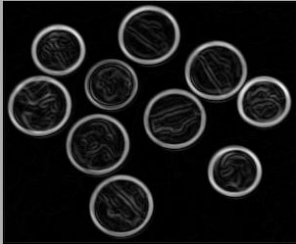



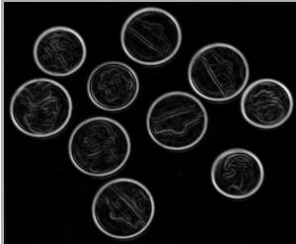
7x7 $\sigma = 2.0$




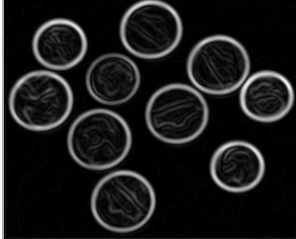
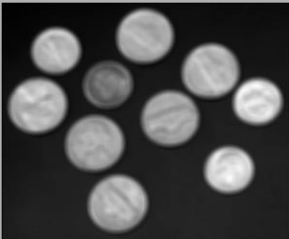


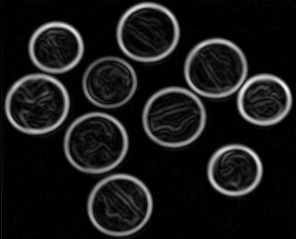


			
<p>7x7 $\sigma = 4.0$</p>			
			
<p>3x3 $\sigma = 1.0$</p>			
			
<p>3x3 $\sigma = 2.0$</p>			
			
<p>3x3 $\sigma = 4.0$</p>			







 <p>5x5 $\sigma = 1.0$</p>			
 <p>5x5 $\sigma = 2.0$</p>			
 <p>5x5 $\sigma = 4.0$</p>			
 <p>7x7 $\sigma = 1.0$</p>			

 <p>7x7 $\sigma = 2.0$</p>			
 <p>7x7 $\sigma = 4.0$</p>			
 <p>3x3 $\sigma = 1.0$</p>			
 <p>3x3 $\sigma = 2.0$</p>			

 <p>3x3 $\sigma = 4.0$</p>			
 <p>5x5 $\sigma = 1.0$</p>			
 <p>5x5 $\sigma = 2.0$</p>			
 <p>5x5 $\sigma = 4.0$</p>			
 <p>7x7 $\sigma = 1.0$</p>			

			
7x7 $\sigma = 2.0$			
			
7x7 $\sigma = 4.0$			

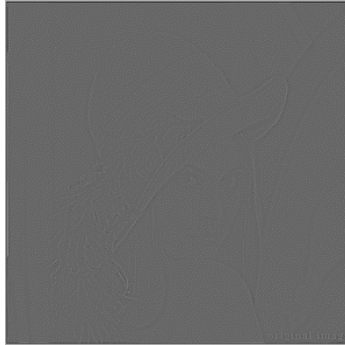
4-) Bulanıklaştırılmış Görüntülere Laplacian Filtresi Uygulanması

GAUSS	Laplacian 1	Laplacian 2
 3x3 $\sigma = 1.0$		
 3x3 $\sigma = 2.0$		

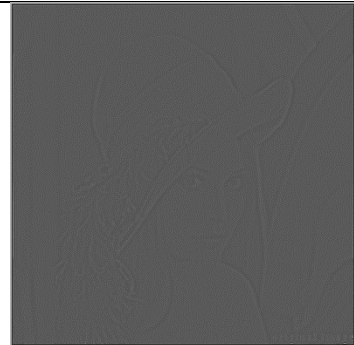
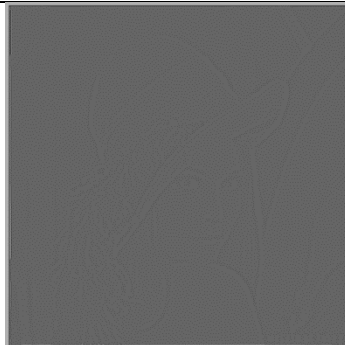
 <p>original image</p> <p>$3 \times 3 \sigma = 4.0$</p>	 <p>original image</p>	 <p>original image</p>
 <p>original image</p> <p>$5 \times 5 \sigma = 1.0$</p>	 <p>original image</p>	 <p>original image</p>
 <p>original image</p> <p>$5 \times 5 \sigma = 2.0$</p>	 <p>original image</p>	 <p>original image</p>
 <p>original image</p> <p>$5 \times 5 \sigma = 4.0$</p>	 <p>original image</p>	 <p>original image</p>



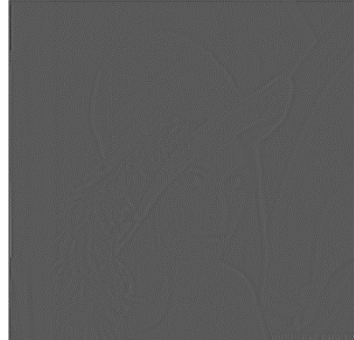
$7 \times 7 \sigma = 1.0$



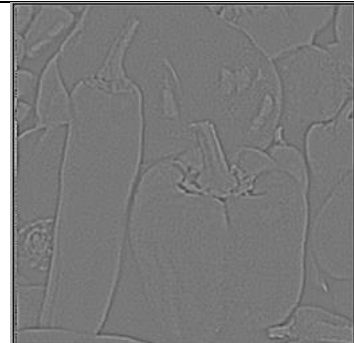
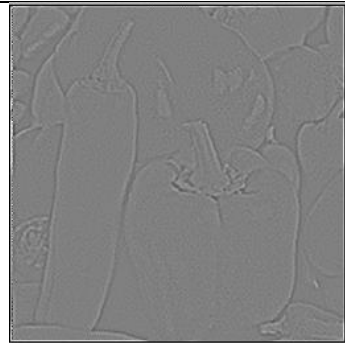
$7 \times 7 \sigma = 2.0$

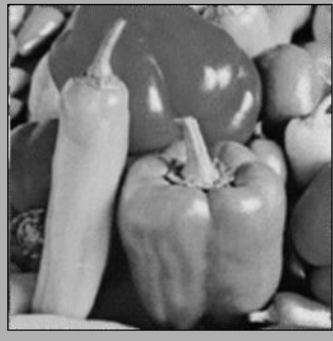


$7 \times 7 \sigma = 4.0$

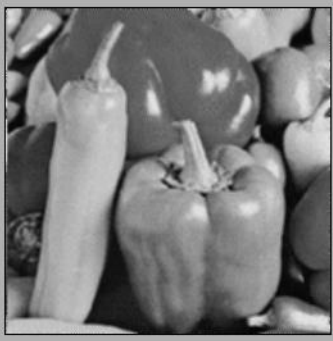
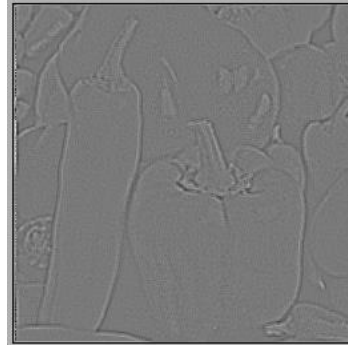
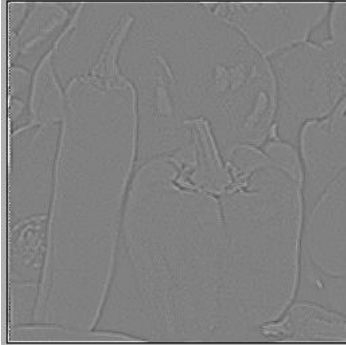


$3 \times 3 \sigma = 1.0$

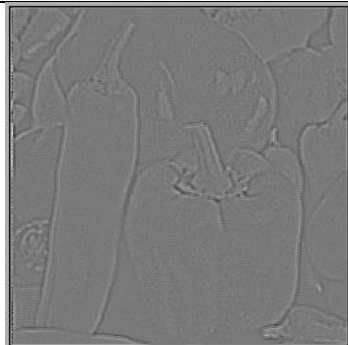
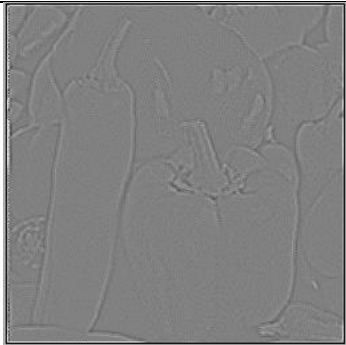




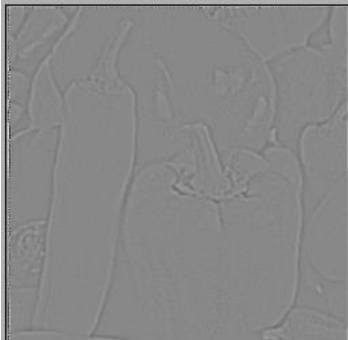
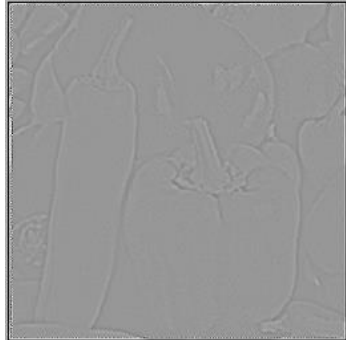
$3 \times 3 \sigma = 2.0$



$3 \times 3 \sigma = 4.0$



$5 \times 5 \sigma = 1.0$

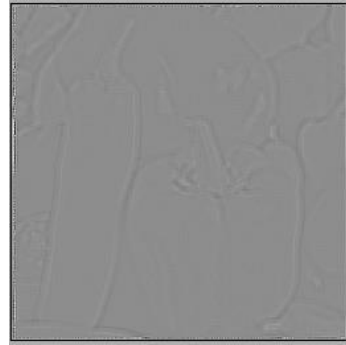


$5 \times 5 \sigma = 2.0$

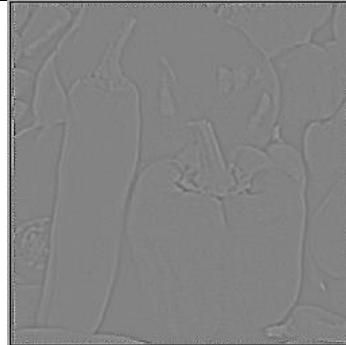
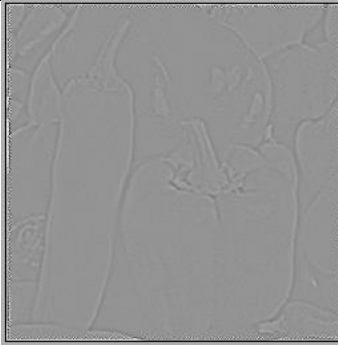




5x5 $\sigma = 4.0$



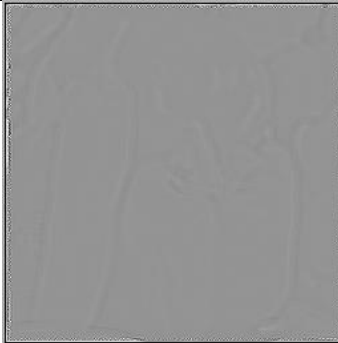
7x7 $\sigma = 1.0$



7x7 $\sigma = 2.0$

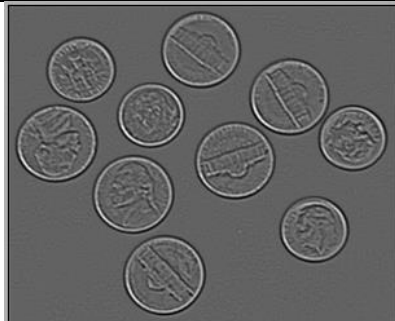
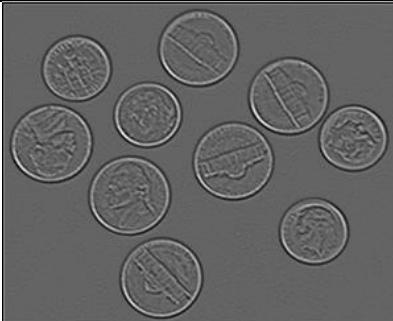


7x7 $\sigma = 4.0$

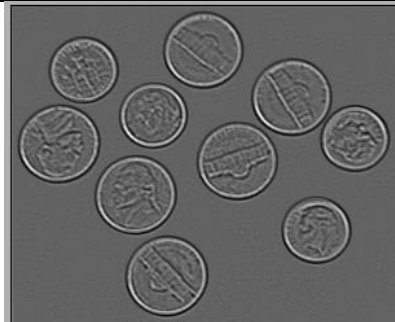
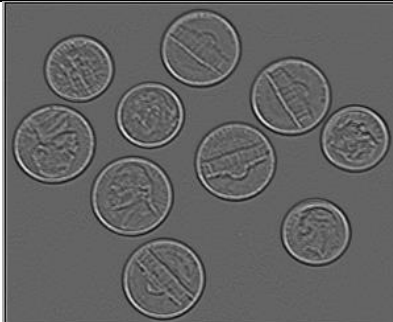




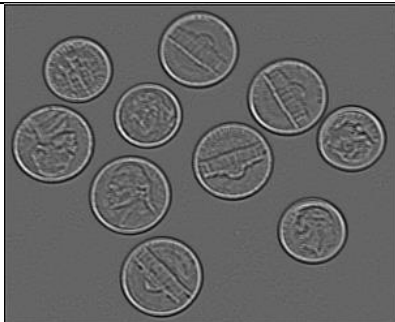
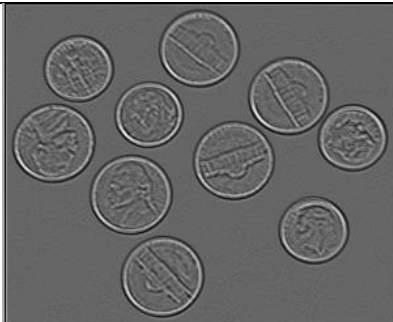
$3 \times 3 \sigma = 1.0$



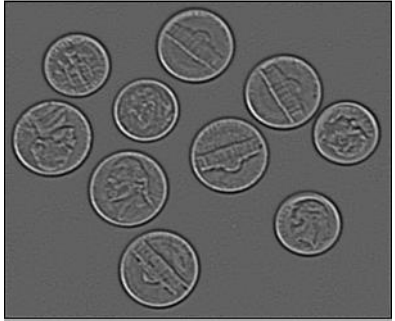
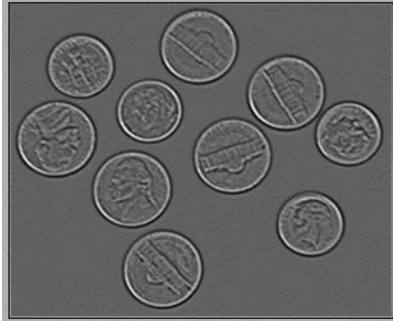
$3 \times 3 \sigma = 2.0$



$3 \times 3 \sigma = 4.0$

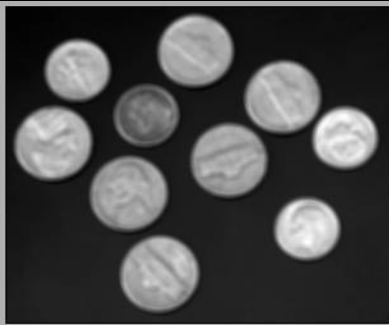
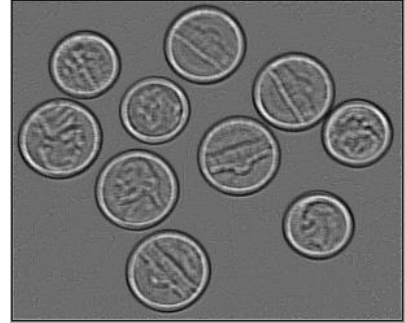
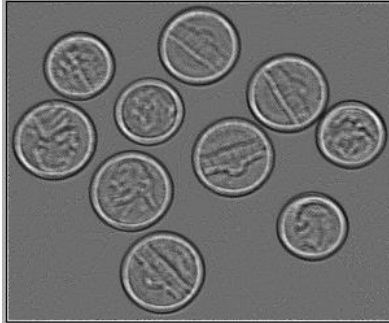


$5 \times 5 \sigma = 1.0$

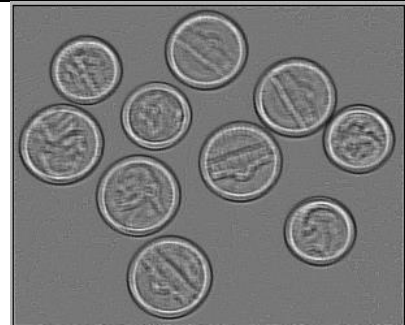
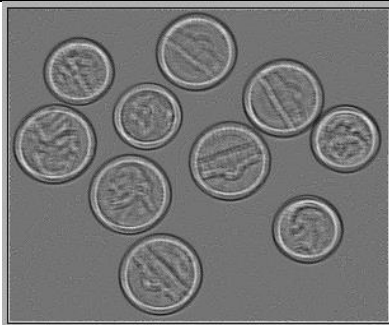




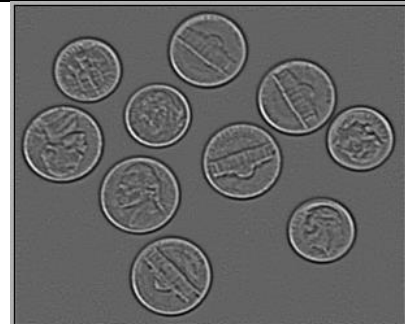
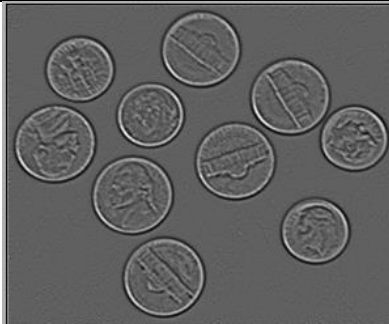
5x5 $\sigma = 2.0$



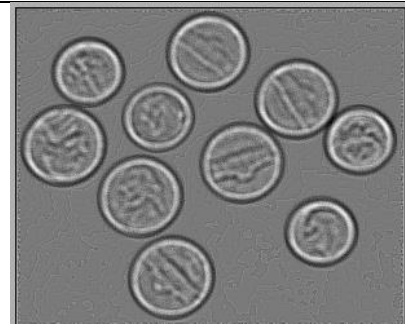
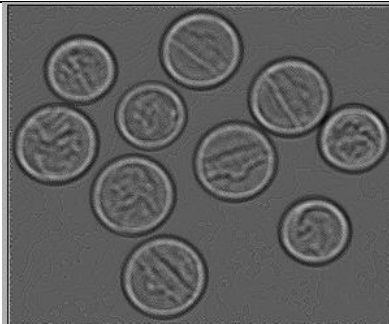
5x5 $\sigma = 4.0$

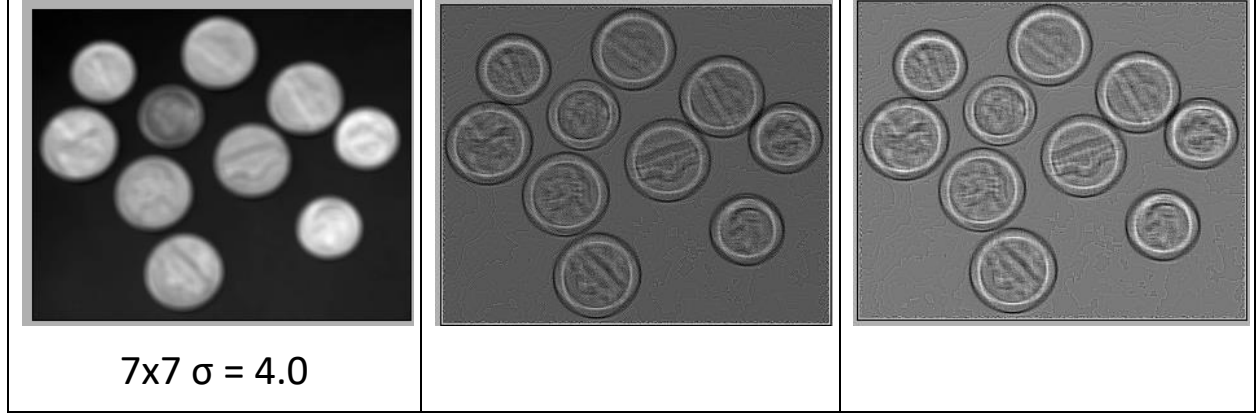


7x7 $\sigma = 1.0$



7x7 $\sigma = 2.0$





5-)

- Bulanıklaştırma işlemi sırasında filtre boyutunun büyümesiyle birlikte görüntünün bulanıklaşma seviyesi de artmaktadır.
- Bulanıklaştırma işlemi sırasında sigma değerinin artması görüntünün daha da bulanık olmasını sağlamıştır. 5x5 $\sigma = 4.0$ görüntünün, 7x7 $\sigma = 1.0$ görüntüden daha bulanık olduğu görüldüğünde sigma değerinin görüntüyü bulanıklaştırmada filtre boyutundan daha önemli olduğu söylenebilir.
- Orijinal görüntüye Sobel uygulanması sonucu tespit edilen kenarlar, bulanıklaştırılmış görüntüye göre tespit edilen kenarlardan daha net olarak gözükmemektedir.
- İncelemelerime göre Sobel filtresinin Laplacian filtresine göre daha iyi sonuçlar çıkardığını söyleyebilirim. Laplacian'da resimlerdeki gürültünün Sobel'e göre pek engellenemediğini gözlemlemek mümkün. Laplacian 2'nin Laplacian 1'e göre daha başarılı olduğunu ise özellikle fruit.pgm görüntüsüne bakarak gözlemledim.