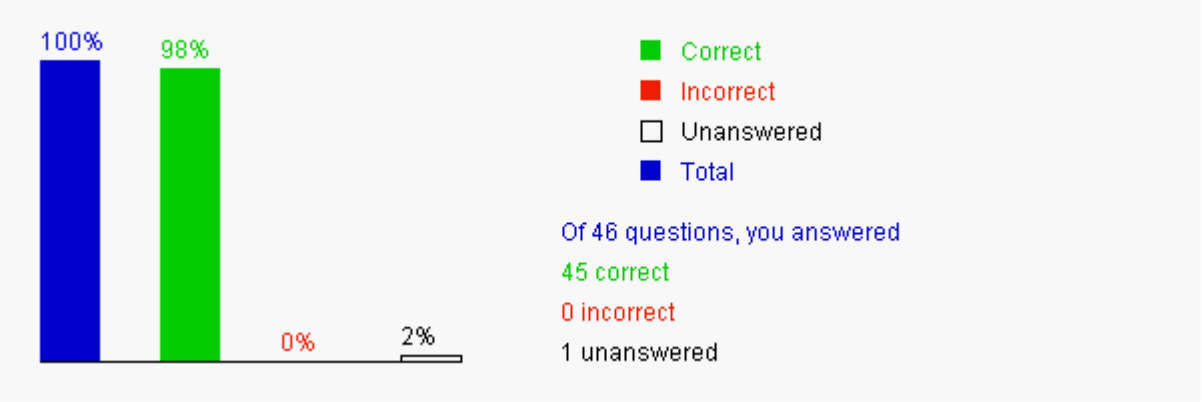
This quiz is for students to practice. A large number of additional quiz is available for instructors using Quiz Generator from the Instructor's Resource Website. Videos for Java, Python, and C++ can be found at https://yongdanielliang.github.io/revelvideos.html.

Chapter 10 Object-Oriented Thinking



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 ✔

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 ✔

Section 10.7 Processing Primitive Data Type Values as Objects

10.3 Which of the following statements will convert a string s into i of int type?

- [x] A. i = Integer.parseInt(s);
- [x] B. i = (new Integer(s)).intValue();
- [x] C. i = Integer.valueOf(s).intValue();
- [x] D. i = Integer.valueOf(s);
- [x] E. i = (int)(Double.parseDouble(s));

Your answer is correct ✔
Explanation: All fine. d performs an auto conversion from an Integer object to int.

10.4 Which of the following statements will convert a string s into a double value d?

- ( ) A. d = Double.parseDouble(s);
- ( ) B. d = (new Double(s)).doubleValue();
- ( ) C. d = Double.valueOf(s).doubleValue();
- (●) D. All of the above.

Your answer is correct ✔
Explanation: All are fine. a is preferred because it does not have to create an object.

10.5 Which of the following statements convert a double value d into a string s?

- [x] A. s = (new Double(d)).toString();
- [ ] B. s = d;
- [ ] C. s = new Double(d).stringOf();
- [ ] D. s = String.stringOf(d);
- [x] E. s = d + "";

Your answer is correct

10.6 Which of the following statements are correct?

- [ ] A. Integer.parseInt("12", 2);
- [ ] B. Integer.parseInt(100);
- [x] C. Integer.parseInt("100");
- [ ] D. Integer.parseInt(100, 16);
- [x] E. Integer.parseInt("345", 8);

Your answer is correct
Explanation: A is incorrect because 12 is not a binary number. (B) and (D) are incorrect because the first argument in the parseInt method must be a string.

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

- ( ) A. 1;
- (•) B. 2;
- ( ) C. 10;
- ( ) D. Invalid statement;

Your answer is correct
Explanation: Based on 2, 10 is 2 in decimal.

Section 10.8 Automatic Conversion Between Primitive Types and Wrapper Class Types

10.8 In JDK 1.5, 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

10.9 In JDK 1.5, analyze the following code.

```
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];
```

- [x] A. It is OK to assign 1, 2, 3 to an array of Integer objects in JDK 1.5.
- [x] B. It is OK to automatically convert an Integer object to an int value in Line 2.
- [x] C. It is OK to mix an int value with an Integer object in an expression in Line 3.
- [x] D. Line 4 is OK. An int value from intArray[0] object is assigned to a double variable d.

Your answer is correct

Section 10.9 The BigInteger and BigDecimal Classes

10.10 To create an instance of BigInteger for 454, use

- ( ) A. BigInteger(454);
- ( ) B. new BigInteger(454);
- ( ) C. BigInteger("454");
- (•) D. new BigInteger("454");

Your answer is correct

10.11 To create an instance of BigDecimal for 454.45, use

- [ ] A. BigDecimal(454.45);
- [x] B. new BigDecimal(454.45);
- [ ] C. BigDecimal("454.45");
- [x] D. new BigDecimal("454.45");

Your answer is correct

10.12 BigInteger and BigDecimal are immutable

- (•) A. true

- ○ B. false

Your answer is correct 

10.13 To add BigInteger b1 to b2, you write _____.

- ☐ 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 

10.14 What is the output of the following code?

```
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 

10.15 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);
- ○ D. b1 = b2.divide(b1);
- ○ E. b2 = b2.divide(b1);

Your answer is correct 

10.16 Which of the following classes are immutable?

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

Your answer is correct 

10.17 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 

Section 10.10 The String Class

10.18 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 

Explanation: (a) is better than (b) because the string created in (a) is interned. Since strings are immutable and are ubiquitous in programming, to improve efficiency and save memory, the JVM uses a unique instance for string literals with the same character sequence. Such an instance is called interned. The JVM (a) is simpler than (c).

10.19 What is the output of the following code?

```
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 

10.21 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 == 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 

10.22 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 

10.23 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 have different contents");
  }
}
```

- ( ) A. s1 and s2 reference to the same String object
- ( ) B. s1 and s2 have the same contents
- (●) C. s1 and s2 have different contents

Your answer is correct

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 = 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

10.25 Suppose s1 and s2 are two strings. Which of the following statements or expressions are incorrect?

- ☐ 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

10.26 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
Explanation: No method in the String class can change the content of the string. String is an immutable class.

10.27 Analyze the following code.

```
class Test {
  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

10.28 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

10.29 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 

10.30 Assume s is "ABCABC", the method _____ returns a new string "aBCaBC".

- ☐ A. s.toLowerCase(s)
- ☐ B. s.toLowerCase()
- ☑ C. s.replace('A', 'a')
- ☐ D. s.replace('a', 'A')
- ☑ E. s.replace("ABCABC", "aBCaBC")

Your answer is correct 

10.31 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 

10.32 _____ returns a string.

- ☑ A. String.valueOf(123)
- ☑ B. String.valueOf(12.53)
- ☑ C. String.valueOf(false)
- ☑ D. String.valueOf(new char[]{'a', 'b', 'c'})

Your answer is correct 

10.33 The following program displays _____.

```
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 

Explanation: Inside the method, the statement s = s + ' and HTML' creates a new String object s, which is different from the original String object passed to the change(s) method. The original String object has not been changed. Therefore, the output from the original string is Java.

10.34 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 

10.35 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

10.36 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 is correct

10.37 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

10.38 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

Section 10.11 The StringBuilder/StringBuffer Class

10.39 Analyze the following code.

```
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

Explanation: The charAt method returns the character at a specific index in the string builder. The first character of a string builder is at index 0, the next at index 1, and so on. The index argument must be greater than or equal to 0, and less than the length of the string builder.

10.40 Which of the following is true?

- [x] A. You can add characters into a string builder.
- [x] B. You can delete characters from a string builder.
- [x] C. You can reverse the characters in a string buffer.

- [x] D. The capacity of a string buffer can be automatically adjusted.

Your answer is correct

10.41 _____ 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

10.42 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

10.43 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

10.44 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

10.45 The StringBuilder methods _____ not only change the contents of a string builder, but also returns a reference to the string builder.

- [x] A. delete
- [x] B. append
- [x] C. insert
- [x] D. reverse
- [x] E. replace

Your answer is correct

10.46 The following program displays _____.

```
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

Explanation: Inside the method, the content of the StringBuilder object is changed to Java and HTML. Therefore, the output from builder is Java and HTML.