1. How many lines of the following program contain compilation errors?

```
package theater;
class Cinema {
   private String name;
   public Cinema(String name) {this.name = name;}
}
public class Movie extends Cinema {
   public Movie(String movie) {}
   public static void main(String[] showing) {
      System.out.print(new Movie("Another Trilogy").name);
   }
}
```

   A. `None`

   B. One

   C. Two

   D. Three

2. Which modifier can be applied to an `abstract` interface method?

   A. `protected`

   B. `static`

   C. `final`

   D. `public`

3. What is the output of the following application?

```
package radio;
public class Song {
   public void playMusic() {
      System.out.print("Play!");
   }
   private static int playMusic() {
      System.out.print("Music!");
   }
   public static void main(String[] tracks) {
      new Song().playMusic();
   }
}
```

   A. `Play!`

   B. `Music!`

   C. The code does not compile.

   D. The code compiles but the answer cannot be determined until runtime.

4. Which of the following statements about inheritance is true?

   A. Inheritance allows objects to access commonly used attributes and methods.

B. Inheritance always leads to simpler code.

C. All primitives and objects inherit a set of methods.

D. Inheritance allows you to write methods that reference themselves.

5. Given the class declaration below, which value cannot be inserted into the blank line that would allow the code to compile?

```
package mammal;
interface Pet {}
public class Canine implements Pet {
   public ___________ getDoggy() {
      return this;
   }
}
```

A. `Class`

B. `Pet`

C. `Canine`

D. `Object`

6. Imagine you are working with another team to build an application. You are developing code that uses a class that the other team has not finished writing yet. Which element of Java would best facilitate this development, allowing easy integration once the other team's code is complete?

A. An abstract class

B. An interface

C. `static` methods

D. An access modifier

7. What is the output of the following application?

```
package vehicles;
class Automobile {
   private final String drive() { return "Driving vehicle"; }
}
class Car extends Automobile {
   protected String drive() { return "Driving car"; }
}
public class ElectricCar extends Car {
   public final String drive() { return "Driving electric car"; }
   public static void main(String[] wheels) {
      final Car car = new ElectricCar();
      System.out.print(car.drive());
   }
}
```

A. `Driving vehicle`

B. `Driving electric car`

C. `Driving car`

D. The code does not compile.

8. Which of the following statements about inheritance is correct?

A. Java does not support multiple inheritance.

B. Java allows multiple inheritance using abstract classes.

C. Java allows multiple inheritance using non-abstract classes.

D. Java allows multiple inheritance using interfaces.

9. How many changes need to be made to the classes below to properly override the `watch()` method?

```
package entertainment;
class Television {
   protected final void watch() {}
}
public class LCD extends Television {
   Object watch() {}
}
```

A. One

B. Two

C. Three

D. None; the code compiles as is.

10. Which of the following statements about overriding a method is incorrect?

A. The return types must be covariant.

B. The access modifier of the method in the child class must be the same or broader than the method in the superclass.

C. A checked exception thrown by the method in the parent class must be thrown by the method in the child class.

D. A checked exception thrown by a method in the child class must be the same or narrower than the exception thrown by the method in the parent class.

11. What is the output of the following application?

```
package machines;
class Computer {
   protected final int process() { return 5; }
}
public class Laptop extends Computer {
   public final int process() { return 3; }
   public static void main(String[] chips) {
      System.out.print(new Laptop().process());
```

```
   }
}
```

A. `5`

B. `3`

C. The code does not compile.

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

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

```
package edu;
import java.io.*;
class School {
   public int getNumberOfStudentsPerClassroom(String... students)
throws IOException {
      return 3;
   }
   public int getNumberOfStudentsPerClassroom() throws IOException {
      return 9;
   }
}
public class HighSchool extends School {
   public int getNumberOfStudentsPerClassroom() throws FileNotFoundException
{
      return 2;
   }
   public static void main(String[] students) throws IOException {
      School school = new HighSchool();
      System.out.print(school.getNumberOfStudentsPerClassroom());
   }
}
```

A. `2`

B. `3`

C. `9`

D. The code does not compile.

13. Which modifier can be applied to an interface method?

A. `protected`

B. `static`

C. `private`

D. `final`

14. What is the output of the following application?

```
package track;
interface Run {
```

```
   default void walk() {
      System.out.print("Walking and running!");
   }
}
interface Jog {
   default void walk() {
      System.out.print("Walking and jogging!");
   }
}

public class Sprint implements Run, Jog {
   public void walk() {
      System.out.print("Sprinting!");
   }
   public static void main() {
      new Sprint().walk();
   }
}
```

A. `Walking and running!`

B. `Walking and jogging!`

C. `Sprinting!`

D. The code does not compile.

5. Which of the following statements about interfaces is not true?

A. An interface can extend another interface.

B. An interface can implement another interface.

C. A class can implement two interfaces.

D. A class can extend another class.

6. What is the output of the following application?

```
package transport;

class Ship {
   protected int weight = 3;
   private int height = 5;
   public int getWeight() { return weight; }
   public int getHeight() { return height; }
}

public class Rocket extends Ship {
   public int weight = 2;
   public int height = 4;
   public void printDetails() {
      System.out.print(super.getWeight()+","+super.height);
   }
   public static final void main(String[] fuel) {
      new Rocket().printDetails();
   }
}
```

A. `2,5`

B. `3,4`

C. `3,5`

D. The code does not compile.

17. Fill in the blanks: Excluding `default` and `static` methods, a(n) _____can contain both abstract and concrete methods, while a(n) _____contains only abstract methods.

A. concrete class, abstract class

B. concrete class, interface

C. interface, abstract class

D. abstract class, interface

18. Which statement about the following class is correct?

```
package shapes;

abstract class Triangle {
   abstract String getDescription();
}
class RightTriangle extends Triangle {
   protected String getDescription() { return "rt"; } // g1
}
public abstract class IsoscelesRightTriangle extends RightTriangle { // g2
   public String getDescription() { return "irt"; }
   public static void main(String[] edges) {
      final Triangle shape = new IsoscelesRightTriangle(); // g3
      System.out.print(shape.getDescription());
   }
}
```

A. The code does not compile due to line `g1`.

B. The code does not compile due to line `g2`.

C. The code does not compile due to line `g3`.

D. The code compiles and runs without issue.

19. Given that `Short` and `Integer` extend `Number`, what type can be used to fill in the blank in the class below to allow it to compile?

```
package band;

interface Horn { public Integer play(); }
abstract class Woodwind { public Short play() {return 3;} }
public final class Saxophone extends Woodwind implements Horn {
   public  ___________play() {
      return null;
   }
}
```

A. `Integer`

B. `Short`

C. `Number`

D. None of the above

20. Fill in the blanks: A class _____an interface, while a class _____an `abstract` class.

A. extends, implements

B. extends, extends

C. implements, extends

D. implements, implements

21. What is the output of the following application?

```
package paper;

abstract class Book {
   protected static String material = "papyrus";
   public Book() {}
   public Book(String material) {this.material = material;}
}
public class Encyclopedia extends Book {
   public static String material = "cellulose";
   public Encyclopedia() {super();}
   public String getMaterial() {return super.material;}
   public static void main(String[] pages) {
      System.out.print(new Encyclopedia().getMaterial());
   }
}
```

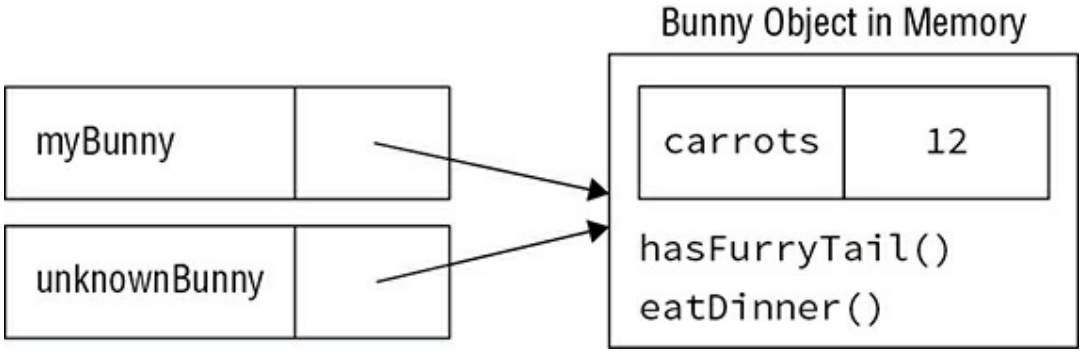
A. `papyrus`

B. `cellulose`

C. The code does not compile.

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

22. The following diagram shows two reference variables pointing to the same `Bunny` object in memory. The reference variable `myBunny` is of type `Bunny`, while `unknownBunny` is of an unknown data type. Which statement about the reference variables is not true? For this question, assume the instance methods and variables shown in the diagram are marked `public`.



A. If the `unknownBunny` reference does not have access to the same variables and methods that `myBunny` has access to, it can be explicitly cast to a reference type that does.

B. The data type of `unknownBunny` must be `Bunny` or a subclass of `Bunny`.

C. If the data type of `unknownBunny` is `Bunny`, it has access to all of the same methods and variables as `myBunny`.

D. The data type of `unknownBunny` could be an interface, class, or abstract class.

13. Which of the following modifiers can be applied to an abstract method?

A. `final`

B. `private`

C. `default`

D. `protected`

14. What is the output of the following application?

```
package space;

interface Sphere {
   default String getName() { return "Unknown"; }
}
abstract class Planet {
   abstract String getName();
}
public class Mars extends Sphere implements Planet {
   public Mars() {
      super();
   }
   public String getName() { return "Mars"; }
   public static void main(final String[] probe) {
      System.out.print(((Planet)new Mars()).getName());
   }
}
```

A. `Mars`

B. `Unknown`

C. The code does not compile due to the declaration of `Sphere`.

D. The code does not compile for another reason.

25. Which of the following statements is correct?

A. A reference to a class can be assigned to a subclass reference without an explicit cast.

B. A reference to a class can be assigned to a superclass reference without an explicit cast.

C. A reference to an interface can be assigned to a reference of a class that implements the interface without an explicit cast.

D. A reference to a class that implements an interface can be assigned to an interface reference only with an explicit cast.

26. 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`

27. 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.

28. 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

29. 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.

30. 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

31. 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.

12. 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.

13. 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

34. 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

35. 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

36. 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.

37. 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.

38. Which of the following is a virtual method?

A. `protected` instance methods

B. `static` methods

C. `private` instance methods

D. `final` instance methods

39. 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

40. 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.

41. 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()`

12. 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`

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

A. `final`

B. `default`

C. `static`

D. `abstract`

14. 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.

15. 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

16. 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.

17. 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

18. 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`

49. 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.

50. 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.

Chapter 8
Handling Exceptions

THE OCA EXAM TOPICS COVERED IN THIS PRACTICE TEST INCLUDE THE FOLLOWING:

- ✓**Handling Exceptions**
  - Differentiate among checked exceptions, unchecked exceptions, and Errors
  - Create a try-catch block and determine how exceptions alter normal program flow
  - Describe the advantages of Exception handling
  - Create and invoke a method that throws an exception
  - Recognize common exception classes (such as NullPointerException, ArithmeticException, ArrayIndexOutOfBoundsException, ClassCastException)

1. What is the result of compiling and executing the following application?

```
package mind;
public class Remember {
   public static void think() throws Exception {  // k1
      try {
         throw new Exception();
      }
   }
   public static void main(String... ideas) throws Exception {
      think();
   }
}
```

   A. The code compiles and runs without printing anything.

   B. The code compiles but a stack trace is printed at runtime.

   C. The code does not compile because of line `k1`.

   D. The code does not compile for another reason.

2. Choose the answer that lists the keywords in the order that they would be used together.

   A. `catch`, `try`, `finally`

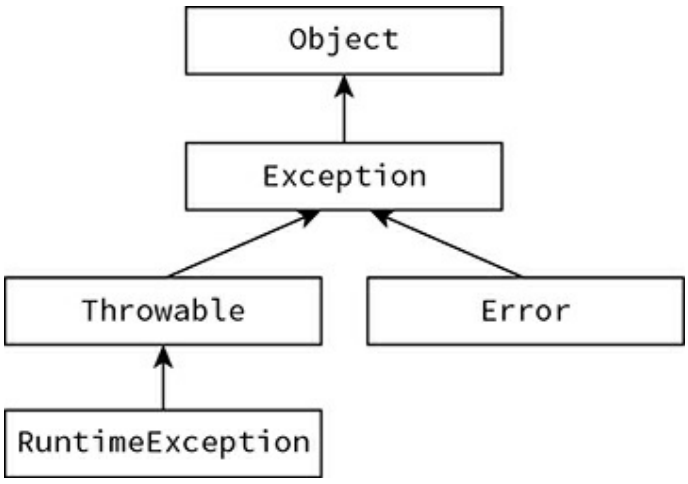
   B. `try`, `catch`, `finally`

   C. `finally`, `catch`, `try`

   D. `try`, `finally`, `catch`

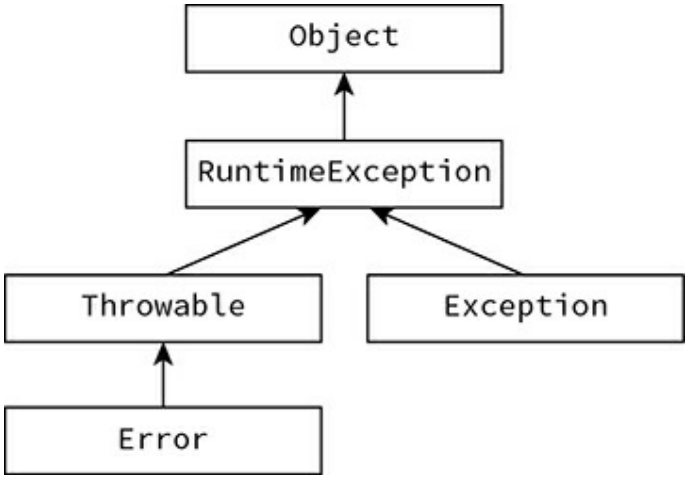
3. Which of the following diagrams of `java.lang` classes shows the inheritance model properly?

   A.

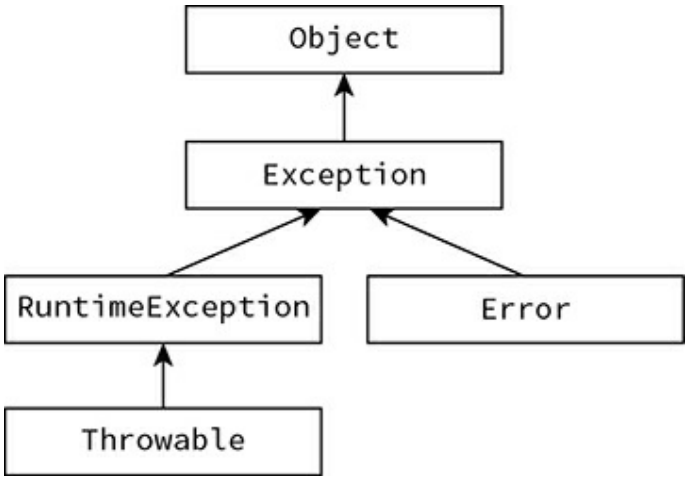


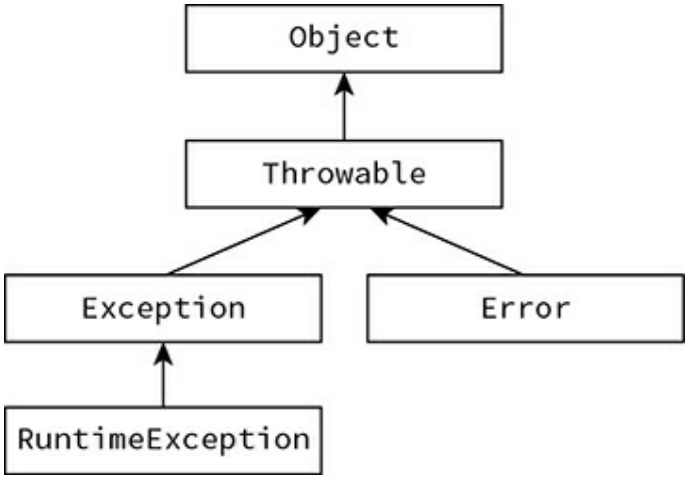
   B.

C.



D.





4. Which of the following `Throwable` types is it recommended not to catch in a Java application?

   A. `Error`

   B. `CheckedException`

   C. `Exception`

   D. `RuntimeException`

5. What is the output of the following application?

```
package game;
public class Baseball {
   public static void main(String... teams) {
      try {
         int score = 1;
         System.out.print(score++);
      } catch (Throwable t) {
         System.out.print(score++);
      } finally {
         System.out.print(score++);
      }
      System.out.print(score++);
   }
}
```

   A. `123`

   B. `124`

   C. `12`

   D. None of the above

6. Which of the following is a checked exception?

   A. `ClassCastException`

   B. `IOException`

   C. `ArrayIndexOutOfBoundsException`

   D. `IllegalArgumentException`

7. Fill in the blanks: The _____keyword is used in method declarations, while the _____keyword is used to throw an exception to the surrounding process.

   A. `throws`, `throw`

   B. `catch`, `throw`

   C. `throw`, `throws`

   D. `throws`, `catch`

8. If a `try` statement has `catch` blocks for both `Exception` and `IOException`, then which of the following statements is correct?

   A. The `catch` block for `Exception` must appear before the `catch` block for `IOException`.

   B. The `catch` block for `IOException` must appear before the `catch` block for `Exception`.

   C. The `catch` blocks for these two exception types can be declared in any order.

   D. A `try` statement cannot be declared with these two `catch` block types because they are incompatible.

9. What is the output of the following application?

```
package game;
public class Football {
   public static void main(String officials[]) {
      try {
         System.out.print('A');
         throw new RuntimeException("Out of bounds!");
      } catch (ArrayIndexOutOfBoundsException aioobe) {
         System.out.print('B');
         throw t;
      } finally {
         System.out.print('C');
      }
   }
}
```

A. `ABC`

B. `ABC`, followed by a stack trace for a `RuntimeException`

C. `AC`, followed by a stack trace for a `RuntimeException`

D. None of the above

10. What is the result of compiling and running the following application?

```
package castles;
public class Fortress {
   public void openDrawbridge() throws Exception {  // p1
      try {
         throw new Exception("Circle");
      } catch (Exception e) {
         System.out.print("Opening!");
      } finally {
         System.out.print("Walls");  // p2
      }
   }
   public static void main(String[] moat) {
      new Fortress().openDrawbridge();  // p3
   }
}
```

A. The code does not compile because of line `p1`.

B. The code does not compile because of line `p2`.

C. The code does not compile because of line `p3`.

D. The code compiles, but a stack trace is printed at runtime.

11. Which of the following exception types must be handled or declared by the method in which they are thrown?

A. `NullPointerException`

B. `Exception`

C. `RuntimeException`

D. `ArithmeticException`

2. What is the output of the following application?

```
package game;
public class BasketBall {
   public static void main(String[] dribble) {
      try {
         System.out.print(1);
         throw new ClassCastException();
      } catch (ArrayIndexOutOfBoundsException ex) {
         System.out.print(2);
      } catch (Throwable ex) {
         System.out.print(3);
      } finally {
         System.out.print(4);
      }
      System.out.print(5);
   }
}
```

A. `1345`

B. `1235`

C. The code does not compile.

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

3. Which of the following statements about a `finally` block is true?

A. Every line of the `finally` block is guaranteed to be executed.

B. The `finally` block is executed only if the related `catch` block is also executed.

C. The `finally` statement requires brackets `{}`.

D. The `finally` block cannot throw an exception.

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

```
package office;
import java.io.*;
public class Printer {
   public void print() {
      try {
         throw new FileNotFoundException();
      } catch (IOException exception) {
         System.out.print("Z");
      } catch (FileNotFoundException enfe) {
         System.out.print("X");
      } finally {
         System.out.print("Y");
      }
   }
```

```
   public static void main(String... ink) {
      new Printer().print();
   }
}
```

A. `XY`

B. `ZY`

C. The code does not compile.

D. The code compiles but a stack trace is printed at runtime.

5. Which keywords are required with a `try` statement?

I. `catch`

II. `finalize`

III. `finally`

A. I only

B. II only

C. I or III, or both

D. None of these statements are required with a `try` statement.

6. Which statement about the role of exceptions in Java is incorrect?

A. Exceptions are often used when things "go wrong" or deviate from the expected path.

B. An application that throws an exception will terminate.

C. Some exceptions can be avoided programmatically.

D. An application that can properly handle its exception may recover from unexpected problems.

7. What is the output of the following application?

```
package harbor;
class CapsizedException extends Exception {}
class Transport {
   public int travel() throws CapsizedException { return 2; };
}
public class Boat {
   public int travel() throws Exception { return 4; };  // j1
   public static void main(String... distance) throws Exception{
      try {
         System.out.print(new Boat().travel());
      } catch (Exception e) (
         System.out.print(8);
      )
   }
}
```

A. `4`

B. `8`

C. The code does not compile due to line `j1`.

D. The code does not compile for another reason.

18. Which of following method signatures would not be allowed in a class implementing the `Printer` interface?

```
class PrintException extends Exception {}
class PaperPrintException extends PrintException {}

public interface Printer {
   abstract int printData() throws PrintException;
}
```

A. `public int printData() throws PaperPrintException`

B. `public int printData() throws Exception`

C. `public int printData()`

D. None of the above

19. Which `import` statement is required to be declared in order to use the `Exception`, `RuntimeException`, and `Throwable` classes in an application?

A. `import java.exception.*;`

B. `import java.util.exception.*;`

C. `import java.lang.*;`

D. None of the above

20. Which statement about the following classes is correct?

```
class GasException extends Exception {}
class Element {
   public int getSymbol() throws GasException { return -1; }  // g1
}
public class Oxygen extends Element {
   public int getSymbol() { return 8; }  // g2
   public void printData() {
      try {
         System.out.print(getSymbol());
      } catch {  // g3
         System.out.print("Unable to read data");
      }
   }
}
```

A. The code does not compile because of line `g1`.

B. The code does not compile because of line `g2`.

C. The code does not compile because of line `g3`.

D. None of the above

21. Fill in the blanks: A program must handle or declare _____but should never handle _____.

A. `java.lang.Error`, unchecked exceptions

B. checked exceptions, `java.lang.Error`

C. `java.lang.Throwable`, `java.lang.Error`

D. unchecked exceptions, `java.lang.Exception`

22. What is the result of compiling and running the following application?

```
package castles;
class CastleUnderSiegeException extends Exception {}
class KnightAttackingException extends CastleUnderSiegeException {}
public class Citadel {
   public void openDrawbridge() throws RuntimeException {  // q1
      try {
         throw new KnightAttackingException();
      } catch (Exception e) {
         throw new ClassCastException();
      } finally {
         throw new CastleUnderSiegeException();  // q2
      }
   }
   public static void main(String[] moat) {
      new Citadel().openDrawbridge();  // q3
   }
}
```

A. The code does not compile because of line `q1`.

B. The code does not compile because of line `q2`.

C. The code does not compile because of line `q3`.

D. The code compiles, but a stack trace is printed at runtime.

23. If an exception matches two or more `catch` blocks, which `catch` block is executed?

A. The first one that matches is executed.

B. The last one that matches is executed.

C. All matched blocks are executed.

D. It is not possible to write code like this.

24. What is the output of the following application?

```
package system;
public class Computer {
   public void compute() throws Exception {
      throw new RuntimeException("Error processing request");
```

```
   }
   public static void main(String[] bits) {
      try {
         new Computer().compute();
         System.out.print("Ping");
      } catch (NullPointerException e) {
         System.out.print("Pong");
         throw e;
      }
   }
}
```

A. `Ping`

B. `Pong`

C. The code does not compile.

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

25. In the following application, the value of `list` has been omitted. Assuming the code compiles without issue, which one of the following is not a possible output of executing this class?

```
package checkboard;

public class Attendance {
   private Boolean[] list = // value omitted
   public int printTodaysCount() {
      int count=0;
      for(int i=0; i<10; i++) {
         if(list[i]) ++count;
      }
      return count;
   }
   public static void main(String[] roster) {
      new Attendance().printTodaysCount();
   }
}
```

A. A stack trace for `NullPointerException` is printed.

B. A stack trace for `ArrayIndexOutOfBoundsException` is printed.

C. A stack trace for `ClassCastException` is printed.

D. None of the above

26. Fill in the blanks: A _____occurs when a program recurses too deeply into an infinite loop, while a(n) _____occurs when a reference to a nonexistent object is acted upon.

A. `NoClassDefFoundError`, `StackOverflowError`

B. `StackOverflowError`, `NullPointerException`

C. `ClassCastException`, `IllegalArgumentException`

D. `StackOverflowError, IllegalArgumentException`

27. Which of the following is not a reason to add checked exceptions to a method signature?

A. To force a caller to handle or declare its exceptions

B. To notify the caller of potential types of problems

C. To ensure that exceptions never cause the application to terminate

D. To give the caller a chance to recover from a problem

28. What is the output of the following application?

```
package peculiar;
public class Stranger {
   public static String getFullName(String firstName, String lastName) {
      try {
         return firstName.toString() + " " + lastName.toString();
      } finally {
         System.out.print("Finished!");
      } catch (NullPointerException npe) {
         System.out.print("Problem?");
      }
      return null;
   }
   public static void main(String[] things) {
      System.out.print(getFullName("Joyce","Hopper"));
   }
}
```

A. `Joyce Hopper`

B. `Finished!Joyce Hopper`

C. `Problem?Finished!null`

D. None of the above

29. Fill in the blanks: A `try` statement has _____`finally` block(s) and _____`catch` blocks.

A. zero or one, zero or more

B. one, one or more

C. zero or one, zero or one

D. one or more, zero or one

30. What is the output of the following application?

```
package pond;
abstract class Duck {
   protected int count;
   public abstract int getDuckies();
}
```

```
public class Ducklings extends Duck {
   private int age;
   public Ducklings(int age) { this.age = age; }
   public int getDuckies() { return this.age/count; }
   public static void main(String[] pondInfo) {
      Duck itQuacks = new Ducklings(5);
      System.out.print(itQuacks.getDuckies());
   }
}
```

A. `0`

B. `5`

C. The code does not compile.

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

31. Given a `try` statement, if both the `catch` block and the `finally` block each throw an exception, what does the caller see?

A. The exception from the `catch` block

B. The exception from the `finally` block

C. Both the exception from the `catch` block and the exception from the `finally` block

D. None of the above

32. What is the output of the following application?

```
package zoo;
class BigCat {
   void roar(int level) throw RuntimeException {  // m1
      if(level<3) throw new IllegalArgumentException("Incomplete");
      System.out.print("Roar!");
   }
}
public class Lion extends BigCat {
   public void roar() {  // m2
      System.out.print("Roar!!!");
   }

   public static void main(String[] cubs) {
      final BigCat kitty = new Lion();  // m3
      kitty.roar(2);
   }
}
```

A. The code does not compile because of line `m1`.

B. The code does not compile because of line `m2`.

C. The code does not compile because of line `m3`.

D. The code compiles but a stack trace is printed at runtime.

33. Given the following code snippet, which specific exception will be thrown?

```
final Object exception = new Exception();
final Exception data = (RuntimeException)exception;
System.out.print(data);
```

A. `ClassCastException`

B. `RuntimeException`

C. `NullPointerException`

D. None of the above

34. Which of the following classes will handle all types in a `catch` block?

A. `Exception`

B. `Error`

C. `Throwable`

D. `RuntimeException`

35. In the following application, the values of `street` and `city` have been omitted. Which one of the following is a possible output of executing this class?

I. `350 5th Ave - New York`

II. `Posted:350 5th Ave - New York`

```
package registration;
public class Address {
   public String getAddress(String street, String city) {
      try {
         return street.toString() + " : " + city.toString();
      } finally {
         System.out.print("Posted:");
      }
   }
   public static void main(String[] form) {
      String street = // value omitted
      String city = // value omitted
      System.out.print(new Address().getAddress(street,city));
   }
}
```

A. I only

B. II only

C. I and II

D. None of the above

36. If a `try` statement has `catch` blocks for both `ClassCastException` and `RuntimeException`, then which of the following statements is correct?

A. The `catch` block for `ClassCastException` must appear before the `catch` block for `RuntimeException`.

B. The `catch` block for `RuntimeException` must appear before the `catch` block for `ClassCastException`.

C. The `catch` blocks for these two exception types can be declared in any order.

D. A `try` statement cannot be declared with these two `catch` block types because they are incompatible.

37. Which of the following is the best scenario to use an exception?

A. The computer caught fire.

B. The code does not compile.

C. A caller passes invalid data to a method.

D. A method finishes sooner than expected.

38. What is the output of the following application?

```
package body;
class Organ {
   public void operate() throws RuntimeException {
      throw new RuntimeException("Not supported");
   }
}
public class Heart extends Organ {
   public void operate() throws Exception {
      System.out.print("beat");
   }
   public static void main(String... cholesterol) throws Exception {
      try {
         new Heart().operate();
      } finally {
      }
   }
}
```

A. `beat`

B. `Not supported`

C. The code does not compile.

D. The code compiles but a stack trace is printed at runtime.

39. Which statement about the following exception statement is correct?

```
throw new NullPointerException();
```

A. The code where this is called must include a try-catch block that handles this exception.

B. The method where this is called must declare a compatible exception.

C. This exception cannot be handled.

D. This exception can be handled with a try-catch block or ignored altogether by the

surrounding method.

10. What is the output of the following application?

```
package clothing;
public class Coat {
   public Long zipper() throws Exception {
      try {
         String checkZipper = (String)new Object();
      } catch (Exception e) {
         throw RuntimeException("Broken!");
      }
      return null;
   }
   public static void main(String... warmth) {
      try {
         new Coat().zipper();
         System.out.print("Finished!");
      } catch (Throwable t) {}
   }
}
```

A. `Finished!`

B. `Finished!`, followed by a stack trace

C. The application does not produce any output at runtime.

D. The code does not compile.

11. Given the following application, which type of exception will be printed in the stack trace at runtime?

```
package carnival;
public class WhackAnException {
   public static void main(String... hammer) {
      try {
         throw new ClassCastException();
      } catch (IllegalArgumentException e) {
         throw new IllegalArgumentException();
      } catch (RuntimeException e) {
         throw new NullPointerException();
      } finally {
         throw new RuntimeException();
      }
   }
}
```

A. `IllegalArgumentException`

B. `NullPointerException`

C. `RuntimeException`

D. The code does not compile.

12. Which of these method signatures is allowed in a class implementing the `Outfielder`

interface?

```
class OutOfBoundsException extends BadCatchException {}
class BadCatchException extends Exception {}

public interface Outfielder {
   public void catchBall() throws OutOfBoundsException;
}
```

A. `public int catchBall() throws OutOfBoundsException`

B. `public int catchBall() throws BadCatchException`

C. `public int catchBall() throws Exception`

D. None of the above

13. What is the output of the following application?

```
package city;
public class Street {
   public static void dancing() throws RuntimeException {
      try {
         throw new IllegalArgumentException();
      } catch (Error) {
         System.out.print("Unable!");
      }
   }
   public static void main(String... count) throws RuntimeException {
      dancing();
   }
}
```

A. `Unable!`

B. The application does not produce any output.

C. The application compiles but produces a stack trace at runtime.

D. The code does not compile.

14. What is the result of compiling and running the following application?

```
package castles;
class DragonException extends Exception {}
public class Lair {
   public void openDrawbridge() throws Exception {  // r1
      try {
         throw new Exception("This Exception");
      } catch (RuntimeException e) {
         throw new DragonException();  // r2
      } finally {
         throw new RuntimeException("Or maybe this one");
      }
   }
   public static void main(String[] moat) throws Exception {
      new Lair().openDrawbridge();  // r3
   }
```

```
}
```

A. The code does not compile because of line `r1`.

B. The code does not compile because of line `r2`.

C. The code does not compile because of line `r3`.

D. The code compiles, but a stack trace is printed at runtime.

15. If a `try` statement has `catch` blocks for both `IllegalArgumentException` and `ClassCastException`, then which of the following statements is correct?

A. The `catch` block for `IllegalArgumentException` must appear before the `catch` block for `ClassCastException`.

B. The `catch` block for `ClassCastException` must appear before the `catch` block for `IllegalArgumentException`.

C. The `catch` blocks for these two exception types can be declared in any order.

D. A `try` statement cannot be declared with these two `catch` block types because they are incompatible.

16. What is the output of the following application?

```
package broken;
class Problem implements RuntimeException {}
public class BiggerProblem extends Problem {
   public static void main(String uhOh[]) {
      try {
         throw new BiggerProblem();
      } catch (BiggerProblem re) {
         System.out.print("Problem?");
      } catch (Problem e) {
         System.out.print("Handled");
      } finally {
         System.out.print("Fixed!");
      }
   }
}
```

A. `Problem?Fixed!`

B. `Handled.Fixed!`

C. `Problem?Handled.Fixed!`

D. The code does not compile.

17. What is the output of the following application?

```
package lighting;
interface Source {
   void flipSwitch() throws Exception;
}
public class LightBulb implements Source {
```

```
   public void flipSwitch() {
      try {
         throws new RuntimeException("Circuit Break!");
      } finally {
         System.out.print("Flipped!");
      }
   }
   public static void main(String... electricity) throws Throwable {
      final Source bulb = new LightBulb();
      bulb.flipSwitch();
   }
}
```

A. A stack trace for a `RuntimeException`

B. `Flipped!`, followed by a stack trace for a `RuntimeException`

C. The code does not compile because `flipSwitch()` is an invalid method override.

D. The code does not compile for another reason.

8. Given an application that hosts a website, which of the following would most likely result in a `java.lang.Error` being thrown?

A. Two users try to register an account at the same time.

B. The application temporarily loses connection to the network.

C. A user enters their password incorrectly.

D. The application runs out of memory.

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

```
package storage;
import java.io.*;
public class Backup {
   public void performBackup() {
      try {
         throw new IOException("Disk not found");
      } catch (Exception e) {
         try {
            throw new FileNotFoundException("File not found");
         } catch (FileNotFoundException e) {  // z1
            System.out.print("Failed");
         }
      }
   }
   public static void main(String... files) {
      new Backup().performBackup();  // z2
   }
}
```

A. `Failed`

B. The application compiles but a stack trace is printed at runtime.

C. The code does not compile because of line `z1`.

D. The code does not compile because of line `z2`.

50. What is the output of the following application?

```
package bed;
public class Sleep {
   public static void snore() {
      try {
         String sheep[] = new String[3];
         System.out.print(sheep[3]);
      } catch (RuntimeException e) {
         System.out.print("Awake!");
      } finally {
         throw new Exception();  // x1
      }
   }
   public static void main(String... sheep) {  // x2
      new Sleep().snore();  // x3
   }
}
```

A. `Awake!`, followed by a stack trace

B. The code does not compile because of line `x1`.

C. The code does not compile because of line `x2`.

D. The code does not compile because of line `x3`.

Chapter 9
Working with Selected Classes from the Java API

THE OCA EXAM TOPICS COVERED IN THIS PRACTICE TEST INCLUDE THE FOLLOWING:

✓**Working with Selected classes from the Java API**

- Manipulate data using the StringBuilder class and its methods
- Create and manipulate Strings
- Create and manipulate calendar data using classes from java.time.LocalDateTime, java.time.LocalDate, java.time.LocalTime, java.time.format.DateTimeFormatter, java.time.Period
- Declare and use an ArrayList of a given type
- Write a simple Lambda expression that consumes a Lambda Predicate expression

1. What is the best reason for using `StringBuilder` instead of `String`?

   A. `StringBuilder` adds support for multiple threads.

   B. `StringBuilder` can use `==` to compare values.

   C. `StringBuilder` saves memory by reducing the number of objects created.

   D. `StringBuilder` supports different languages and encodings.

2. What is not true about a `String`?

   A. It can be created without coding a call to a constructor.

   B. It can be reused via the string pool.

   C. It is final.

   D. It is mutable.

3. Which of the following creates a `StringBuilder` with a different value than the other options?

   A. `new StringBuilder().append("clown")`

   B. `new StringBuilder("clown")`

   C. `new StringBuilder("cl").insert(2, "own")`

   D. All of them create the same value.

4. What is the output of the following?

```
StringBuilder teams = new StringBuilder("333");
teams.append(" 806");
teams.append(" 1601");
System.out.print(teams);
```

   A. `333`

   B. `333 806 1601`

   C. The code compiles but outputs something else.

   D. The code does not compile.

5. How many of the types `ArrayList`, `List`, and `Object` can fill in the blank to produce code that compiles?

```
List frisbees = new  ___________();
```

   A. None

   B. One

   C. Two

   D. Three

6. What is the output of the following?

```
List<String> tools = new ArrayList<>();
tools.add("hammer");
tools.add("nail");
tools.add("hex key");
System.out.println(tools.get(1));
```

A. `hammer`

B. `hex key`

C. `nail`

D. None of the above

7. What is the result of the following code?

```
StringBuilder sb = new StringBuilder("radical")
   .insert(sb.length(), "robots");
System.out.println(sb);
```

A. `radicarobots`

B. `radicalrobots`

C. The code does not compile.

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

8. What is the output of the following?

```
List<String> museums = new ArrayList<>(1);
museums.add("Natural History");
museums.add("Science");
museums.add("Art");
museums.remove(2);
System.out.println(museums);
```

A. `[Natural History, Science]`

B. `[Natural History, Art, Science]`

C. The code does not compile.

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

9. What is the output of the following?

```
12:  StringBuilder b = new StringBuilder("12");
13:  b = b.append("3");
14:  b.reverse();
15:  System.out.println(b.toString());
```

A. `12`

B. `123`

C. `321`

D. The code does not compile.

10. What is the main benefit of a lambda expression?

A. It allows you to convert a primitive to a wrapper class.

B. It allows you to change the bytecode while the application is running.

C. It allows you to inherit from multiple classes.

D. It allows you to write code that has the execution deferred.

11. What is the output of the following?

```
5:  StringBuilder line = new StringBuilder("-");
6:  StringBuilder anotherLine = line.append("-");
7:  System.out.print(line == anotherLine);
8:  System.out.print(" ");
9:  System.out.print(line.length());
```

A. `false 1`

B. `false 2`

C. `true 1`

D. `true 2`

12. The author of this method forgot to include the data type. Which of the following reference types can fill in the blank to complete this method?

```
public static void secret( ____________mystery) {
  mystery.add("metal");
  String str = mystery.get(0);
  int num = mystery.length();
}
```

A. `ArrayList`

B. `ArrayList<String>`

C. `StringBuilder`

D. None of the above

13. Which portion of code can be removed so that this line of code continues to compile?

```
Predicate<StringBuilder> p = (StringBuilder b) -> {return true;};
```

A. Remove `StringBuilder b`

B. Remove `->`

C. Remove `{` and `;}`

D. Remove `{ return` and `;}`

4. What is the output of the following?

```
20:  List<Character> chars = new ArrayList<>();
21:  chars.add('a');
22:  chars.add('b');
23:  chars.set(1, 'c');
24:  chars.remove(0);
25:  System.out.print(chars.size() + " " + chars.contains('b'));
```

A. `1 false`

B. `1 true`

C. `2 false`

D. `2 true`

5. What is the output of the following?

```
12:  String b = "12";
13:  b += "3";
14:  b.reverse();
15:  System.out.println(b.toString());
```

A. `12`

B. `123`

C. `321`

D. The code does not compile.

6. How many of these lines fail to compile?

```
Predicate<String> pred1 = s -> false;
Predicate<String> pred2 = (s) -> false;
Predicate<String> pred3 = String s -> false;
Predicate<String> pred4 = (String s) -> false;
```

A. One

B. Two

C. Three

D. Four

17. What does the following do?

```
public class Shoot {
   interface Target {
      boolean needToAim(double angle);
   }
   static void prepare(double angle, Target t) {
      boolean ready = t.needToAim(angle);  // k1
      System.out.println(ready);
   }
   public static void main(String[] args) {
```

```
      prepare(45, d -> d > 5 || d < -5);   // k2
   }
}
```

A. It prints `true`.

B. It prints `false`.

C. It doesn't compile due to line `k1`.

D. It doesn't compile due to line `k2`.

18. What is the output of the following?

```
String teams = new String("694");
teams.concat(" 1155");
teams.concat(" 2265");
teams.concat(" 2869");
System.out.println(teams);
```

A. `694`

B. `694 1155 2265 2869`

C. The code compiles but outputs something else.

D. The code does not compile.

19. Which of these classes are in the `java.util` package?

I. `ArrayList`

II. `LocalDate`

III. `String`

A. I only

B. II only

C. I and II

D. I, II, and III

20. Which of the answer choices results in a different value being output than the other three choices?

```
StringBuilder sb = new StringBuilder("radical ");
sb = ____________________________;
System.out.print(sb);
```

A.
```
new StringBuilder("radical ")
      .append("robots")
```

B.
```
new StringBuilder("radical ")
      .delete(1, 100)
```

```
      .append("obots")

      .insert(1, "adical r")
```

C.
```
new StringBuilder("radical ")

      .insert(7, "robots")
```

D.
```
new StringBuilder("radical ")

      .insert(sb.length(), "robots")
```

21. What is the output of the following?

```
String[] array = {"Natural History", "Science"};
List<String> museums = Arrays.asList(array);
museums.set(0, "Art");
System.out.println(museums.contains("Art"));
```

A. `true`

B. `false`

C. The code does not compile.

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

22. Which is a true statement?

A. If `s.contains("abc")` is true, then `s.equals("abc")` is also true.

B. If `s.contains("abc")` is true, then `s.startsWith("abc")` is also true.

C. If `s.startsWith("abc")` is true, then `s.equals("abc")` is also true.

D. If `s.startsWith("abc")` is true, then `s.contains("abc")` is also true.

23. What is the output of the following?

```
20:  List<Character> chars = new ArrayList<>();
21:  chars.add('a');
22:  chars.add('b');
23:  chars.set(1, 'c');
24:  chars.remove(0);
25:  System.out.print(chars.length());
```

A. `0`

B. `1`

C. `2`

D. None of the above

24. The author of this method forgot to include the data type. Which of the following reference types can fill in the blank to complete this method?

```
public static void secret(_____________ mystery) {
   mystery = mystery.replace("1", "8");
```

```
   mystery.startsWith("paper");
   String s = mystery.toString();
}
```

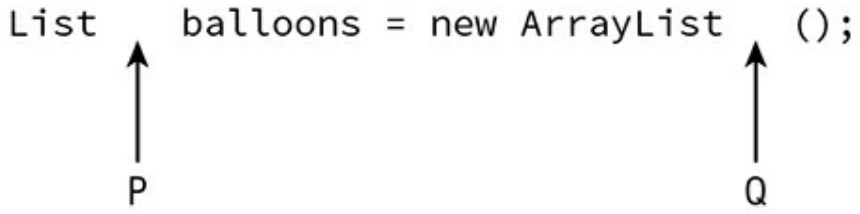
A. `ArrayList`

B. `String`

C. `StringBuilder`

D. None of the above

25. Which statement is true about the following figure while ensuring the code continues to compile?



A. `<>` can be inserted at position P without making any other changes.

B. `<>` can be inserted at position Q without making any other changes.

C. `<>` can be inserted at both positions P and Q.

D. None of the above

26. Which of the following can fill in the blank to make the code compile?

```
import java.util.function.*;
public class Card {
   public static void main(String[] s) {
      Predicate<String> pred =_____  I> true;
   }
}
```

A. `(Integer i)`

B. `(Object o)`

C. `(String s)`

D. None of the above

27. What is the output of the following?

```
5:  String line = new String("-");
6:  String anotherLine = line.concat("-");
7:  System.out.print(line == anotherLine);
8:  System.out.print(" ");
9:  System.out.print(line.length());
```

A. `false 1`

B. `false 2`

C. `true 1`

D. `true 2`

28. What does the following output?

```
Predicate dash = c -> c.startsWith("-");
System.out.println(dash.test("-"));
```

A. `true`

B. `false`

C. The code does not compile.

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

29. Of the classes `LocalDate`, `LocalDateTime`, `LocalTime`, and `LocalTimeStamp`, how many include hours, minutes, and seconds?

A. One

B. Two

C. Three

D. Four

30. What is the output of the following class?

```
1:  package rocket;
2:  public class Countdown {
3:     public static void main(String[] args) {
4:        String builder = "54321";
5:        builder = builder.substring(4);
6:        System.out.println(builder.charAt(2));
7:     }
8:  }
```

A. `2`

B. `3`

C. `4`

D. None of the above

31. Which equivalent code can replace `i -> i != 0` in the following line?

```
Predicate<Integer> ip = i -> i != 0;
```

A. `i -> { i != 0 }`

B. `i -> { i != 0; }`

C. `i -> { return i != 0 }`

D. `i -> { return i != 0; }`

32. What is the output of the following?

```
LocalDate xmas = LocalDate.of(2016,  12,  25);
xmas.plusDays(-1);
System.out.println(xmas.getDayOfMonth());
```

A. `24`

B. `25`

C. `26`

D. None of the above

33. What is the output of the following?

```
1:   public class Legos {
2:      public static void main(String[] args) {
3:         StringBuilder sb = new StringBuilder();
4:         sb.append("red");
5:         sb.deleteCharAt(0);
6:         sb.delete(1, 2);
7:         System.out.println(sb);
8:      }
9:   }
```

A. `e`

B. `d`

C. `ed`

D. None of the above

34. What does the following output?

```
Predicate clear = c -> c.equals("clear");
System.out.println(clear.test("pink"));
```

A. `true`

B. `false`

C. The code does not compile.

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

35. Which starts counting from one rather than zero?

A. Array indexes

B. The index used by `charAt` in a `String`

C. The months in a `LocalDateTime`

D. The months in a `LocalTime`

36. Which statement is not true of `Predicate`?

A. A `boolean` is returned from the method it declares.

B. It is an interface.

C. The method it declares accepts two parameters.

D. The method it declares is named `test`.

37. Which of these periods represents a larger amount of time?

```
Period period1 = Period.ofWeeks(1).ofDays(3);
Period period2 = Period.ofDays(10);
```

A. `period1`

B. `period2`

C. They represent the same length of time.

D. None of the above. This code does not compile.

38. What is the result of the following?

```
import java.time.*;
import java.time.format.*;

public class HowLong {
   public static void main(String[] args) {
      LocalDate newYears = LocalDate.of(2017, 1, 1);
      Period period = Period.ofDays(1);
      DateTimeFormatter format = DateTimeFormatter.ofPattern("MM-dd-yyyy");
      System.out.print(format.format(newYears.minus(period)));
   }
}
```

A. `01-01-2017`

B. `12-31-2016`

C. The code does not compile.

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

39. Which of the following can fill in the blank so the following code prints `true`?

```
String happy = " :) - (: ";
String really = happy.trim();
String question = _____________________;
System.out.println(really.equals(question));
```

A. `happy.substring(0, happy.length() - 1)`

B. `happy.substring(0, happy.length())`

C. `happy.substring(1, happy.length() - 1)`

D. `happy.substring(1, happy.length())`

40. Which is not a true statement about the `Period` class?

A. A `Period` is immutable.

B. A `Period` is typically used for adding or subtracting time from dates.

C. You can create a `Period` representing 2 minutes.

D. You can create a `Period` representing 5 years.

11. What is the output of the following class?

```
1:  package rocket;
2:  public class Countdown {
3:     public static void main(String[] args) {
4:        StringBuilder builder = new StringBuilder("54321");
5:        builder.substring(2);
6:        System.out.println(builder.charAt(1));
7:     }
8:  }
```

A. `1`

B. `2`

C. `3`

D. `4`

12. What does the following output?

```
List<Integer> pennies = new ArrayList<>();
pennies.add(3);
pennies.add(2);
pennies.add(1);
pennies.remove(2);
System.out.println(pennies);
```

A. `[3, 1]`

B. `[3, 2]`

C. The code does not compile.

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

13. The author of this method forgot to include the data type. Which of the following reference types can best fill in the blank to complete this method?

```
public static void secret(_____________ mystery) {
   char ch = mystery.charAt(3);
   mystery = mystery.insert(1, "more");
   int num = mystery.length();
}
```

A. `ArrayList`

B. `String`

C. `StringBuilder`

D. None of the above

14. What is the smallest unit you can add to a `LocalTime` object?

A. Second

B. Millisecond

C. Nanosecond

D. Picosecond

15. What is the result of the following?

```
import java.time.*;
import java.time.format.*;

public class HowLong {
   public static void main(String[] args) {
      LocalDate newYears = LocalDate.of(2017, 1, 1);
      Period period = Period.ofDays(1);
      DateTimeFormatter format = DateTimeFormatter.ofPattern("mm-dd-yyyy");
      System.out.print(format.format(newYears.minus(period)));
   }
}
```

A. `01-01-2017`

B. `12-31-2016`

C. The code does not compile.

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

16. Which of the following types can you pass as a parameter to the `replace()` method on the `String` class?

I. `char`

II. `String`

III. `StringBuilder`

A. I

B. I and II

C. II and III

D. I, II, and III

17. How many lines does this code output?

```
import java.util.*;
import java.util.function.*;

public class PrintNegative {
   public static void main(String[] args) {
      List<String> list = new ArrayList<>();
```

```
      list.add("-5");
      list.add("0");
      list.add("5");
      print(list, e -> e < 0);
   }
   public static void print(List<String> list, Predicate<Integer> p) {
      for (String num : list)
         if (p.test(num))
            System.out.println(num);
   }
}
```

A. One

B. Two

C. None. The code does not compile.

D. None. The code throws an exception at runtime.

8. What is the output of the following?

```
12:  List<String> magazines = new ArrayList();
13:  magazines.add("Readers Digest");
14:  magazines.add("People");
15:  magazines.clear();
16:  magazines.add("The Economist");
17:  magazines.remove(1);
18:  System.out.println(magazines.size());
```

A. `0`

B. `1`

C. The code does not compile.

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

9. What is the output of the following?

```
public class Costume {
   public static void main(String[] black) {
     String witch = 'b';
     String tail = "lack";
     witch = witch.concat(tail);
     System.out.println(witch);
   }
}
```

A. `b`

B. `black`

C. The code does not compile.

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

10. What is the result of the following?

```
LocalDate xmas = LocalDate.of(2016,  12,  25);
xmas.setYear(2017);
System.out.println(xmas.getYear());
```

A. `2016`

B. `2017`

C. The code does not compile.

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

Chapter 10
OCA Practice Exam

This chapter contains 80 questions and is designed to simulate a real OCA exam. While previous chapters were focused on a specific set of objectives, this chapter covers all of the objectives on the exam. We recommend you take this exam only after you score well on the questions in the individual chapters.

For this chapter, you should try to simulate the real exam experience as much as possible. This means setting aside 150 minutes of uninterrupted time to complete the test, as well as not looking at any reference material while taking the exam. If you don't know an answer to a question, complete it as best you can and move on to the next question, just as you would on a real exam.

Remember, the exam permits writing material, such as a whiteboard. If you do not have a whiteboard handy, you can just use blank sheets of paper and a pencil. If you do well on this test, then you are hopefully ready to take the real exam. With that said, good luck!

1. What is the output if this class is run with `java Indexing cars carts`?

```
public class Indexing {
   public static void main(String... books) {
      StringBuilder sb = new StringBuilder();
      for (String book : books)
         sb.insert(sb.indexOf("c"), book);
      System.out.println(sb);
   }
}
```

   A. `cars`

   B. `cars carts`

   C. `ccars arts`

   D. The code does not compile.

   E. The code compiles but throws an exception at runtime.

2. Fill in the blanks: The operators `+=`,_____ ,_____ ,_____ ,_____ , and `++` are listed in increasing or the same level of operator precedence. (Choose two.)

   A. `-`, `+`, `=`, `--`

   B. `%`, `*`, `/`, `+`

   C. `=`, `+`, `/`, `*`

   D. `^`, `*`, `-`, `==`

   E. `*`, `/`, `%`, `--`

3. Which of the following are valid JavaBean signatures? (Choose three.)

   A. `public byte getNose(String nose)`

   B. `public void setHead(int head)`

   C. `public String getShoulders()`

   D. `public long isMouth()`

   E. `public void gimmeEars()`

   F. `public boolean isToes()`

4. Which of the following are true? (Choose two.)

```
20:  int[] crossword [] = new int[10][20];
21:  for (int i = 0; i < crossword.length; i++)
22:     for (int j = 0; j < crossword.length; j++)
23:        crossword[i][j] = 'x';
24:  System.out.println(crossword.size());
```

   A. One line needs to be changed for this code to compile.

B. Two lines need to be changed for this code to compile.

C. Three lines need to be changed for this code to compile.

D. If the code is fixed to compile, none of the cells in the 2D array have a value of 0.

E. If the code is fixed to compile, half of the cells in the 2D array have a value of 0.

F. If the code is fixed to compile, all of the cells in the 2D array have a value of 0.

5. Which of the following statements about `java.lang.Error` are most accurate? (Choose two.)

   A. An `Error` should be thrown if a file system resource becomes temporarily unavailable.

   B. An application should never catch an `Error`.

   C. `Error` is a subclass of `Exception`, making it a checked exception.

   D. It is possible to catch and handle an `Error` thrown in an application.

   E. An `Error` should be thrown if a user enters invalid input.

6. Given a class that uses the following `import` statements, which class would be automatically accessible without using its full package name? (Choose three.)

```
import forest.Bird;
import jungle.tree.*;
import savana.*;
```

   A. `forest.Bird`

   B. `savana.sand.Wave`

   C. `jungle.tree.Huicungo`

   D. `java.lang.Object`

   E. `forest.Sloth`

   F. `forest.ape.bonobo`

7. How many of the following variables represent immutable objects?

```
ArrayList l = new ArrayList();
String s = new String();
StringBuilder sb = new StringBuilder();
LocalDateTime t = LocalDateTime.now();
```

   A. None

   B. One

   C. Two

   D. Three

E. Four

F. None of the above—this code doesn't compile.

8. What is the output of the following?

```
StringBuilder builder = new StringBuilder("Leaves growing");
do {
   builder.delete(0, 5);
} while (builder.length() > 5);
System.out.println(builder);
```

A. `Leaves growing`

B. `ing`

C. `wing`

D. The code does not compile.

E. The code compiles but throws an exception at runtime.

9. What is the output of the following application?

```
package reality;
public class Equivalency {
   public static void main(String[] edges) {
      final String ceiling = "up";
      String floor = new String("up");
      final String wall = new String(floor);
      System.out.print((ceiling==wall)          +" "+(floor==wall)
+" "+ceiling.equals(wall));
   }
}
```

A. `false false false`

B. `true true true`

C. `false true true`

D. `false false true`

E. It does not compile.

10. How many times does the following code print `true`?

```
1:   public class Giggles {
2:      public static void main(String[] args) {
3:         String lol = "lol";
4:         System.out.println(lol.toUpperCase() == lol);
5:         System.out.println(lol.toUpperCase() == lol.toUpperCase());
6:         System.out.println(lol.toUpperCase().equals(lol));
7:         System.out.println(lol.toUpperCase().equals(lol.toUpperCase()));
8:         System.out.println(lol.toUpperCase().equalsIgnoreCase(lol));
9:         System.out.println(lol.toUpperCase()
10:           .equalsIgnoreCase(lol.toUpperCase()));
11:  } }
```

A. One

B. Two

C. Three

D. Four

E. Five

F. None. The code does not compile.

11. Which lines can be removed together without stopping the code from compiling and while printing the same output? (Choose three.)

```
14:  String race = "";
15:  outer:
16:  do {
17:  inner:
18:     do {
19:        race += "x";
20:     } while (race.length() <= 4);
21:  } while (race.length() < 4);
22: System.out.println(race);
```

A. Lines 15 and 17

B. Lines 15, 16, and 21

C. Line 17

D. Lines 17, 18, and 20

E. Line 20

F. Line 21

12. Which of the following do not compile when filling in the blank? (Choose two.)

```
long bigNum = ____________;
```

A. `1234`

B. `1234.0`

C. `1234.0L`

D. `1234l`

E. `1234L`

F. `1_234`

13. How many lines does this program print?

```
import java.time.*;
public class OnePlusOne {
```

```
   public static void main(String... nums) {
      LocalTime time = LocalTime.of(1, 11);
      while (time.getHour() < 1) {
         time.plusHours(1);
         System.out.println("in loop");
      }
   }
}
```

A. None

B. One

C. Two

D. This is an infinite loop.

E. The code does not compile.

4. What is the result of running the following program?

```
1:   package fun;
2:   public class Sudoku {
3:      static int[][] game;
4:
5:      public static void main(String args[]) {
6:         game[3][3] = 6;
7:         Object[] obj = game;
8:         obj[3] = 'X';
9:         System.out.println(game[3][3]);
10:     }
11:  }
```

A. `6`

B. `X`

C. The code does not compile.

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

E. The code compiles but throws a different exception at runtime.

F. The output is not guaranteed.

5. Which of the following use generics and compile without warnings? (Choose two.)

A. `List<String> a = new ArrayList();`

B. `List<> b = new ArrayList();`

C. `List<String> c = new ArrayList<>();`

D. `List<> d = new ArrayList<>();`

E. `List<String> e = new ArrayList<String>();`

F. `List<> f = new ArrayList<String>();`

16. Which of the following are true right before the `main()` method ends? (Choose two.)

```
public static void main(String[] args) {
   String shoe1 = new String("sandal");
   String shoe2 = new String("flip flop");
   String shoe3 = new String("croc");

   shoe1 = shoe2;
   shoe2 = shoe3;
   shoe3 = shoe1;
}
```

A. No objects are eligible for garbage collection.

B. One object is eligible for garbage collection.

C. Two objects are eligible for garbage collection.

D. No objects are guaranteed to be garbage collected.

E. One object is guaranteed to be garbage collected.

F. Two objects are guaranteed to be garbage collected.

17. How many lines of the following application do not compile?

```
package ocean;
class BubbleException extends Exception {}
class Fish {
   Fish getFish() throws BubbleException {
      throw new RuntimeException("fish!");
   }
}
public final class Clownfish extends Fish {
   public final Clownfish getFish() {
      throw new RuntimeException("clown!");
   }
   public static void main(String[] bubbles) {
      final Fish f = new Clownfish();
      f.getFish();
      System.out.println("swim!");
   }
}
```

A. None. The code compiles and prints `swim!`.

B. None. The code compiles and prints a stack trace.

C. One

D. Two

E. Three

18. How many lines does this code output?

```
import java.util.*;
import java.util.function.*;
```

```
public class PrintNegative {

  public static void main(String[] args) {
     List<Integer> list= new ArrayList<>();
     list.add(-5);
     list.add(0);
     list.add(5);
     print(list, e -> e < 0);
  }

  public static void print(List<Integer> list, Predicate<Integer> p) {
      for (Integer num : list)
         if (p.test(num))
            System.out.println(num);
  }
}
```

A. One

B. Two

C. Three

D. None. It doesn't compile.

E. None. It throws an exception at runtime.

9. Which keywords are required with a `try` statement?

I. `finalize`

II. `catch`

III. `throws`

IV. `finally`

A. I only

B. II only

C. III only

D. IV only

E. I or II, or both

F. None of the above

10. What is the output of the following?

```
12:  int result = 8;
13:  loop: while (result > 7) {
14:     result++;
15:     do {
16:        result--;
17:     } while (result > 5);
18:     break loop;
```

```
19:  }
20:  System.out.println(result);
```

A. `5`

B. `7`

C. `8`

D. The code does not compile.

E. The code compiles but throws an exception at runtime.

21. What is the result of compiling and executing the following application?

```
package reptile;
public class Alligator {
   static int teeth;
   double scaleToughness;
   public Alligator() {
      teeth++;
   }
   public void snap(int teeth) {
      System.out.print(teeth+" ");
      teeth--;
   }
   public static void main(String[] unused) {
      new Alligator().snap(teeth);
      new Alligator().snap(teeth);
   }
}
```

A. `0 1`

B. `1 1`

C. `1 2`

D. `2 2`

E. The code does not compile.

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

22. What is the output of the following?

```
public class Costume {
   public static void main(String[] black) {
      String witch = "b";
      String tail = "lack";
      witch.concat(tail);
      System.out.println(witch);
   }
}
```

A. `b`

B. `black`

C. `lack`

D. The code does not compile.

E. The code compiles but throws an exception at runtime.

23. Which modifiers can be independently applied to an interface method? (Choose three.)

A. `default`

B. `protected`

C. `static`

D. `private`

E. `final`

F. `abstract`

24. What is the output of the following?

```
public class Shoelaces {
   public static void main(String[] args) {
      String tie = null;
      while (tie = null)
         tie = "shoelace";
         System.out.print(tie);
   }
}
```

A. `null`

B. `shoelace`

C. `shoelaceshoelace`

D. The code does not compile.

E. This is an infinite loop.

F. The code compiles but throws an exception at runtime.

25. What statements are true about compiling a Java class file? (Choose two.)

A. If the file does not contain a `package` statement, then the compiler considers the class part of the `java.lang` package.

B. The compiler assumes every class implicitly imports the `java.lang.*` package.

C. The compiler assumes every class implicitly imports the `java.util.*` package.

D. Java requires every file to declare a `package` statement.

E. Java requires every file to declare at least one `import` statement.

F. If the class declaration does not extend another class, then it implicitly extends the `java.lang.Object` class.

26. What is the output of the following application?

```
package woods;
interface Plant {
   default String grow() { return "Grow!"; }
}
interface Living {
   public default String grow() { return "Growing!"; }
}
public class Tree implements Plant, Living {  // m1
   public String grow(int height) { return "Super Growing!"; }
   public static void main(String[] leaves) {
      Plant p = new Tree();  // m2
      System.out.print(((Living)p).grow());  // m3
   }
}
```

A. `Grow!`

B. `Growing!`

C. `Super Growing!`

D. It does not compile because of line `m1`.

E. It does not compile because of line `m2`.

F. It does not compile because of line `m3`.

27. What is the result of the following?

```
public static void main(String... args) {
   String name = "Desiree";
   int _number = 694;
   boolean profit$$$;
   System.out.println(name + " won. "
       + _number + " profit? " + profit$$$);
}
```

A. The declaration of `name` does not compile.

B. The declaration of `_number` does not compile.

C. The declaration of `profit$$$` does not compile.

D. The `println` statement does not compile.

E. The code compiles and runs successfully.

F. The code compiles and throws an exception at runtime.

28. Fill in the blanks: Given a variable `x`, _____ decreases the value of `x` by `1` and returns the original value, while _____ increases the value of `x` by `1` and returns the new value.

A. `x--`, `++x`

B. `x--`, `x++`

C. `--x, x++`

D. `--x, ++x`

29. Given the following two classes in the same package, which constructors contain compiler errors? (Choose three.)

```
public class Big {
   public Big(boolean stillIn) {
      super();
   }
}

public class Trouble extends Big {
   public Trouble()  {}
   public Trouble(int deep) {
      super(false);
      this();
   }
   public Trouble(String now, int... deep) {
      this(3);
   }
   public Trouble(long deep) {
      this("check",deep);
   }
   public Trouble(double test) {
      super(test>5 ? true : false);
   }
}
```

A. `public Big(boolean stillIn)`

B. `public Trouble()`

C. `public Trouble(int deep)`

D. `public Trouble(String now, int... deep)`

E. `public Trouble(long deep)`

F. `public Trouble(double test)`

30. Which of the following can replace the comment so this code outputs `100`? (Choose two.)

```
public class Stats {
   // INSERT CODE
   public static void main(String[] math) {
     System.out.println(max - min);
   }
}
```

A. `final int min, max = 100;`

B. `final int min = 0, max = 100;`

C. `int min, max = 100;`

D. `int min = 0, max = 100;`

E. `static int min, max = 100;`

F. `static int min = 0, max = 100;`

31. Which of the following statements are true about Java operators and statements? (Choose two.)

A. Both right-hand sides of the ternary expression will be evaluated at runtime.

B. A `switch` statement may contain at most one `default` statement.

C. A single if-then statement can have multiple `else` statements.

D. The `|` and `||` operator are interchangeable, always producing the same results at runtime.

E. The `!` operator may not be applied to numeric expressions.

32. What is the output of the following?

```
1:   public class Legos {
2:      public static void main(String[] args) {
3:         StringBuilder sb = new StringBuilder();
4:         sb.append("red");
5:         sb.deleteCharAt(0);
6:         sb.delete(1, 1);
7:         System.out.println(sb);
8:      }
9:   }
```

A. `r`

B. `e`

C. `ed`

D. `red`

E. The code does not compile.

F. The code compiles but throws an exception at runtime.

33. Which of the following is a valid method name in Java? (Choose two.)

A. `_____()`

B. `%run()`

C. `check-Activity()`

D. `$Hum2()`

E. `sing\\3()`

F. `po#ut ()`

34. Which of the following statements about inheritance are true? (Choose two.)

A. Inheritance is better than using `static` methods for accessing data in other classes.

B. Inheritance allows a method to be overridden in a subclass, possibly changing the expected behavior of other methods in a superclass.

C. Inheritance allows objects to inherit commonly used attributes and methods.

D. It is possible to create a Java class that does not inherit from any other.

E. Inheritance tends to make applications more complicated.

35. Which of the following statements about Java are true?

I. The `java` command uses `.` to separate packages.

II. Java supports functional programming.

III. Java is object oriented.

IV. Java supports polymorphism.

A. I only

B. II only

C. II and III

D. I, III, and IV

E. I, II, III, and IV

F. None are true.

36. What is the output of the following?

```
String[][] listing = new String[][] { { "Book", "34.99" },
   { "Game", "29.99" }, { "Pen", ".99" } };
System.out.println(listing.length + " " + listing[0].length);
```

A. `2 2`

B. `2 3`

C. `3 2`

D. `3 3`

E. The code does not compile.

F. The code compiles but throws an exception at runtime.

37. Which of the following variable types is permitted in a `switch` statement? (Choose three.)

A. `Character`

B. `Byte`

C. `Double`

D. `long`

E. `String`

F. `Object`

38. What does the following do?

```
public class Shoot {
   interface Target {
      boolean needToAim(double angle);
   }
   static void prepare(double angle, Target t) {
      boolean ready = t.needToAim(angle);  // k1
      System.out.println(ready);
   }
   public static void main(String[] args) {
      prepare(45, d => d > 5 || d < -5);   // k2
   }
}
```

A. It prints `true`.

B. It prints `false`.

C. It doesn't compile due to line `k1`.

D. It doesn't compile due to line `k2`.

E. It doesn't compile due to another line.

39. Which of the following is a valid code comment in Java? (Choose three.)

A. `/** Insert */ in next method **/`

B. `/****** Find the kitty cat */`

C. `// Is this a bug?`

D. `/ Begin method - performStart() /`

E. `/*** TODO: Call grandma ***/`

F. `# Updated code by Patti`

40. Given the following two classes, each in a different package, which lines allow the second class to compile when inserted independently? (Choose two.)

```
package food;
public class Grass {
   public static int seeds = 10;
   public static Grass getGrass() {return new Grass();}
}

package woods;
// INSERT CODE HERE
public class Deer {
   public void eat() {
      getGrass();
```

```
      System.out.print(seeds);
   }
}
```

A.
```
import static food.Grass.getGrass;

   import static food.Grass.seeds;
```

B.
```
import static food.*;
```

C.
```
static import food.Grass.*;
```

D.
```
import food.Grass.*;
```

E.
```
static import food.Grass.getGrass;

   static import food.Grass.seeds;
```

F.
```
import static food.Grass.*;
```

11. What is the result of the following?

```
import java.util.*;
public class Museums {
   public static void main(String[] args) {
      String[] array = {"Natural History", "Science", "Art"};
      List<String> museums = Arrays.asList(array);
      museums.remove(2);
      System.out.println(museums);
   }
}
```

A. `[Natural History, Science]`

B. `[Natural History, Science, Art]`

C. The code does not compile.

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

12. Which of the following substitutions will compile? (Choose two.)

```
public class Underscores {
   public String name = "Sherrin";
   public void massage() {
      int zip = 10017;
   }
}
```

A. Change `name` to `_name`

B. Change `10017` to `_10017`

C. Change `10017` to `10017_`

D. Change `10017` to `10_0_17`

E. Change `int` to `_int`

13. What is the result of the following when called as `java counting.Binary`?

```
package counting;
import java.util.*;
public class Binary {

   public static void main(String[] args) {
      args = new String[] {"0", "1", "01", "10" };

      Arrays.sort(args);
      System.out.println(Arrays.toString(args));
   }
}
```

A. `[]`

B. `[0, 01, 1, 10]`

C. `[0, 01, 10, 1]`

D. `[0, 1, 01, 10]`

E. The code does not compile.

F. The code compiles but throws an exception at runtime.

14. Fill in the blanks: Using the _____ and _____ modifiers together allows a variable to be accessed from any class, without requiring an instance variable.

A. `final`, package-private

B. `class`, `static`

C. `protected`, `instance`

D. `public`, `static`

E. `default`, `public`

15. How many lines does the following code output?

```
import java.util.*;
public class Exams {
   public static void main(String[] args) {
      List<String> exams = Arrays.asList("OCA", "OCP");
      for (String e1 : exams)
         for (String e2 : exams)
            System.out.print(e1 + " " + e2);
            System.out.println();
   }
}
```

A. One

B. Four

C. Five

D. The code does not compile.

E. The code compiles but throws an exception at runtime.

16. Which of the following are true statements? (Choose two.)

A. The `javac` command compiles a source text file into a set of machine instructions.

B. The `java` command compiles a `.class` file into a `.java` file.

C. The `javac` command compiles a `.java` file into a `.class` file.

D. The `javac` command compiles a source text file into a bytecode file.

E. The `java` command compiles a `.java` file into a `.class` file.

F. The `javac` command compiles a `.class` file into a `.java` file.

17. How many of the following lines of code compile?

```
char one = Integer.parseInt("1");
Character two = Integer.parseInt("2");
int three = Integer.parseInt("3");
Integer four = Integer.parseInt("4");
short five = Integer.parseInt("5");
Short six = Integer.parseInt("6");
```

A. None

B. One

C. Two

D. Three

E. Four

F. Five

18. Given the application below, what data types can be inserted into the blank that would allow the code to print `3`? (Choose three.)

```
public class Highway {
   public int drive(long car) { return 2; }
   public int drive(double car) { return 3; }
   public int drive(int car) { return 5; }
   public int drive(short car) { return 3; }
   public static void main(String[] gears) {
      _____________ value = 5;
      System.out.print(new Highway().drive(value));
   }
}
```

A. `boolean`

B. `short`

C. `int`

D. `byte`

E. `long`

F. `float`

49. How many times does this code print `true`?

```
import java.time.*;
public class Equality {
   public void main(String[] args) {
      System.out.println(new StringBuilder("zelda")
          == new StringBuilder("zelda"));
      System.out.println(3 == 3);
      System.out.println("bart" == "bart");
      System.out.println(new int[0] == new int[0]);
      System.out.println(LocalTime.now() == LocalTime.now());
   }
}
```

A. None

B. One

C. Two

D. Three

E. The code does not compile.

50. What is the output of the following application?

```
package ballroom;
public class Dance {
   public static void swing(int... beats) throws ClassCastException {
      try {
         System.out.print("1"+beats[2]);  // p1
      } catch (RuntimeException e) {
         System.out.print("2");
      } catch (Exception e) {
         System.out.print("3");
      } finally {
         System.out.print("4");
      }
   }
   public static void main(String... music) {
      new Dance().swing(0,0);  // p2
      System.out.print("5");
   }
}
```

A. `145`

B. `1045`

C. `24`, followed by a stack trace

D. `245`

E. The code does not compile because of line `p1`.

F. The code does not compile because of line `p2`.

51. What is the output of the following?

```
List<String> drinks = Arrays.asList("can", "cup");
for (int container = drinks.size(); container > 0; container++) {
   System.out.print(drinks.get(container-1) + ",");
}
```

A. `can,cup,`

B. `cup,can,`

C. The code does not compile.

D. This is an infinite loop.

E. The code compiles but throws an exception at runtime.

52. Which of the following method signatures are valid declarations of an entry point in a Java application? (Choose three.)

A. `public static void main(String... widgets)`

B. `public static void main(String sprockets)`

C. `protected static void main(String[] args)`

D. `public static int void main(String[] arg)`

E. `public static final void main(String []a)`

F. `public static void main(String[] data)`

53. Given the application below and the choices available, which lines must all be removed to allow the code to compile? (Choose three.)

```
1:  package year;
2:  public class Seasons {
3:     public static void main(String[] time) {
4:        final long winter = 10;
5:        final byte season = 2;
6:        int fall = 4;
7:        final short summer = 3;
8:        switch(season) {
9:           case 1:
10:          case winter: System.out.print("winter");
11:          default:
12:          case fall: System.out.print("fall");
13:          case summer: System.out.print("summer");
14:          default:
15:       }
16:    }
17: }
```

A. Line 8

B. Line 9

C. Line 10

D. Line 11

E. Line 12

F. Line 13

54. Given the application below, which lines do not compile? (Choose three.)

```
package furryfriends;
interface Friend {
   protected String getName();  // h1
}
class Cat implements Friend {
   String getName() {  // h2
      return "Kitty";
   }
}
public class Dog implements Friend {
   String getName() throws RuntimeException {  // h3
      return "Doggy";
   }
   public static void main(String[] adoption) {
      Friend friend = new Dog();  // h4
      System.out.print(((Cat)friend).getName());  // h5
      System.out.print(((Dog)null).getName());  // h6
   }
}
```

A. Line `h1`

B. Line `h2`

C. Line `h3`

D. Line `h4`

E. Line `h5`

F. Line `h6`

55. Which of the following are unchecked exceptions? (Choose three.)

A. `FileNotFoundException`

B. `ArithmeticException`

C. `IOException`

D. `Exception`

E. `IllegalArgumentException`

F. `RuntimeException`

56. What is the result of compiling and executing the following application?

```
package ranch;
public class Cowboy {
   private int space = 5;
   private double ship = space < 2 ? 1 : 10;  // g1
   public void printMessage() {
      if(ship>1) {
         System.out.println("Goodbye");
      } if(ship<10 && space>=2) System.out.println("Hello");  // g2
      else System.out.println("See you again");
   }
   public static final void main(String... stars) {
      new Cowboy().printMessage();
   }
}
```

A. It only prints `Hello`.

B. It only prints `Goodbye`.

C. It only prints `See you again`.

D. It does not compile because of line `g1`.

E. It does not compile because of line `g2`.

F. None of the above

;7. Given the following three class declarations, which sets of access modifiers can be inserted, in order, into the blank lines below that would allow all of the classes to compile? (Choose three.)

```
package wake;
public class Alarm {
    ____________static int clock;
    ____________long getTime() {return clock;}
}

package wake;
public class Coffee {
   private boolean bringCoffee() { return new Alarm().clock<10;}
}

package sleep;
public class Snooze extends wake.Alarm {
   private boolean checkTime() { return getTime()>10;}
}
```

A. `protected` and package-private (blank)

B. `public` and `public`

C. package-private (blank) and `protected`

D. `protected` and `protected`

E. `private` and `public`

F. package-private (blank) and package-private (blank)

8. Given that `FileNotFoundException` is a subclass of `IOException` and `Long` is a subclass of `Number`, what is the output of the following application?

```
package materials;

import java.io.*;

class CarbonStructure {
    protected long count;
    public abstract Number getCount() throws IOException;  // q1
    public CarbonStructure(int count) { this.count = count; }
}
public class Diamond extends CarbonStructure {
   public Diamond() { super(15); }
   public Long getCount() throws FileNotFoundException {  // q2
      return count;
   }
   public static void main(String[] cost) {
      try {
         final CarbonStructure ring = new Diamond();  // q3
         System.out.print(ring.getCount());  // q4
      } catch (IOException e) {
         e.printStackTrace();
      }
   }
}
```

A. `15`

B. It does not compile because of line `q1`.

C. It does not compile because of line `q2`.

D. It does not compile because of line `q3`.

E. It does not compile because of line `q4`.

F. It compiles but throws an exception at runtime.

9. How many lines contain a compile error?

```
1:   import java.time.*;
2:   import java.time.format.*;
3:
4:   public class HowLong {
5:      public void main(String h) {
6:         LocalDate newYears = new LocalDate(2017, 1, 1);
7:         Period period = Period.ofYears(1).ofDays(1);
8:         DateTimeFormat format = DateTimeFormat.ofPattern("MM-dd-yyyy");
9:         System.out.print(format.format(newYears.minus(period)));
10:    }
11:  }
```

A. None

B. One

C. Two

D. Three

E. Four

F. Five

50. Which of the following statements about try-catch blocks are correct? (Choose two.)

A. A `catch` block can never appear after a `finally` block.

B. A `try` block must be followed by a `catch` block.

C. A `finally` block can never appear after a `catch` block.

D. A `try` block must be followed by a `finally` block.

E. A `try` block can have zero or more `catch` blocks.

F. A `try` block can have zero or more `finally` blocks.

51. What is printed by the following code snippet?

```
int fish = 1 + 2 * 5>=2 ? 4 : 2;
int mammals = 3 < 3 ? 1 : 5>=5 ? 9 : 7;
System.out.print(fish+mammals+"");
```

A. `49`

B. `13`

C. `18`

D. `99`

E. It does not compile.

52. Which of the following statements about objects, reference types, and casting are correct? (Choose three.)

A. An object can be assigned to an inherited interface reference variable without an explicit cast.

B. The compiler can prevent all explicit casts that lead to an exception at runtime.

C. Casting an object to a reference variable does not modify the object in memory.

D. An object can be assigned to a subclass reference variable without an explicit cast.

E. An object can be assigned to a superclass reference variable without an explicit cast.

F. An implicit cast of an object to one of its inherited types can sometimes lead to a `ClassCastException` at runtime.

53. What is the output of the following when run as `java EchoFirst seed flower plant`?

```
package unix;
```

```
import java.util.*;

public class EchoFirst {

   public static void main(String[] args) {
      int result = Arrays.binarySearch(args, args[0]);
      System.out.println(result);
  }
}
```

A. `0`

B. `1`

C. `2`

D. The code does not compile.

E. The code compiles but throws an exception at runtime.

F. The output is not guaranteed.

54. How many objects are eligible for garbage collection at the end of the `main()` method?

```
package store;
public class Shoes {

   static String shoe1 = new String("sandal");
   static String shoe2 = new String("flip flop");

   public static void shopping() {
      String shoe3 = new String("croc");
      shoe2 = shoe1;
      shoe1 = shoe3;
   }

   public static void main(String... args) {
      shopping();
   }
}
```

A. None

B. One

C. Two

D. Three

E. The code does not compile.

55. Fill in the blanks: The _____keyword is used in method declarations, the _____keyword is used to guarantee a statement will execute even if an exception is thrown, and the _____keyword is used to throw an exception to the surrounding process.

A. `throw`, `finally`, `throws`

B. `throws`, `catch`, `throw`

C. `catch`, `finally`, `throw`

D. `finally`, `catch`, `throw`

E. `throws`, `finally`, `throw`

56. Which statements best describe the result of this code? (Choose two.)

```
package nyc;
public class TouristBus {
  public static void main(String... args) {
     String[] nycTourLoops = new String[] { "Downtown", "Uptown", "Brooklyn"
};
     String[] times = new String[] { "Day", "Night" };
        for (int i = 0, j = 0; i < nycTourLoops.length; i++, j++)
           System.out.println(nycTourLoops[i] + " " + times[j]);
  }
}
```

A. The `println` causes one line of output.

B. The `println` causes two lines of output.

C. The `println` causes three lines of output.

D. The code terminates successfully.

E. The code throws an exception at runtime.

57. Fill in the blanks: Because of_____ , it is possible to _____a method, which allows Java to support_____ .

A. abstract methods, override, inheritance

B. concrete methods, overload, inheritance

C. virtual methods, overload, interfaces

D. inheritance, abstract, polymorphism

E. virtual methods, override, polymorphism.

58. What is the result of the following?

```
package calendar;
public class Seasons {

   public static void seasons(String... names) {
      int l = names[1].length();       // s1
      System.out.println(names[l]);    // s2
   }

   public static void main(String[] args) {
      seasons("Summer", "Fall", "Winter", "Spring");
   }
```

```
}
```

A. `Fall`

B. `Spring`

C. The code does not compile.

D. The code throws an exception on line `s1`.

E. The code throws an exception on line `s2`.

69. How many lines of the following application contain compilation errors?

```
1:  package percussion;
2:
3:  interface MakesNoise {}
4:  abstract class Instrument implements MakesNoise {
5:     public Instrument(int beats) {}
6:     public void play() {}
7:  }
8:  public class Drum extends Instrument {
9:     public void play(int count) {}
10:    public void concert() {
11:       super.play(5);
12:    }
13:    public static void main(String[] beats) {
14:       MakesNoise mn = new Drum();
15:       mn.concert();
16:    }
17: }
```

A. None. The code compiles and runs without issue.

B. One

C. Two

D. Three

E. Four

70. What is the output of the following application?

```
package fly;
public class Helicopter {
   public int adjustPropellers(int length, String[] type) {
      length++;
      type[0] = "LONG";
      return length;
   }
   public static void main(String[] climb) {
      final Helicopter h = new Helicopter();
      int length = 5;
      String[] type = new String[1];
      length = h.adjustPropellers(length, type);
      System.out.print(length+","+type[0]);
```

```
   }
}
```

A. `5,LONG`

B. `6,LONG`

C. `5,null`

D. `6,null`

E. The code does not compile.

F. The code compiles but throws an exception at runtime.

71. How many lines of the following application do not compile?

```
package castles;
class OpenDoorException extends Exception {}
class CableSnapException extends OpenDoorException {}
public class Palace {
   public void openDrawbridge() throws Exception {
      try {
         throw new Exception("Problem");
      } catch (OpenDoorException e) {
         throw new OpenDoorException();
      } catch (CableSnapException ex) {
         try {
            throw new OpenDoorException();
         } catch (Exception ex) {
         } finally {
            System.out.println("Almost done");
         }
      } finally {
         throw new RuntimeException("Unending problem");
      }
   }
   public static void main(String[] moat) throws IllegalArgumentException {
      new Palace().openDrawbridge();
   }
}
```

A. None. The code compiles and produces a stack trace at runtime.

B. One

C. Two

D. Three

E. Four

F. Five

72. Choose the best answer: _____and _____are two properties that go hand in hand to improve class design by structuring a class with related attributes and actions while protecting the underlying data from access by other classes.

A. Optimization and platform independence

B. Platform independence and encapsulation

C. Platform independence and inheritance

D. Object orientation and encapsulation

E. Inheritance and polymorphism

73. What is the output of the following?

```
string bike1 = "speedy";
string bike2 = new String("speedy");
boolean test1 = bike1 == bike2;
boolean test2 = bike1.equals(bike2);
System.out.println(test1 + " " + test2);
```

A. `false false`

B. `false true`

C. `true false`

D. `true true`

E. The code does not compile.

F. The code compiles but throws an exception at runtime.

74. What is the output of the following when run as `java EchoFirst seed flower plant`?

```
package unix;

import java.util.*;

public class EchoFirst {

   public static void main(String[] args) {
      Arrays.sort(args);
      int result = Arrays.binarySearch(args, args[0]);
      System.out.println(result);
  }
}
```

A. `0`

B. `1`

C. `2`

D. The code does not compile.

E. The code compiles but throws an exception at runtime.

F. The output is not guaranteed.

75. Which are true statements? (Choose three.)

A. Every `do-while` loop can be rewritten as a `for`-each loop.

B. Every `for`-each loop can be rewritten as a `do-while` loop.

C. Every `for`-each loop can be rewritten as a traditional `for` loop.

D. Every `for`-each loop can be rewritten as a `while` loop.

E. Every traditional `for` loop can be rewritten as a `for`-each loop.

F. Every `while` loop can be rewritten as a `for`-each loop.

76. How many lines does this program print?

```
import java.time.*;
public class OnePlusOne {
   public static void main(String... nums) {
     LocalDate time = LocalDate.of(1, 11);
     while (time.getHour() < 1) {
        time.plusHours(1);
        System.out.println("in loop");
     }
   }
}
```

A. None

B. One

C. Two

D. This is an infinite loop.

E. The code does not compile.

77. How many objects are eligible for garbage collection immediately before the end of the `main()` method?

```
public class Tennis {
   public static void main(String[] game) {
      String[] balls = new String[1];
      int[] scores = new int[1];
      balls = null;
      scores = null;
   }
}
```

A. None

B. One

C. Two

D. Three

E. Four

78. What is the output of the following?

```
14:  int count = 0;
15:  LocalDate date = LocalDate.of(2017, Month.JANUARY, 1);
16:  while (date.getMonth() != Month.APRIL)
17:     date = date.minusMonths(1);
18:     count++;
19:  System.out.println(count);
```

A. `0`

B. `1`

C. `3`

D. `9`

E. This is an infinite loop.

F. The code does not compile.

79. How many lines of the following class do not compile?

```
1:  package arctic;
2:  abstract class Bear {
3:     protected int sing;
4:     protected abstract int grunt();
5:     int sing() {
6:        return sing;
7:     }
8:  }
9:  public class PolarBear extends Bear {
10:    int grunt() {
11:       sing() += 10;
12:       return super.grunt()+1;
13:       return 10;
14:    }
15: }
```

A. None, the class compiles without issue.

B. One

C. Two

D. Three

E. Four

F. Five

80. In which places is the `default` keyword permitted to be used? (Choose two.)

A. Access modifier in a class

B. Execution path in a `switch` statement

C. Method name

D. Modifier in an `abstract` interface method

E. Modifier in an interface method with a body
F. Variable name