

1. Which code can be inserted to have the code print 2?

```
public class BirdSeed {  
    private int numberBags;  
    boolean call;  
  
    public BirdSeed() {  
        // LINE 1  
        call = false;  
        // LINE 2  
    }  
  
    public BirdSeed(int numberBags) {  
        this.numberBags = numberBags;  
    }  
  
    public static void main(String[] args) {  
        var seed = new BirdSeed();  
        System.out.print(seed.numberBags);  
    }  
}
```

- A. Replace line 1 with BirdSeed(2);.
- B. Replace line 2 with BirdSeed(2);.
- C. Replace line 1 with new BirdSeed(2);.
- D. Replace line 2 with new BirdSeed(2);.
- E. Replace line 1 with this(2);.
- F. Replace line 2 with this(2);.
- G. The code prints 2 without any changes.

A, E

Las variables de instancia y estáticas pueden ser marcadas como **final**, haciendo que la opción A sea correcta. Efectivamente final significa que una variable local no está marcada como **final** pero cuyo valor no cambia después de ser establecido, haciendo que la opción B sea incorrecta.

La opción C es incorrecta, ya que final se refiere solo a la referencia a un objeto, no a su contenido. La opción D es incorrecta, ya que **var** y **final** se pueden usar juntos. Finalmente, la opción E es correcta: una vez que un primitivo está marcado como final, no se puede modificar.

2. Which modifier pairs can be used together in a method declaration?  
(Choose all that apply.)

- A. static and final
- B. private and static
- C. static and abstract
- D. private and abstract
- E. abstract and final
- F. private and final

3. Which of the following statements about methods are true? (Choose all that apply.)

- A. Overloaded methods must have the same signature.
- B. Overridden methods must have the same signature.
- C. Hidden methods must have the same signature.
- D. Overloaded methods must have the same return type.
- E. Overridden methods must have the same return type.
- F. Hidden methods must have the same return type.

4. What is the output of the following program?

```
1: class Mammal {  
2:   private void sneeze() {}  
3:   public Mammal(int age) {  
4:     System.out.print("Mammal");  
5:   }}  
6: public class Platypus extends Mammal {  
7:   int sneeze() { return 1; }  
8:   public Platypus() {  
9:     System.out.print("Platypus");  
10:  }  
11:  public static void main(String[] args) {  
12:    new Mammal(5);  
13:  }}
```

- A. Platypus
- B. Mammal
- C. PlatypusMammal
- D. MammalPlatypus
- E. The code will compile if line 7 is changed.
- F. The code will compile if line 9 is changed.

5. Which of the following complete the constructor so that this code prints out 50? (Choose all that apply.)

```
class Speedster {
    int numSpots;
}
public class Cheetah extends Speedster {
    int numSpots;

    public Cheetah(int numSpots) {
        // INSERT CODE HERE
    }

    public static void main(String[] args) {
        Speedster s = new Cheetah(50);
        System.out.print(s.numSpots);
    }
}
```

- A. numSpots = numSpots;
- B. numSpots = this.numSpots;
- C. this.numSpots = numSpots;
- D. numSpots = super.numSpots;
- E. super.numSpots = numSpots;
- F. The code does not compile regardless of the code inserted into the constructor.
- G. None of the above

6. Which of the following declare immutable classes? (Choose all that apply.)

```
public final class Moose {
    private final int antlers;
}

public class Caribou {
    private int antlers = 10;
}

public class Reindeer {
    private final int antlers = 5;
}

public final class Elk {}

public final class Deer {
    private final Object o = new Object();
}
```

- A. Moose
- B. Caribou
- C. Reindeer
- D. Elk
- E. Deer
- F. None of the above

<div data-bbox="199 49 624 76">7. What is the output of the following code?</div> <div data-bbox="221 106 936 686"><pre>1: class 2: pro 3: Sy 4: } 5: voi 6: Sy 7: }} 8: publi 9: pro 10: S 11: } 12: pu 13: A 14: a 15: a 16: a 17: }}</pre><div data-bbox="329 106 936 558"><div>8. What is the result of the following code?</div><pre>1: abstract class Bird { 2:   private final void fly() { System.out.println("Bird"); } 3:   protected Bird() { System.out.print("Wow-"); } 4: } 5: public class Pelican extends Bird { 6:   public Pelican() { System.out.print("Oh-"); } 7:   protected void fly() { System.out.println("Pelican"); } 8:   public static void main(String[] args) { 9:     var chirp = new Pelican(); 10:    chirp.fly(); 11: }}</pre></div></div> <div data-bbox="568 518 1032 833"><div>A. Oh-Bird</div><div>B. Oh-Pelican</div><div>C. Wow-Oh-Bird</div><div>D. Wow-Oh-Pelican</div><div>E. The code contains a compilation error.</div><div>F. None of the above</div></div>	
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9. Which of the following statements about overridden methods are true?

(Choose all that apply.)

- A. An overridden method must contain method parameters that are the same or covariant with the method parameters in the inherited method.
- B. An overridden method may declare a new exception, provided it is not checked.
- C. An overridden method must be more accessible than the method in the parent class.
- D. An overridden method may declare a broader checked exception than the method in the parent class.
- E. If an inherited method returns void, then the overridden version of the method must return void.
- F. None of the above

10. Which of the following pairs, when inserted into the blanks, allow the code to compile? (Choose all that apply.)

```
1: public class Howler {  
2:   public Howler(long shadow) {  
3:     _____;  
4:   }  
5:   private Howler(int moon) {  
6:     super();  
7:   }  
8: }  
9: class Wolf extends Howler {  
10:   protected Wolf(String stars) {  
11:     super(2L);  
12:   }  
13:   public Wolf() {  
14:     _____;  
15:   }  
16: }
```

- A. this(3) at line 3, this("") at line 14
- B. this() at line 3, super(1) at line 14
- C. this((short)1) at line 3, this(null) at line 14
- D. super() at line 3, super() at line 14
- E. this(2L) at line 3, super((short)2) at line 14
- F. this(5) at line 3, super(null) at line 14
- G. Remove lines 3 and 14.

11. What is the result of the following?

```
1: public class PolarBear {  
2:   StringBuilder value = new StringBuilder("t");  
3:   { value.append("a"); }  
4:   { value.append("c"); }  
5:   private PolarBear() {  
6:     value.append("b");  
7:   }  
8:   public PolarBear(String s) {  
9:     this();  
10:    value.append(s);  
11:  }  
12:   public PolarBear(CharSequence p) {  
13:     value.append(p);  
14:   }  
15:   public static void main(String[] args) {  
16:     Object bear = new PolarBear();  
17:     bear = new PolarBear("f");  
18:     System.out.println(((PolarBear)bear).value);  
19:  }}
```

- A. tacb
- B. tacf
- C. tacbf
- D. tcafb
- E. taftacb
- F. The code does not compile.
- G. An exception is thrown.

12. How many lines of the following program contain a compilation error?

```
1: public class Rodent {  
2:   public Rodent(Integer x) {}  
3:   protected static Integer chew() throws Exception {  
4:     System.out.println("Rodent is chewing");  
5:     return 1;  
6:   }  
7: }  
8: class Beaver extends Rodent {  
9:   public Number chew() throws RuntimeException {  
10:    System.out.println("Beaver is chewing on wood");  
11:    return 2;  
12:  }}
```

- A. None
- B. 1
- C. 2
- D. 3
- E. 4
- F. 5

13. Which of these classes compile and will include a default constructor created by the compiler? (Choose all that apply.)

A. `public class Bird {}`

B. `public class Bird {  
 public bird() {}  
}`

C. `public class Bird {  
 public bird(String name) {}  
}`

D. `public class Bird {  
 public Bird() {}  
}`

E. `public class Bird {  
 Bird(String name) {}  
}`

F. `public class Bird {  
 private Bird(int age) {}  
}`

G. `public class Bird {  
 public Bird bird() { return null; }  
}`

14. Which of the following statements about inheritance are correct? (Choose all that apply.)

A. A class can directly extend any number of classes.

B. A class can implement any number of interfaces.

C. All variables inherit `java.lang.Object`.

D. If class `A` is extended by `B`, then `B` is a superclass of `A`.

E. If class `C` implements interface `D`, then `C` is a subtype of `D`.

F. Multiple inheritance is the property of a class to have multiple direct superclasses.

15. Which statements about the following program are correct? (Choose all that apply.)

```
1: abstract class Nocturnal {  
2:   boolean isBlind();  
3: }  
4: public class Owl extends Nocturnal {  
5:   public boolean isBlind() { return false; }  
6:   public static void main(String[] args) {  
7:     var nocturnal = (Nocturnal)new Owl();  
8:     System.out.println(nocturnal.isBlind());  
9:   } }
```

- A. It compiles and prints true.
- B. It compiles and prints false.
- C. The code will not compile because of line 2.
- D. The code will not compile because of line 5.
- E. The code will not compile because of line 7.
- F. The code will not compile because of line 8.
- G. None of the above

16. What is the result of the following?

```
1: class Arachnid {  
2:   static StringBuilder sb = new StringBuilder();  
3:   { sb.append("c"); }  
4:   static  
5:   { sb.append("u"); }  
6:   { sb.append("r"); }  
7: }  
8: public class Scorpion extends Arachnid {  
9:   static  
10:  { sb.append("q"); }  
11:  { sb.append("m"); }  
12:  public static void main(String[] args) {  
13:    System.out.print(Scorpion.sb + " ");  
14:    System.out.print(Scorpion.sb + " ");  
15:    new Arachnid();  
16:    new Scorpion();  
17:    System.out.print(Scorpion.sb);  
18:  } }
```

- A. qu qu qumrcrc
- B. u u ucrarm
- C. uq uq uqmcrcr
- D. uq uq uqrcarm
- E. qu qu qumrcrc
- F. qu qu qucrarm
- G. The code does not compile.



17. Which of the following are true? (Choose all that apply.)

- A. `this()` can be called from anywhere in a constructor.
- B. `this()` can be called from anywhere in an instance method.
- C. `this.variableName` can be called from any instance method in the class.
- D. `this.variableName` can be called from any static method in the class.
- E. You can call the default constructor written by the compiler using `this()`.
- F. You can access a private constructor with the `main()` method in the same class.

18. Which statements about the following classes are correct? (Choose all that apply.)

```
1: public class Mammal {  
2:   private void eat() {}  
3:   protected static void drink() {}  
4:   public Integer dance(String p) { return null; }  
5: }  
6: class Primate extends Mammal {  
7:   public void eat(String p) {}  
8: }  
9: class Monkey extends Primate {  
10:   public static void drink() throws RuntimeException {}  
11:   public Number dance(CharSequence p) { return null; }  
12:   public int eat(String p) {}  
13: }
```

- A. Theeat() method inMammal is correctly overridden on line 7.
- B. Theeat() method inMammal is correctly overloaded on line 7.
- C. Thedrink() method inMammal is correctly overridden on line 10.
- D. Thedrink() method inMammal is correctly hidden on line 10.
- E. Thedance() method inMammal is correctly overridden on line 11.
- F. Thedance() method inMammal is correctly overloaded on line 11.
- G. Theeat() method inPrimate is correctly hidden on line 12.
- H. Theeat() method inPrimate is correctly overloaded on line 12.

19. What is the output of the following code?

```
1: class Reptile {  
2:   {System.out.print("A");}  
3:   public Reptile(int hatch) {}  
4:   void layEggs() {  
5:     System.out.print("Reptile");  
6:   }}  
7: public class Lizard extends Reptile {  
8:   static {System.out.print("B");}  
9:   public Lizard(int hatch) {}  
10:   public final void layEggs() {  
11:     System.out.print("Lizard");  
12:   }  
13:   public static void main(String[] args) {  
14:     var reptile = new Lizard(1);  
15:     reptile.layEggs();  
16:   }}
```

- A. AALizard
- B. BALizard
- C. BLizardA
- D. ALizard
- E. The code will not compile because of line 3.
- F. None of the above

20. Which statement about the following program is correct?

```
1: class Bird {  
2:   int feathers = 0;  
3:   Bird(int x) { this.feathers = x; }  
4:   Bird fly() {  
5:     return new Bird(1);  
6:   }}  
7: class Parrot extends Bird {  
8:   protected Parrot(int y) { super(y); }  
9:   protected Parrot fly() {  
10:    return new Parrot(2);  
11:  }}  
12: public class Macaw extends Parrot {  
13:   public Macaw(int z) { super(z); }  
14:   public Macaw fly() {  
15:     return new Macaw(3);  
16:   }  
17:   public static void main(String... sing) {  
18:     Bird p = new Macaw(4);  
19:     System.out.print(((Parrot)p.fly()).feathers);  
20:   }}
```

- A. One line contains a compiler error.
- B. Two lines contain compiler errors.
- C. Three lines contain compiler errors.
- D. The code compiles but throws aClassCastException at runtime.
- E. The program compiles and prints3.
- F. The program compiles and prints0.

21. Which of the following are properties of immutable classes? (Choose all that apply.)

- A. The class can contain setter methods, provided they are marked final.
- B. The class must not be able to be extended outside the class declaration.
- C. The class may not contain any instance variables.
- D. The class must be marked static.
- E. The class may not contain any static variables.
- F. The class may only contain private constructors.
- G. The data for mutable instance variables may be read, provided they cannot be modified by the caller.

22. What does the following program print?

```
1: class Person {  
2:   static String name;  
3:   void setName(String q) { name = q; } }  
4: public class Child extends Person {  
5:   static String name;  
6:   void setName(String w) { name = w; }  
7:   public static void main(String[] p) {  
8:     final Child m = new Child();  
9:     final Person t = m;  
10:    m.name = "Elysia";  
11:    t.name = "Sophia";  
12:    m.setName("Webby");  
13:    t.setName("Olivia");  
14:    System.out.println(m.name + " " + t.name);  
15:  } }
```

- A. Elysia Sophia
- B. Webby Olivia
- C. Olivia Olivia
- D. Olivia Sophia
- E. The code does not compile.
- F. None of the above

23. What is the output of the following program?

```
1: class Canine {
2:   public Canine(boolean t) { logger.append("a"); }
3:   public Canine() { logger.append("q"); }
4:
5:   private StringBuilder logger = new StringBuilder();
6:   protected void print(String v) { logger.append(v); }
7:   protected String view() { return logger.toString(); }
8: }
9:
10: class Fox extends Canine {
11:   public Fox(long x) { print("p"); }
12:   public Fox(String name) {
13:     this(2);
14:     print("z");
15:   }
16: }
17:
18: public class Fennec extends Fox {
19:   public Fennec(int e) {
20:     super("tails");
21:     print("j");
22:   }
23:   public Fennec(short f) {
24:     super("eevee");
25:     print("m");
26:   }
27:
28:   public static void main(String... unused) {
29:     System.out.println(new Fennec(1).view());
30:   }
```

- A. qpz
- B. qpzj
- C. jzpa
- D. apj
- E. apjm
- F. The code does not compile.
- G. None of the above

24. What is printed by the following program?

```
1: class Antelope {  
2:   public Antelope(int p) {  
3:     System.out.print("4");  
4:   }  
5:   { System.out.print("2"); }  
6:   static { System.out.print("1"); }  
7: }  
8: public class Gazelle extends Antelope {  
9:   public Gazelle(int p) {  
10:    super(6);  
11:    System.out.print("3");  
12:  }  
13:   public static void main(String hopping[]) {  
14:     new Gazelle(0);  
15:  }  
16:   static { System.out.print("8"); }  
17:   { System.out.print("9"); }  
18: }
```

- A. 182640
- B. 182943
- C. 182493
- D. 421389
- E. The code does not compile.
- F. The output cannot be determined until runtime.

25. Which of the following are true about a concrete class? (Choose all that apply.)

- A. A concrete class can be declared as abstract.
- B. A concrete class must implement all inherited abstract methods.
- C. A concrete class can be marked as final.
- D. A concrete class must be immutable.
- E. A concrete method that implements an abstract method must match the method declaration of the abstract method exactly.

26. What is the output of the following code?

```
4: public abstract class Whale {  
5:   public abstract void dive();  
6:   public static void main(String[] args) {  
7:     Whale whale = new Orca();  
8:     whale.dive(3);  
9:   }  
10: }  
11: class Orca extends Whale {  
12:   static public int MAX = 3;  
13:   public void dive() {  
14:     System.out.println("Orca diving");  
15:   }  
16:   public void dive(int... depth) {  
17:     System.out.println("Orca diving deeper "+MAX);  
18:   }  
19: }
```

- A. Orca diving
- B. Orca diving deeper 3
- C. The code will not compile because of line 4.
- D. The code will not compile because of line 8.
- E. The code will not compile because of line 11.
- F. The code will not compile because of line 12.
- G. The code will not compile because of line 17.
- H. None of the above