

Computer vision, pattern recognition and image retrieval

Laboratory 2

Topic: *Basic operations and functions in Matlab*

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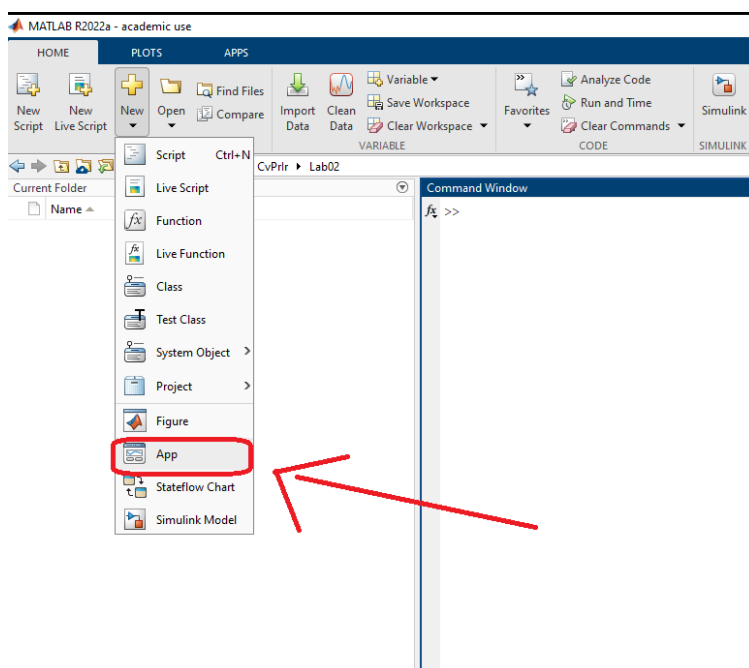
Technical support for Matlab is available on the website: <http://www.mathworks.com/>

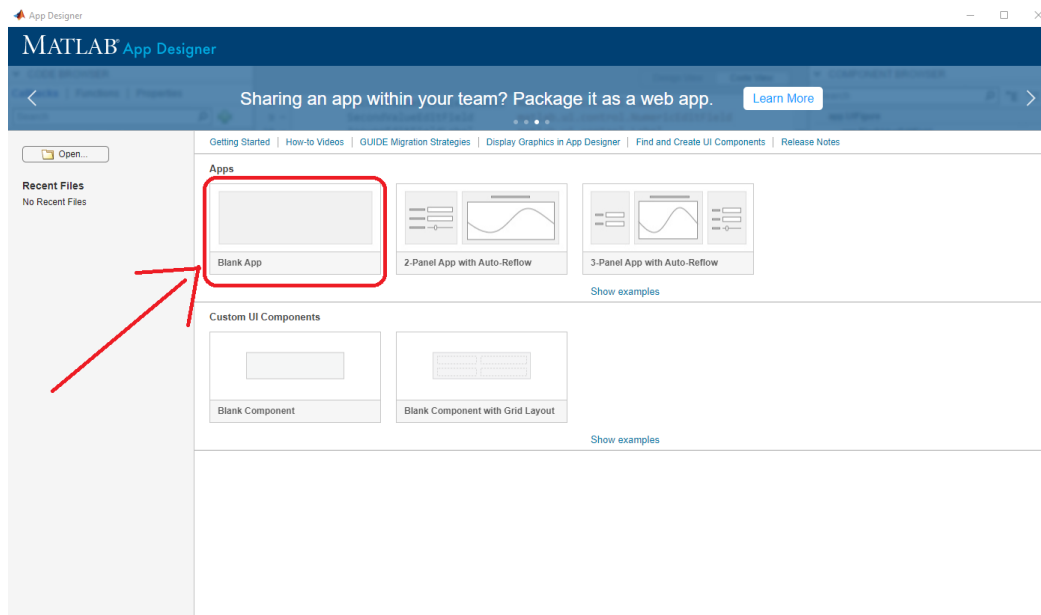
There is a graphical user interface in Matlab. There is a graphical user interface in Matlab.

A simple application will be made for today's class. Its task will be to perform sample transformations on images.

Exercise 1

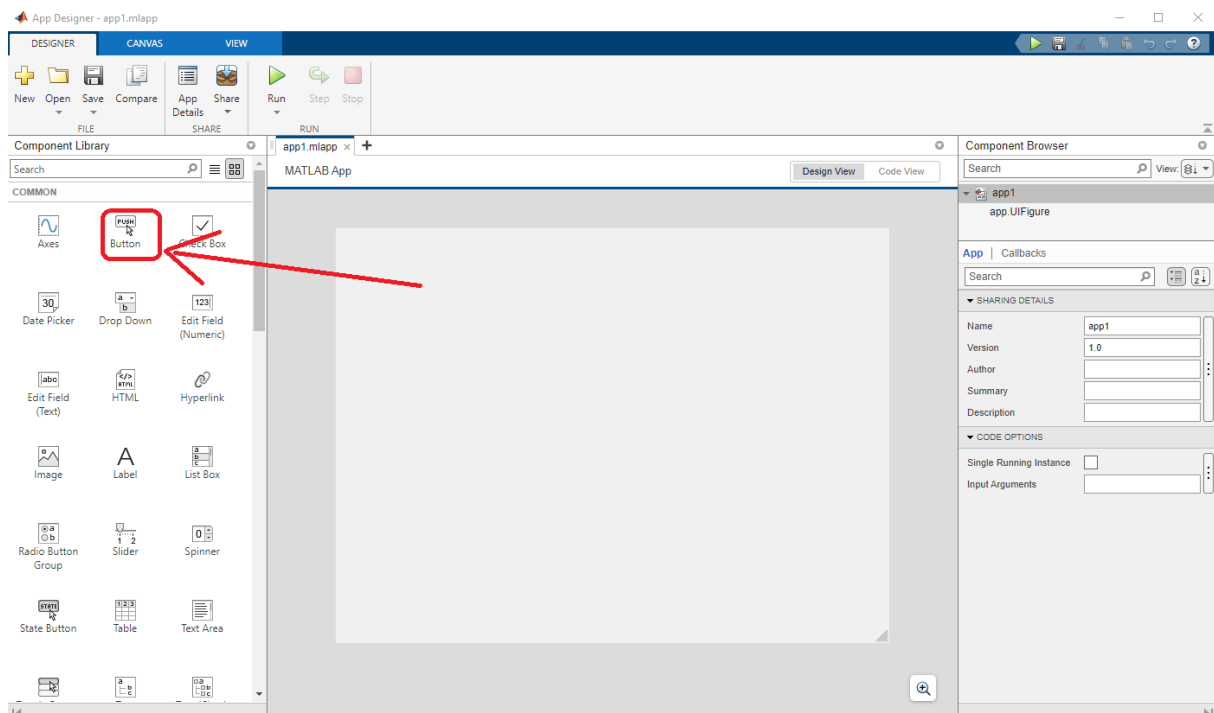
Please create a new application as shown in the pictures.





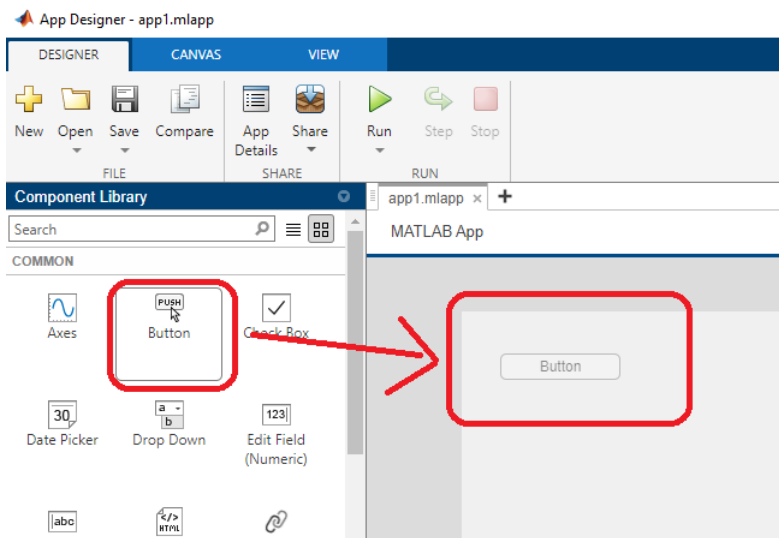
It is a window that is used to create applications that are easy to use.

On the left side of the page, basic Button, Label, Axes, Edit Field and other objects are available.

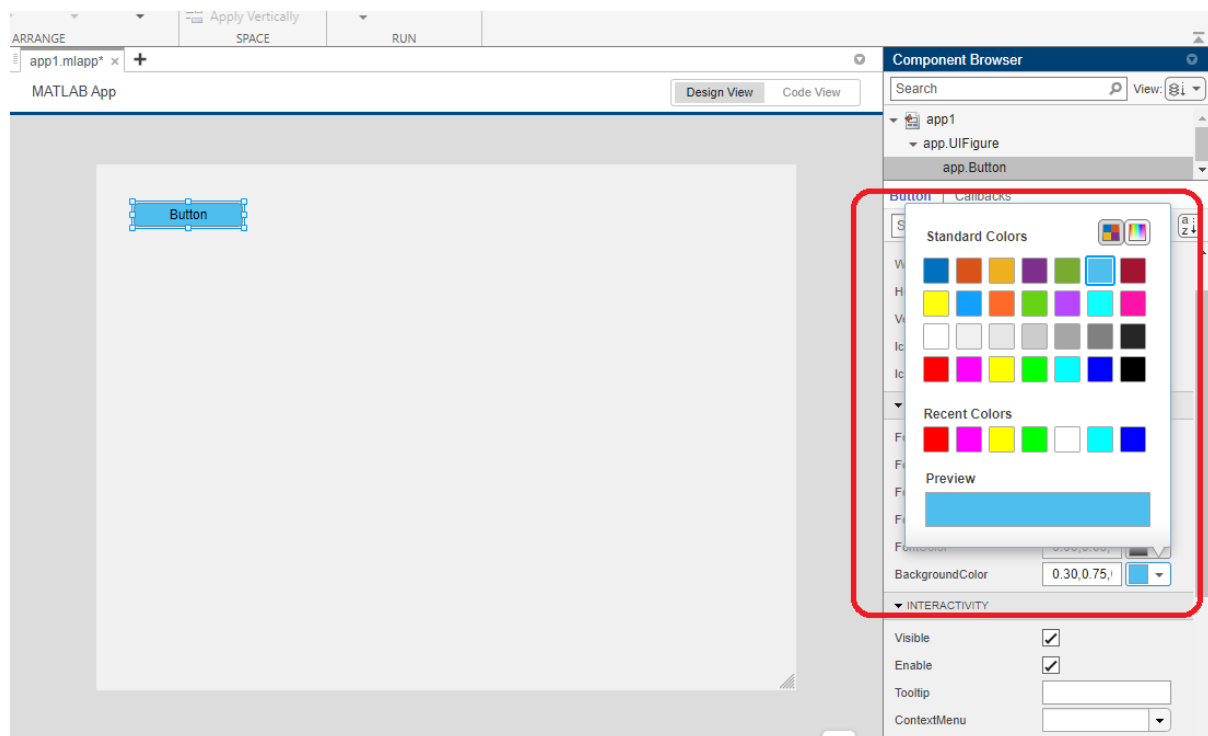


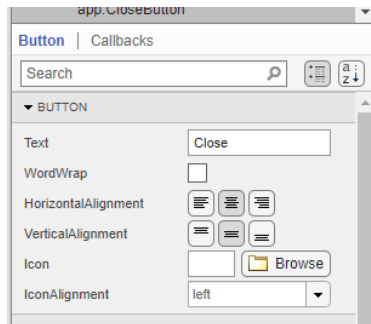
In the middle there is a form on which we can arrange the available objects. On the right side is the properties window. It shows the properties for the object that is selected. We place the objects on our mat by grabbing the selected object with the left mouse button, then dragging it onto our mat and dropping it in the selected place.

As the first task, please perform the button to close the form. To do this, select the object of the Button type and move it to the form.



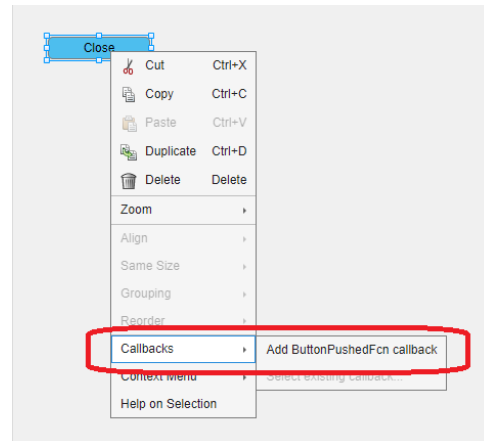
In the settings on the right, please change the button color to any color and leave the text in black. Then please change its string to "Close".





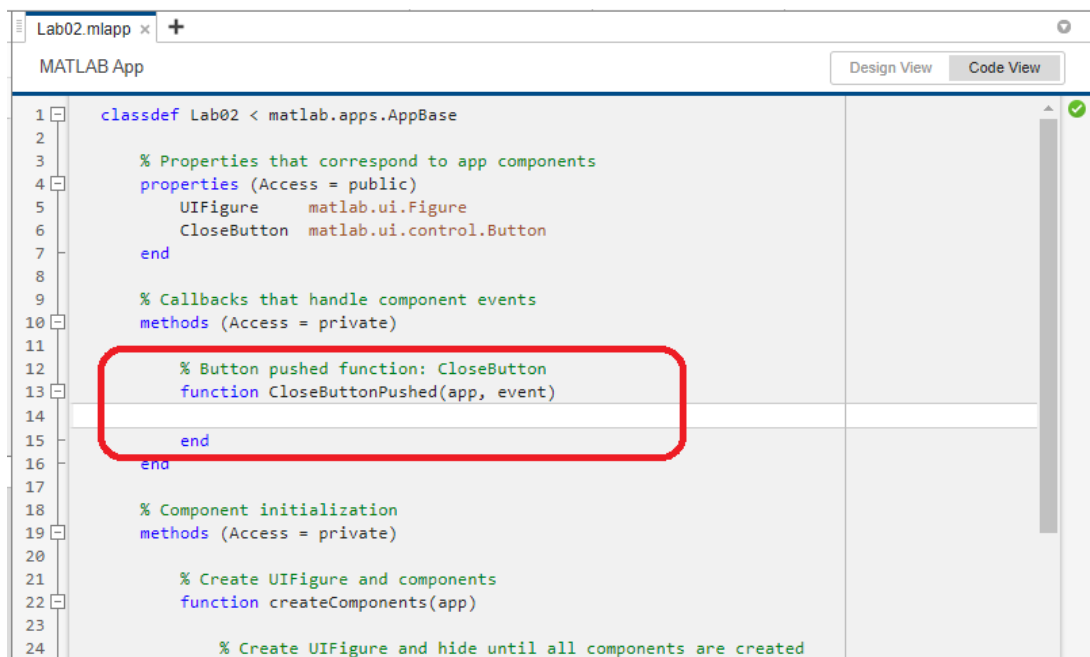
Then please change its string to "Close".

To connect a button action, click the right mouse button on the "Close" button, and then "Callbacks Add ButtonPushedFcn callback".



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We were moved to the window containing the code for our form. Exactly to the function that is to be performed when our button is pressed.



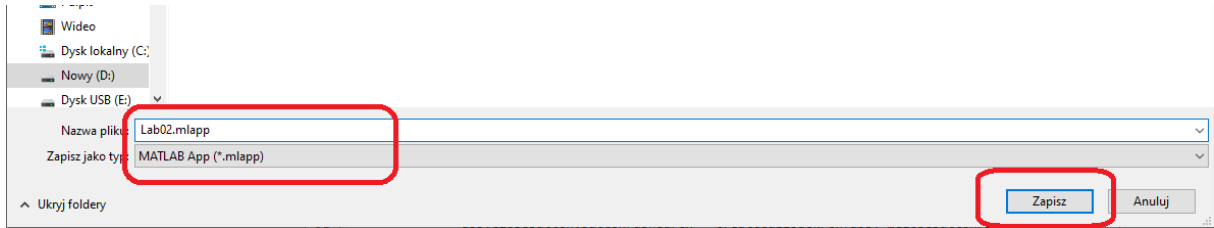
Since our button is to close the form, we use the close function. We give the name of the form as a parameter. We enter:
„close(app.UIFigure);”

```

% Button pushed function: CloseButton
function CloseButtonPushed(app, event)
    close(app.UIFigure);
end
end

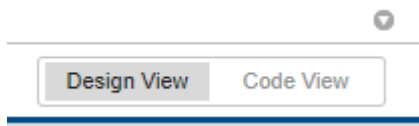
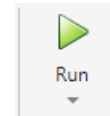
```

We save our application as "Lab02.mlapp".



Start the program with the Run button.

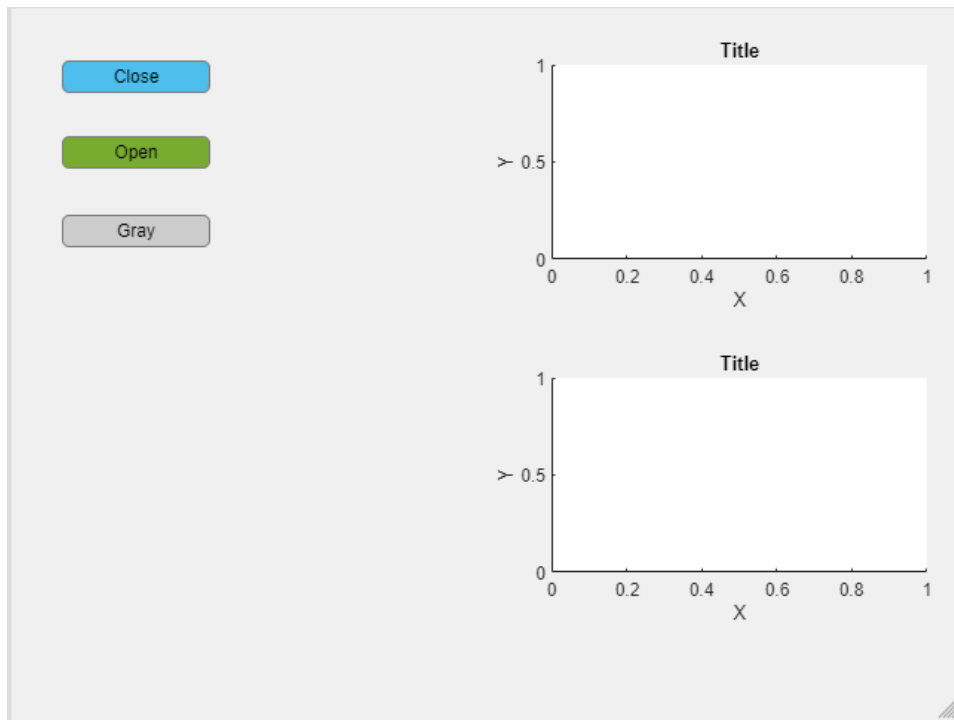
The Close button we created should disable program execution.



The following buttons are used to navigate between the form and the source code of the form: "Design View Code View".

Exercise 2

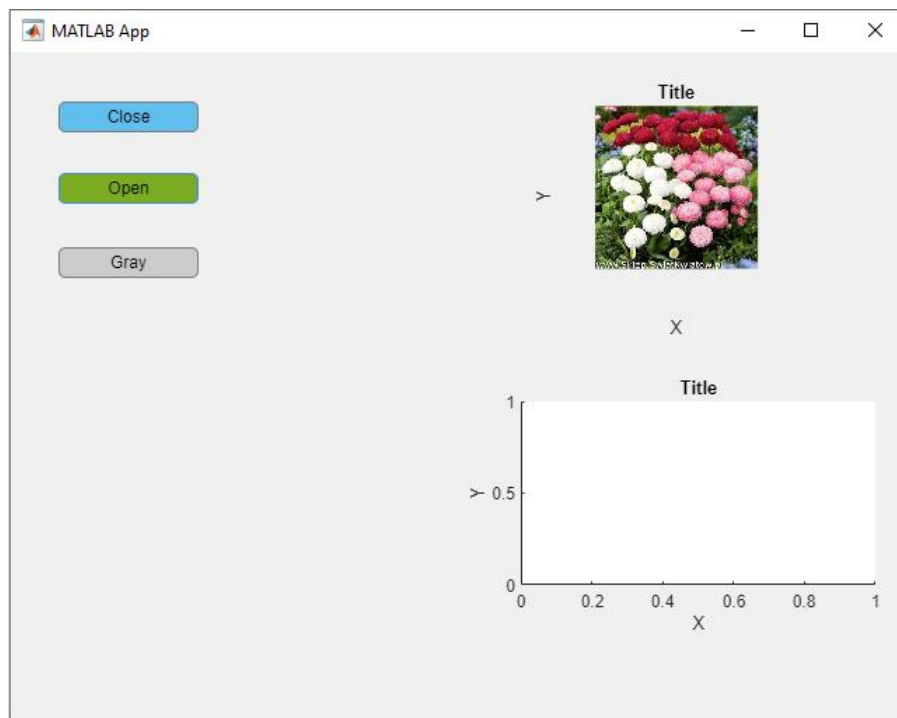
Please create two more buttons named "Open" and "Gray", like you did just now. In addition, please place two Axes objects on the form.



To the "Open" button, please attach the option of reading an image from the selected file. We will use functions, so to pass variables between them, it is necessary to define them as global (only those that we pass between functions). Next, we attach a handle to the file location. And then we read from the selected file.

```
global image1
[file1,path1]=uigetfile('*.jpg;*.png;*.bmp','Load the image');
image1=imread([path1,file1]);
imshow(image1,'Parent',app.UIAxes);
```

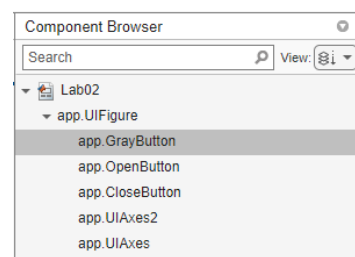
After starting the program (Run), we should get a result similar to the figure.



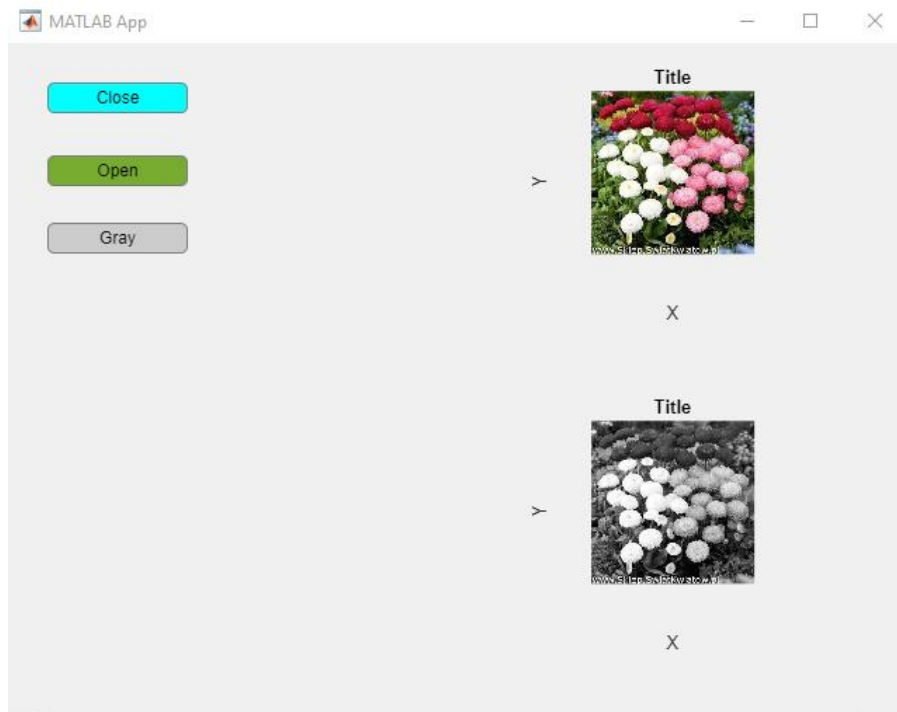
Exercise 3

Please prepare the support for the "Gray" button in the same way as presented above. The task of the "Gray" button is to convert a color image loaded with the "Open" button into a gray image. The gray image should be displayed in the second Axes object. Please remember that we refer to individual objects by their unique name with a handle. For example:

```
image2=rgb2gray(image1);
```



After starting the program (Run), we should get a result similar to the figure.



Exercise 4

Please create the fourth "Brighter" button and another Axes type object.

Please program the "Brighter" button to lighten the gray image from task 3. Brighter image is obtained by increasing the value of all pixels in the image. Then the brightened image was displayed in the third Axes.

Exercise 5

Please create the fifth "Darker" button, and another Axes type object.

Please program the "Darker" button to darken the gray image from task 3. Brighter image is obtained by reducing the value of all image pixels. Then a darkened image displayed in the fourth Axes.

Please send only the „Lab02.mlapp” file to the moodle platform as an answer.