

Chapter 2: Review Exercise Solutions

R2.1

An object is an instance (an entity) that defined by a class. A class provides a definition which includes characteristics (data) and behavior (methods).

R2.2

The public interface consists of all the methods we can apply to any of its objects. Essentially, it is the set of methods to interact with the class. The implementation is how the methods accomplish their tasks. The public interface is accessible to all; the implementation should be private.

R2.3

```
double price = 5.50;  
String description = "Dress Socks";
```

R2.4

The value of `mystery` is equal to 0 after the statements are executed. In the first statement (line 1), `mystery` is initialized to a value of 1. In the assignment statement on line 2, `mystery` is set to -1. Finally, `mystery` is set to 0 in line 3.

R2.5

The variable `mystery` is being declared twice, first in line 1 and then again in line 2. A variable can only be initialized once. (If you remove the reserved word `int` on line 3, the statements will work just fine, and will set `mystery` to -3.)

R2.6

In the Java programming language, the `=` operator denotes an action, to replace the value of a variable. This usage differs from the traditional use of the `=` symbol as a statement about equality.

R2.7

```
title = "Big Java";  
char letter = title.charAt(0); // letter would be 'B'  
int titleLength = title.length(); // titleLength would be 8
```

R2.8

```
String message = "Hello";  
message = message.toUpperCase();
```

R2.9

```
String message = "Hello";  
message = message.replace("H", "h");
```

R2.10

An object contains state information. An object variable contains an object reference, that is, the location of an object.

R2.11

```
new Rectangle(5, 10, 20, 30); // Object  
Rectangle box; // Object variable
```

R2.12

```
new Rectangle(75, 75, 50, 50)  
"Hello, Dave!"
```

R2.13

```
Rectangle square = new Rectangle(75, 75, 50, 50);  
String greeting = "Hello, Dave!";
```

R2.14

```
Rectangle square = new Rectangle(10, 20, 40, 40);  
square = new Rectangle(10, 20, 40, 40);
```

R2.15

```
Rectangle square1 = new Rectangle(20, 20, 40, 40);  
Rectangle square2 = square1; // the same object
```

R2.16

a. `new Rectangle` is missing

b. `Rectangle(5, 10, 15, 20)` does not refer to an object. The corrected version should be:
`double width = (new Rectangle(5, 10, 15, 20)).getWidth();`

c. `r` has not been initialized; it does not refer to any object.

d. The method `translate` takes two integer arguments, not a string argument.

R2.17

Possible answers are:

Accessor: `getWidth()`, `getHeight()`

Mutator: `translate(int, int)`, `add(int, int)`

R2.18

Class	Return type	Method name	Types of arguments
String	String	concat	String
String	String	trim	none
Rectangle	String	toString	none
Rectangle	Rectangle	union	Rectangle
Random	float	nextFloat	none

R2.19

An object contains state information. An object reference is the location of that object in memory.

R2.20

Console applications provide text-only interfaces and cannot display any drawings/figures (except ASCII art). *Graphical applications* are more user friendly and can display drawings inside frames (windows).

R2.21

The Swing toolkit calls the `paintComponent` method whenever the component needs to be repainted. For example, it is called when the window is shown for the first time, when it is resized, or when it is shown again after it was hidden.

R2.22

The designers of Java did not want to inconvenience those programmers who had produced programs that used simple graphics from the `Graphics` class after they developed the newer, more powerful `Graphics2D` class, so they did not change the parameter of the `paintComponent` method to `Graphics2D`.

R2.23

The purpose of a graphics context is to store the programmer choices for colors, fonts, and so on, and to draw and fill shapes.

R2.24

The `paintComponent` method of the component class produces a drawing, while the `main` method of the viewer class constructs a frame and a component, adds the component to the frame, and makes the frame visible.

R2.25

You specify a text color simply by calling the `setColor` method of the graphics context before calling the `drawString` method.