Chapter 2: Objects and Primitive Data
Solutions

Multiple Choice Solutions

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

True/False Solutions

1. T
2. F
3. T
4. T
5. T
6. F
7. T
8. T

Short Answer Solutions

2.1. Explain the following programming statement in terms of objects and the services they provide.

```
System.out.println ("I gotta be me!");
```

The System.out object has a println method which accepts a string, enclosed in parentheses and quotation marks, which it displays on the monitor.

2.2. What output is produced by the following code fragment? Explain.

```
System.out.print ("Here we go!");
System.out.println ("12345");
System.out.print ("Test this if you are not sure.");
System.out.print ("Another.");
System.out.println ();
System.out.println ("All done.");
```

The output produced is:

```
Here we go!12345
Test this if you are not sure.
Another.
All done.
```

After printing its data, the println method moves to the next line of output, whereas the print method does not. A println statement with no data has the effect of moving down to the next line.

2.3. What is wrong with the following program statement? How can it be fixed?

```
System.out.println ("To be or not to be, that
is the question.");
```

The string to be printed is not all on one line. The problem can be fixed by using the string concatenation operator (+) or by using a print statement for part of the string and a println statement for the remainder of the string.

2.4. What output is produced by the following statement? Explain.

```
System.out.println ("50 plus 25 is " + 50 + 25);
```

The output produced is:

```
50 plus 25 is 5025
```

First the string "50 plus 25" is concatenated with the sting "50"; since one of the operands associated with the "+" operator is a string, the other is treated as a string. Then the string "50 plus 25 is 50" is concatenated with the string "25".

2.5. What is the output produced by the following statement? Explain.

```
System.out.println ("He thrusts his fists\n\tagainst" +
" the post\nand still insists\n\the sees the \"ghost\"");
```

The output produced is:

```
He thrusts his fists
      against the post
 and still insists
      he sees the "ghost"
```

Escape characters are used to go to the beginning of new lines (\n), to tab (\t), and to print quotation marks (\").

2.6. Given the following declarations, what result is stored in each of the listed assignment statements?

```
int iResult, num1 = 25, num2 = 40, num3 = 17, num4 = 5;
double fResult, val1 = 17.0, val2 = 12.78;
```

- `iResult = num1 / num4;`

  iResult is assigned 5
- `fResult = num1 / num4;`

  fResult is assigned 5.0
- `iResult = num3 / num4;`

  iResult is assigned 3
- `fResult = num3 / num4;`

  fResult is assigned 3.0
- `fResult = val1 / num4;`

  fResult is assigned 3.4
- `fResult = val1 / val2;`

  fResult is assigned 1.3302034...
- `iResult = num1 / num2;`

  iResult is assigned 0
- `fResult = (double) num1 / num2;`

  fResult is assigned 0.625
- `fResult = num1 / (double) num2;`

  fResult is assigned 0.625
- `fResult = (double) (num1 / num2);`

  fResult is assigned 0.0

- `iResult = (int) (val1 / num4);`

`iResult is assigned 3`

- `fResult = (int) (val1 / num4);`

`fResult is assigned 3.0`

- `fResult = (int) ((double) num1 / num2);`

`fResult is assigned 0.0`

- `iResult = num3 % num4;`

`iResult is assigned 2`

- `iResult = num 2 % num3;`

`iResult is assigned 6`

- `iResult = num3 % num2;`

`iResult is assigned 17`

- `iResult = num2 % num4;`

`iResult is assigned 0`

2.7. For each of the following expressions, indicate the order in which the operators will be evaluated by writing a number beneath each operator.

- `a - b - c - d`
  `1 2 3`
- `a - b + c - d`
  `1 2 3`
- `a + b / c / d`
  `3 1 2`
- `a + b / c * d`
  `3 1 2`
- `a / b * c * d`
  `1 2 3`
- `a % b / c * d`
  `1 2 3`
- `a % b % c % d`
  `1 2 3`
- `a - (b - c) - d`
  `2 1 3`
- `(a - (b - c)) - d`
  `2 1 3`
- `a - ((b - c) - d)`
  `3 1 2`
- `a % (b % c) * d * e`
  `2 1 3 4`
- `a + (b - c) * d - e`
  `3 1 2 4`
- `(a + b) * c + d * e`

```
        1    2   4   3
```

- `(a + b) * (c / d) % e`

```
         1    3    2    4
```

2.8. Write code to create an enumerated type for the days of the week. Declare a variable of the type you created and set it equal to Sunday.

```
enum Day {Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}
Day today = Day.Sunday;
```

2.9. What output is produced by the following code fragment?

```
String m1, m2, m3;
m1 = "Quest for the Holy Grail";
m2 = m1.toLowerCase();
m3 = m1 + " " + m2;
System.out.println (m3.replace('h', 'z'));
```

The output produced is:

```
Quest for tze Holy Grail quest for tze zoly grail
```

The original string is concatenated with a lowercase version of itself, then all lowercase 'h' characters are replaced with 'z'.

2.10. Write an assignment statement that computes the square root of the sum of `num1` and `num2` and assigns the result to `num3`.

```
num3 = Math.sqrt(num1 + num2);
```

2.11. Write a single statement that computes and prints the absolute value of `total`.

```
System.out.println (Math.abs(total));
```

2.12. Assuming that a `Random` object has been created called `generator`, what is the range of the result of each of the following expressions?

- `generator.nextInt(20)`

  `0 to 19, inclusive`
- `generator.nextInt(8) + 1`

  `1 to 8, incluslive`
- `generator.nextInt(45) + 10`

  `10 to 54, inclusive`
- `generator.nextInt(100) - 50`

  `-50 to 49, inclusive`

2.13. Write code to declare and instantiate an object of the `Random` class (call the object reference variable `rand`). Then write a list of expressions using the `nextInt` method that generate random numbers in the following specified ranges, including the endpoints. Use the version of the `nextInt` method that accepts a single integer parameter.

```
Random rand = new Random();
```

- 0 to 10

  `rand.nextInt(11)`
- 0 to 500

  `rand.nextInt(501)`

- 1 to 10

  ```
  rand.nextInt(10) + 1
  ```

- 1 to 500

  ```
  rand.nextInt(500) + 1
  ```

- 25 to 50

  ```
  rand.nextInt(26) + 25
  ```

- –10 to 15

  ```
  rand.nextInt(26) - 10
  ```

AP-Style Multiple Choice Solutions

1. D
2. B
3. C