# Unit 1—Getting Started with Java

# Chapter 5—Using Classes and Objects in Media Computing

EXERCISE 5.1

1. A bit In the Cartesian coordinate system, the origin point (0,0) is at the center of the viewing area. The y-coordinates increase in positive numbers above the x-axis and in negative numbers below the x-axis. In the screen coordinate system, the origin point (0,0) is at the upper left corner of the viewing area. The y-coordinates increase in positive numbers below the x-axis and in negative numbers above the x-axis. In both systems, the x-coordinates increase in positive numbers to the right of the y-axis and in negative numbers to the left of the y-axis.

exercise 5.2

1. An interface contains the information that programmers need to use a resource. This information includes the headers of public methods. Each method header includes a name, a return type, and a list of parameters. A method header might also include a comment that states what the method does.
2. APImage image = new APImage(200, 200);

for (Pixel p : image){

p.setRed(0);

p.setGreen(255);

p.setBlue(0);

}

1. for (int y = 0; y < image.getHeight(); y++)

image.setPixel(0, y, new Pixel(0, 0, 255));.

for (int y = 0; y < image.getHeight(); y++)

image.setPixel(image.getWidth() - 1, y,

new Pixel(0, 0, 255));

for (int x = 0; x < image.getWidth(); x++)

image.setPixel(x, 0, new Pixel(0, 0, 255));.

for (int x = 0; x < image.getWidth(); x++)

image.setPixel(x, image.getHeight() - 1,

new Pixel(0, 0, 255));

EXERCISE 5.3

1. A row-major traversal starts at position (0, 0) in a grid and visits each position in a given row before moving on to the next row. Thus, the next position visited, if there is one in the first row, would be ((0,1).
2. A column-major traversal starts at position (0,0) in a grid and visits each position in a column before moving on to the next column. Here is a loop that prints the positions of a 2 by 3 grid in column-major order:
3. for (int x = 0; x < 2; x++)

for (int y = 0; y < 3; y++)

System.out.println("(" + x + "," + y + ")");

1. The clone method creates a copy of an object. One would use this to create two distinct objects that have the same attributes. Thus, changes to one object would have no effect on the other object.
2. The edge detection algorithm creates a new image because the color of a pixel in the output image depends on the colors of its neighbors. If the original image were modified, the data required for the transformation would be lost.
3. APImage image = new APImage(original.getWidth() + 2,

original.getHeight() + 2);

for (int y = 0; y < image.getHeight(); y++)

image.setPixel(0, y, new Pixel(0, 0, 255));.

for (int y = 0; y < image.getHeight(); y++)

image.setPixel(image.getWidth() - 1, y,

new Pixel(0, 0, 255));

for (int x = 0; x < image.getWidth(); x++)

image.setPixel(x, 0, new Pixel(0, 0, 255));.

for (int x = 0; x < image.getWidth(); x++)

image.setPixel(x, image.getHeight() - 1,

new Pixel(0, 0, 255));

for (int x = 0; x < original.getWidth(); x++)

for (int y = 0; y < original.getHeight(); y ++){

Pixel oldP = original.getPixel(x, y);

Pixel newP = image.getPixel(x, y);

newP.setRed(oldP.getRed());

newP.setGreen(oldP.getGreen());

newP.setBlue(oldP.getBlue());

}

EXERCISE 5.5

1. int min = Integer.MAX\_VALUE;

int max = Integer.MIN\_VALUE;

for (Sample s : clip){

int value = s.getValue();

if (value < min)

min = value;

if (value > max)

max = value;

}

System.out.println("Minimum = " + min + "\n" +

"Maximum = " + max);

1. System.out.println(clip.getLength() /

clip.getSamplingRate() +

" seconds");

Review Questions

## Multiple Choice

1. c
2. b
3. c
4. c
5. b
6. b
7. a
8. a
9. a
10. b