

















## 7. ve 8. Hafta Ders Notları

original	darken	lower contrast	non-linear lower contrast
			
$I(X, Y)$	$I(X, Y) - 128$	$\frac{I(X, Y)}{2}$	$\left(\frac{I(X, Y)}{255}\right)^{1/3} \times 255$
invert	lighten	raise contrast	non-linear raise contrast
			
$255 - I(X, Y)$	$I(X, Y) + 128$	$I(X, Y) \times 2$	$\left(\frac{I(X, Y)}{255}\right)^2 \times 255$

59 Slide Credit: Ioannis (Yannis) Gkioulekas (CMU)

### Examples of **Point Processing**

original	darken	lower contrast	non-linear lower contrast
			
$I(X, Y)$	$I(X, Y) - 128$	$\frac{I(X, Y)}{2}$	$\left(\frac{I(X, Y)}{255}\right)^{1/3} \times 255$
invert	lighten	raise contrast	non-linear raise contrast
			
$255 - I(X, Y)$	$I(X, Y) + 128$	$I(X, Y) \times 2$	$\left(\frac{I(X, Y)}{255}\right)^2 \times 255$

60 Slide Credit: Ioannis (Yannis) Gkioulekas (CMU)

Form1

Resim Yükle

GrayScale

Bitmap

Threshold

X

Y

GetPiksel

SetPiksel

Renk Adı

Darken

Lower Contrast

Invert

Lighten

Raise Contrast

Nonlinear Lower Contrast

Nonlinear Raise Contrast

```

Form1.cs [Design]
img_u_1.Form1
button6_Click(object sender, EventArgs e)
{
    Color renk;
    int r, g, b;
    int darken;
    for (int x = 0; x < 300; x++)
    {
        for (int y = 0; y < 300; y++)
        {
            renk = resim.GetPixel(x, y);
            r = Convert.ToInt32(renk.R);
            g = Convert.ToInt32(renk.G);
            b = Convert.ToInt32(renk.B);

            //red için işlemler
            darken = r - 128;
            r = darken;
            if (darken < 0) r = 0;
            //red için işlemler

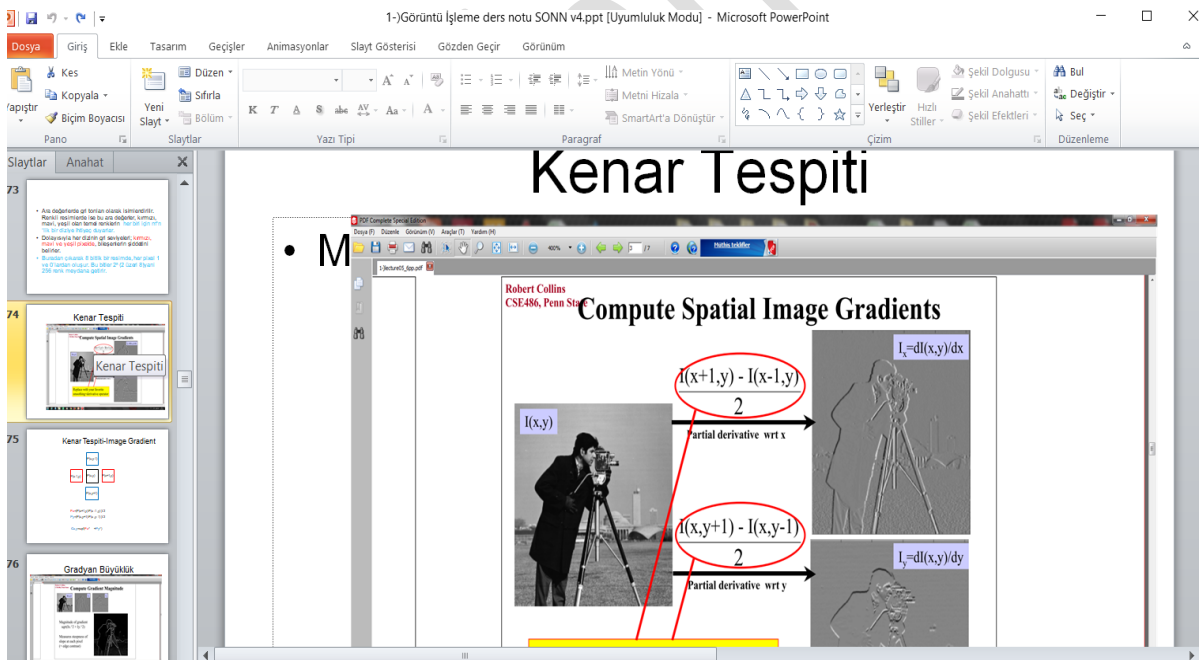
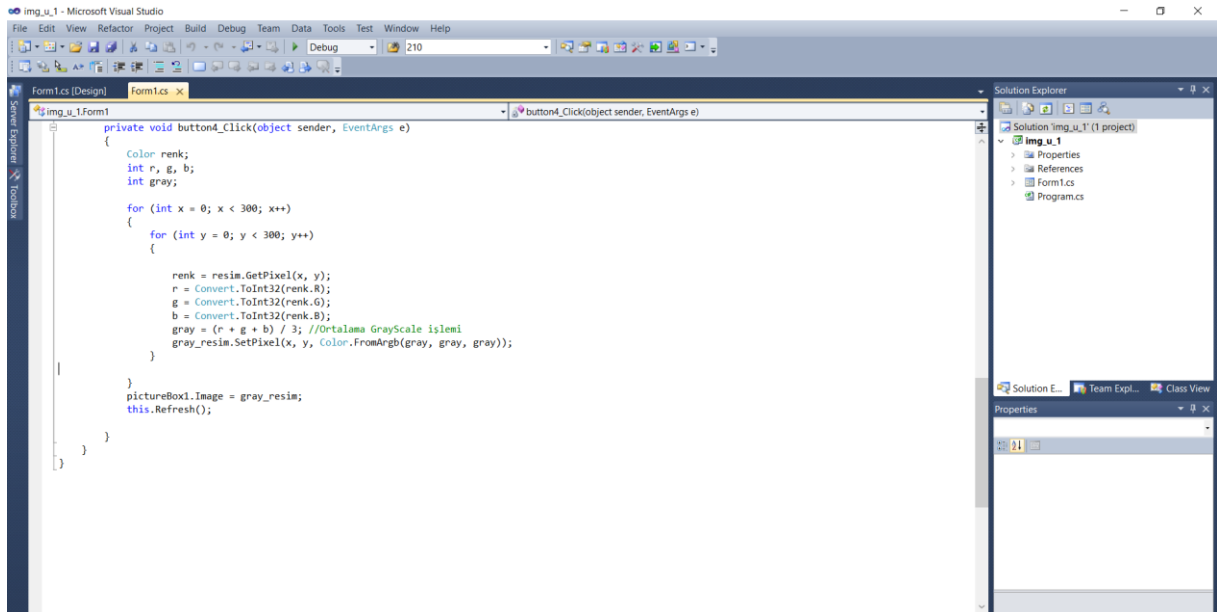
            //green için işlemler
            darken = g - 128;
            g = darken;
            if (darken < 0) g = 0;
            //green için işlemler

            //blue için işlemler
            darken = b - 128;
            b = darken;
            if (darken < 0) b = 0;
            //blue için işlemler

            pikselOP_resim.SetPixel(x, y, Color.FromArgb(r, g, b));
        }
    }
    pictureBox2.Image = pikselOP_resim;
}

```

## GrayScale



Kenar Tespiti-Image Gradient

$P(x,y-1)$

$P(x-1,y)$   $P(x,y)$   $P(x+1,y)$

$P(x,y+1)$

$P_x = (P(x+1,y) - P(x-1,y)) / 2$

Not eklemek için tıklayın

Gradyan Büyüklük

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Compute Gradient Magnitude

$I(x,y)$   $I_x$   $I_y$

Magnitude of gradient  
 $\sqrt{I_x.^2 + I_y.^2}$

Measures steepness of