

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 17:50 on December 14th, 2021.

Download “image3.jpg” from “Week 12” page Resource of “Programming Practice 1”, manaba+R.

Exercise 26 (file name “Exercise26.java”)

Create Java program “Exercise26.java” which displays the image. The program must satisfy the following condition.

(1) The window size is 500 pixels wide by 810 pixels vertical.

(2) Set the following variables in the field.

```
BufferedImage bimage1, bimage2;  
String filename = "image3.jpg";  
int xCenter = 240;  
int yCenter = 180;  
double scale = 0.7;  
double rotate = Math.toRadians(45 + 10);
```

(3) The BufferedImage variable bimage1 is assigned the image in the file “image3.jpg”.

The upper left corner when displaying bimage1 is (10, 70) of the window.

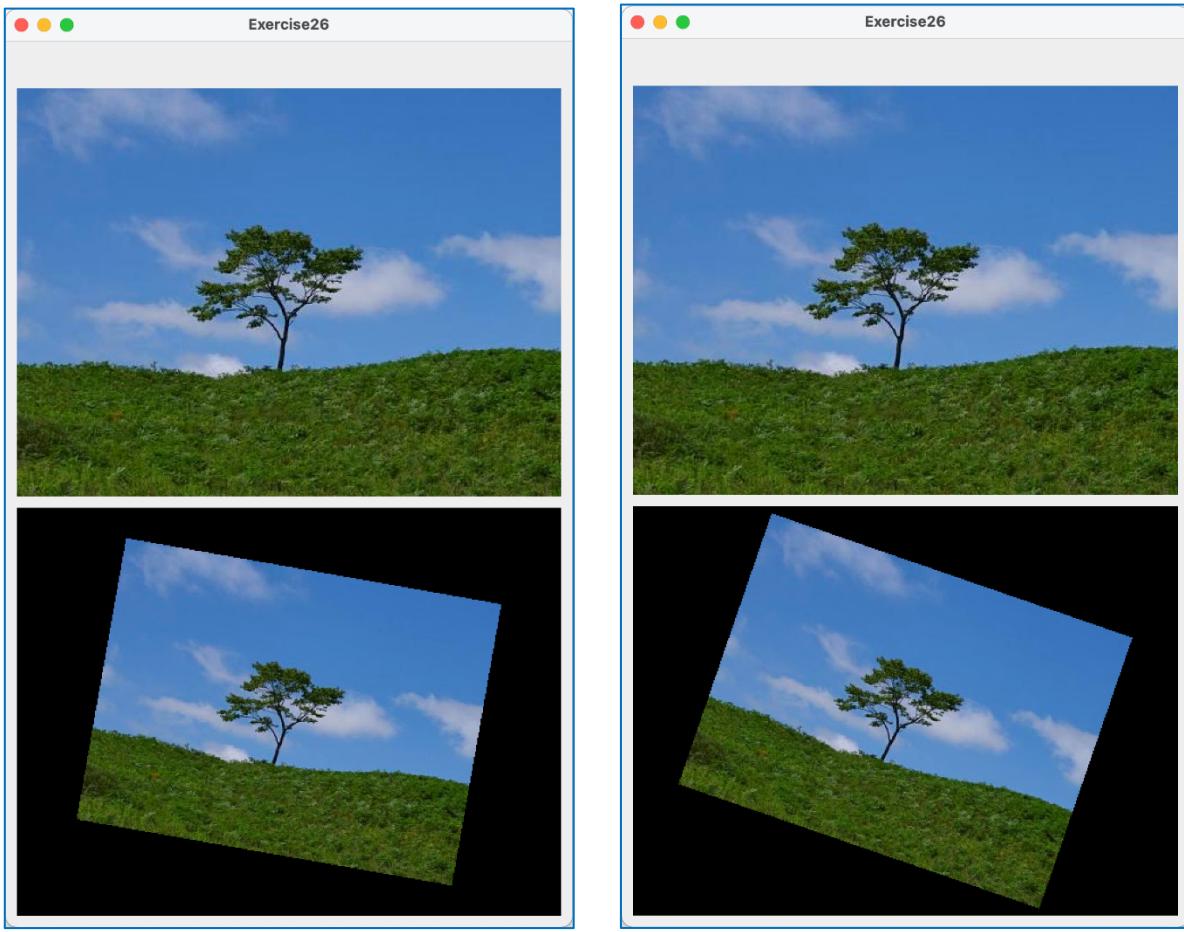
- (4) The `BufferedImage` variable `bimage2` is assigned an image obtained by transforming the image “`bimage1`” as follows:
- (4-1) Reduce the image to 70% to see the entire rotation result.
- (4-2) Rotate the reduced image clockwise around (NN + 10) degrees around the center.
- ✓ NN should be the same as the check digit of the student identification number (the number on the right side).



- ✓ The width of “`image3.jpg`” is 480 pixels and the height is 360 pixels. The center coordinates of “`image3.jpg`” are (240, 180)
- (5) The upper left corner when displaying `bimage2` is (10, 440) of the window.

The execution results are shown in Figure 1.

Refer Chapter 3 “Combining Scale and Rotate” of the twelfth day in Programming Language.



(b)

Figure 1. The execution results

- (a) In the case that the check digit is 0.
- (b) In the case that the check digit is 9.

Exercise 27 (file name “Exercise27.java”)

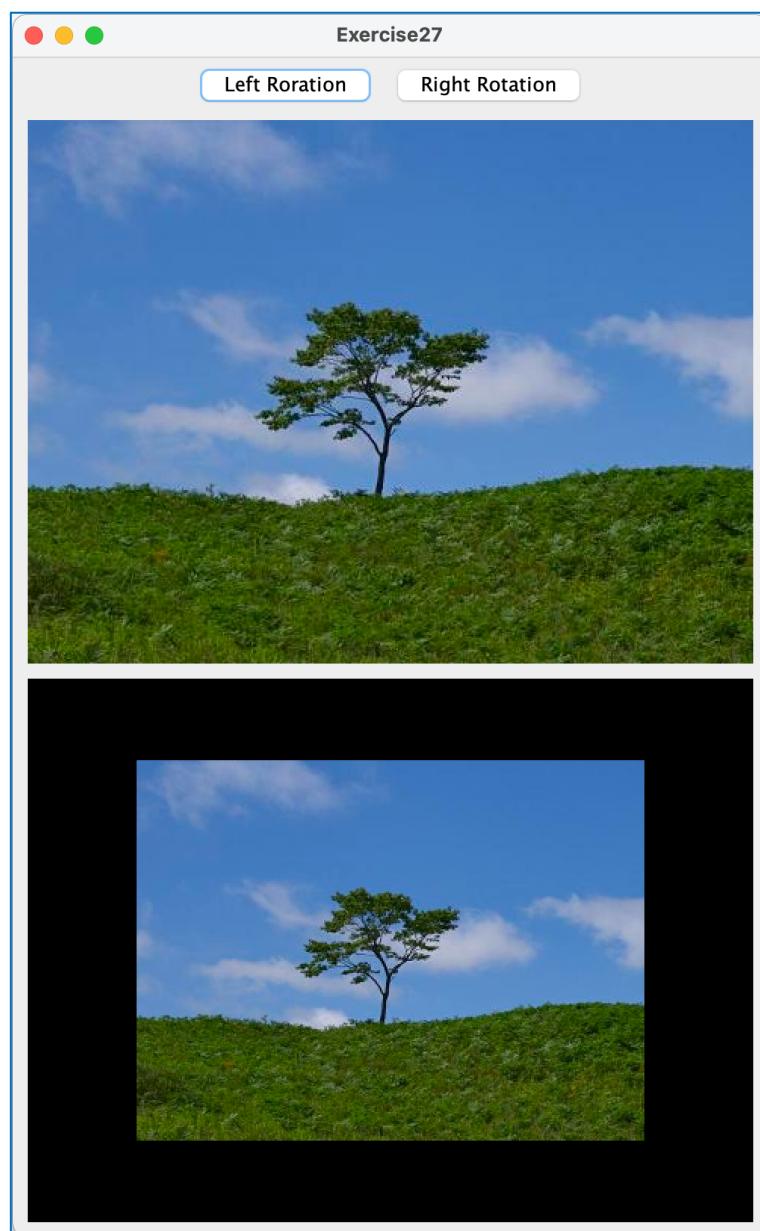
Create Java program “Exercise27.java” by making the following change and adding the following functions to “Exercise26.java”. Regarding the determination of the rotation angle, a different method is specified instead of the method used in "Exercise26.java".

- (1) Set the initial value of the variable “rotate” to 0.0.
- (2) Create the following two buttons at the top of the window.
Use JButton variables “button1” and “button2”.
Use the interface “ActionListener” to perform the required processing when the button is pressed.

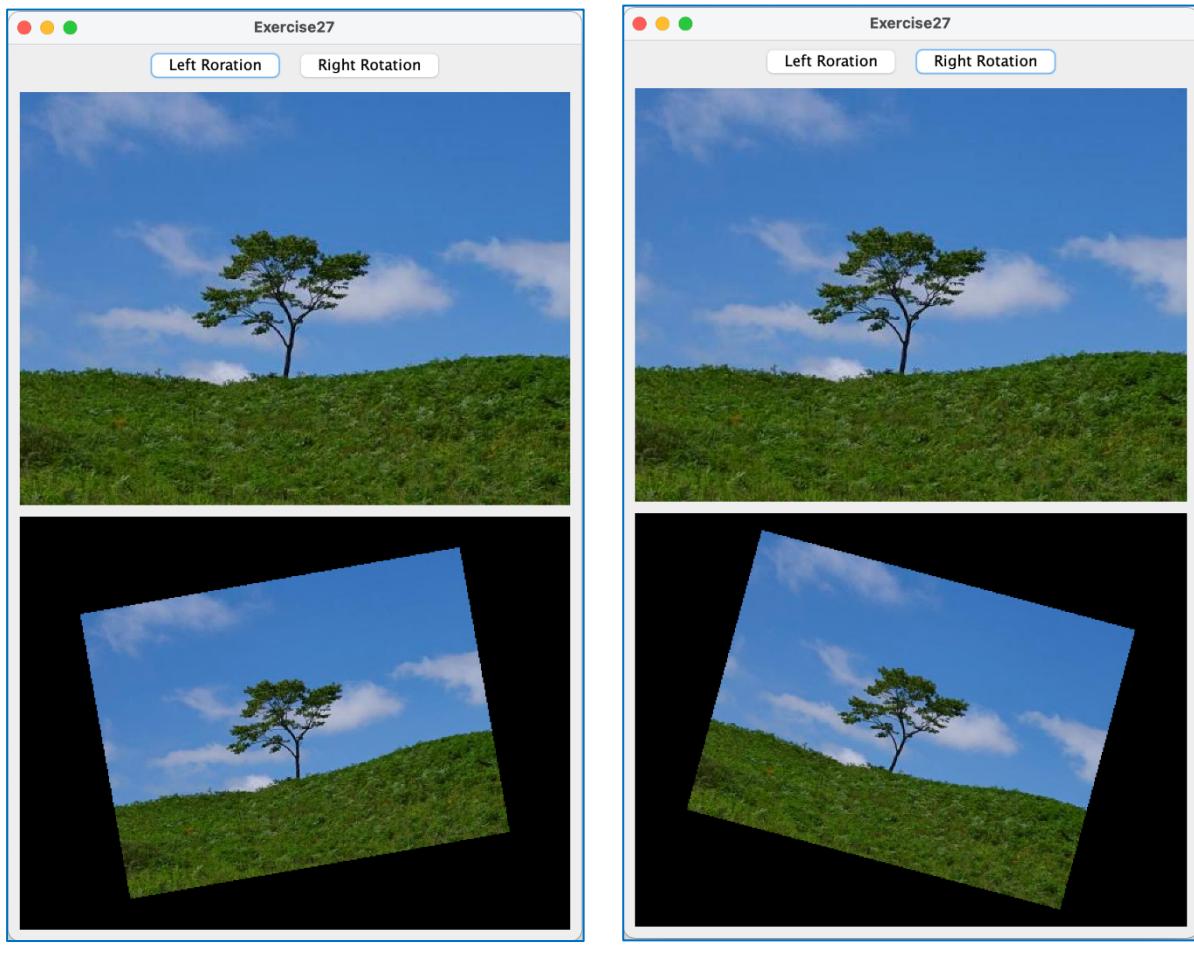
- (a) The variable “button1” is the button labeled “Left Rotation”.
When pressed, “rotate” is decreased by the radian equivalent to 5 degree, rotate the image counterclockwise around the center.
- (b) The variable “button2” is the button labeled “Right Rotation”.
When pressed, “rotate” is increased by the radian equivalent to 5 degree, rotate the image clockwise around the center.

The execution results are shown in Figure 2.

Refer Chapter 4 “ActionListener” of the ninth day, and Chapter 3 “Combining Scale and Rotate” of the twelfth day in Programming Language.



(a)



(c)

Figure 2. The execution results.

- (a) Initial state.
- (b) Pressing “Left Rotation” button twice from the initial state.
- (c) Pressing “Right Rotation” button 3 times from the initial state.