SCJA Exercises Day 5

- **Multiple Choice**

In today's lab we give questions covering the following topics:

- Working with Strings
- Public and Private
- Static Variables and Methods
- Char Data Type and Strings
- Polymorphism

- **Coding Questions**
  - Following an online tutorial: http://www.freejavaguide.com/corejava.htm
  - Try running and understanding the code examples in Parts 3 and 4
  - Feel free to continue on with the tutorial (part 5) in your own time, although this is outside the scope of the SCJA exam

Multiple Choice

Working with Strings

1. Given:

```
System.out.print(3 + 3 + "3");
System.out.print(" and ");
System.out.println("3" + 3 + 3);
```

What will be printed out?

A. 333 and 333
B. 63 and 63
C. 333 and 63
D. 63 and 333

2. Consider the interface CharSequence that is a required argument in one of the replace method declarations:

```
public Stringreplace(CharSequencetarget,CharSequencereplacement){
  ...
}
```

This CharSequence interface is a super interface to which concrete classes?

A. String
B. StringBoxer
C. StringBuffer
D. StringBuilder

3. Which statement is **false** about the toString method?

A. The toString method is a method of the Object class.
B. The toString method returns a string representation of the object.
C. The toString method must return the object's state information in the form of a string.
D. The toString method is commonly overridden.

4. Which indexOf method declaration is **invalid**?

A. indexOf(int ch)
B. indexOf(int ch, int fromIndex)
C. indexOf(String str, int fromIndex)
D. indexOf(CharSequence str, int fromIndex)

Answers

1 Answer:
D.The (+) operators have left-to-right association. The first two operands of the first statement are numeric, so the addition (+) operator is used. Therefore, 3 + 3 = 6. Since 6 + "3" uses a string as an operand, the string concatenation (+) operator is used. Therefore, concatenating the strings “6” and “3” renders the string “63”. The last statement is handled a little differently. The first operand is a String, therefore the string concatenation operator is used with the other operands. Thus, concatenating strings “3” + “3” + “3” renders the string “333”. The correct answer is “63 and 333”. A, B, and C are incorrect. Note that changing ("3" + 3 + 3) to ("3" + (3 + 3)) would have rendered “36”.

2 Answer:
A, C, and D. The concrete classes String, StringBuffer, and StringBuilder all implement the interface CharSequence. These classes can all be used in a polymorphic manner in regards to CharSequence being an expected argument in one of the String class’s replace methods. B is incorrect. There is no such thing as a StringBoxer class.

3 Answer:
C. While the toString method is commonly used to return the object’s state information, any information that can be gathered may be returned in the string. A, B, and D are incorrect answers since they all represent true statements. A is incorrect because the toString method is a method of the Object class. B is incorrect because the toString method returns a string representation of the object. D is incorrect because the toString method is also commonly overridden.

4 Answer:
D. The method declaration including indexOf(CharSequence str, int fromIndex)is invalid. CharSequence is not used as an argument in any indexOf method. Note that String, StringBuffer, and StringBuilder all declare their own indexOf methods. A , B, and C are incorrect because they are all valid method declarations.

Public and Private

1. Given a property called ageLimit of type int, what would be the correctly named accessor for this property?
    a) public void ageLimit()
    b) public int getAgeLimit()
    c) public int getAgelimit()
    d) public int getAgelimit(int age)

2. Private variables:
    a) are read only if only an accessor is provided
    b) are set only if only a mutator is provided
    c) cannot be directly accessed by parent class
    d) cannot be directly accessed by subclasses

3. Internal methods of a class should:
    a) be marked as private, so only the class can access them
    b) be marked as private, so external classes cannot see them
    c) have instance properties passed as arguments to the method
    d) be able to access all instance methods of the class

4. Which symbol denotes a public method or variable?
    a) #
    b) *
    c) -
    d) +

5. Protecting instance variables by making them private is known as which of the following concepts?
Select the correct answer:

a. data inheritance
b. data implementation
c. data encapsulation
d. data privating

Answers

1. Answer
b

2 Answer
a, b, c and d

3. Answer
a, b and d

4. Answer
d

5. Answer
c. is correct.

Static Variables and Methods

1.A non static method can only access other non static methods or non static variables.
Select the correct answer:
a. The statement is true
b. The statement is false

2.How can a static method help()of the utility class CertificationUtil be invoked?
Select all correct answers:
a. Create an instance of CertificationUtil and call the help() method on the instance
b. Use CertificationUtil->help() to invoke the method
c. Use CertificationUtil.getHelp() to invoke the method
d. Use CertificationUtil.help() to invoke the method

3.Which of the following statements about static variables are true?
Select all correct answers:
a. Changing the value of a static variable is not possible
b. A static variable must be private
c. An interface cannot contain static variables
d. None of the above

4. What variable scope is best suited for a temporary variable?

A. Local variable
B. Static variable
C. Global variable
D. Method parameter
E. Instance variable

Answers

1.Answer
b. is correct.

2.Answer
a. and d. are correct.

3.Answer
d. is correct.

4. Answer:
A. A variable should also be declared using the least amount of scope. Since a temporary variable will normally only be used for a few lines of code, it should be declared as a local variable. B, C, D, and E are incorrect.

Char Data Type and Strings

1. Which of the following primitives are known as the floating point datatypes?
Select all correct answers:
a. int
b. short
c. double
d. float
e. char

2.Which of the given code fragments will compile without errors?
Select all correct answers:
a. float f=3.5;
b. double d=3.5;
c. int i=10;
d. int e,f=10;
e. char c = "C";

3. Given:

```
String tenCharString = "AAAAAAAAAA";
System.out.println(tenCharString.replace("AAA", "LLL"));
```

What is printed to the standard out?

A. AAAAAAAAAA
B. LLLAAAAAAA
C. LLLLLLLLLA
D. LLLLLLLLLL

4. Which indexOf method declaration is invalid?

A. indexOf(int ch)
B. indexOf(int ch, int fromIndex)
C. indexOf(String str, int fromIndex)
D. indexOf(CharSequence str, int fromIndex)

Answers

1.Answer
c. and d. are correct.

2.Answer
b. c. and d. are correct.

3. Answer:
C. The replace method of the String class replaces all instances of the specified string. The first three instances of AAA are replaced by LLL, making LLLLLLLLLA. A, B, and D are incorrect answers as justified by the correct answer's explanation.

4. Answer:
D. The method declaration including indexOf(CharSequence str, int fromIndex)is invalid. CharSequence is not used as an argument in any indexOf method. Note that String, StringBuffer, and StringBuilder all declare their own indexOf methods. A, B, and C are incorrect because they are all valid method declarations.

Polymorphism

1. Which statement is true about the term polymorphism?
   - A. It is a Latin word that roughly means "changeable."
   - B. It is a Greek word that roughly means "many forms."
   - C. It is an Old English word that roughly means "insectlike."
   - D. It is a new technical term that means "Java object."

2. What type of object can polymorphically behave as another?
   - A. An object can act as any subclass of the class it was created from.
   - B. An object can act as any superclass of the class it was created from.
   - C. An object can act as any other abstract class.

3. Polymorphism helps to facilitate which of the following? (Choose all that apply.)
   - A. Highly optimized code
   - B. Code reuse
   - C. Code obfuscation
   - D. Code that is generic and flexible

4. What is a correct "is-a" relationship?
   - A. A specific object "is-a" more generic one.
   - B. A generic object "is-a" more specific one.
   - C. A null object "is-an" object.

5. Which of the following statements explain why an object can polymorphically behave as an interface?

A. By implementing the interface, the object is required to have all of the functionality that the interface presents.
B. By implementing the interface, the object inherits all the required methods it defines.
C. An object can behave as an interface because interfaces do not have a strict expected behaviour and therefore any object can act as an interface.

Answers

1. Answer:
B. The word polymorphism comes from the Greeks and means “many forms.” A, C, and D are incorrect.

2 Answer:
B An object inherits all of the functionality of its superclasses, and therefore can polymorphically behave as they do. A and C are incorrect. A is incorrect because an object cannot behave as its subclass since this class is more specific and contains functionality that is not present in the superclass. C is incorrect because there needs to be an “is-a” relationship between the classes. This answer does not mention what the relationship is.

3 Answer:
B and D. Polymorphism aids in creating reusable code because it allows the code to be written more abstractly, thus B is correct. Similar to B, polymorphism allows the code to be generic by using generic data types that any more specific object can fulfill. Thus, D is also correct. A and C are incorrect. A is incorrect because polymorphism has no effect on the level of optimization of the code. C is incorrect because obfuscated code (code that is intentionally hard to read) is not related to polymorphism.

4 Answer:
A. A more specific object can be considered to be a more generic one. This is the fundamental principle of polymorphism. B and C are incorrect. B is incorrect because generic objects do not have all of the functionality of more specific ones and therefore do not possess an “is-a” relationship with the specific objects. C is incorrect because a null object has no effect on its relationship with other objects.

5 Answer:
A. When a class implements an interface it is then required to implement all the methods the interface contains. This gives the class the functionality defined in the interface and therefore allows this class to behave as the interface. B and C are incorrect. B is incorrect because nothing is inherited when an interface is implemented. C is incorrect because each interface has a strict behaviour expected of it. This is represented by the methods that must be implemented.