



Kurs Adı: Görüntü İşleme

Kurs Grubu: Grup 1

Öğretim Üyesinin Adı: M. Elif Karslıgil

Öğrenci Adı ve Soyadı: Arda Kaşıkçı




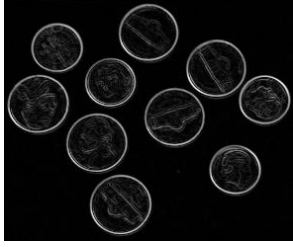
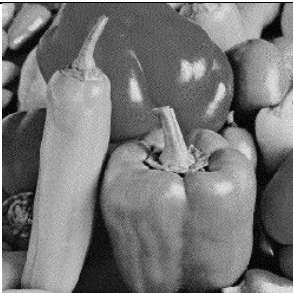
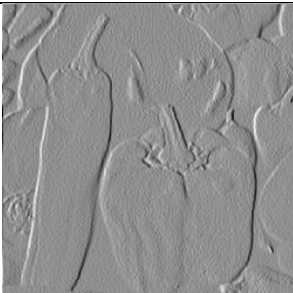
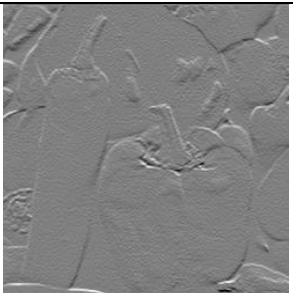
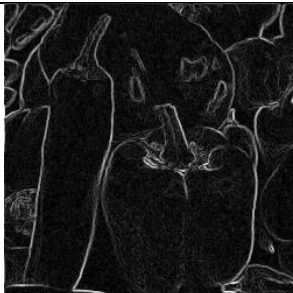

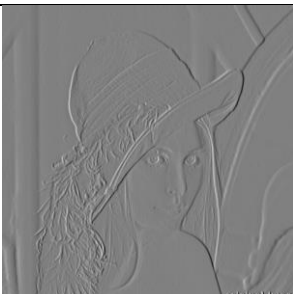

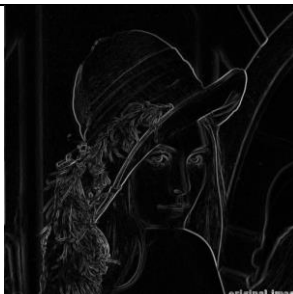
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Gauss Kernel Matrisleri




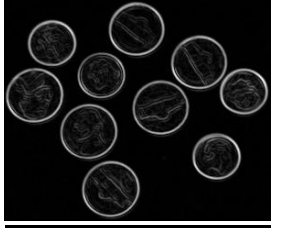



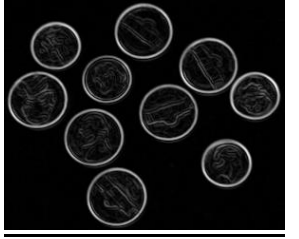



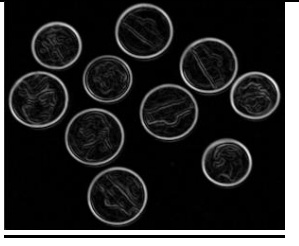

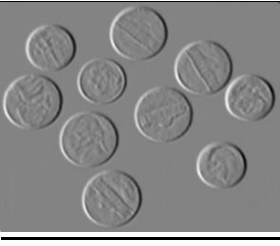
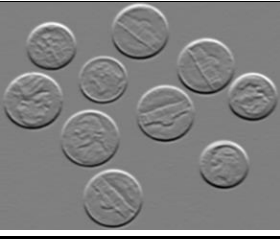
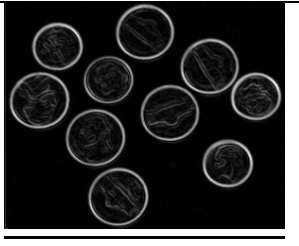
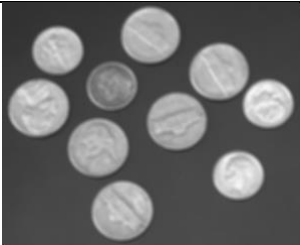


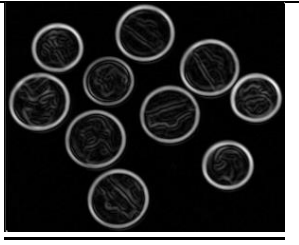
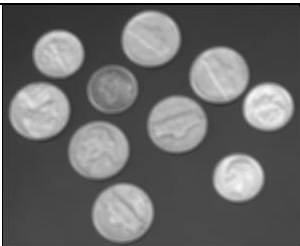


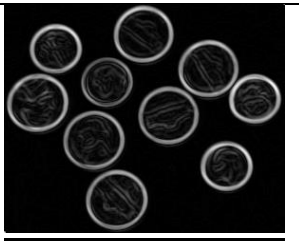
3X3 $\sigma=1$	0.075114 0.123841 0.075114 0.123841 0.204180 0.123841 0.075114 0.123841 0.075114 -----	
3X3 $\sigma=2$	0.101868 0.115432 0.101868 0.115432 0.130801 0.115432 0.101868 0.115432 0.101868 -----	
3X3 $\sigma=4$	0.108797 0.112250 0.108797 0.112250 0.115813 0.112250 0.108797 0.112250 0.108797 -----	
5X5 $\sigma=1$	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 -----	
5X5 $\sigma=2$	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 -----	
5X5 $\sigma=4$	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 -----	
7X7 $\sigma=1$	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 -----	

7X7 $\sigma=2$	0.004922 0.009196 0.013380 0.015162 0.013380 0.009196 0.004922 0.009196 0.017181 0.024998 0.028326 0.024998 0.017181 0.009196 0.013380 0.024998 0.036371 0.041214 0.036371 0.024998 0.013380 0.015162 0.028326 0.041214 0.046702 0.041214 0.028326 0.015162 0.013380 0.024998 0.036371 0.041214 0.036371 0.024998 0.013380 0.009196 0.017181 0.024998 0.028326 0.024998 0.017181 0.009196 0.004922 0.009196 0.013380 0.015162 0.013380 0.009196 0.004922 -----
7X7 $\sigma=4$	0.014760 0.017256 0.018952 0.019554 0.018952 0.017256 0.014760 0.017256 0.020175 0.022157 0.022861 0.022157 0.020175 0.017256 0.018952 0.022157 0.024335 0.025108 0.024335 0.022157 0.018952 0.019554 0.022861 0.025108 0.025905 0.025108 0.022861 0.019554 0.018952 0.022157 0.024335 0.025108 0.024335 0.022157 0.018952 0.017256 0.020175 0.022157 0.022861 0.022157 0.020175 0.017256 0.014760 0.017256 0.018952 0.019554 0.018952 0.017256 0.014760 -----

Orijinal Görüntülere Sobel Filtresi Uygulanması

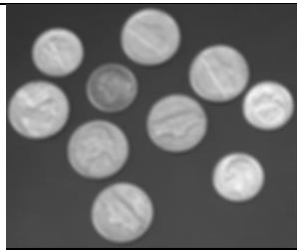
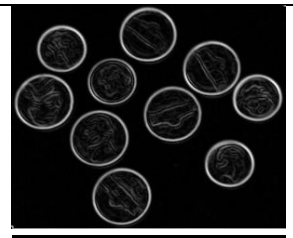
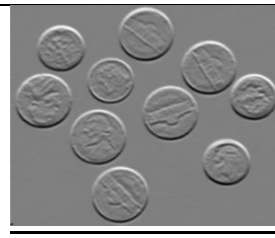
Orijinal	SOBEL-X	SOBEL-Y	SOBEL
			
Orijinal	SOBEL-X	SOBEL-Y	SOBEL
			
Orijinal	SOBEL-X	SOBEL-Y	SOBEL
			

Görüntü Bulanıklaştırma Ardından Sobel Uygulaması

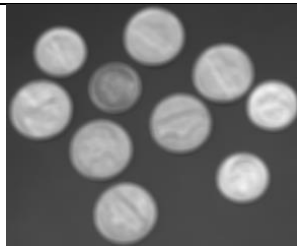
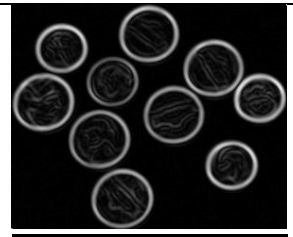
Gauss Smooth	SOBEL-X	SOBEL-Y	SOBEL
 3X3 $\sigma=1$			
 3X3 $\sigma=2$			
 3X3 $\sigma=4$			
 5X5 $\sigma=1$			
 5X5 $\sigma=2$			
 5X5 $\sigma=4$			



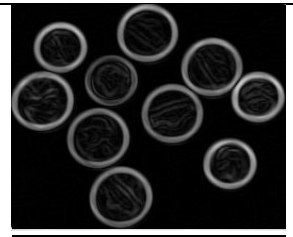
7X7 $\sigma=1$



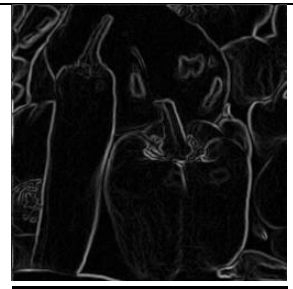
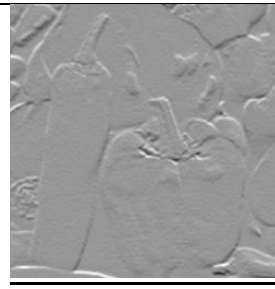
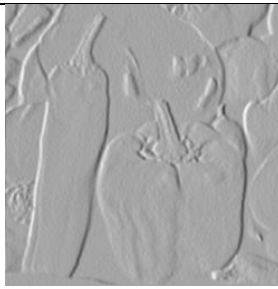
7X7 $\sigma=2$



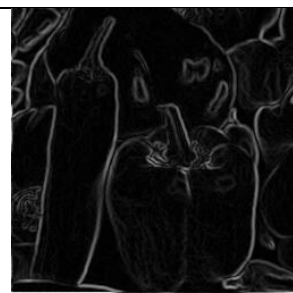
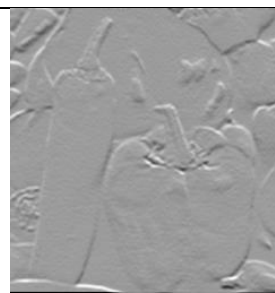
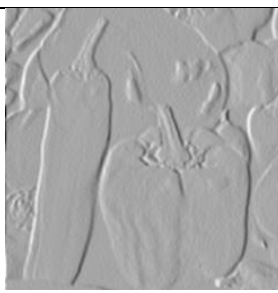
7X7 $\sigma=4$



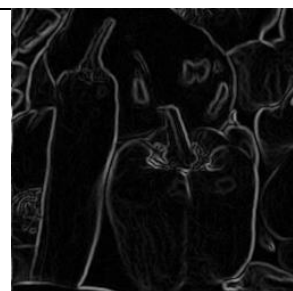
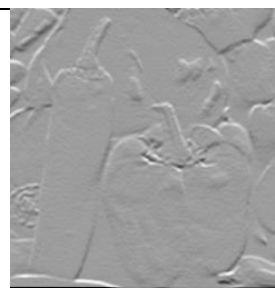
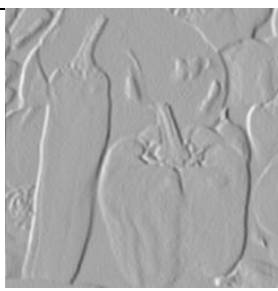
3X3 $\sigma=1$


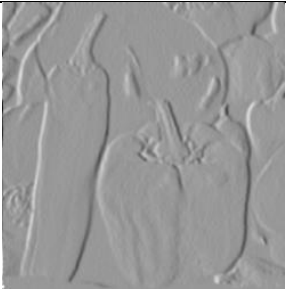
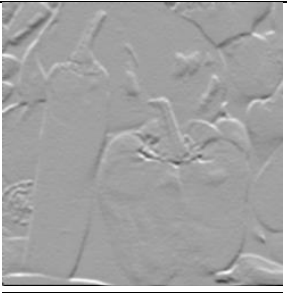
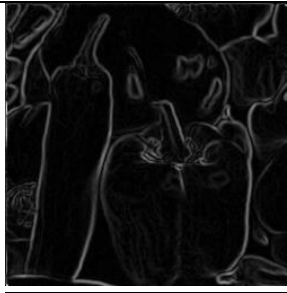

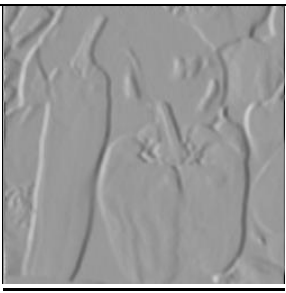
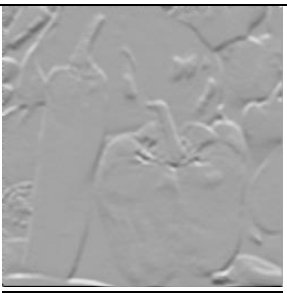
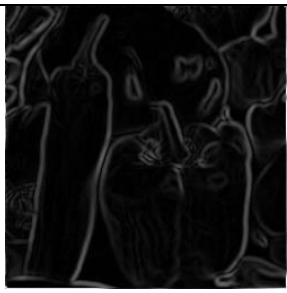

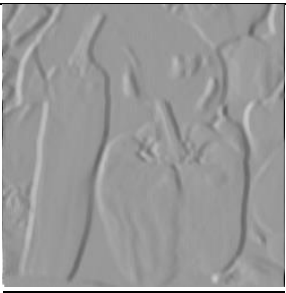
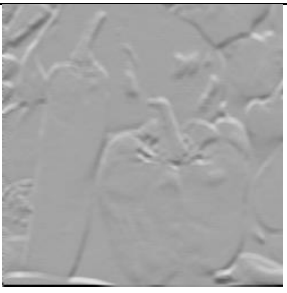
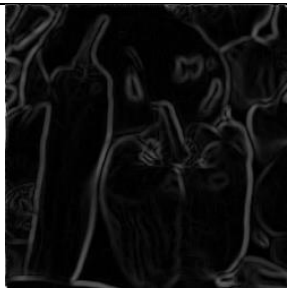
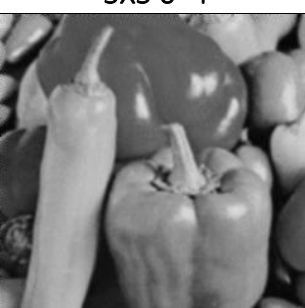
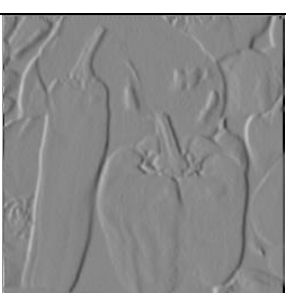
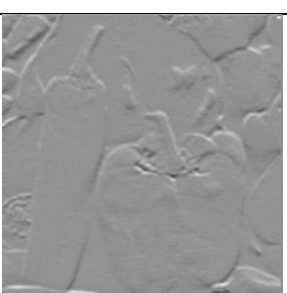
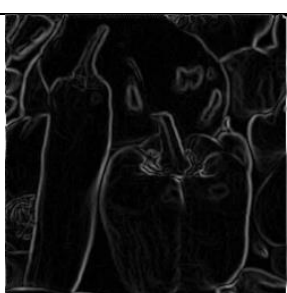
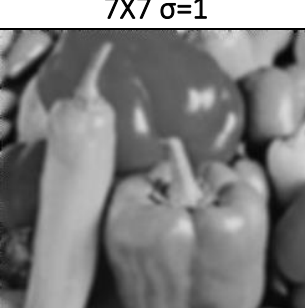
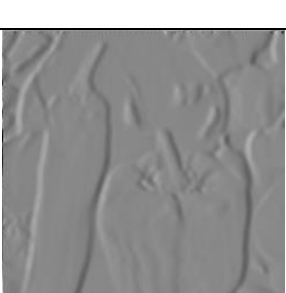
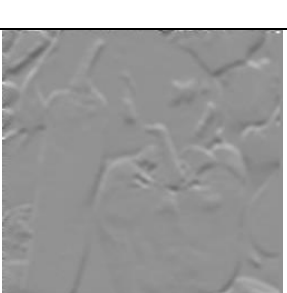
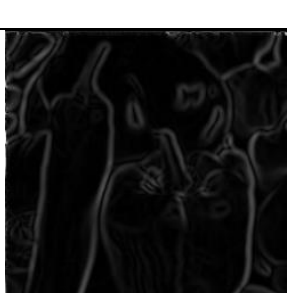



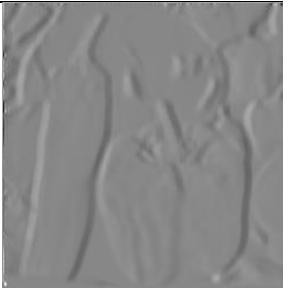
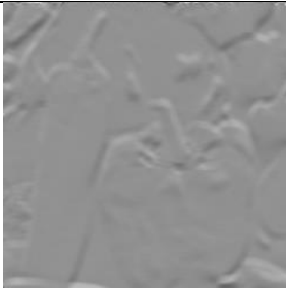
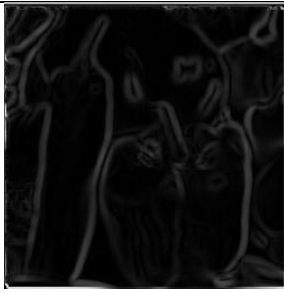







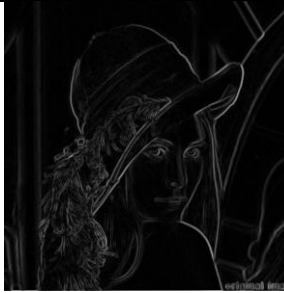








3X3 $\sigma=2$






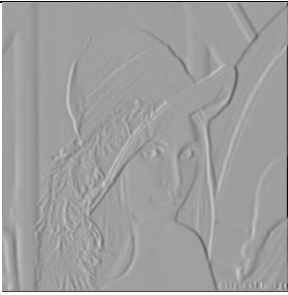

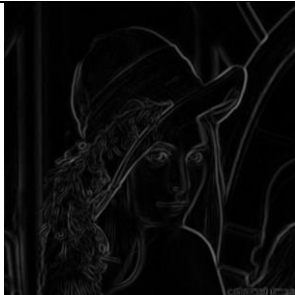
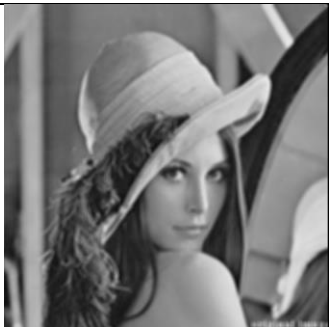


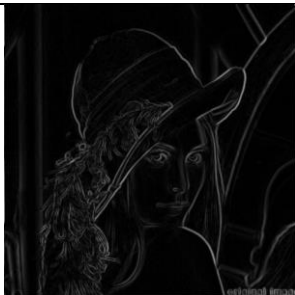

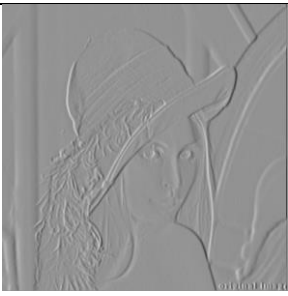



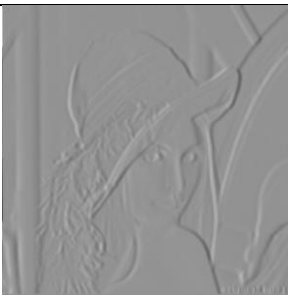




3X3 $\sigma=4$



 <p>5X5 $\sigma=1$</p>			
 <p>5X5 $\sigma=2$</p>			
 <p>5X5 $\sigma=4$</p>			
 <p>7X7 $\sigma=1$</p>			
 <p>7X7 $\sigma=2$</p>			

 <p>7X7 $\sigma=4$</p>			
 <p>3X3 $\sigma=1$</p>			
 <p>3X3 $\sigma=2$</p>			
 <p>3X3 $\sigma=4$</p>			
 <p>5X5 $\sigma=1$</p>			

 <p>5X5 $\sigma=2$</p>			
 <p>5X5 $\sigma=4$</p>			
 <p>7X7 $\sigma=1$</p>			
 <p>7X7 $\sigma=2$</p>			
 <p>7X7 $\sigma=4$</p>			


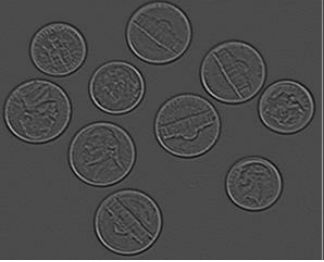
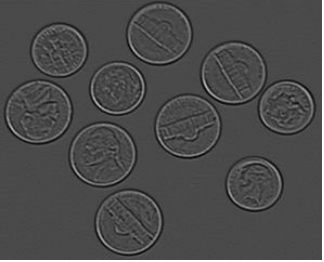

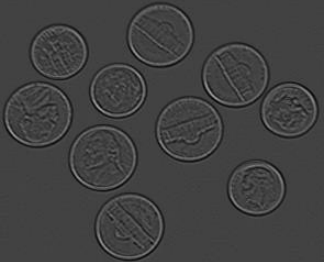
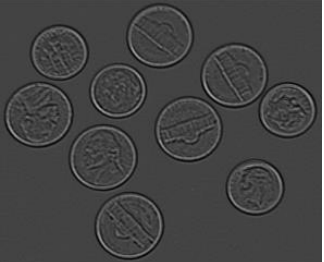

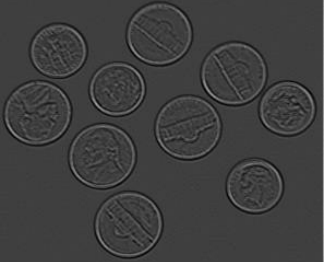
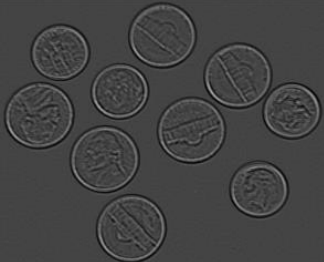

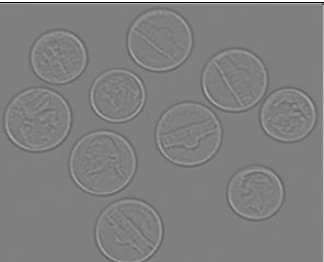
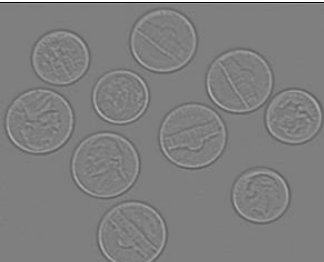
Görüntü Bulanıklaştırma Ardından Laplacian Uygulaması

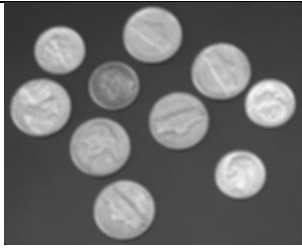
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-1	4	-1
0	-1	0

-1	-1	-1
-1	8	-1
-1	-1	-1

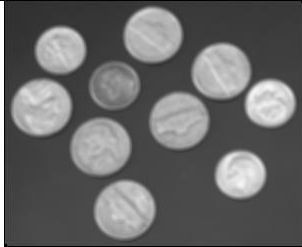
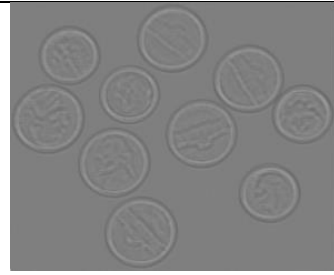
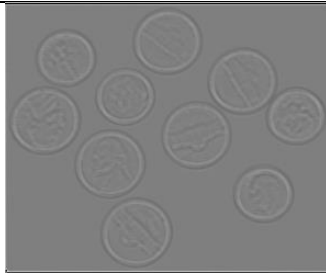
1.KERNEL

2.KERNEL

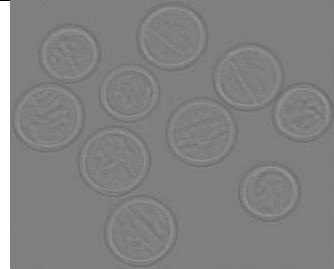
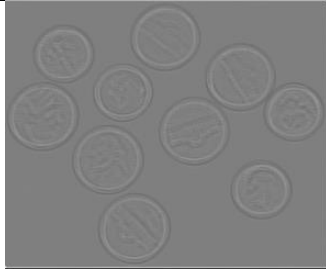
Gauss Smooth	Laplace 1	Laplace 2
 3X3 $\sigma=1$		
 3X3 $\sigma=2$		
 3X3 $\sigma=4$		
 5X5 $\sigma=1$		



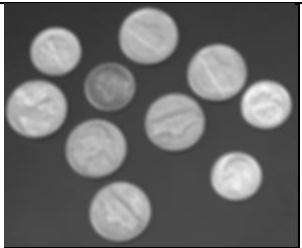
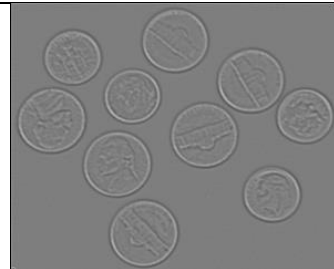
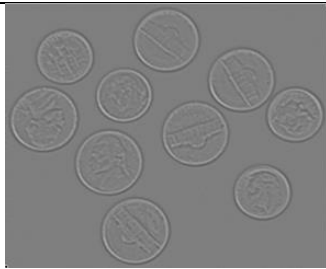
5X5 $\sigma=2$



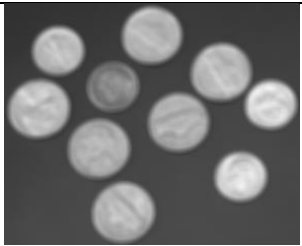
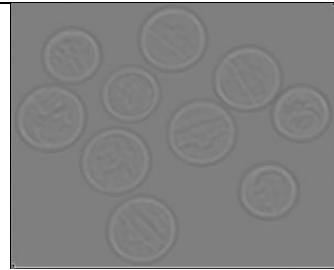
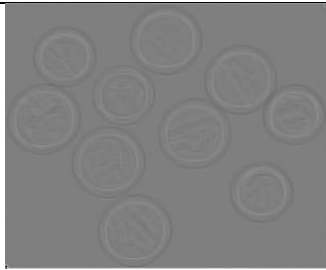
5X5 $\sigma=4$



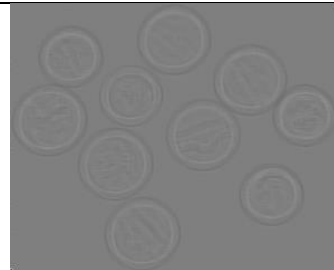
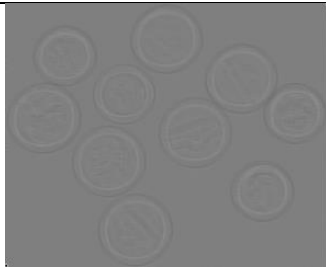
7X7 $\sigma=1$



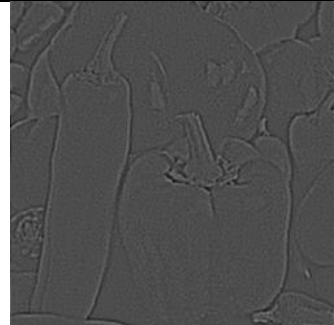
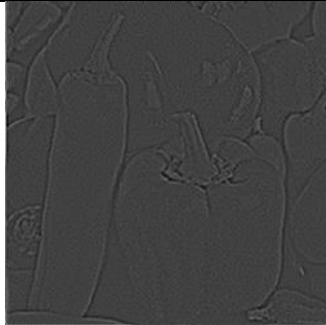
7X7 $\sigma=2$


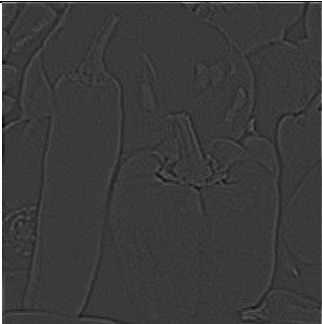
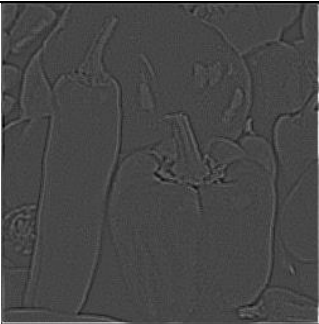





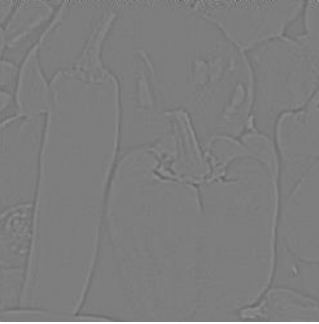















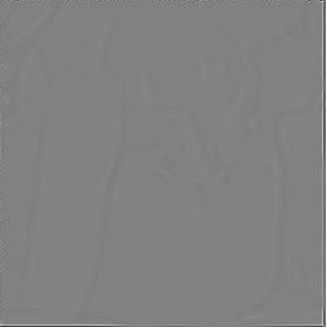










7X7 $\sigma=4$



3X3 $\sigma=1$



 <p>3X3 $\sigma=2$</p>		
 <p>3X3 $\sigma=4$</p>		
 <p>5X5 $\sigma=1$</p>		
 <p>5X5 $\sigma=2$</p>		
 <p>5X5 $\sigma=4$</p>		

		
 7X7 $\sigma=1$		
 7X7 $\sigma=2$		
 7X7 $\sigma=4$		
 3X3 $\sigma=1$		
 3X3 $\sigma=2$		

 <p>original image</p> <p>3X3 $\sigma=4$</p>	 <p>original image</p>	 <p>original image</p>
 <p>original image</p> <p>5X5 $\sigma=1$</p>	 <p>original image</p>	 <p>original image</p>
 <p>original image</p> <p>5X5 $\sigma=2$</p>	 <p>original image</p>	 <p>original image</p>
 <p>original image</p> <p>5X5 $\sigma=4$</p>	 <p>original image</p>	 <p>original image</p>
 <p>original image</p> <p>7X7 $\sigma=1$</p>	 <p>original image</p>	 <p>original image</p>



Yorumlama

- Bulanıklaştırma aşamasında filtre boyutlarının artması görüntü üzerinde bulanıklığın artmasına sebep olmuştur. Merkez pikselin çevredeki değerlere bağlılığı büyük kernelde arttığından dolayı görüntü daha bulanık bir hal almıştır.
- Bulanıklaştırma aşamasında sigma(s) değerinin artması filtre boyutunun artmasıyla aynı şekilde görüntü üzerinde bulanıklığın artmasına sebep olmuştur. Bu değerın bulanıklaştırma etkisinin yüksek olduğu gözlemlenmiştir.
- Orijinal görüntüler üzerinde Sobel uygulanması görüntü üzerinde keskinleştirmeye sebep olmuş ufak kenarların bile algılanmasıyla sonuçlanmıştır. Orijinal görüntü üzerine uygulanan Sobel'de görüntüde gürültü fazladır. Bulanıklaştırılmış görüntü üzerine uygulanan Sobel işlemi kenar bulma işleminde daha başarılıdır. Gereksiz kenarların tespitini engellemiş ve daha doğru sonuç vermiştir.
- Laplacian filtresi Sobel'e göre bulanıklığı yüksek görüntüler üzerinde daha başarısız bir sonuç vermiştir. Laplacian filtresi resim üzerinde kabartmalıya benzer bir görüntü oluşturmuş, Sobel filtresi ise kenarları net çizgiler ile belli etmiştir. Meyve görüntüsünde Laplacian daha iyi sonuç vermiş, diğer görüntülerde bulanıklık olsa bile Sobel filtresi daha başarılı çıktılar üretmiştir.