

EXERCISE SOLUTIONS

1. In a program, the number of days in a calendar year is already initialized as 365 in the **integer** variable **daysInYear**. Write a simple **if** statement that modifies that number appropriately if the boolean variable **leapYear** is true.

```
if (leapYear)
{
    daysInYear = 366;           // curly braces are optional here
}
```

2. Write an **if-else** statement to print out the square root of a **double** number stored in **aNumber**, or print out a message that the square root is imaginary if the value of **aNumber** is negative.

```
if (aNumber >= 0)
{
    System.out.println("Square root of " + aNumber + " is " + Math.sqrt(aNumber));
}
else
{
    System.out.println("The square root of a negative number is imaginary.");
}
```

3. Write an **if-else** statement that takes the **double** variables **a** and **b** and prints out the answer to **a / b**, but only if **b** is not **0**. Otherwise, the statement should print an error message.

(Note that the following code, without the curly braces, is legal and works as it should. Which system of writing if-else statements do you prefer and find easier to read: the solution in #2 above or the solution for #3 given here?)

```
if (b != 0) System.out.println(a/b);
else System.out.println("Division by 0 is undefined.");
```

4. Write a series of appropriate **if-else** statements (a “switch-style” statement) to **print** an appropriate **String** comment on the weather based on the temperature as given by the **double** variable **degreesFahrenheit**. Include at least 4 remarks, depending on the temperature, in your solution.

```
if (degreesFahrenheit >= 100)
{
    System.out.println("It's a heatwave!");
}
else if (degreesFahrenheit >= 80)
{
    System.out.println("It's a little warm, eh?");
}
else if (degreesFahrenheit >= 60)
{
    System.out.println("Nice day for a picnic!");
}
else if (degreesFahrenheit >= 40)
{
    System.out.println("It's a little chilly, don't you think?");
}
else
    System.out.println("It's COLD out! Better bundle up!");
```

5. A program stores the lengths of the three sides of a triangle in the variables **a**, **b**, and **c**. Write if-else statements to to **return** a **String** identifying the type of triangle: *equilateral*, *isosceles*, or *scalene*.

```
if (a == b && b == c)
    return "equilateral";
else if (a == b || b == c || a == c)
    return "isosceles";
else
    return "scalene";
```

6. You're trying to decide what to do this weekend. If you're **alone** and you **haveMoney** (both **boolean** variables), you'll go to the movies, but if you're broke, you'll stay home and read. If you're *not* alone though, and you have money, you'll take your friends out to dinner, but if you don't have money, you'll all hang out and play video games. Write a set of **if-else** statements to print out your weekend options based on the **boolean** variables **alone** and **haveMoney**.

```
if (alone)
{
    if (haveMoney)
    {
        System.out.println("Going to movies alone");
    }
    else // ie. we don't have money
    {
        System.out.println("Staying home to read");
    }
}
else // this is the !alone part...
{
    if (haveMoney)
    {
        System.out.println("Taking friends out to dinner");
    }
    else
    {
        System.out.println("Playing videogames with friends");
    }
}
}
```

Because each statement is a single command, we can remove the curly braces to make it more readable:

```
if (alone)
    if (haveMoney)
        System.out.println("Going to movies alone");
    else
        System.out.println("Staying home to read");
else
    if (haveMoney)
        System.out.println("Taking friends out to dinner");
    else
        System.out.println("Playing videogames with friends");
```

Nesting statements as shown above is far preferable to trying to code everything with a series of complex, repetitive, and time-wasting **if-else** statements. *Don't do it like this:*

```
if (alone && haveMoney) System.out.println("Going to movies alone");
if (alone && !haveMoney) System.out.println("Staying home to read");
if (!alone && haveMoney) System.out.println("Taking friends out to dinner");
if (!alone && !haveMoney) System.out.println("Playing videogames with friends");
```