1. Which Of the following four modifiers, choose the one that is not implicitly applied to all interface variables.

A. `final`

B. `abstract`

C. `static`

D. `public`

2. What is the output of the following application?

```
package race;
abstract class Car {
static { System.out.print("1"); }
public Car(String name) {
super();
System.out.print("2");
}
{ System.out.print("3"); }
}public class BlueCar extends Car {
{ System.out.print("4"); }
public BlueCar() {
super("blue");
System.out.print("5");
}
public static void main(String[] gears) {
new BlueCar();
}
}
```

A. 23451

B. 12354

C. 13245

D. The code does not compile.

3. Fill in the blank: Overloaded and overridden methods always have_____ .
A. the same parameter list
B. different return types
C. the same method name
D. covariant return types

4. What is the output of the following application?

```
package sports;
abstract class Ball {
protected final int size;
public Ball(int size) {
this.size = size;
}
}interface Equipment {}
public class SoccerBall extends Ball implements Equipment {
public SoccerBall() {
super(5);
}
public Ball get() { return this; }
public static void main(String[] passes) {
Equipment equipment = (Equipment)(Ball)new SoccerBall().get();
System.out.print(((SoccerBall)equipment).size);
}
}
```

A. 5

B. The code does not compile due an invalid cast.

C. The code does not compile for a different reason.

D. The code compiles but throws a `ClassCastException` at runtime.

5. Fill in the blanks: A class that defines an instance variable with the same name as a variable in the parent class is referred to as _____a variable, while a class that defines a `static` method with the same signature as a `static` method in a parent class is referred to as _____a method.

A. hiding, overriding
B. overriding, hiding
C. hiding, hiding
D. replacing, overriding

6. Which statement about the following class is correct?

```
package shapes;
abstract class Parallelogram {
private int getEqualSides() {return 0;}
}abstract class Rectangle extends Parallelogram {
public static int getEqualSides() {return 2;} // x1
}public final class Square extends Rectangle {
public int getEqualSides() {return 4;} // x2
public static void main(String[] corners) {
final Square myFigure = new Square(); // x3
System.out.print(myFigure.getEqualSides());
}
}
```

A. The code does not compile due to line x1.
B. The code does not compile due to line x2.
C. The code does not compile due to line x3.
D. The code compiles and runs without issue.

7. What is the output of the following application?

```
package flying;
class Rotorcraft {
protected final int height = 5;
abstract int fly();
}public class Helicopter extends Rotorcraft {
private int height = 10;
protected int fly() {
return super.height;
}
public static void main(String[] unused) {
Helicopter h = (Helicopter)new Rotorcraft();
System.out.print(h.fly());
}
}
```

A. 5

B. 10

C. The code does not compile.

D. The code compiles but produces a `ClassCastException` at runtime.

8. Fill in the blanks: A class may be assigned to a(n) _____ reference variable automatically but requires an explicit cast when assigned to a(n) _____ reference variable.

A. subclass, outer class
B. superclass, subclass
C. subclass, superclass
D. abstract class, concrete class

9. Fill in the blank: A(n) _____is the first non-abstract subclass that is
required to implement all of the inherited abstract methods.
A. abstract class
B. abstraction
C. concrete class
D. interface

10. How many compiler errors does the following code contain?

```
package animal;
interface CanFly {
public void fly() {}
}final class Bird {
public int fly(int speed) {}
}public class Eagle extends Bird implements CanFly {
public void fly() {}
}
```

A. None
B. One
C. Two
D. Three

11. Which of the following is not an attribute common to both abstract classes and
interfaces?
A. They both can contain `static` variables.
B. They both can contain `default` methods.
C. They both can contain `static` methods.
D. They both can contain `abstract` methods.

12. What is the output of the following application?

```
package musical;
interface SpeakDialogue { default int talk() { return 7; } }
interface SingMonologue { default int talk() { return 5; } }
public class Performance implements SpeakDialogue, SingMonologue {
public int talk(String... x) {
return x.length;
}
public static void main(String[] notes) {
System.out.print(new Performance().talk(notes));
}
}
```

A. 7

B. 5

C. The code does not compile.

D. The code compiles without issue, but the output cannot be determined until runtime.

13. Which of the following is a virtual method?
A. `protected` instance methods
B. `static` methods
C. `private` instance methods
D. `final` instance methods

14. Fill in the blanks: An interface _____another interface, while a class _____another class.
A. implements, extends
B. extends, extends
C. implements, implements
D. extends, implements

15. What is the output of the following application?

```
class Math {
public final double secret = 2;
}class ComplexMath extends Math {
public final double secret = 4;
}public class InfiniteMath extends ComplexMath {
public final double secret = 8;
public static void main(String[] numbers) {
Math math = new InfiniteMath();
System.out.print(math.secret);
}
}
```

A. 2

B. 4

C. 8

D. The code does not compile.

16. Given the following method and the fact that `FileNotFoundException` is a subclass of `IOException`, which of the following method signatures is a valid override by a subclass?

```
protected void dance() throws FileNotFoundException {}
```

A. `void dance() throws IOException`

B. `public void dance() throws IOException`

C. `private void dance() throws FileNotFoundException`

D. `public final void dance()`

17. Given the class definitions below, which value, when inserted into the blank line, does not allow the class to compile?

```
public class Canine {}
public class Dog extends Canine {}
public class Wolf extends Canine {}
public final class Husky extends Dog {}
public class Zoologist {
Canine animal;
public final void setAnimal(Dog animal) { this.animal = animal; }
public static void main(String[] furryFriends) {
new Zoologist().setAnimal(_____);
}
}
```

A. `new Husky()`

B. `new Dog()`

C. `new Wolf()`

D. `null`

18. Which of the following modifiers cannot be applied to an interface method?

A. `final`

B. `default`

C. `static`

D. `abstract`

19. Which statement about the following application is true?

```
package party;
abstract class House {
protected abstract Object getSpace();
}abstract class Room extends House {
abstract Object getSpace(Object list);
}abstract public class Ballroom extends House {
protected abstract Object getSpace();
public static void main(String[] squareFootage) {
System.out.print("Let's start the party!");
}
}
```

A. It compiles and at runtime prints `Let's start the party!`
B. It does not compile for one reason.
C. It does not compile for two reasons.
D. It does not compile for three reasons.

20. Fill in the blanks: _____methods must have a different list of parameters,while _____methods must have the exact same return type.
A. Overloaded, overridden
B. Inherited, overridden
C. Overridden, overloaded
D. None of the above

21. Which of the following statements about no-argument constructors is correct?
A. If a parent class does not include a no-argument constructor, a child class cannot declare one.
B. If a parent class does not include a no-argument constructor (nor a default one inserted by the compiler), a child class must contain at least one constructor definition.
C. If a parent class contains a no-argument constructor, a child class must contain a no-argument constructor.
D. If a parent class contains a no-argument constructor, a child class must contain at least one constructor.

22. Fill in the blanks: The _____determines which attributes exist in memory, while the _____determines which attributes are accessible by the caller.
A. reference type, signature
B. object type, superclass
C. reference type, object type
D. object type, reference type

23. Given that `Integer` and `Long` are subclasses of `Number`, what type can be used to fill in the blank in the class below to allow it to compile?

```
package orchestra;
interface MusicCreator { public Number play(); }
abstract class StringInstrument { public Long play() {return 3L;} }
public class Violin extends StringInstrument implements MusicCreator {
public _____ play() {
return 12;
}
}
```

A. `Long`

B. `Integer`

C. `Long` or `Integer`

D. `Long` or `Number`

24. Which of the following is the best reason for creating a `default` interface method?
A. Allow interface methods to be inherited.
B. Add backward compatibility to existing interfaces.
C. Give an interface the ability to create concrete methods.
D. Allow an interface to define a method at the class level.

25. Given that `EOFException` is a subclass of `IOException`, what is the output of the following application?

```
package ai;
import java.io.*;
class Machine {
public boolean turnOn() throws EOFException {return true;}
}public class Robot extends Machine {
public boolean turnOn() throws IOException {return false;}
public static void main(String[] doesNotCompute) throws Exception {
Machine m = new Robot();
System.out.print(m.turnOn());
}
}
```

A. `true`

B. `false`

C. The code does not compile.

D. The code compiles but produces an exception at runtime.