מגישים:

אברהם רובין : 302483607

אלכס זקשנסקי : 310110028

1. יישום פילטרים (Dilation, Erosion)

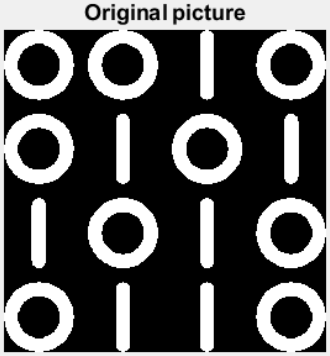
תוכנית :

```
%% Lab 6 - Morphological
clear;clc;
pic1=imread('01.png');
pic1=im2bw(pic1);
figure(1)
subplot(2,3,1);
imshow(pic1)
title('Original picture');
grey = 150.0;
h1=7;
h2=7;
x1=int8((-1*(h1))/2)+1;
x2=int8(((h1))/2)-1;
y1=int8((-1*(h2))/2)+1;
y2=int8(((h2))/2)-1;
%%---------------------------------------
subplot(2,3,2);
[m,n]=size(pic1);
pic_3X3_Dilation=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        if pic1(i,j)==1
           for x=-3:3
                for y=-3:3
                   pic_3X3_Dilation(i+x,j+y) = 1;
                end
           end
        end
    end
end
imshow(pic_3X3_Dilation)
title('Dilation 7X7 picture');
%%---------------------------------------
subplot(2,3,3);
[m,n]=size(pic1);
pic_3X1_Dilation=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        if pic1(i,j)==1
           for x=-3:3
                for y=-1:1
                   pic_3X1_Dilation(i+x,j+y) = 1;
                end
           end
        end
    end
end
imshow(pic_3X1_Dilation)
title('Dilation 7X3 picture');
%%---------------------------------------
```

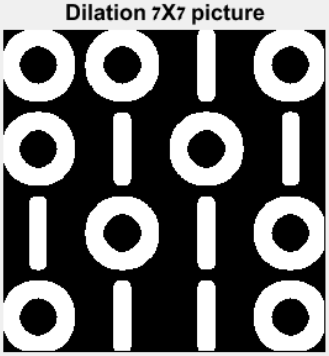
```
%%---------------------------------------
subplot(2,3,4);
[m,n]=size(pic1);
pic_7X7_Erosion=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        flag=0;
           for x=-3:3
                for y=-3:3
                    if pic1(i+x,j+y) == 1
                        flag=flag+1;
                    end
                end
           end
           if flag==49
            pic_7X7_Erosion(i,j)=1;
           end
    end
end
imshow(pic_7X7_Erosion)
title('Erosion 7X7 picture');
%%---------------------------------------
subplot(2,3,5);
[m,n]=size(pic1);
pic_7X3_Erosion=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        flag=0;
           for x=-3:3
                for y=-1:1
                    if pic1(i+x,j+y) == 1
                        flag=flag+1;
                    end
                end
           end
           if flag==21
            pic_7X3_Erosion(i,j)=1;
           end
    end
end
imshow(pic_7X3_Erosion)
title('Erosion 7X7 picture');
```

פלט:

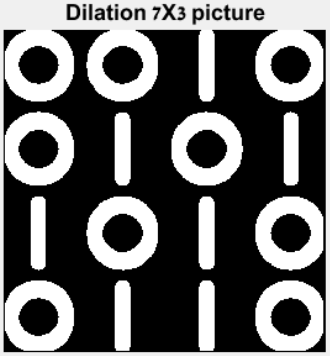
Original picture



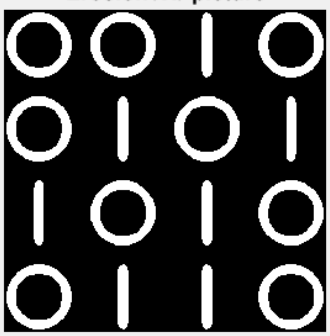
Dilation 7X7 picture



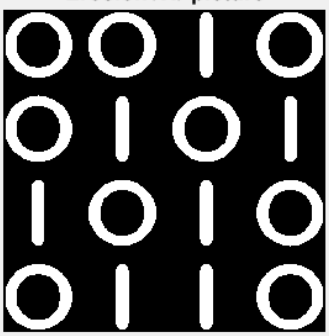
Dilation 7X3 picture



Erosion 7X7 picture



Erosion 7X7 picture



2. הרכבה של הפונקציות (Opening, Closing)

תוכנית:

```
%% Lab 6 - Morphological
clear;clc;
pic1=imread('text0.jpg');
pic1=im2bw(pic1);
figure(1)
subplot(1,3,1);
imshow(pic1)
title('Original picture');
%%----------------------------------------
subplot(1,3,2);
[m,n]=size(pic1);
pic_3X3_Dilation=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        if pic1(i,j)==1
           for x=-3:3
                for y=-3:3
                   pic_3X3_Dilation(i+x,j+y) = 1;
                end
           end
        end
    end
end
pic_7X7_Erosion=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        flag=0;
           for x=-3:3
                for y=-3:3
                    if pic_3X3_Dilation(i+x,j+y) == 1
                        flag=flag+1;
                    end
                end
           end
           if flag==49
            pic_7X7_Erosion(i,j)=1;
           end
    end
end
imshow(pic_7X7_Erosion)
title('Closing 7X7 picture');

%%----------------------------------------
```

```
%%----------------------------------------
[m,n]=size(pic1);
pic_7X7_Erosion=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        flag=0;
           for x=-3:3
                for y=-3:3
                    if pic1(i+x,j+y) == 1
                        flag=flag+1;
                    end
                end
           end
           if flag==49
            pic_7X7_Erosion(i,j)=1;
           end
    end
end
pic_3X3_Dilation=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        if pic_7X7_Erosion(i,j)==1
           for x=-3:3
                for y=-3:3
                   pic_3X3_Dilation(i+x,j+y) = 1;
                end
           end
        end
    end
end
subplot(1,3,3);
imshow(pic_7X7_Erosion)
title('Opening 7X7 picture');
```

פלט:

3. שיפור תמונה בעזרת קומבינציה של פילטרים:

תוכנית :

```
%% Lab 6 - Morphological
clear;clc;
pic1=imread('Apple.jpg');
pic1=im2bw(pic1);
figure(1)
subplot(1,4,1);
imshow(pic1)
title('Original picture');
grey = 150.0;

subplot(1,4,2);
[m,n]=size(pic1);
pic_3X1_Dilation=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        if pic1(i,j)==1
           for x=-3:3
                for y=-1:1
                   pic_3X1_Dilation(i+x,j+y) = 1;
                end
           end
        end
    end
end
imshow(pic_3X1_Dilation)
title('Setp 1 :Dilation 7X3 picture');
%%---------------------------------------
subplot(1,4,3);
[m,n]=size(pic_3X1_Dilation);
pic_7X7_Erosion=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        flag=0;
           for x=-1:1
                for y=-1:1
                    if pic_3X1_Dilation(i+x,j+y) == 1
                        flag=flag+1;
                    end
                end
           end
           if flag==9
            pic_7X7_Erosion(i,j)=1;
           end
    end
end
imshow(pic_7X7_Erosion)
title('Step 2: Erosion 7X7 picture');
%%---------------------------------------
```

```
%%---------------------------------------
subplot(1,4,4);
[m,n]=size(pic_3X1_Dilation);
pic_7X7_Erosion1=zeros(m,n);
for i=4:m-4
    for j=4:n-4
        flag=0;
           for x=-1:1
                for y=-1:1
                    if pic_7X7_Erosion(i+x,j+y) == 1
                        flag=flag+1;
                    end
                end
           end
           if flag==9
            pic_7X7_Erosion1(i,j)=1;
           end
    end
end
imshow(pic_7X7_Erosion1)
title('Step 3: Erosion 3X3 picture');
```

פלט :