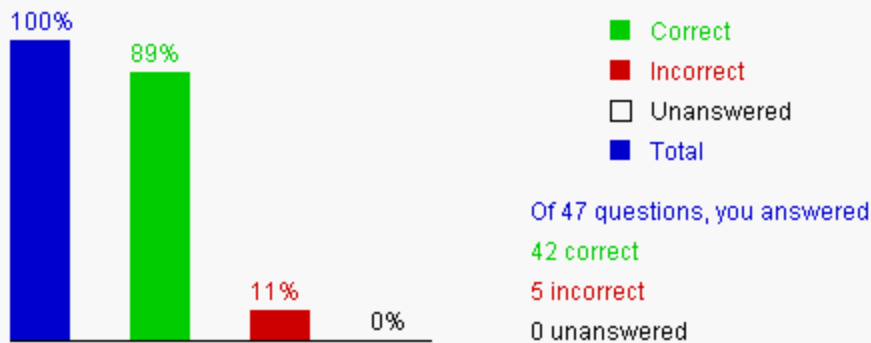**Introduction to Java Programming and Data Structures, 12E, Y. Daniel Liang**

This quiz is for students to practice. A large number of additional quiz is available for instructors using Quiz Generator from the Instructor's Resource Website. Videos for Java, Python, and C++ can be found at https://yongdanielliang.github.io/revelvideos.html.

Chapter 10 Object-Oriented Thinking

Correct
Incorrect
Unanswered
Total

Of 47 questions, you answered
42 correct
5 incorrect
0 unanswered

Please send suggestions and errata to Dr. Liang at y.daniel.liang@gmail.com. Indicate which book and edition you are using. Thanks!

Section 10.4 Class Relationships

10.1 _____ is attached to the class of the composing class to denote the aggregation relationship with the composed object.

- ⦿ A. An empty diamond
- ◯ B. A solid diamond
- ◯ C. An empty oval
- ◯ D. A solid oval

Your answer is correct
Explanation: See Figure 10.6.

10.2 An aggregation relationship is usually represented as _____ in _____.

- ⦿ A. a data field/the aggregating class
- ◯ B. a data field/the aggregated class
- ◯ C. a method/the aggregating class
- ◯ D. a method/the aggregated class

Your answer is correct
Click here to show an explanation

10.3 Composition means _____.

- ◯ A. that data fields should be declared private
- ◯ B. that a class extends another class
- ◯ C. that a variable of supertype refers to a subtype object
- ⦿ D. that a class contains a data field that references another object

Your answer is correct
Click here to show an explanation

Section 10.7 Processing Primitive Data Type Values as Objects

10.4 Which of the following statements will convert a string s into i of int type? Please select all that apply.

- ☑ A. i = Integer.parseInt(s);
- ☑ B. i = (new Integer(s)).intValue();
- ☑ C. i = Integer.valueOf(s).intValue();
- ☑ D. i = Integer.valueOf(s);

☑ E. i = (int)(Double.parseDouble(s));

Your answer is correct
Click here to show an explanation

10.5 Which of the following statements will convert a string s into a double value d? Please select all that apply.

☑ A. d = Double.parseDouble(s);

☑ B. d = (new Double(s)).doubleValue();

☑ C. d = Double.valueOf(s).doubleValue();

Your answer is correct
Click here to show an explanation

10.6 Which of the following statements are correct? Please select all that apply.

☐ A. Integer.parseInt("12", 2);

☐ B. Integer.parseInt(100);

☑ C. Integer.parseInt("100");

☐ D. Integer.parseInt(100, 16);

☑ E. Integer.parseInt("345", 8);

Your answer is correct
Click here to show an explanation

10.7 What is the output of Integer.parseInt("10", 2)?

○ A. 1;

◉ B. 2;

○ C. 10;

○ D. Invalid statement;

Your answer is correct
Click here to show an explanation

10.8 Which of the following statements convert a double value d into a string s? Please select all that apply.

☑ A. s = Double.valueOf(d).toString();

☐ B. s = d;

☐ C. s = Double.valueOf(d).stringOf();

☐ D. s = String.stringOf(d);

☑ E. s = d + "";

Your answer is correct
Click here to show an explanation

Section 10.8 Automatic Conversion Between Primitive Types and Wrapper Class Types

10.9 You may directly assign a primitive data type value to a wrapper object. This is called _____.

◉ A. auto boxing

○ B. auto unboxing

○ C. auto conversion

○ D. auto casting

Your answer is correct
Click here to show an explanation

10.10 Analyze the following code. Please select all that apply.

```
Line 1: Integer[] intArray = {1, 2, 3};
```

```
Line 2: int i = intArray[0] + intArray[1];
Line 3: int j = i + intArray[2];
Line 4: double d = intArray[0];
```

☑ A. It is OK to assign 1, 2, 3 to an array of Integer objects in JDK 1.5.

☑ B. It is OK to automatically convert an Integer object to an int value in Line 2.

☑ C. It is OK to mix an int value with an Integer object in an expression in Line 3.

☑ D. Line 4 is OK. An int value from intArray[0] object is assigned to a double variable d.

Your answer B is incorrect
Hint: See the diagram in this section.
The correct answer is ABCD

Section 10.9 The BigInteger and BigDecimal Classes

10.11 To create an instance of BigInteger for 454, use _____. Please select all that apply.

☑ A. BigInteger.valueOf(454);

☐ B. new BigInteger(454);

☐ C. BigInteger.valueOf("454");

☑ D. new BigInteger("454");

Your answer ABCD is incorrect
Hint: See the first paragraph.
The correct answer is AD

10.12 To add BigInteger b1 to b2, you write _____. Please select all that apply.

☐ A. b1.add(b2);

☐ B. b2.add(b1);

☑ C. b2 = b1.add(b2);

☑ D. b2 = b2.add(b1);

☐ E. b1 = b2.add(b1);

Your answer is correct
Click here to show an explanation

10.13 What is the output of the following code?

```java
public class Test {
  public static void main(String[] args) {
    java.math.BigInteger x = new java.math.BigInteger("3");
    java.math.BigInteger y = new java.math.BigInteger("7");
    x.add(y);
    System.out.println(x);
  }
}
```

◉ A. 3

○ B. 4

○ C. 10

○ D. 11

Your answer is correct
Click here to show an explanation

10.14 To create an instance of BigDecimal for 454.45, use _____. Please select all that apply.

☑ A. BigDecimal.valueOf(454.45);

☐ B. new BigDecimal(454.45);

☐ C. BigDecimal("454.45");

☑ D.   new BigDecimal("454.45");

Your answer is correct
Click here to show an explanation

10.15 BigInteger and BigDecimal are immutable.

⦿ A.   true
◯ B.   false

Your answer is correct
Click here to show an explanation

10.16 To divide BigDecimal b1 by b2 and assign the result to b1, you write _____.

◯ A.   b1.divide(b2);
◯ B.   b2.divide(b1);
⦿ C.   b1 = b1.divide(b2, 20, RoundingMode.HALF_UP);
◯ D.   b1 = b2.divide(b1, 20, RoundingMode.HALF_UP);
◯ E.   b2 = b2.divide(b1, 20, RoundingMode.HALF_UP);

Your answer B is incorrect
Hint: See the first paragraph in this section.
The correct answer is C

10.17 Which of the following classes are immutable? Please select all that apply.

☑ A.   Integer
☑ B.   Double
☑ C.   BigInteger
☑ D.   BigDecimal
☑ E.   String

Your answer is correct
Click here to show an explanation

10.18 Which of the following statements are correct?

☑ A.   new java.math.BigInteger("343");
☑ B.   new java.math.BigDecimal("343.445");
☐ C.   new java.math.BigInteger(343);
☐ D.   new java.math.BigDecimal(343.445);

Your answer is correct
Click here to show an explanation

Section 10.10 The String Class

10.19 Which of the following statements is preferred to create a string "Welcome to Java"?

⦿ A.   String s = "Welcome to Java";
◯ B.   String s = new String("Welcome to Java");
◯ C.   String s; s = "Welcome to Java";
◯ D.   String s; s = new String("Welcome to Java");

Your answer is correct
Click here to show an explanation

10.20 Analyze the following code.

```
class Test {
```

```java
    public static void main(String[] args) {
      String s;
      System.out.println("s is " + s);
    }
}
```

  🔘 A. The program has a compile error because s is not initialized, but it is referenced in the println statement.

  ⚪ B. The program has a runtime error because s is not initialized, but it is referenced in the println statement.

  ⚪ C. The program has a runtime error because s is null in the println statement.

  ⚪ D. The program compiles and runs fine.

Your answer is correct
Click here to show an explanation

10.21 What is the output of the following code?

```java
public class Test {
  public static void main(String[] args) {
    String s1 = "Welcome to Java!";
    String s2 = s1;

    if (s1 == s2)
      System.out.println(
        "s1 and s2 reference to the same String object");
    else
      System.out.println(
        "s1 and s2 reference to different String objects");
  }
}
```

  🔘 A. s1 and s2 reference to the same String object

  ⚪ B. s1 and s2 reference to different String objects

Your answer is correct
Click here to show an explanation

10.22 What is the output of the following code?

```java
public class Test {
  public static void main(String[] args) {
    String s1 = "Welcome to Java!";
    String s2 = "Welcome to Java!";

    if (s1 == s2)
      System.out.println(
        "s1 and s2 reference to the same String object");
    else
      System.out.println(
        "s1 and s2 reference to different String objects");
  }
}
```

  🔘 A. s1 and s2 reference to the same String object

  ⚪ B. s1 and s2 reference to different String objects

Your answer is correct
Click here to show an explanation

10.23 What is the output of the following code?

```java
public class Test {
  public static void main(String[] args) {
    String s1 = new String("Welcome to Java!");
    String s2 = new String("Welcome to Java!");

    if (s1 == s2)
      System.out.println(
```

```
          "s1 and s2 reference to the same String object");
        else
          System.out.println(
            "s1 and s2 reference to different String objects");
    }
  }
```

   ◯ A.   s1 and s2 reference to the same String object

   ◉ B.   s1 and s2 reference to different String objects

Your answer is correct
Click here to show an explanation

10.24 What is the output of the following code?

```
public class Test {
  public static void main(String[] args) {
    String s1 = new String("Welcome to Java!");
    String s2 = new String("Welcome to Java!");

    if (s1.equals(s2))
      System.out.println("s1 and s2 have the same contents");
    else
      System.out.println("s1 and s2 have different contents");
  }
}
```

   ◉ A.   s1 and s2 have the same contents

   ◯ B.   s1 and s2 have different contents

Your answer is correct
Click here to show an explanation

10.25 What is the output of the following code?

```
public class Test {
  public static void main(String[] args) {
    String s1 = new String("Welcome to Java!");
    String s2 = s1.toUpperCase();

    if (s1 == s2)
      System.out.println("s1 and s2 reference to the same String object");
    else if (s1.equals(s2))
      System.out.println("s1 and s2 have the same contents");
    else
      System.out.println("s1 and s2 are of different objects");
  }
}
```

   ◯ A.   s1 and s2 reference to the same String object

   ◯ B.   s1 and s2 have the same contents

   ◉ C.   s1 and s2 are of different objects

Your answer is correct
Click here to show an explanation

10.26 What is the output of the following code?

```
public class Test {
  public static void main(String[] args) {
    String s1 = new String("Welcome to Java");
    String s2 = s1;

    s1 += "and Welcome to HTML";

    if (s1 == s2)
      System.out.println(
        "s1 and s2 reference to the same String object");
    else
```

```
        System.out.println(
          "s1 and s2 reference to different String objects");
    }
}
```

    ○ A.   s1 and s2 reference to the same String object

    ◉ B.   s1 and s2 reference to different String objects

Your answer is correct ✔
Click here to show an explanation

10.27 Suppose s1 and s2 are two strings. Which of the following statements or expressions are incorrect? Please select all that apply.

    ☐ A.   String s = new String("new string");

    ☐ B.   String s3 = s1 + s2

    ☑ C.   s1 >= s2

    ☑ D.   int i = s1.length

    ☑ E.   s1.charAt(0) = '5'

Your answer is correct ✔
Click here to show an explanation

10.28 What is the output of the following code?

```
String s = "University";
s.replace("i", "ABC");
System.out.println(s);
```

    ○ A.   UnABCversity

    ○ B.   UnABCversABCty

    ○ C.   UniversABCty

    ◉ D.   University

Your answer is correct ✔
Click here to show an explanation

10.29 Assume s is "ABCABC", the method _____ returns a new string "aBCaBC". Please select all that apply.

    ☐ A.   s.change('A', 'a')

    ☐ B.   s.change('a', 'A')

    ☑ C.   s.replace('A', 'a')

    ☐ D.   s.replace('a', 'A')

    ☑ E.   s.replace("ABCABC", "aBCaBC")

Your answer is correct ✔
Click here to show an explanation

10.30 What is displayed by the following code?

```
public static void main(String[] args) {
  String[] tokens = "Welcome to Java".split("o");
  for (int i = 0; i < tokens.length; i++) {
    System.out.print(tokens[i] + " ");
  }
}
```

    ○ A.   Welcome to Java

    ○ B.   Welc me to Java

    ◉ C.   Welc me t Java

    ○ D.   Welcome t Java

Your answer is correct ✓
Click here to show an explanation

10.31 What is displayed by the following statement?

```
System.out.println("Java is neat".replaceAll("is", "AAA"));
```

- ○ A. JavaAAAneat
- ○ B. JavaAAA neat
- ⊙ C. Java AAA neat
- ○ D. Java AAAneat

Your answer is correct ✓
Click here to show an explanation

Section 10.10.3 Matching, Replacing, and Splitting by Patterns

10.32 What is displayed by the following code?

```
System.out.print("Hi, ABC, good".matches("ABC ") + " ");
System.out.println("Hi, ABC, good".matches(".*ABC.*"));
```

- ○ A. false false
- ○ B. true false
- ○ C. true true
- ⊙ D. false true

Your answer C is incorrect ✗
Hint: "Hi, ABC, good" does not match "ABC ". "Hi, ABC, good" matches the regex ".*ABC.*". The regex .* means zero or more any characters.
The correct answer is D

10.33 What is displayed by the following code?

```
System.out.print("A,B;C".replaceAll(",;", "#") + " ");
System.out.println("A,B;C".replaceAll("[,;]", "#"));
```

- ○ A. A B C A#B#C
- ○ B. A#B#C A#B#C
- ⊙ C. A,B;C A#B#C
- ○ D. A B C A B C

Your answer is correct ✓
Click here to show an explanation

10.34 What is displayed by the following code?

```
String[] tokens = "A,B;C;D".split("[,;]");
for (int i = 0; i < tokens.length; i++)
  System.out.print(tokens[i] + " ");
```

- ○ A. A,B;C;D
- ⊙ B. A B C D
- ○ C. A B C;D
- ○ D. A B;C;D

Your answer is correct ✓
Click here to show an explanation

Section 10.10.4 Conversion between Strings and Arrays

10.35 Which of the following is the correct statement to return a string from an array a of characters?

- ○ A. toString(a)
- ⊙ B. new String(a)

○ C. convertToString(a)

○ D. String.toString(a)

Your answer is correct
Click here to show an explanation

10.36 Assume s is " abc ", the method _____ returns a new string "abc".

○ A. s.trim(s)

○ B. trim(s)

○ C. String.trim(s)

◉ D. s.trim()

Your answer is correct
Click here to show an explanation

10.37 Assume s is "ABCABC", the method _____ returns an array of characters.

○ A. toChars(s)

◉ B. s.toCharArray()

○ C. String.toChars()

○ D. String.toCharArray()

○ E. s.toChars()

Your answer is correct
Click here to show an explanation

Section 10.10.5 Converting Characters and Numeric Values

10.38 _____ returns a string. Please select all that apply.

☑ A. String.valueOf(123)

☑ B. String.valueOf(12.53)

☑ C. String.valueOf(false)

☑ D. String.valueOf(new char[]{'a', 'b', 'c'})

Your answer B is incorrect
Hint: See Figure 10.17.
The correct answer is ABCD

Section 10.11 The StringBuilder/StringBuffer Class

10.39 The following program displays _____.

```java
public class Test {
  public static void main(String[] args) {
    String s = "Java";
    StringBuilder builder = new StringBuilder(s);
    change(s);
    System.out.println(s);
  }

  private static void change(String s) {
    s = s + " and HTML";
  }
}
```

◉ A. Java

○ B. Java and HTML

○ C. and HTML

○ D. nothing is displayed

Your answer is correct

Click here to show an explanation

10.40 Analyze the following code.

```java
class Test {
  public static void main(String[] args) {
    StringBuilder strBuilder = new StringBuilder(4);
    strBuilder.append("ABCDE");
    System.out.println("What's strBuilder.charAt(5)? "
      + strBuilder.charAt(5));
  }
}
```

   ○ A. The program has a compile error because you cannot specify initial capacity in the StringBuilder constructor.

   ○ B. The program has a runtime error because because the builder's capacity is 4, but five characters "ABCDE" are appended into the builder.

   ◉ C. The program has a runtime error because the length of the string in the builder is 5 after "ABCDE" is appended into the builder. Therefore, strBuilder.charAt(5) is out of range.

   ○ D. The program compiles and runs fine.

Your answer is correct
Click here to show an explanation

10.41 The following program displays _____.

```java
public class Test {
  public static void main(String[] args) {
    String s = "Java";
    StringBuilder builder = new StringBuilder(s);
    change(builder);
    System.out.println(builder);
  }

  private static void change(StringBuilder builder) {
    builder.append(" and HTML");
  }
}
```

   ○ A. Java

   ◉ B. Java and HTML

   ○ C. and HTML

   ○ D. nothing is displayed

Your answer is correct
Click here to show an explanation

10.42 Which of the following is true? Please select all that apply.

   ☑ A. You can add characters into a string builder.

   ☑ B. You can delete characters from a string builder.

   ☑ C. You can reverse the characters in a string buffer.

   ☑ D. The capacity of a string buffer can be automatically adjusted.

Your answer is correct
Click here to show an explanation

10.43 Assume StringBuilder strBuilder is "ABCDEFG", after invoking _____, strBuilder contains "AEFG".

   ○ A. strBuilder.delete(0, 3)

   ○ B. strBuilder.delete(1, 3)

   ◉ C. strBuilder.delete(1, 4)

   ○ D. strBuilder.delete(2, 4)

Your answer is correct ✓
Click here to show an explanation

10.44 Assume StringBuilder strBuilder is "ABCDEFG", after invoking _____, strBuilder contains "ABCRRRRDEFG".

   ○ A.   strBuilder.insert(1, "RRRR")

   ○ B.   strBuilder.insert(2, "RRRR")

   ◉ C.   strBuilder.insert(3, "RRRR")

   ○ D.   strBuilder.insert(4, "RRRR")

Your answer is correct ✓
Click here to show an explanation

10.45 Assume StringBuilder strBuilder is "ABCCEFC", after invoking _____, strBuilder contains "ABTTEFT".

   ○ A.   strBuilder.replace('C', 'T')

   ○ B.   strBuilder.replace("C", "T")

   ○ C.   strBuilder.replace("CC", "TT")

   ○ D.   strBuilder.replace('C', "TT")

   ◉ E.   strBuilder.replace(2, 7, "TTEFT")

Your answer is correct ✓
Click here to show an explanation

10.46 The StringBuilder methods _____ not only change the contents of a string builder, but also returns a reference to the string builder. Please select all that apply.

   ☑ A.   delete

   ☑ B.   append

   ☑ C.   insert

   ☑ D.   reverse

   ☑ E.   replace

Your answer is correct ✓
Click here to show an explanation

Section 10.11.2 The toString, capacity, length, setLength, and charAt Methods

10.47 _____ returns the last character in a StringBuilder variable named strBuilder?

   ◉ A.   strBuilder.charAt(strBuilder.length() - 1)

   ○ B.   strBuilder.charAt(strBuilder.capacity() - 1)

   ○ C.   StringBuilder.charAt(strBuilder.length() - 1)

   ○ D.   StringBuilder.charAt(strBuilder.capacity() - 1)

Your answer is correct ✓
Click here to show an explanation