Assignment 4-2: Implementation of Matrix in Image Processing

The objective of this exercise is getting practice in operating with matrices – creating, multiplying, convolving, pooling, and visualisation.
The solution could be used later as a stage of a more complex image recognition process.

The task is to create a program to

a) enter a grey scale pixel matrix [32, 32] with random colour values
b) filter it by **convolutional multiplication** with a sparse matrix for discovering vertical lines
c) reshape it by applying **max-pool** method with size [2x2] and stride of 2
d) show the result

Hint:
Instead of creating a matrix with random numbers, you can load a real image and use its original pixel matrix. This code can do the work:

```
import cv2                          # works with images
from matplotlib import pyplot       # for visualisation

# load your image, 0 is for grey scale mode
img = cv2.imread('your-image.jpg', 0)

# visualisation function
def myimage(image):
    # image view
    pyplot.imshow(image)
    pyplot.show()
    # pixel view
    print('image size: ', image.shape)
    print('pixel matrix:\n', image)

# show the original image
myimage(img)

# resize the image
SIZE = 320
img = cv2.resize(img, (SIZE, SIZE))

# show the resized image
myimage(img)
```