

T.C.

YILDIZ TEKNİK ÜNİVERSİTESİ
BİLGİSAYAR MÜHENDİSLİĞİ



BLM4540 - Görüntü İşleme

Ödev – 1

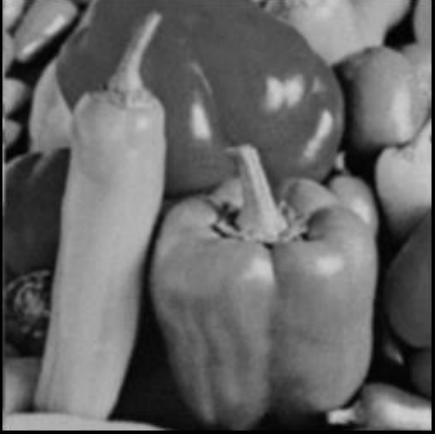
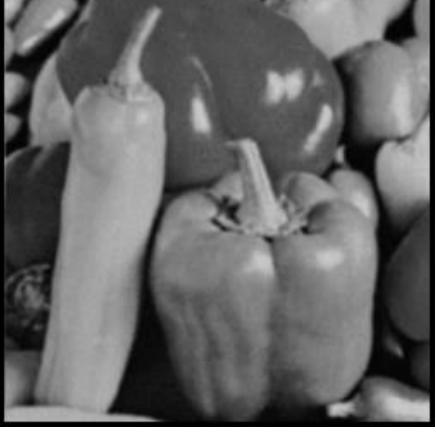
Tahir Can Özer – 17011061

tcanozerr@gmail.com

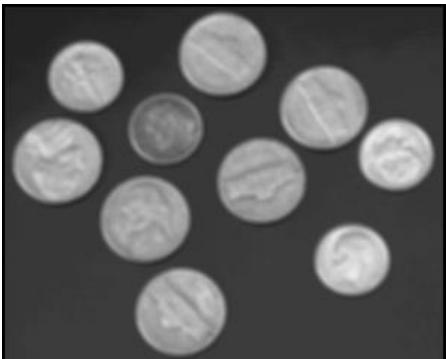
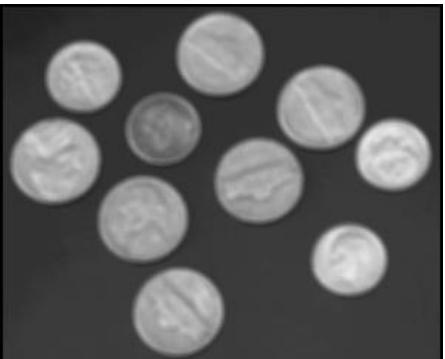
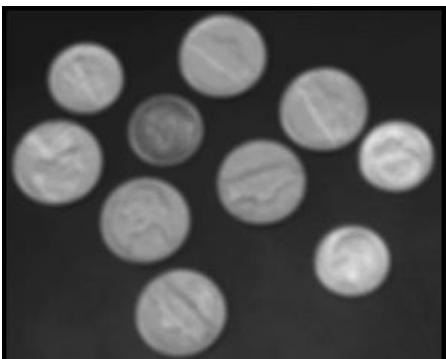
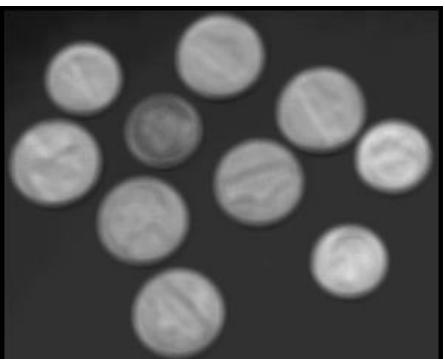
Dersin Yürüttüsü
Prof. Dr. Mine Elif Karslıgil

1-Gaus Kernelleri ve Bulanıklaştırılmış Sonuçlar

fruit.pgm

	Standart Sapma= 1.0	Standart Sapma= 2.0	Standart Sapma= 4.0
3x3			
5x5			
7x7			

coins.ascii.pgm

	Standart Sapma= 1.0	Standart Sapma= 2.0	Standart Sapma= 4.0
3x3			
<u>5x5</u>			
7x7			

lena.pgm

	Standart Sapma= 1.0	Standart Sapma= 2.0	Standart Sapma= 4.0
3x3			
5x5			
7x7			

!Tabloya sığındırmak için image dimensions küçülmüştür. Resimlere zoom yaparak bakmak farkın daha sağlıklı görünmesini sağlayacaktır!

Gaus Kernel Matisleri

- 3x3 Standart Sapma = 1.0

0.075114	0.123841	0.075114
0.123841	0.204180	0.123841
0.075114	0.123841	0.075114

- 3x3 Standart Sapma = 2.0

0.101868	0.115432	0.101868
0.115432	0.130801	0.115432
0.101868	0.115432	0.101868

- 3x3 Standart Sapma = 4.0

0.108797	0.112250	0.108797
0.112250	0.115813	0.112250
0.108797	0.112250	0.108797

- 5x5 Standart Sapma = 1.0

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 Standart Sapma = 2.0

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 Standart Sapma = 4.0

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 Standart Sapma = 1.0

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

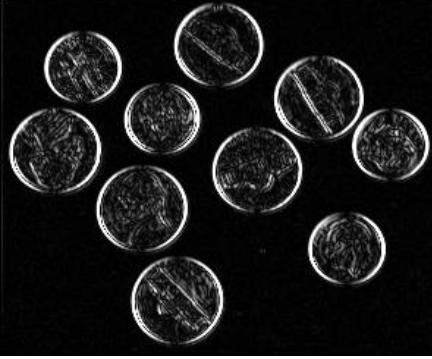
- 7x7 Standart Sapma = 2.0

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 Standart Sapma = 4.0

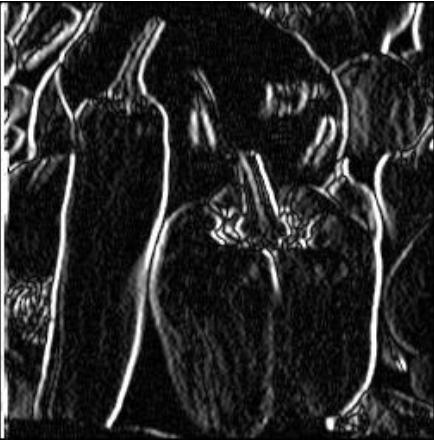
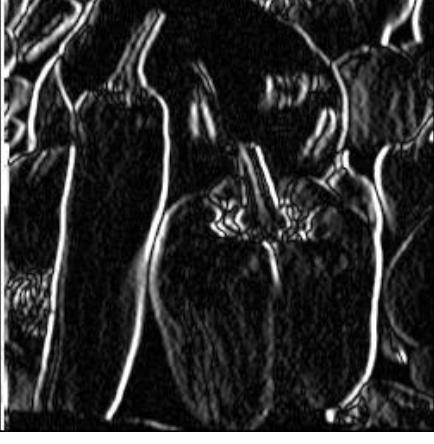
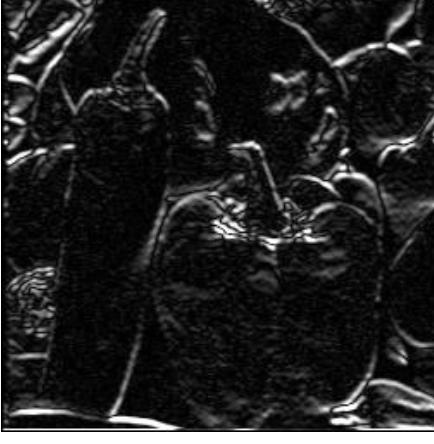
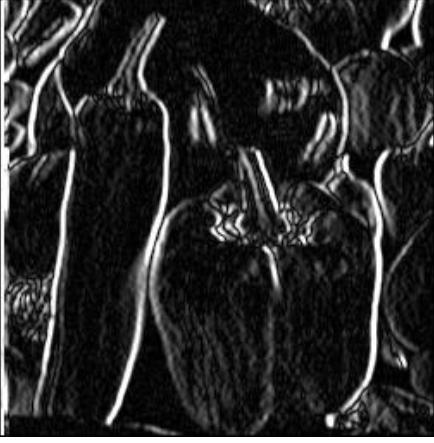
0.014760	0.017256	0.018952	0.019554	0.018952	0.017256	0.014760
0.017256	0.020175	0.022157	0.022861	0.022157	0.020175	0.017256
0.018952	0.022157	0.024335	0.025108	0.024335	0.022157	0.018952
0.019554	0.022861	0.025108	0.025905	0.025108	0.022861	0.019554
0.018952	0.022157	0.024335	0.025108	0.024335	0.022157	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

2-Sobel Filtresi Uygulanmış Orijinal Görüntüler

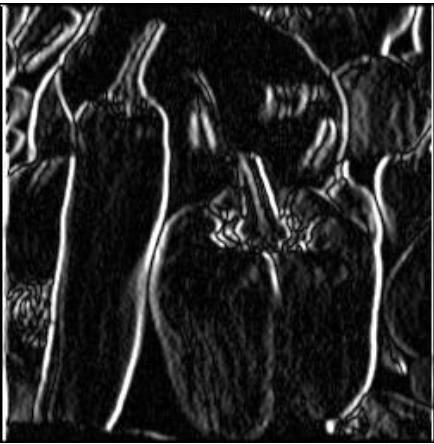
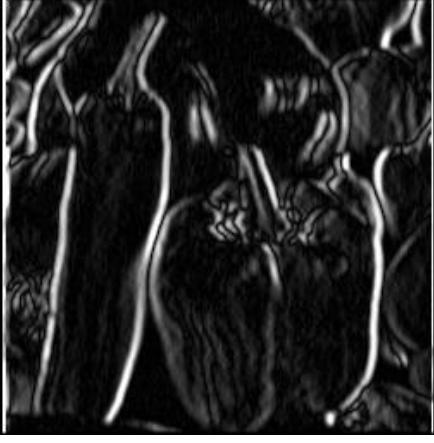
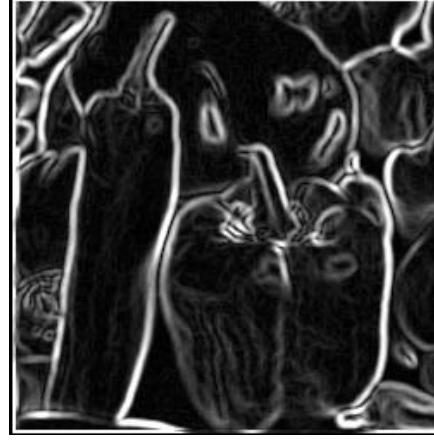
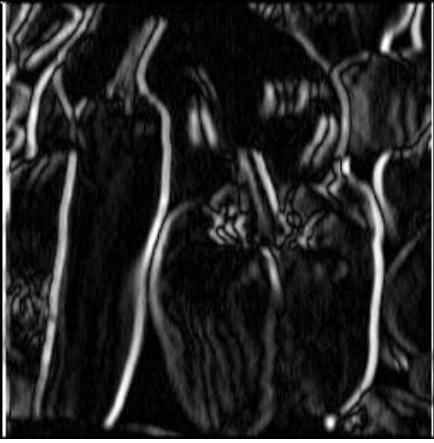
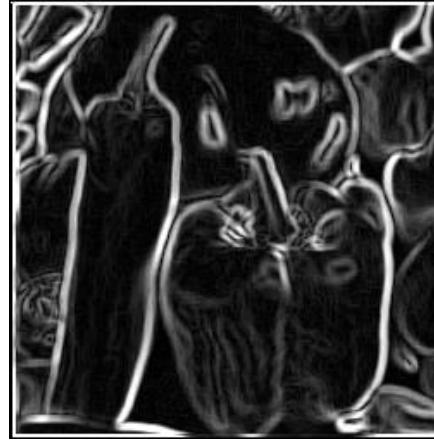
	X Yönündeki Değişim	Y Yönündeki Değişim	Her Yönüdeki Değişim
Fruit			
Coins			
Lena			

3-Sobel Filtresi Uygulanmış Blurlu Görüntüler

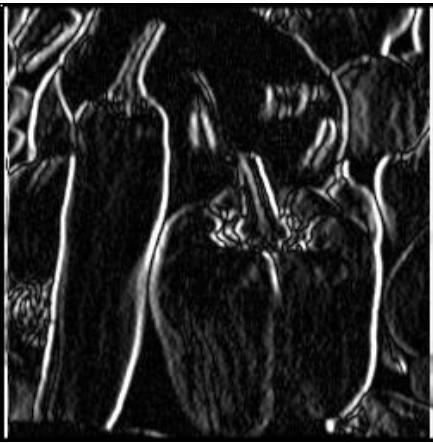
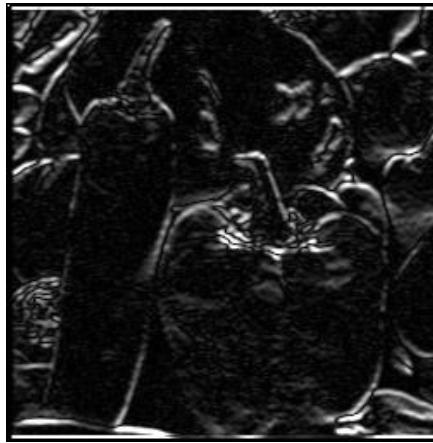
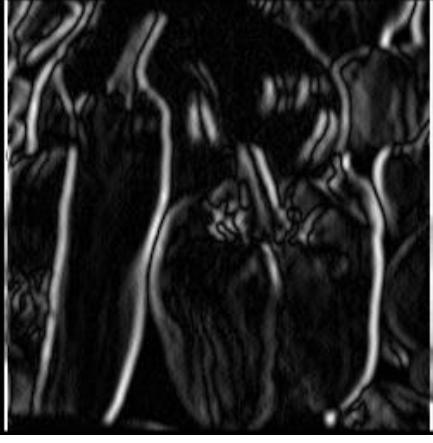
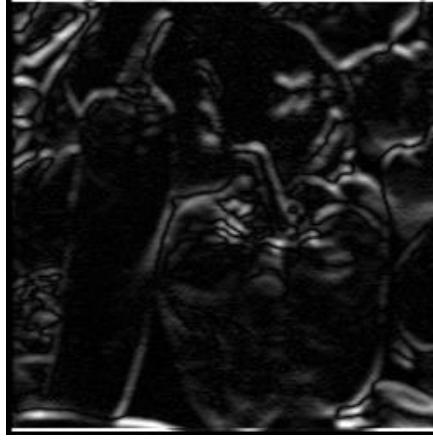
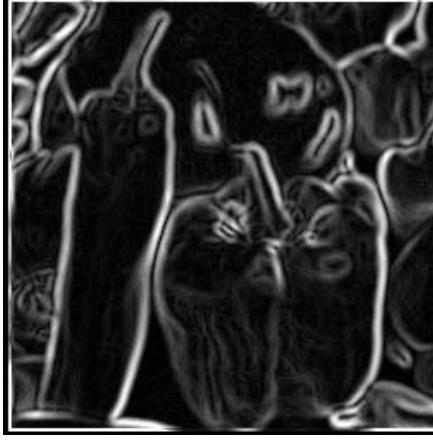
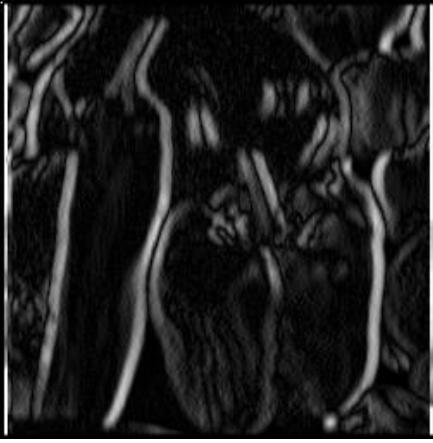
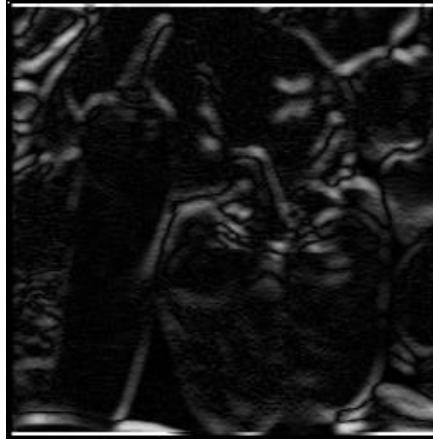
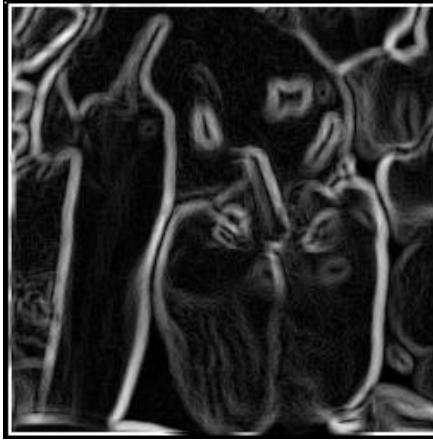
Blurred Fruit Sobel(3x3)

	X Yönündeki Değişim	Y Yönündeki Değişim	Her Yönündeki Değişim
3x3 S=1			
3x3 S=2			
3x3 S=4			

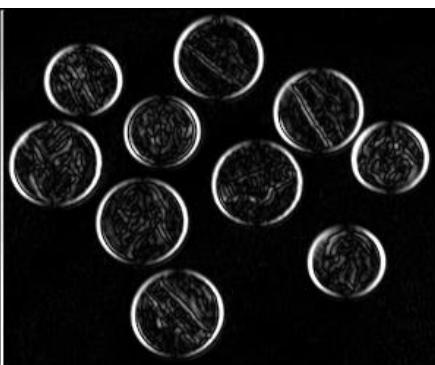
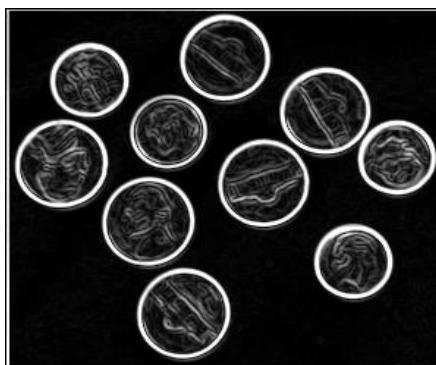
Blurred Fruit Sobel(5x5)

	X Yönündeki Değişim	Y Yönündeki Değişim	Her Yönündeki Değişim
5x5 S=1			
5x5 S=2			
5x5 S=4			

Blurred Fruit Sobel(7x7)

	X Yönündeki Değişim	Y Yönündeki Değişim	Her Yönündeki Değişim
7x7 S=1			
7x7 S=2			
7x7 S=4			

Blurred Coins Sobel(3x3)

	X Yönündeki Değişim	Y Yönündeki Değişim	Her Yönündeki Değişim
3x3 S=1			
3x3 S=2			
3x3 S=4			

Blurred Coins Sobel(5x5)

	X Yönündeki Değişim	Y Yönündeki Değişim	Her Yönüdeki Değişim
5x5 S=1			
5x5 S=2			
5x5 S=4			

Blurred Coins Sobel(7x7)

	X Yönündeki Değişim	Y Yönündeki Değişim	Her Yönüdeki Değişim
7x7 S=1			
7x7 S=2			
7x7 S=4			

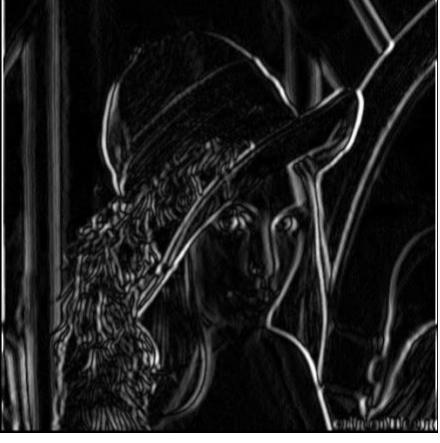
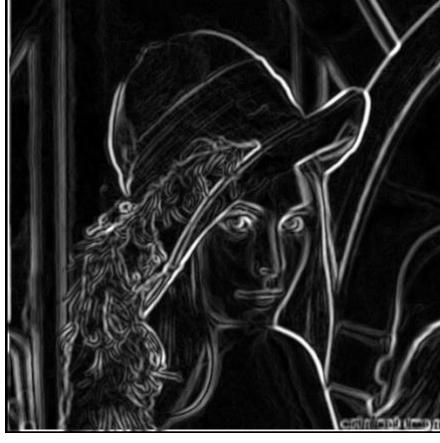
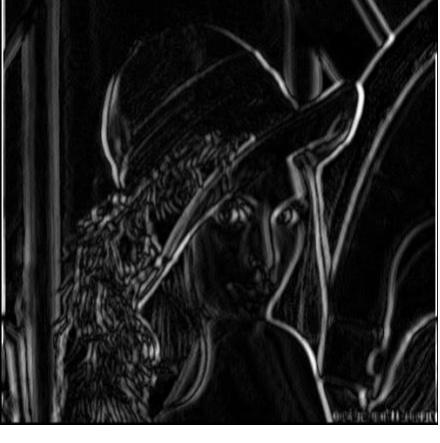
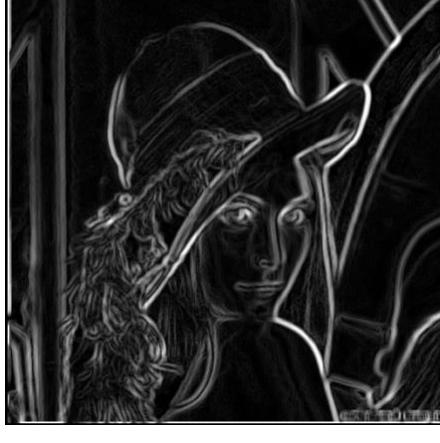
Blurred Lena Sobel(3x3)

	X Yönündeki Değişim	Y Yönündeki Değişim	Her Yönündeki Değişim
3x3 S=1			
3x3 S=2			
3x3 S=4			

Blurred Lena Sobel(5x5)

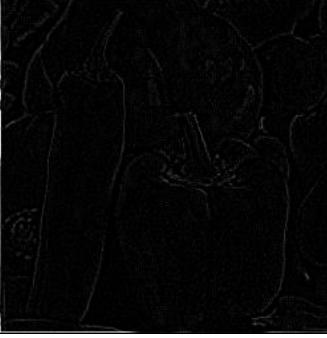
	X Yönündeki Değişim	Y Yönündeki Değişim	Her Yönündeki Değişim
5x5 S=1			
5x5 S=2			
5x5 S=4			

Blurred Lena Sobel(7x7)

	X Yönündeki Değişim	Y Yönündeki Değişim	Her Yönündeki Değişim
7x7 S=1			
7x7 S=2			
7x7 S=4			

4-Laplacian Filtresi Uygulanmış Blurlu Görüntüler

Blurred Fruit Laplacian(3x3)

	1.Laplacian Kerneli	2. Laplacian Kerneli
3x3 S=1		
3x3 S=2		
3x3 S=4		

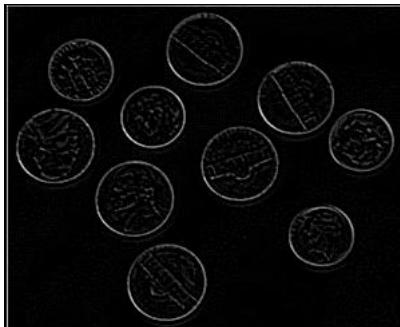
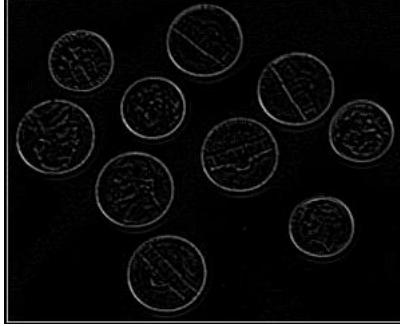
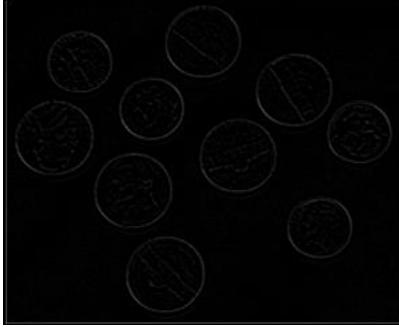
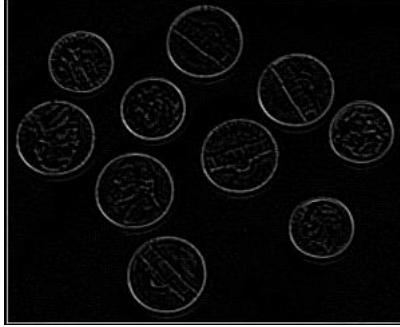
Blurred Fruit Laplacian(5x5)

	1.Laplacian Kerneli	2. Laplacian Kerneli
5x5 S=1		
5x5 S=2		
5x5 S=4		

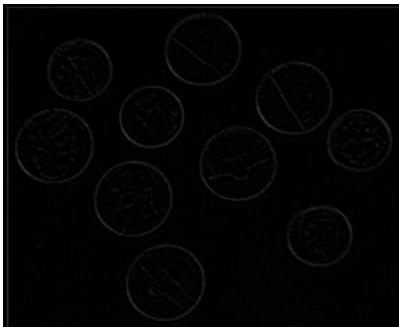
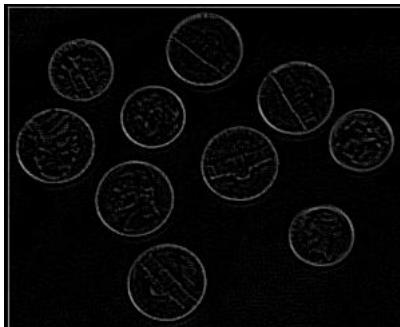
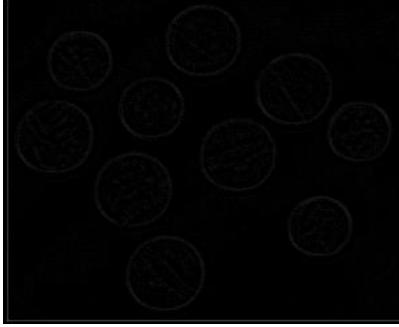
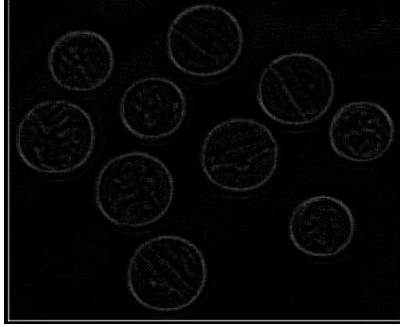
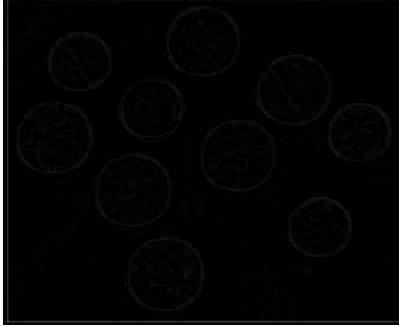
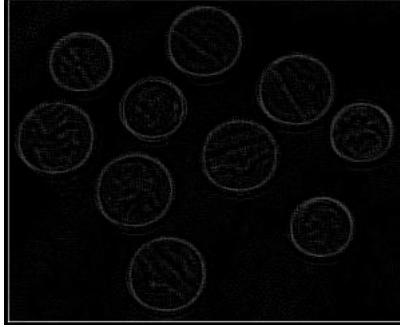
Blurred Fruit Laplacian(7x7)

	1.Laplacian Kerneli	2. Laplacian Kerneli
7x7 S=1		
7x7 S=2		
7x7 S=4		

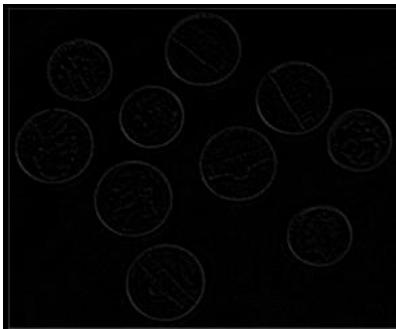
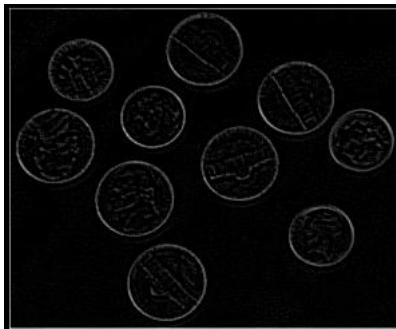
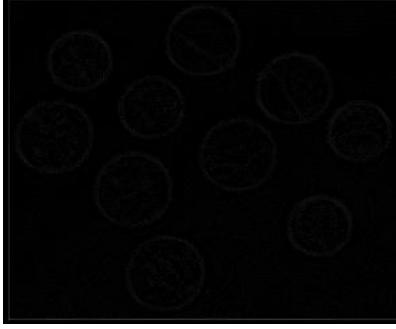
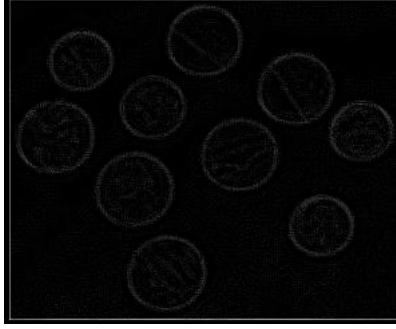
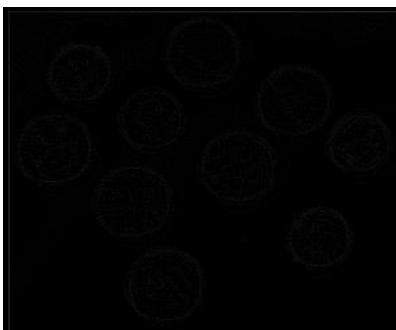
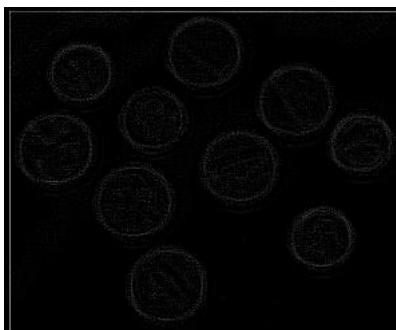
Blurred Coins Laplacian(3x3)

	1.Laplacian Kerneli	2. Laplacian Kerneli
3x3 S=1		
3x3 S=2		
3x3 S=4		

Blurred Coins Laplacian(5x5)

	1.Laplacian Kerneli	2. Laplacian Kerneli
5x5 S=1		
5x5 S=2		
5x5 S=4		

Blurred Coins Laplacian(7x7)

	1.Laplacian Kerneli	2. Laplacian Kerneli
7x7 S=1		
7x7 S=2		
7x7 S=4		

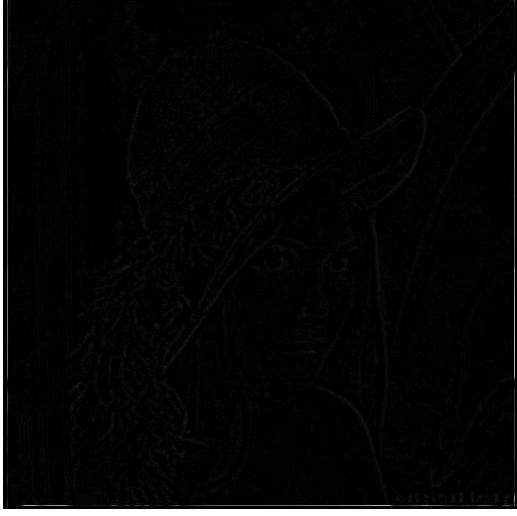
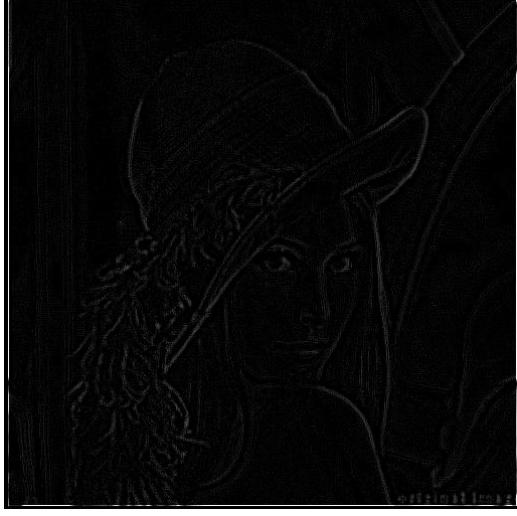
Blurred Lena Laplacian(3x3)

	1.Laplacian Kerneli	2. Laplacian Kerneli
3x3 S=1	 original image	 original image
3x3 S=2	 original image	 original image
3x3 S=4	 original image	 original image

Blurred Lena Laplacian(5x5)

	1.Laplacian Kerneli	2. Laplacian Kerneli
5x5 S=1	 original image	 original image
5x5 S=2	 original image	 original image
5x5 S=4	 original image	 original image

Blurred Lena Laplacian(7x7)

	1.Laplacian Kerneli	2. Laplacian Kerneli
7x7 S=1	 original image	 original image
7x7 S=2	 original image	 original image
7x7 S=4	 original image	 original image

5- Elde Edilen Sonuçlar Hakkında Yorumlar

- a) Bulanıklaştırma aşamasında filtre boyutları arttıkça görüntüdeki noise ve detayların daha çok temizlendiği ancak buna karşın kenar bilgilerinde kayıplar olduğu gözlemlenmiştir.
- b) Bulanıklaştırma aşamasında sigma değeri arttıkça görüntünün başta merkez olmak üzere daha çok bulanıklaştığı gözlenmiştir.
- c) Orijinal görüntülere direkt Sobelfiltresi uygulandığında görüntüdeki fazla detay ve noise varlığından dolayı kenarlar tam olarak seçilememiştir. Bulanıklaştırılmış görüntülere Sobelfiltresi uygulandığında ise fazla detaylar temizlendiğinden dolayı kenarlar daha rahat seçilebilmiştir.
- d) Gaus Filtresi ile bulanıklaştırma uygulanmadan Laplacianfiltresi uygulandığında elde edilen sonuç görüntülerinde Sobel filteresine oranla çok daha fazla noise olduğu gözlemlenmiştir. Buna karşılık bulanıklaştırılmış görüntülere uygulanan Laplacian ve Sobelfiltreleri karşılaştırıldığında coins.pgm gibi kısmen daha az noise içeren görüntülerde Sobelkenarları daha ön plana çıkarırken lena.pgm gibi çok fazla noise içeren görüntülerde Laplacian resmin ana hatları dışındaki kenarları yok ederek Sobel e oranla yalnızca ana görüntüye ait kenarları öne çıkarma konusunda başarılı bir iş ortaya koymuştur. Sobelfiltresi kenarları kalınlaşmıştır.