Digital Image Processing

Image Rotation and Resizing

22-Jun-22

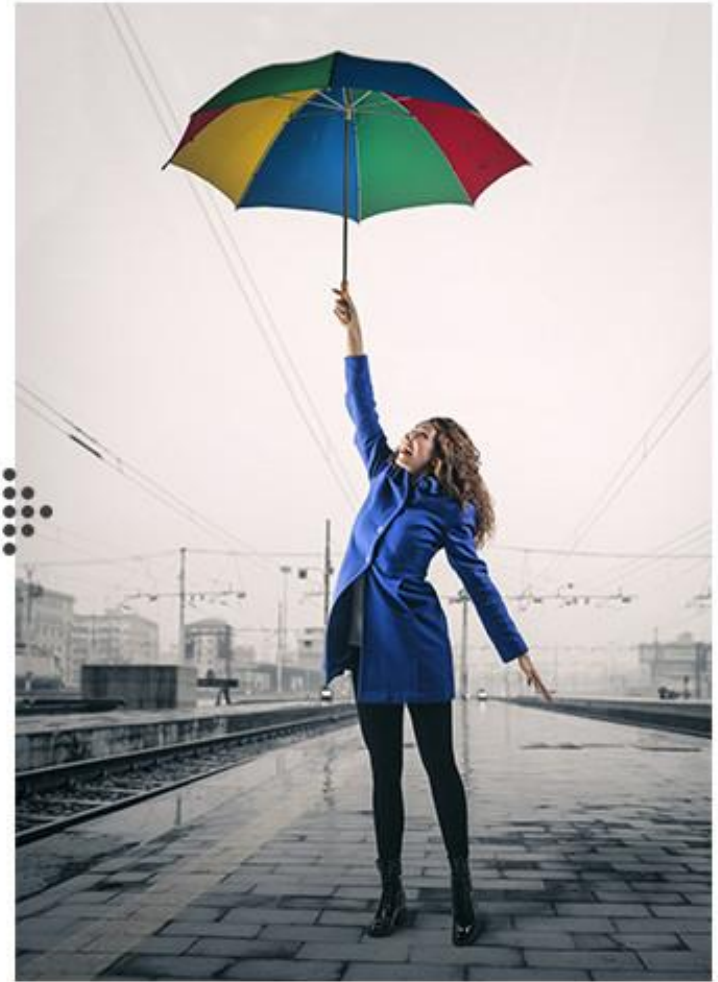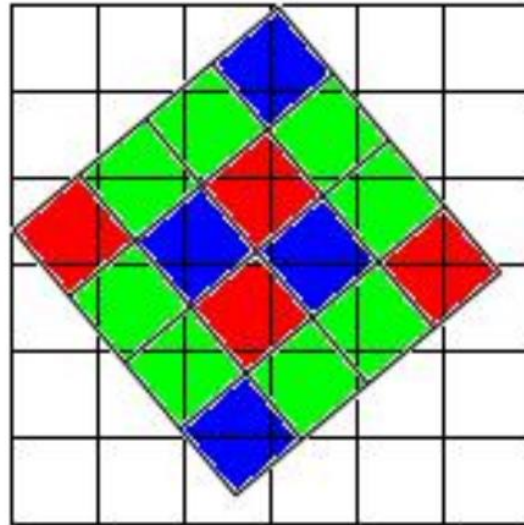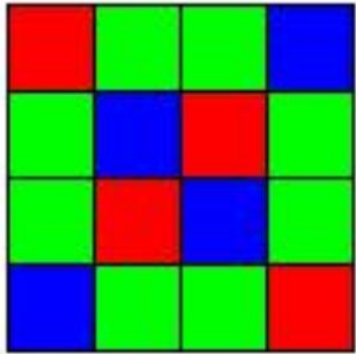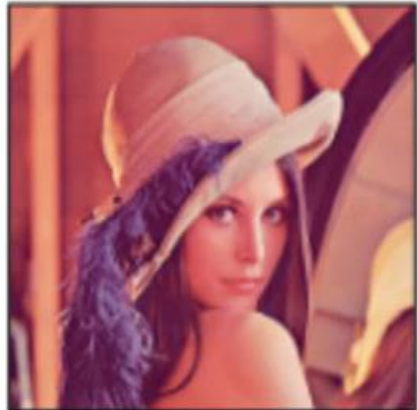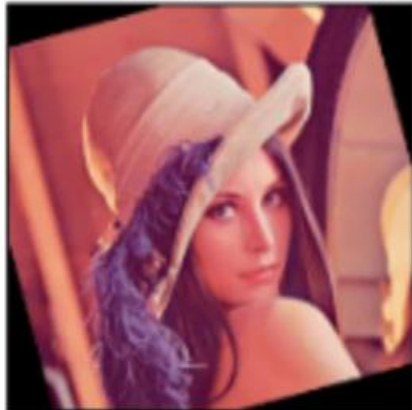# Image Resizing

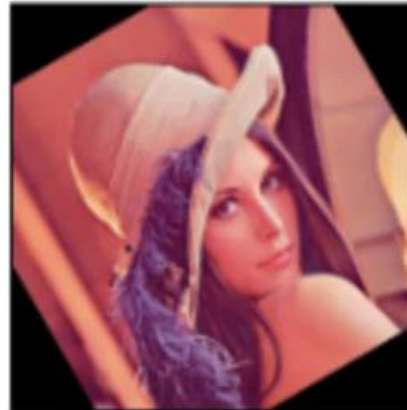# Image Rotation

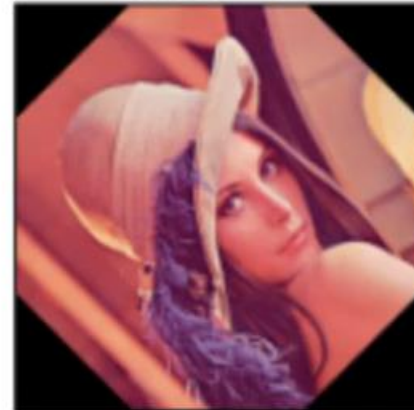rotate=0   rotate=15   rotate=30   rotate=45

Rotation matrix

▸ In two dimensions, the standard rotation matrix has the following form:

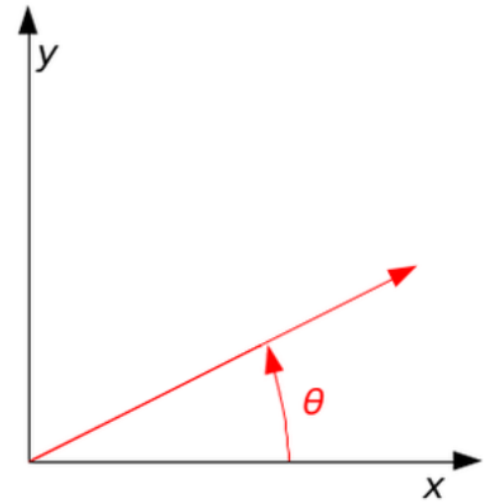$$R = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$$

▸ This rotates column vectors by means of the following matrix multiplication,

$$\begin{bmatrix} x' \\ y' \end{bmatrix} = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix}$$
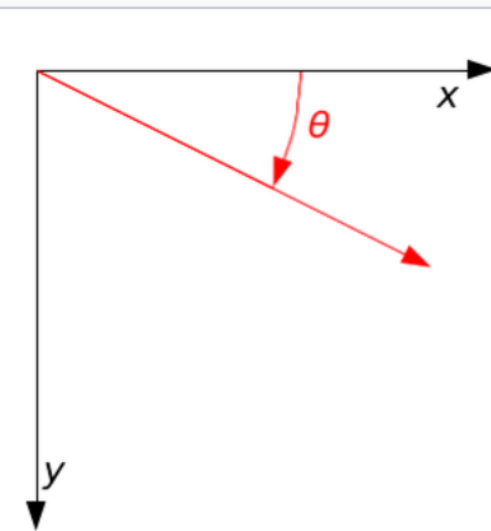
▸ Thus, the new coordinates (x', y') of a point (x, y) after rotation are

$$x' = x\cos\theta - y\sin\theta$$
$$y' = x\sin\theta + y\cos\theta$$

A counterclockwise rotation of a vector through angle θ. The vector is initially aligned with the x-axis.

A rotation through angle θ with non-standard axes.

References

- https://en.wikipedia.org/wiki/Rotation_matrix
- https://ansta.co.uk/blog/how-to-resize-images-using-image-editing-software-605/