

Exercises for Programming Practice 1

The submitted program will be evaluated as described in “Lesson Plan (2021)”.

Note:

- ✓ Do not create “module-info.java”, when you create a Java Project.
- ✓ Do not set Package name in the window “New Java Class”.
- ✓ The following information must be included as a comment at the first part of the program.
 - Contents of the program
 - ❖ Do not use the title of exercise for “contents of the program”
Think about “contents of the program” yourself.
 - Submission date
 - Program creator
- ✓ Wrong file name (including case sensitivity) is not accepted.

The deadline for submitting the programs is 18:00 on December 23rd, 2021.

Download “imageL2.jpg” from “Week 13” page Resource of “Programming Practice 1”, manaba+R.

Exercise 28 (file name “Exercise28.java”)

Create Java program “Exercise28.java” which satisfies the following conditions.

- (1) The window size is 560 pixels wide by 600 pixels vertical.
- (2) Display the following three images as shown in Figure 1.
 - (a) A color image obtained from the file “imageL2.jpg”. The size of the image is 1080 pixels wide and 720 pixels vertically. It is better to display it so that its upper left corner is (10, 30) with half the actual size.
 - (b) The gray image obtained from the color image. The gray image is displayed so that its upper left corner is (10, 400) and the length is 1/4.
 - (c) The binary image obtained by binarizing the gray image. The threshold value for binarization should be appropriately set so that the image is easy to understand. It is displayed so that its upper left corner is (280, 400) and the length is 1/4.

Refer Chapter4 (“Image Display”) and Chapter 5 (“Colored Image to GrayScale and Binary”) of “Introduction to OpenCV” in “Programming Language”.



Figure 1. The result of “Exercise28.java”.

Exercise 29 (file name “Exercise29.java”)

Create Java program “Exercise29.java” which satisfies the following conditions.

- (1) The window size is 560 pixels wide by 760 pixels vertical.
- (2) Display the following two images as shown in Figure 2 and Figure 3.
 - (a) A color image obtained from the file “imageL2.jpg”. The size of the image is 1080 pixels wide and 720 pixels vertically. It is better to display it so that its upper left corner is (10, 30) with half the actual size.
 - (d) A color image obtained from the area specified by the mouse of the input image. The obtained new color image is displayed so that its upper left corner is (10, 400) and the length is half the actual size.

- (3) Press mouse button from the upper left corner of the area, and then drag it to finally specify the lower right corner. Display the rectangle obtained by the upper left coordinate and the lower right coordinate in the red frame.

When the mouse button is released, the image in the area indicated by the red frame is cut out and drawn in the lower left corner of the window.

Use the Rect class and Mat class to crop the image. Note that the area obtained by the red frame and the area of the actual image (not the image shown in the window) to be cut out are different because the image being drawn is half the length.

Refer “OpenCV4.Java” of “Introduction to OpenCV” in “Programming Language”.

The size of the window is assumed to specify less than half the area of the image. There is no problem if the obtained images are too large and comes out of the window or overlaps.

An error may occur when a location other than the original image is accessed with the mouse.

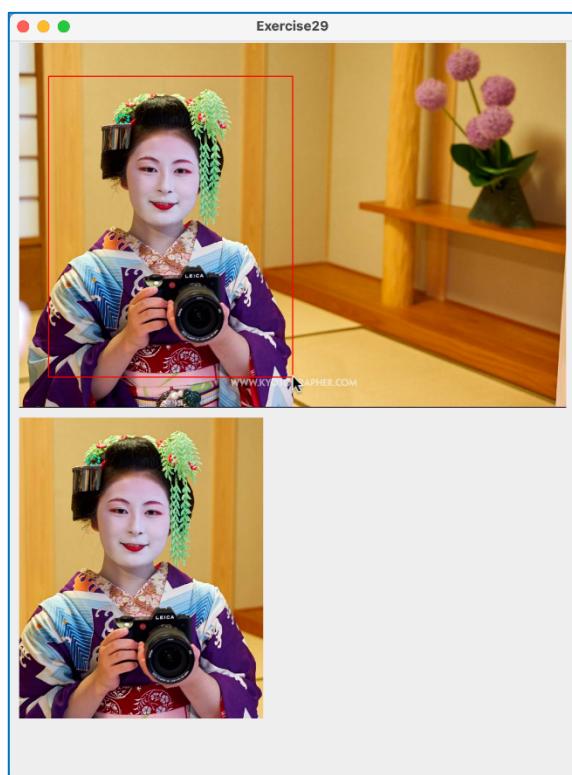


Figure 2. An example of execution result of “Exercise29.java”

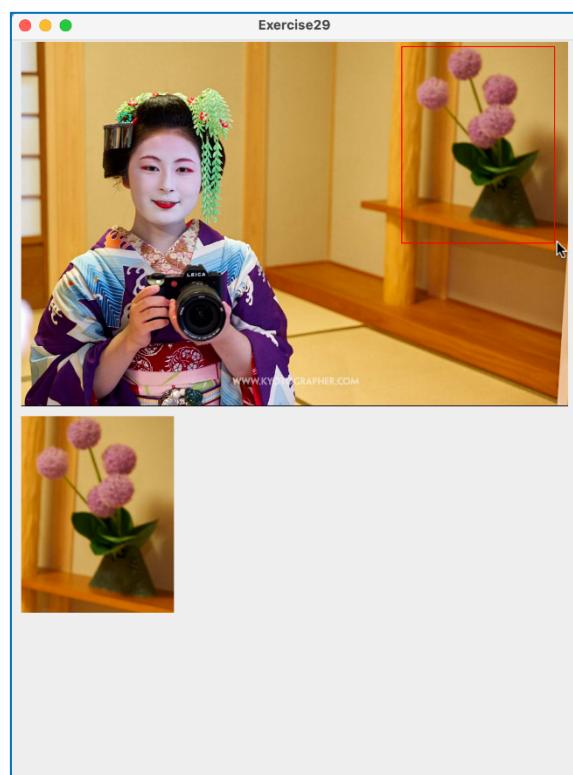


Figure 3. Other example of execution result of “Exercise29.java”

Exercise 30 (file name “Exercise30.java”)

Create Java program “Exercise30.java” by adding the following functions to “Exercise29.java”.

- ✓ Mosaic a color image cut with a mouse. Draw the image with the half of length of the actual image. The coordinates at the top left of the new Mosaic image should be (280, 400).

Execution examples are shown in Figure 4 and Figure 5.

Refer “OpenCV4.Java” of “Introduction to OpenCV” in “Programming Language”.



Figure 4. An example of execution result of “Exercise30.java”

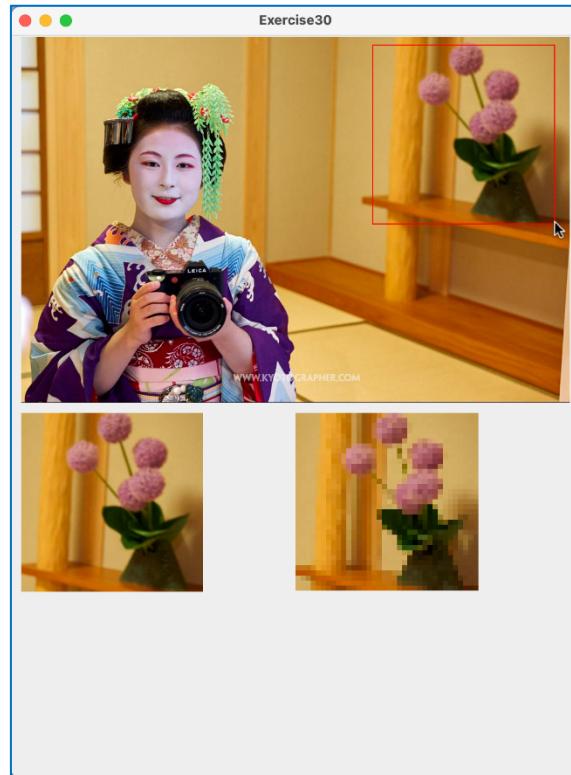


Figure 5. Other example of execution result of “Exercise30.java”