	Exercise series zero of the basics of computer vision	
		Delivery deadline: 12/8/1401

For this exercise you need opencv, numpy and matplotlib libraries . First, install these libraries on your system (if you don't already have them installed) and then answer the following questions.

1-According to the image jpg1.Q, answer this question:

A) Both matplotlob and opencv libraries are used to read the image, first a notebook with ipynb format and display the above image with the help of these two libraries. What is the difference between these two libraries to display the image in the built?

The output of the matplotlob library Do like opencv .

b) Interpret the output of shape.img . (img is the variable in which the read image is located)

c) After the notebook is made, create empty folders in the 1Q folder with the help of makedirs.os , and then read the images in the 1Q folder one by one and make the images black and white, then create a file with the same format and dimensions for each image Save the image Finally, save the images and text files in the folder you created .

2- Refer to the ipynb2.Q notebook and complete each section according to the instructions given in the notebook.

3- According to the ipynb3.Q notebook , answer the following questions:

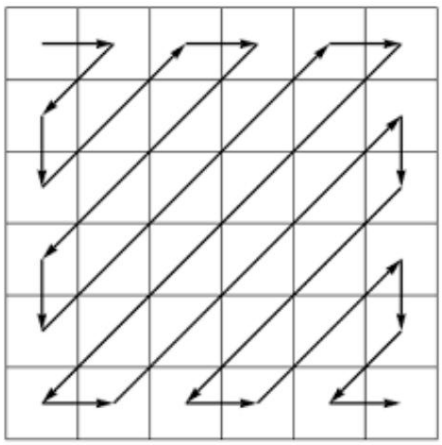
x , write a program that receives the number n from the input and fills a square matrix. Then count on this matrix, what is the number of random integers in the range of n to +100n For example, we have:

10 33 65		
12 78 9		
25 59 104		

For this matrix, the answer should be as follows:

{digit: number of appearance}
{0: 2, 1: 3, 2: 2, 3: 2, 4: 1, 5: 3, 6: 1, 7: 1, 8: 1, 9: 2}

b) Navigate this matrix as follows and print it:



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4- In the notebook ipynb4.Q, in the specified parts, perform the following matrix operations using data guides.
done:

A) Obtain the result of the following expression with the help of the *numpy* library:

$$\left(\begin{bmatrix}1&2&3\\4&5&6\\7&8&9\end{bmatrix}\begin{bmatrix}1&2&3\\4&5&6\\7&8&9\end{bmatrix}\right)\ddot{y}1\begin{bmatrix}1&2&3\\4&5&6\\7&8&9\end{bmatrix}\begin{bmatrix}1\\-1\\1\end{bmatrix}+\begin{bmatrix}1&2&3\\4&5&6\\7&8&9\end{bmatrix}$$

b) Slide the 3 x 3 matrix A onto the 5 x 5 matrix B and multiply it step by step and add up the results. Then save this sum in the result matrix. To solve this question on the matrix B with Python functions and Iterate through the numpy library and calculate the results.

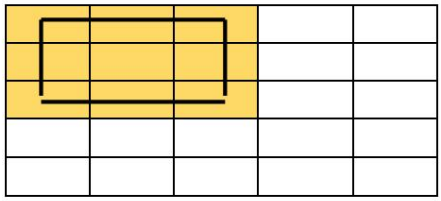
B

1	*1*	*1*	*1*	*1*
1	*2*	*2*	*2*	*1*
1	*2*	*2*	*2*	*1*
1	*2*	*2*	*2*	*1*
1	*1*	*1*	*1*	*1*

A

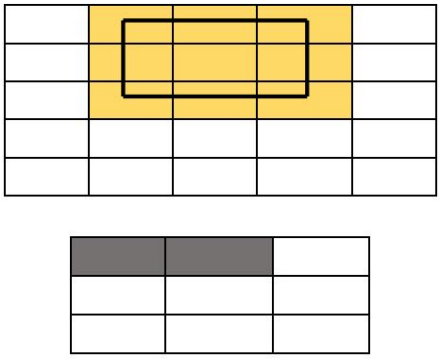
1	*1*	*1*
1	*-9*	*1*
1	*1*	*1*

To better understand the question, pay attention to the following guide: What is meant by sliding matrix A B is as follows: on



In the specified area, perform multiplication by multiplication and then add the product of the multiplications and then put it in the resulting matrix:

Then move the matrix A to the right and repeat the same operation and place the result in the corresponding row in the output matrix:



5- (scoring) Read the png5.Q image that is attached with the questions in the ipynb5.Q notebook in color, first the various characteristics of the read image, including dimensions, type of values, average pixels, maximum and minimum amount in total Find the image and also within the indices [0 :, :,] (all the pixels of index 0 from the 2nd dimension). This image is given to an object detection model (you will get familiar with these concepts later in this lesson, but for this question it is enough to run the corresponding cell) and some detection samples are taken from the model. These the class that is and It belongs to it Y detections include the rectangle of the environment. to the detected objects, the degree of confidence of the detection. First, according to the instructions made in the notebook, draw the detections on the original image and display the result Also save the result as requested.

Note: It is preferable to use the colab environment for this question.