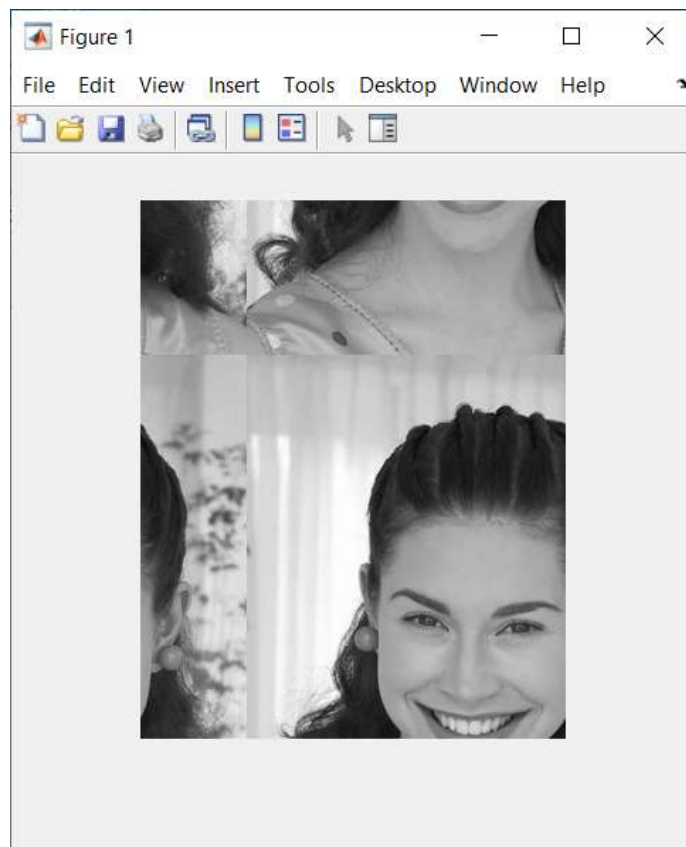


Classes 3 - geometric transformations continued

Exercise 1 . Basing on example 1, write a program that will allow shifting the image by the given vector (with folding the image elements). The user first indicates the starting point and then the end point of the vector. The program repeats the operation on the processed image until the right mouse button is pressed.

Output code :

```
L1 = imread('portrait.jpg');  
figure;  
imshow(L1);  
[x,y,k] = ginput(1);  
[x1,y1,k] = ginput(1);  
while k~=3  
    L1 = circshift (L1, [round(y1-y), round(x1-x)]);  
    imshow(L1);  
    [x,y,k] = ginput(1);  
    [x1,y1,k] = ginput(1);  
end
```

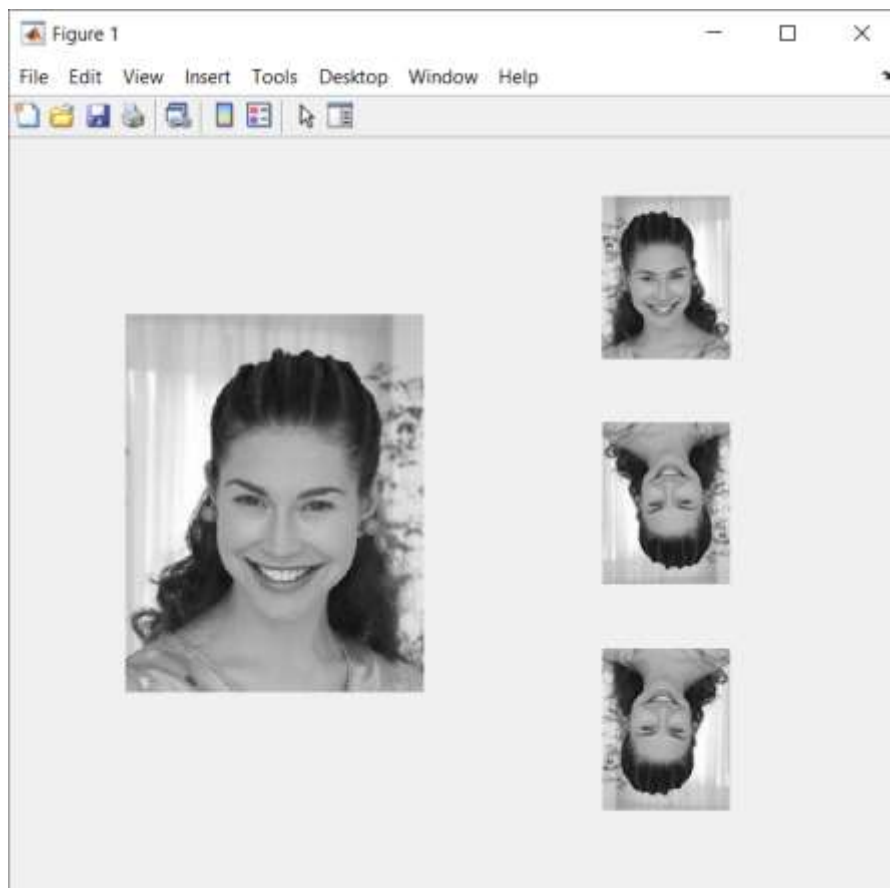


Pic.3.1

Exercise 2 . Create a figure consisting of four sub images with the given layout .

Output code :

```
L1=imread('portrait.jpg');  
figure;  
imshow(zeros(800,800));  
L2 = fliplr(L1);  
L3 = flipud(L1);  
L4 = fliplr(L3);  
subplot(3,2,[1 3 5]), subimage(L1);  
axis off  
subplot(3,2,2), subimage(L2);  
axis off  
subplot(3,2,4), subimage(L3);  
axis off  
L4 = imrotate (L1 , 180 );  
subplot(3,2,6), subimage(L4);  
axis off
```

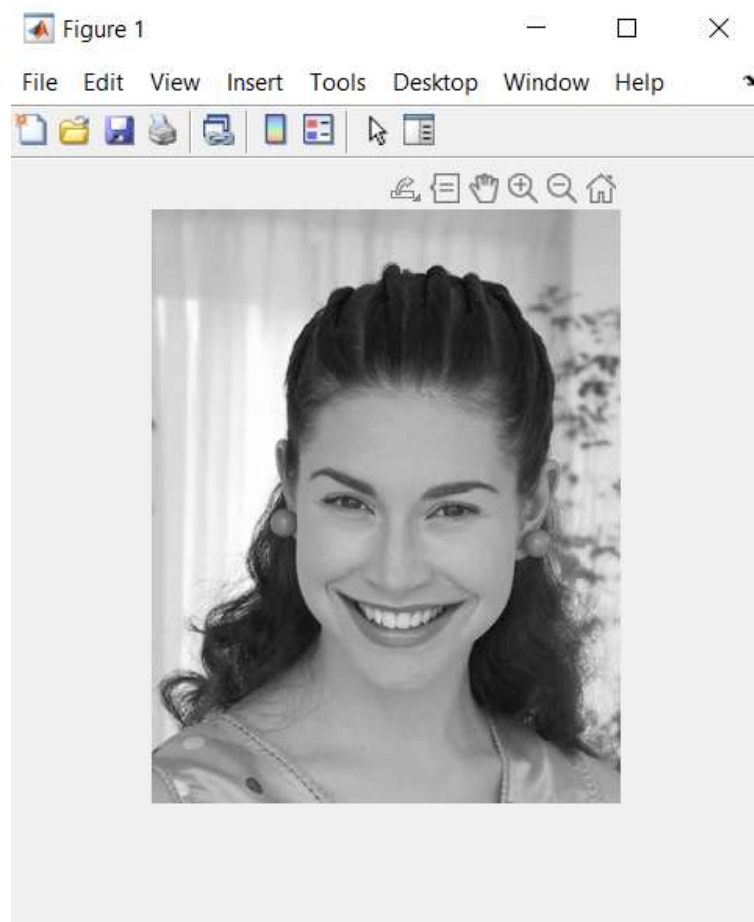


Pic.3.2

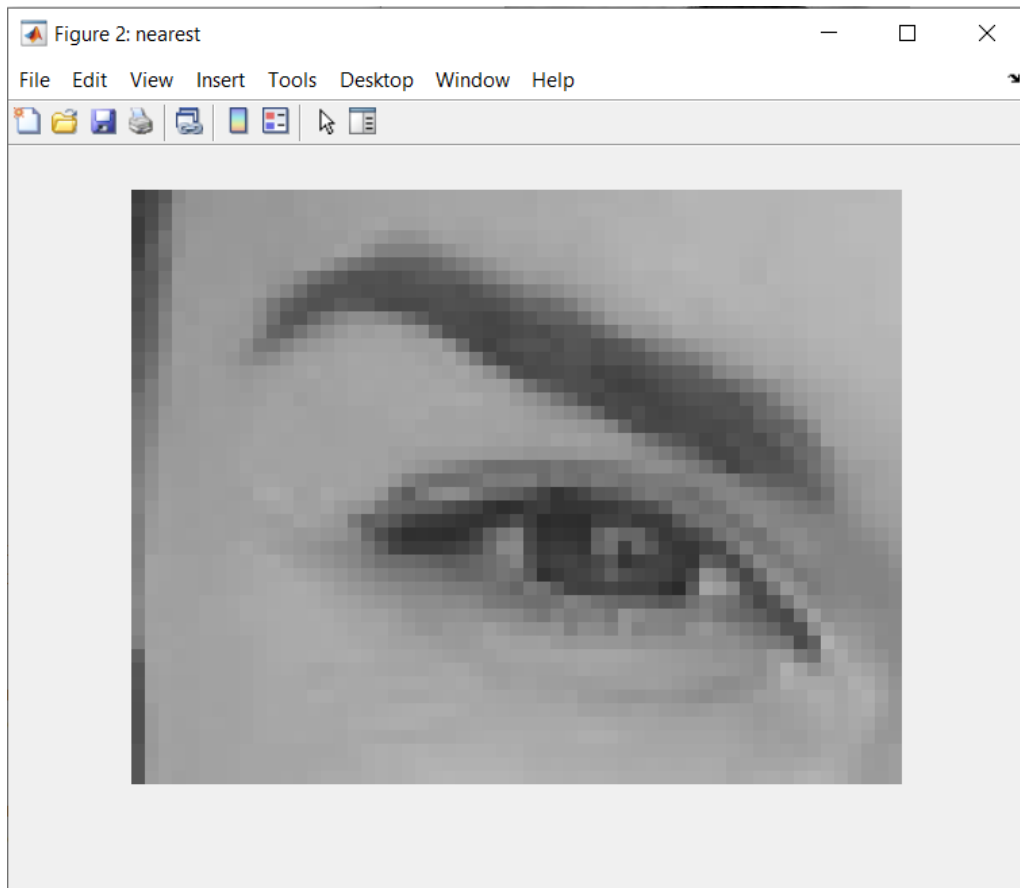
Exercise 3 . Create a program that will allow the user to select a part of the image (user indicates the top left and bottom right corner of the rectangle) and display this fragment in a new figure, magnified 10 times. Display the results using three different interpolation methods and describe the figures accordingly.

Output code :

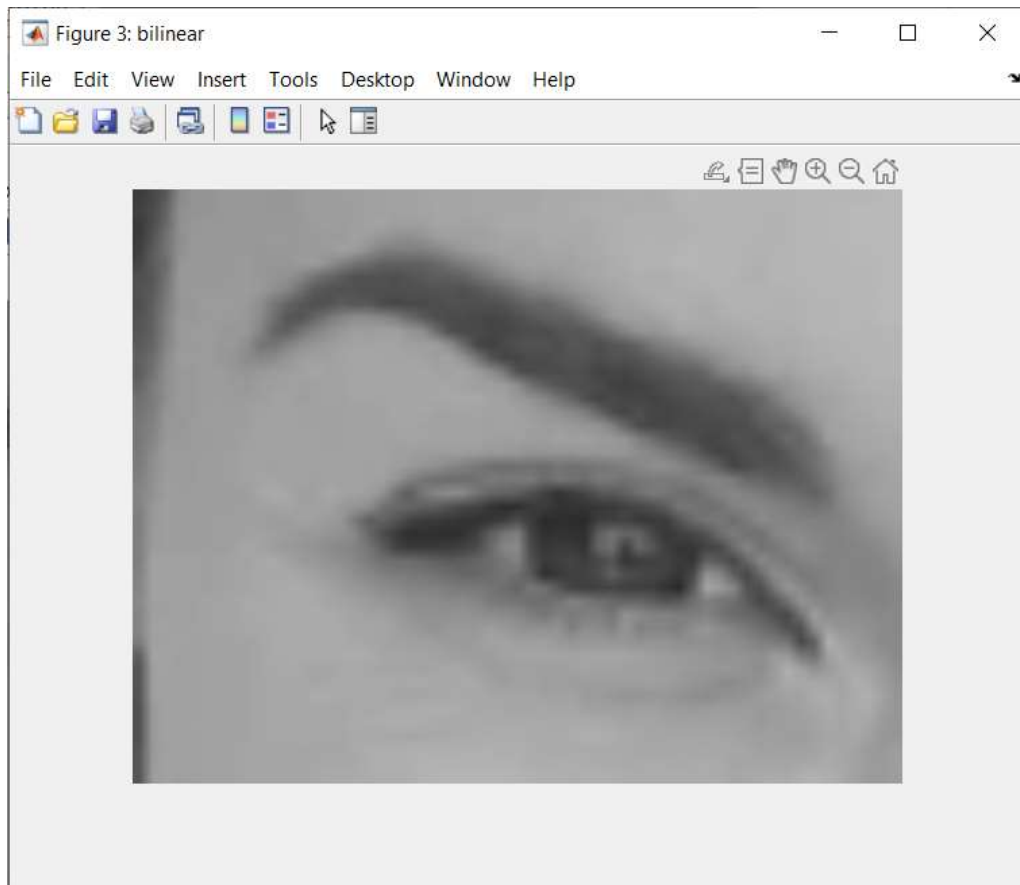
```
L1 = imread('portrait.jpg');  
figure; imshow(L1)  
[x,y] = ginput(1);  
[x1, y1] = ginput(1);  
L2 = L1(fix(y):fix(y1),fix(x):fix(x1));  
L3 = imresize(L2,10,'nearest');  
figure(2);  
imshow(L3);  
set(2,'Name','nearest');  
L3 = imresize(L2,10,'bilinear');  
figure(3);  
imshow(L3);  
set(3,'Name','bilinear');  
L3 = imresize(L2,10,'lanczos2');  
figure(4);  
imshow(L3);  
set(4,'Name','lanczos2');
```



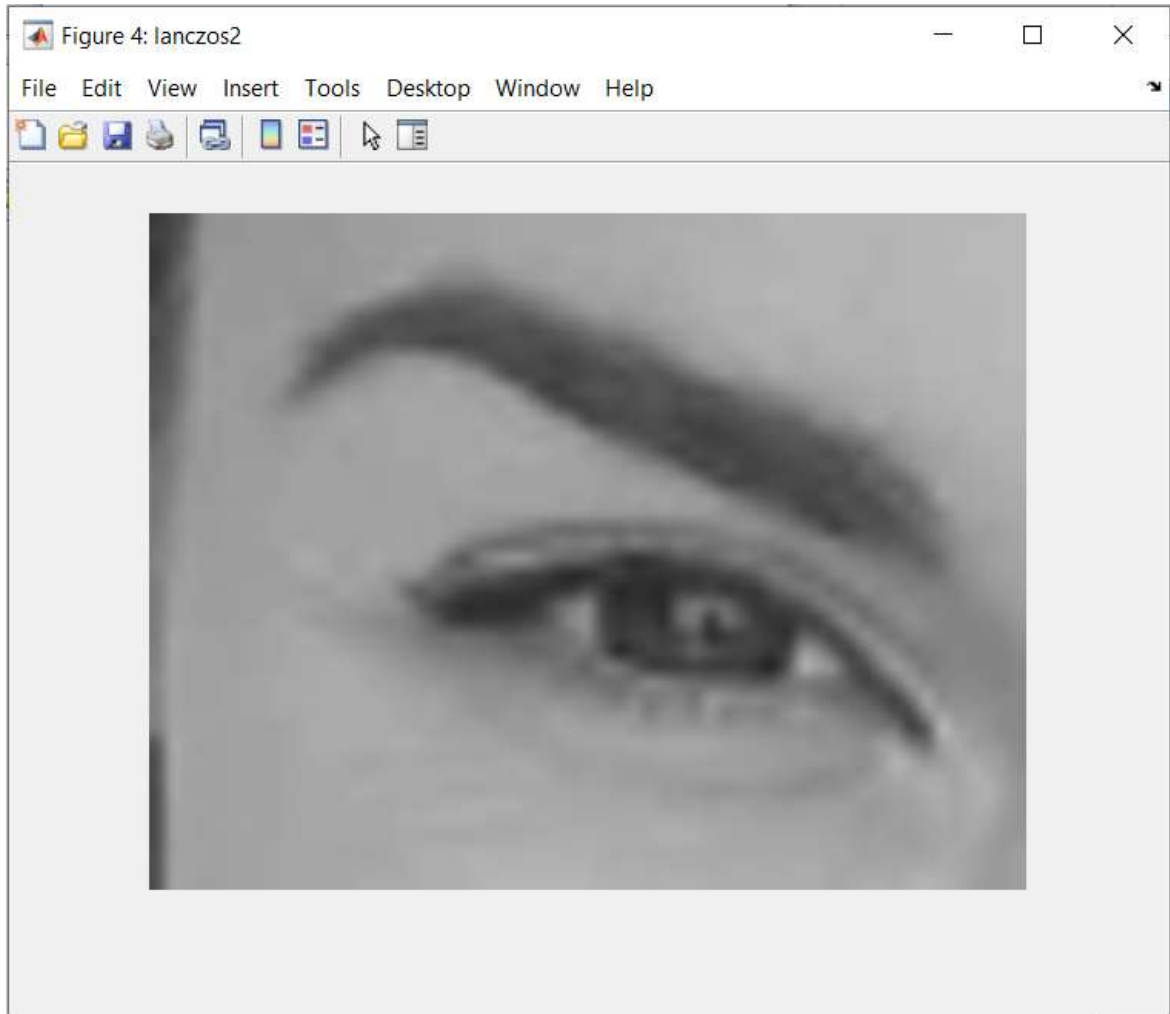
Pic.3.3



Pic.3.4



Pic.3.5



Pic.3.6

Conclusions : on this lesson had learned image geometric transformations and had improved practical skills .