Review Questions

The answers to the chapter review questions can be found in the Appendix.

1. Which of the following are legal entry point methods that can be run from the command line? (Choose all that apply.)

   A. `private static void main(String[] args)` ✗ main is not public
   B. `public static final main(String[] args)` ✗ missing a void return type
   C. `public void main(String[] args)` ✗ must be static
   D. `public static final void main(String[] args)` ✓ final is redundant
   E. `public static void main(String[] args)` ✓ standard form
   F. `public static main(String[] args)` ✗

2. Which answer options represent the order in which the following statements can be assembled into a program that will compile successfully? (Choose all that apply.)

```
X: class Rabbit {}
Y: import java.util.*;
Z: package animals;
```

   A. X, Y, Z ✗
   B. Y, Z, X ✗
   C. Z, Y, X
   D. Y, X
   E. Z, X
   F. X, Z ✗

   package and import are optional. If present: 1.- package, import, class.

   G. None of the above

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

```
public class Bunny {
   public static void main(String[] x) {
      Bunny bun = new Bunny();
} }
```

   A. Bunny is a class.
   B. bun is a class.
   C. main is a class.
   D. Bunny is a reference to an object.
   E. bun is a reference to an object.
   F. main is a reference to an object.
   G. The `main()` method doesn't run because the parameter name is incorrect.

4. Which of the following are valid Java identifiers? (Choose all that apply.)

   A. `_` x single underscore is not allowed
   B. `_helloWorld$`
   C. `true`
   D. `java.lang` x dot is not allowed
   E. `Public`
   F. `1980_s`
   G. `_Q2_`

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

```
2:  public class Bear {
3:     private Bear pandaBear;
4:     private void roar(Bear b) {
5:        System.out.println("Roar!");
6:        pandaBear = b;
7:     }
8:     public static void main(String[] args) {
9:        Bear brownBear = new Bear();
10:       Bear polarBear = new Bear();
11:       brownBear.roar(polarBear);
12:       polarBear = null;
13:       brownBear = null;
14:       System.gc(); } }
```

   A. The object created on line 9 is eligible for garbage collection after line 13.
   B. The object created on line 9 is eligible for garbage collection after line 14.
   C. The object created on line 10 is eligible for garbage collection after line 12.
   D. The object created on line 10 is eligible for garbage collection after line 13.
   E. Garbage collection is guaranteed to run.
   F. Garbage collection might or might not run.
   G. The code does not compile.

6. Assuming the following class compiles, how many variables defined in the class or method are in scope on the line marked on line 14?

```
1:  public class Camel {
2:     { int hairs = 3_000_0; }
3:     long water, air=2;
4:     boolean twoHumps = true;
5:     public void spit(float distance) {
6:        var path = "";
```

```
7:        { double teeth = 32 + distance++; }
8:        while(water > 0) {
9:           int age = twoHumps ? 1 : 2;
10:          short i=-1;
11:          for(i=0; i<10; i++) {
12:             var Private = 2;
13:          }
14:          // SCOPE
15:       }
16:    }
17: }
```

A. 2
B. 3
C. 4
D. 5
E. 6
F. 7
G. None of the above

7. Which are true about this code? (Choose all that apply.)

```
public class KitchenSink {
    private int numForks;

    public static void main(String[] args) {
       int numKnives;
       System.out.print("""
          "# forks = " + numForks +
           " # knives = " + numKnives +
          # cups = 0""");
    }
}
```

A. The output includes: `# forks = 0`.
B. The output includes: `# knives = 0`.
C. The output includes: `# cups = 0`.
D. The output includes a blank line.
E. The output includes one or more lines that begin with whitespace.
F. The code does not compile.

8. Which of the following code snippets about `var` compile without issue when used in a method? (Choose all that apply.)

   A. `var spring = null;`
   B. `var fall = "leaves";`
   C. `var evening = 2; evening = null;`
   D. `var night = Integer.valueOf(3);`
   E. `var day = 1/0;`
   F. `var winter = 12, cold;`
   G. `var fall = 2, autumn = 2;`
   H. `var morning = ""; morning = null;`

9. Which of the following are correct? (Choose all that apply.)

   A. An instance variable of type `float` defaults to `0`.
   B. An instance variable of type `char` defaults to `null`.
   C. A local variable of type `double` defaults to `0.0`.
   D. A local variable of type `int` defaults to `null`.
   E. A class variable of type `String` defaults to `null`.
   F. A class variable of type `String` defaults to the empty string `""`.
   G. None of the above.

10. Which of the following expressions, when inserted independently into the blank line, allow the code to compile? (Choose all that apply.)

```
public void printMagicData() {
   var magic = _____;
   System.out.println(magic);
}
```

   A. `3_1`
   B. `1_329_.0`
   C. `3_13.0_`
   D. `5_291._2`
   E. `2_234.0_0`
   F. `9___6`
   G. `_1_3_5_0`

11. Given the following two class files, what is the maximum number of imports that can be removed and have the code still compile?

```
// Water.java
package aquarium;
public class Water { }
```

```
// Tank.java
package aquarium;
import java.lang.*;
import java.lang.System;
import aquarium.Water;
import aquarium.*;
public class Tank {
   public void print(Water water) {
   System.out.println(water); } }
```

A. 0
B. 1
C. 2
D. 3
E. 4
F. Does not compile

12. Which statements about the following class are correct? (Choose all that apply.)

```
1: public class ClownFish {
2:    int gills = 0, double weight=2;
3:    { int fins = gills; }
4:    void print(int length = 3) {
5:       System.out.println(gills);
6:       System.out.println(weight);
7:       System.out.println(fins);
8:       System.out.println(length);
9: } }
```

A. Line 2 generates a compiler error.
B. Line 3 generates a compiler error.
C. Line 4 generates a compiler error.
D. Line 7 generates a compiler error.
E. The code prints `0`.
F. The code prints `2.0`.
G. The code prints `2`.
H. The code prints `3`.

13. Given the following classes, which of the following snippets can independently be inserted in place of `INSERT IMPORTS HERE` and have the code compile? (Choose all that apply.)

```
package aquarium;
public class Water {
   boolean salty = false;
}

package aquarium.jellies;
public class Water {
   boolean salty = true;
}

package employee;
INSERT IMPORTS HERE
public class WaterFiller {
   Water water;
}
```

A. `import aquarium.*;`

B.
```
import aquarium.Water;
import aquarium.jellies.*;
```

C.
```
import aquarium.*;
import aquarium.jellies.Water;
```

D.
```
import aquarium.*;
import aquarium.jellies.*;
```
→ Does not know which "Water" to use

E.
```
import aquarium.Water;
import aquarium.jellies.Water;
```
→ same class

F. None of these imports can make the code compile.

14. Which of the following statements about the code snippet are true? (Choose all that apply.) ✓

```
3: short numPets = 5L;
4: int numGrains = 2.0;
5: String name = "Scruffy";
6: int d = numPets.length();
7: int e = numGrains.length;
8: int f = name.length();
```

A. Line 3 generates a compiler error.

B. Line 4 generates a compiler error.

C. Line 5 generates a compiler error.

D. Line 6 generates a compiler error.

E. Line 7 generates a compiler error.

F. Line 8 generates a compiler error.

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

A. Calling `System.gc()` is guaranteed to free up memory by destroying objects eligible for garbage collection.

B. Garbage collection runs on a set schedule.

C. Garbage collection allows the JVM to reclaim memory for other objects.

D. Garbage collection runs when your program has used up half the available memory.

E. An object may be eligible for garbage collection but never removed from the heap.

F. An object is eligible for garbage collection once no references to it are accessible in the program.

G. Marking a variable `final` means its associated object will never be garbage collected.

16. Which are true about this code? (Choose all that apply.)

```
var blocky = """
   squirrel \s
   pigeon   \
   termite""";
System.out.print(blocky);
```

A. It outputs two lines.

B. It outputs three lines.

C. It outputs four lines.

D. There is one line with trailing whitespace.

E. There are two lines with trailing whitespace.

F. If we indented each line five characters, it would change the output.

17. What lines are printed by the following program? (Choose all that apply.)

```
1:  public class WaterBottle {
2:     private String brand;
3:     private boolean empty;
4:     public static float code;
5:     public static void main(String[] args) {
6:        WaterBottle wb = new WaterBottle();
```

```
7:        System.out.println("Empty = " + wb.empty);
8:        System.out.println("Brand = " + wb.brand);
9:        System.out.println("Code = " + code);
10:    } }
```

A. Line 8 generates a compiler error.
B. Line 9 generates a compiler error.
C. `Empty =`
D. `Empty = false`
E. `Brand =`
F. `Brand = null`
G. `Code = 0.0`
H. `Code = 0f`

18. Which of the following statements about `var` are true? (Choose all that apply.)

A. A `var` can be used as a constructor parameter.
B. The type of a `var` is known at compile time.
C. A `var` cannot be used as an instance variable.
D. A `var` can be used in a multiple variable assignment statement.
E. The value of a `var` cannot change at runtime.
F. The type of a `var` cannot change at runtime.
G. The word `var` is a reserved word in Java.

19. Which are true about the following code? (Choose all that apply.)

```
var num1 = Long.parseLong("100");
var num2 = Long.valueOf("100");
System.out.println(Long.max(num1, num2));
```

Reference object

A. The output is `100`.
B. The output is `200`.
C. The code does not compile.
D. `num1` is a primitive.
E. `num2` is a primitive.

20. Which statements about the following class are correct? (Choose all that apply.)

```
1:  public class PoliceBox {
2:     String color;
3:     long age;
4:     public void PoliceBox() {
5:        color = "blue";
6:        age = 1200;
```

→ method is never executed

```
7:     }
8:     public static void main(String []time) {
9:        var p = new PoliceBox();
10:       var q = new PoliceBox();
11:       p.color = "green";
12:       p.age = 1400;
13:       p = q;
14:       System.out.println("Q1="+q.color);
15:       System.out.println("Q2="+q.age);
16:       System.out.println("P1="+p.color);
17:       System.out.println("P2="+p.age);
18: } }
```

A. It prints `Q1=blue`.

B. It prints `Q2=1200`.

C. It prints `P1=null`.

D. It prints `P2=1400`.

E. Line 4 does not compile.

F. Line 12 does not compile.

G. Line 13 does not compile.

H. None of the above.

21. What is the output of executing the following class?

```
1:  public class Salmon {
2:     int count;
3:     { System.out.print(count+"-"); }
4:     { count++; }
5:     public Salmon() {
6:        count = 4;
7:        System.out.print(2+"-");
8:     }
9:     public static void main(String[] args) {
10:       System.out.print(7+"-");
11:       var s = new Salmon();
12:       System.out.print(s.count+"-"); } }
```

A. `7-0-2-1-`

B. `7-0-1-`

C. `0-7-2-1-`

D. `7-0-2-4-`

E. `0-7-1-`

F. The class does not compile because of line 3.

G. The class does not compile because of line 4.

H. None of the above.

22. Given the following class, which of the following lines of code can independently replace `INSERT CODE HERE` to make the code compile? (Choose all that apply.)

```
public class Price {
   public void admission() {
      INSERT CODE HERE
      System.out.print(amount);
      } }
```

A. `int Amount = 0b11;`

B. `int amount = 9L;`

C. `int amount = 0xE;`

D. `int amount = 1_2.0;` → is a double value

E. `double amount = 1_0_.0;`

F. `int amount = 0b101;`

G. `double amount = 9_2.1_2;`

H. `double amount = 1_2_.0_0;`

23. Which statements about the following class are true? (Choose all that apply.)

```
1:  public class River {
2:     int Depth = 1;
3:     float temp = 50.0;
4:     public void flow() {
5:        for (int i = 0; i < 1; i++) {
6:           int depth = 2;
7:           depth++;
8:           temp--;
9:        }
```

is a double without the postfix

solo se ejecuta una vez

1 50 ; 3 49 } saliendo del ciclo tienen estos valores

```
10:       System.out.println(depth);
11:       System.out.println(temp); }
12:    public static void main(String... s) {
13:       new River().flow();
14: } }
```

depth only belongs to for

A. Line 3 generates a compiler error.

B. Line 6 generates a compiler error.

C. Line 7 generates a compiler error.

D. Line 10 generates a compiler error.

E. The program prints `3` on line 10.

F. The program prints `4` on line 10.

G. The program prints `50.0` on line 11.

H. The program prints `49.0` on line 11.

Review Questions

The answers to the chapter review questions can be found in the Appendix.

1. Which of the following Java operators can be used with `boolean` variables? (Choose all that apply.)

   A. `==`
   B. `+`
   C. `--`
   D. `!`
   E. `%`
   F. `~`
   G. Cast with `(boolean)`

2. What data type (or types) will allow the following code snippet to compile? (Choose all that apply.)

```
byte apples = 5;
short oranges = 10;
_____ bananas = apples + oranges;
```

   A. `int`
   B. `long`
   C. `boolean`
   D. `double`
   E. `short`
   F. `byte`

3. What change, when applied independently, would allow the following code snippet to compile? (Choose all that apply.)

```
3: long ear = 10;
4: int hearing = 2 * ear;
```

   A. No change; it compiles as is.
   B. Cast `ear` on line 4 to `int`.
   C. Change the data type of `ear` on line 3 to `short`.
   D. Cast `2 * ear` on line 4 to `int`.
   E. Change the data type of `hearing` on line 4 to `short`.
   F. Change the data type of `hearing` on line 4 to `long`.

4. What is the output of the following code snippet?

```
3: boolean canine = true, wolf = true;
4: int teeth = 20;
5: canine = (teeth != 10) ^ (wolf=false);
6: System.out.println(canine+", "+teeth+", "+wolf);
```

A. `true, 20, true`
B. `true, 20, false`
C. `false, 10, true`
D. `false, 20, false`
E. The code will not compile because of line 5.
F. None of the above.

5. Which of the following operators are ranked in increasing or the same order of precedence? Assume the + operator is binary addition, not the unary form. (Choose all that apply.)

A. `+, *, %, --`
B. `++, (int), *`
C. `=, ==, !`
D. `(short), =, !, *`
E. `*, /, %, +, ==`
F. `!, ||, &`
G. `^, +, =, +=`

6. What is the output of the following program?

```
1: public class CandyCounter {
2:    static long addCandy(double fruit, float vegetables) {
3:       return (int)fruit+vegetables;
4:    }
5:
6:    public static void main(String[] args) {
7:       System.out.print(addCandy(1.4, 2.4f) + ", ");
8:       System.out.print(addCandy(1.9, (float)4) + ", ");
9:       System.out.print(addCandy((long)(int)(short)2, (float)4)); } }
```

✗ result is float, not returned as long

A. `4, 6, 6.0`
B. `3, 5, 6`
C. `3, 6, 6`
D. `4, 5, 6`
E. The code does not compile because of line 9.
F. None of the above.

7. What is the output of the following code snippet?

```
int ph = 7, vis = 2;
boolean clear = vis > 1 & (vis < 9 || ph < 2);
boolean safe = (vis > 2) && (ph++ > 1);
boolean tasty = 7 <= --ph;
System.out.println(clear + "-" + safe + "-" + tasty);
```

A. `true-true-true`
B. `true-true-false`
C. `true-false-true`
D. `true-false-false`
E. `false-true-true`
F. `false-true-false`
G. `false-false-true`
H. `false-false-false`

8. What is the output of the following code snippet?

```
4: int pig = (short)4;
5: pig = pig++;
6: long goat = (int)2;
7: goat -= 1.0;
8: System.out.print(pig + " - " + goat);
```

A. `4 - 1`
B. `4 - 2`
C. `5 - 1`
D. `5 - 2`
E. The code does not compile due to line 7.
F. None of the above.

9. What are the unique outputs of the following code snippet? (Choose all that apply.)

```
int a = 2, b = 4, c = 2;
System.out.println(a > 2 ? --c : b++);
System.out.println(b = (a!=c ? a : b++));
System.out.println(a > b ? b < c ? b : 2 : 1);
```

A. `1`
B. `2`
C. `3`
D. `4`
E. `5`
F. `6`
G. The code does not compile.

10. What are the unique outputs of the following code snippet? (Choose all that apply.)

```
short height = 1, weight = 3;
short zebra = (byte) weight * (byte) height;
double ox = 1 + height * 2 + weight;
long giraffe = 1 + 9 % height + 1;
System.out.println(zebra);
System.out.println(ox);
System.out.println(giraffe);
```

A. 1
B. 2
C. 3
D. 4
E. 5
F. 6
G. The code does not compile.

11. What is the output of the following code?

```
11: int sample1 = (2 * 4) % 3;
12: int sample2 = 3 * 2 % 3;
13: int sample3 = 5 * (1 % 2);
14: System.out.println(sample1 + ", " + sample2 + ", " + sample3);
```

A. 0, 0, 5
B. 1, 2, 10
C. 2, 1, 5
D. 2, 0, 5
E. 3, 1, 10
F. 3, 2, 6
G. The code does not compile.

12. The _____ operator increases a value and returns the original value, while the _____ operator decreases a value and returns the new value.

A. post-increment, post-increment
B. pre-decrement, post-decrement
C. post-increment, post-decrement
D. post-increment, pre-decrement
E. pre-increment, pre-decrement
F. pre-increment, post-decrement

13. What is the output of the following code snippet?

```
boolean sunny = true, raining = false, sunday = true;
boolean goingToTheStore = sunny & raining ^ sunday;
boolean goingToTheZoo = sunday && !raining;
boolean stayingHome = !(goingToTheStore && goingToTheZoo);
System.out.println(goingToTheStore + "-" + goingToTheZoo
   + "-" +stayingHome);
```

A. `true-false-false`

B. `false-true-false`

C. `true-true-true`

D. `false-true-true`

E. `false-false-false`

F. `true-true-false`

G. None of the above

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

A. The return value of an assignment operation expression can be `void`.

B. The inequality operator (`!=`) can be used to compare objects.

C. The equality operator (`==`) can be used to compare a `boolean` value with a numeric value.

D. During runtime, the & and | operators may cause only the left side of the expression to be evaluated.

E. The return value of an assignment operation expression is the value of the newly assigned variable.

F. In Java, `0` and `false` may be used interchangeably.

G. The logical complement operator (`!`) cannot be used to flip numeric values.

15. Which operators take three operands or values? (Choose all that apply.)

A. `=`

B. `&&`

C. `*=`

D. `? :`

E. `&`

F. `++`

G. `/`

16. How many lines of the following code contain compiler errors?

```
int note = 1 * 2 + (long)3;
short melody = (byte)(double)(note *= 2);
double song = melody;
float symphony = (float)((song == 1_000f) ? song * 2L : song);
```

A. 0
B. 1
C. 2
D. 3
E. 4

17. Given the following code snippet, what are the values of the variables after it is executed? (Choose all that apply.)

```
int ticketsTaken = 1;
int ticketsSold = 3;
ticketsSold += 1 + ticketsTaken++;
ticketsTaken *= 2;
ticketsSold += (long)1;
```

A. `ticketsSold` is 8.
B. `ticketsTaken` is 2.
C. `ticketsSold` is 6.
D. `ticketsTaken` is 6.
E. `ticketsSold` is 7.
F. `ticketsTaken` is 4.
G. The code does not compile.

18. Which of the following can be used to change the order of operation in an expression? (Choose all that apply.)

A. `[ ]`
B. `< >`
C. `( )`
D. `\ /`
E. `{ }`
F. `" "`

19. What is the result of executing the following code snippet? (Choose all that apply.)

```
3: int start = 7;
4: int end = 4;
5: end += ++start;
6: start = (byte)(Byte.MAX_VALUE + 1);
```

A. `start` is `0`.

B. `start` is `-128`.

C. `start` is `127`.

D. `end` is `8`.

E. `end` is `11`.

F. `end` is `12`.

G. The code does not compile.

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

20. Which of the following statements about unary operators are true? (Choose all that apply.)

A. Unary operators are always executed before any surrounding numeric binary or ternary operators.

B. The `-` operator can be used to flip a `boolean` value.

C. The pre-increment operator (`++`) returns the value of the variable before the increment is applied.

D. The post-decrement operator (`--`) returns the value of the variable before the decrement is applied.

E. The `!` operator cannot be used on numeric values.

F. None of the above

21. What is the result of executing the following code snippet?

```
int myFavoriteNumber = 8;
int bird = ~myFavoriteNumber;
int plane = -myFavoriteNumber;
var superman = bird == plane ? 5 : 10;
System.out.println(bird + "," + plane + "," + --superman);
```

A. `-7,-8,9`

B. `-7,-8,10`

C. `-8,-8,4`

D. `-8,-8,5`

E. `-9,-8,9`

F. `-9,-8,10`

G. None of the above

Review Questions

The answers to the chapter review questions can be found in the Appendix.

1. Which of the following data types can be used in a `switch` expression? (Choose all that apply.)

   A. `enum`
   B. `int`
   C. `Byte`
   D. `long`
   E. `String`
   F. `char`
   G. `var`
   H. `double`

2. What is the output of the following code snippet? (Choose all that apply.)

```
3: int temperature = 4;
4: long humidity = -temperature + temperature * 3;
5: if (temperature>=4)
6: if (humidity < 6) System.out.println("Too Low");
7: else System.out.println("Just Right");
8: else System.out.println("Too High");
```

   A. `Too Low`
   B. `Just Right`
   C. `Too High`
   D. A `NullPointerException` is thrown at runtime.
   E. The code will not compile because of line 7.
   F. The code will not compile because of line 8.

3. Which of the following data types are permitted on the right side of a for-each expression? (Choose all that apply.)

   A. `Double[][]`
   B. `Object`
   C. `Map`
   D. `List`
   E. `String`
   F. `char[]`
   G. `Exception`
   H. `Set`

4. What is the output of calling `printReptile(6)`?

```
void printReptile(int category) {
  var type = switch(category) {
      case 1,2 -> "Snake";
      case 3,4 -> "Lizard";
      case 5,6 -> "Turtle";
      case 7,8 -> "Alligator";
   };
   System.out.print(type);
}
```

A. `Snake`
B. `Lizard`
C. `Turtle`
D. `Alligator`
E. `TurtleAlligator`
F. None of the above

5. What is the output of the following code snippet?

```
List<Integer> myFavoriteNumbers = new ArrayList<>();
myFavoriteNumbers.add(10);
myFavoriteNumbers.add(14);
for (var a : myFavoriteNumbers) {
   System.out.print(a + ", ");
   break;
}

for (int b : myFavoriteNumbers) {
   continue;
   System.out.print(b + ", ");
}

for (Object c : myFavoriteNumbers)
   System.out.print(c + ", ");
```

A. It compiles and runs without issue but does not produce any output.
B. `10, 14,`
C. `10, 10, 14,`
D. `10, 10, 14, 10, 14,`
E. Exactly one line of code does not compile.
F. Exactly two lines of code do not compile.
G. Three or more lines of code do not compile.
H. The code contains an infinite loop and does not terminate.

6. Which statements about decision structures are true? (Choose all that apply.)

A. A for-each loop can be executed on any Collections Framework object.

B. The body of a `while` loop is guaranteed to be executed at least once.

C. The conditional expression of a `for` loop is evaluated before the first execution of the loop body.

D. A `switch` expression that takes a `String` and assigns the result to a variable requires a `default` branch.

E. The body of a `do/while` loop is guaranteed to be executed at least once.

F. An `if` statement can have multiple corresponding `else` statements.

7. Assuming `weather` is a well-formed nonempty array, which code snippet, when inserted independently into the blank in the following code, prints all of the elements of `weather`? (Choose all that apply.)

```
private void print(int[] weather) {
   for(_____) {
      System.out.println(weather[i]);
   }
}
```

A. `int i=weather.length; i>0; i--`

B. `int i=0; i<=weather.length-1; ++i`

C. `var w : weather`

D. `int i=weather.length-1; i>=0; i--`

E. `int i=0, int j=3; i<weather.length; ++i`

F. `int i=0; ++i<10 && i<weather.length;`

G. None of the above

8. What is the output of calling `printType(11)`?

```
31: void printType(Object o) {
32:    if(o instanceof Integer bat) {
33:       System.out.print("int");
34:    } else if(o instanceof Integer bat && bat < 10) {
35:       System.out.print("small int");
36:    } else if(o instanceof Long bat || bat <= 20) {
37:       System.out.print("long");
38:    } default {
39:       System.out.print("unknown");
40:    }
41: }
```

out of scope because it was previously used

A. `int`

B. `small int`

C. `long`

D. `unknown`

E. Nothing is printed.

F. The code contains one line that does not compile.

G. The code contains two lines that do not compile.

H. None of the above

9. Which statements, when inserted independently into the following blank, will cause the code to print 2 at runtime? (Choose all that apply.)

```
int count = 0;
BUNNY: for(int row = 1; row <=3; row++)
   RABBIT: for(int col = 0; col <3 ; col++) {
      if((col + row) % 2 == 0)
         ____________________;
      count++;
   }
System.out.println(count);
```

A. `break BUNNY`

B. `break RABBIT`

C. `continue BUNNY`

D. `continue RABBIT`

E. `break`

F. `continue`

G. None of the above, as the code contains a compiler error.

10. Given the following method, how many lines contain compilation errors? (Choose all that apply.)

```
10: private DayOfWeek getWeekDay(int day, final int thursday) {
11:    int otherDay = day;
12:    int Sunday = 0;
13:    switch(otherDay) {
14:       default:
15:       case 1: continue;
16:       case thursday: return DayOfWeek.THURSDAY;
17:       case 2,10: break;
```

↳ no value

→ not marked as final

```
18:       case Sunday: return DayOfWeek.SUNDAY;
19:       case DayOfWeek.MONDAY: return DayOfWeek.MONDAY;
20:    }
21:    return DayOfWeek.FRIDAY;
22: }
```

A. None, the code compiles without issue.
B. 1
C. 2
D. 3
E. 4
F. 5
G. 6
H. The code compiles but may produce an error at runtime.

11. What is the output of calling `printLocation(Animal.MAMMAL)`?

```
10: class Zoo {
11:    enum Animal {BIRD, FISH, MAMMAL}
12:    void printLocation(Animal a) {
13:       long type = switch(a) {
14:          case BIRD -> 1;
15:          case FISH -> 2;
16:          case MAMMAL -> 3;
17:          default -> 4;
18:       };
19:       System.out.print(type);
20:    } }
```

A. 3
B. 4
C. 34
D. The code does not compile because of line 13.
E. The code does not compile because of line 17.
F. None of the above

12. What is the result of the following code snippet?

```
3: int sing = 8, squawk = 2, notes = 0;
4: while(sing > squawk) {
5:    sing--;
6:    squawk += 2;
```

```
7:    notes += sing + squawk;
8: }
9: System.out.println(notes);
```

A. 11
B. 13
C. 23
D. 33
E. 50
F. The code will not compile because of line 7.

13. What is the output of the following code snippet?

```
2: boolean keepGoing = true;
3: int result = 15, meters = 10;
4: do {
5:    meters--;
6:    if(meters==8) keepGoing = false;
7:    result -= 2;
8: } while keepGoing;
9: System.out.println(result);
```

A. 7
B. 9
C. 10
D. 11
E. 15
F. The code will not compile because of line 6.
G. The code does not compile for a different reason.

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

```
for(var penguin : new int[2])
   System.out.println(penguin);
var ostrich = new Character[3];
for(var emu : ostrich)
   System.out.println(emu);
List<Integer> parrots = new ArrayList<Integer>();
for(var macaw  : parrots)
   System.out.println(macaw);
```

A. The data type of `penguin` is `Integer`.

B. The data type of `penguin` is `int`.

C. The data type of `emu` is undefined.

D. The data type of `emu` is `Character`.

E. The data type of `macaw` is `List`.

F. The data type of `macaw` is `Integer`.

G. None of the above, as the code does not compile.

15. What is the result of the following code snippet?

```
final char a = 'A', e = 'E';
char grade = 'B';
switch (grade) {
   default:
   case a:
   case 'B': 'C': System.out.print("great ");
   case 'D': System.out.print("good "); break;
   case e:
   case 'F': System.out.print("not good ");
}
```

A. `great`

B. `great good`

C. `good`

D. `not good`

E. The code does not compile because the data type of one or more `case` statements does not match the data type of the `switch` variable.

F. None of the above

16. Given the following array, which code snippets print the elements in reverse order from how they are declared? (Choose all that apply.)

```
char[] wolf = {'W', 'e', 'b', 'b', 'y'};
```

A.

```
int q = wolf.length;
for( ; ; ) {
   System.out.print(wolf[--q]);
   if(q==0) break;
}
```

B.

```
for(int m=wolf.length-1; m>=0; --m)
   System.out.print(wolf[m]);
```

C.

```
for(int z=0; z<wolf.length; z++)
   System.out.print(wolf[wolf.length-z]);
```

D.

```
int x = wolf.length-1;
for(int j=0; x>=0 && j==0; x--)
   System.out.print(wolf[x]);
```

E.

```
final int r = wolf.length;
for(int w = r-1; r>-1; w = r-1)
   System.out.print(wolf[w]);
```

F.

```
for(int i=wolf.length; i>0; --i)
   System.out.print(wolf[i]);
```

G. None of the above

17. What distinct numbers are printed when the following method is executed? (Choose all that apply.)

```
private void countAttendees() {
   int participants = 4, animals = 2, performers = -1;
   while((participants = participants+1) < 10) {}
   do {} while (animals++ <= 1);
   for( ; performers<2; performers+=2) {}

   System.out.println(participants);
   System.out.println(animals);
   System.out.println(performers);
}
```

A. 6

B. 3

C. 4

D. 5

E. 10

F. 9

G. The code does not compile.

H. None of the above

18. Which statements about pattern matching and flow scoping are correct? (Choose all that apply.)

A. Pattern matching with an `if` statement is implemented using the `instance` operator.

B. Pattern matching with an `if` statement is implemented using the `instanceon` operator.

C. Pattern matching with an `if` statement is implemented using the `instanceof` operator.

D. The pattern variable cannot be accessed after the `if` statement in which it is declared.

E. Flow scoping means a pattern variable is only accessible if the compiler can discern its type.

F. Pattern matching can be used to declare a variable with an `else` statement.

19. What is the output of the following code snippet?

```
2: double iguana = 0;
3: do {
4:    int snake = 1;
5:    System.out.print(snake++ + " ");
6:    iguana--;
7: } while (snake <= 5);
8: System.out.println(iguana);
```

A. `1 2 3 4 -4.0`

B. `1 2 3 4 -5.0`

C. `1 2 3 4 5 -4.0`

D. `0 1 2 3 4 5 -5.0`

E. The code does not compile.

F. The code compiles but produces an infinite loop at runtime.

G. None of the above

20. Which statements, when inserted into the following blanks, allow the code to compile and run without entering an infinite loop? (Choose all that apply.)

```
4:  int height = 1;
5:  L1: while(height++ <10) {
6:     long humidity = 12;
7:     L2: do {
8:        if(humidity-- % 12 == 0) _____;
9:        int temperature = 30;
10:       L3: for( ; ; ) {
11:          temperature++;
12:          if(temperature>50) _____;
13:       }
14:    } while (humidity > 4);
15: }
```

A. `break L2` on line 8; `continue L2` on line 12 * both skipped the infinite loop
B. `continue` on line 8; `continue` on line 12
C. `break L3` on line 8; `break L1` on line 12
D. `continue L2` on line 8; `continue L3` on line 12
E. `continue L2` on line 8; `continue L2` on line 12 *
F. None of the above, as the code contains a compiler error

21. A minimum of how many lines need to be corrected before the following method will compile?

```
21: void findZookeeper(Long id) {
22:    System.out.print(switch(id) {
23:       case 10 -> {"Jane"};
24:       case 20 -> {yield "Lisa";};
25:       case 30 -> "Kelly";
26:       case 30 -> "Sarah";
27:       default -> "Unassigned";
28:    });
29: }
```

A. Zero
B. One
C. Two
D. Three
E. Four
F. Five

22. What is the output of the following code snippet? (Choose all that apply.)

```
2: var tailFeathers = 3;
3: final var one = 1;
4: switch (tailFeathers) {
5:    case one: System.out.print(3 + " ");
6:    default: case 3: System.out.print(5 + " ");
7: }
8: while (tailFeathers > 1) {
9:    System.out.print(--tailFeathers + " "); }
```

A. `3`
B. `5 1`
C. `5 2`
D. `3 5 1`
E. `5 2 1`
F. The code will not compile because of lines 3–5.
G. The code will not compile because of line 6.

23. What is the output of the following code snippet?

```
15: int penguin = 50, turtle = 75;
16: boolean older = penguin >= turtle;
17: if (older = true) System.out.println("Success");
18: else System.out.println("Failure");
19: else if(penguin != 50) System.out.println("Other");
```

false

× no preceding if

A. `Success`

B. `Failure`

C. `Other`

D. The code will not compile because of line 17.

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

F. None of the above

24. Which of the following are possible data types for `friends` that would allow the code to compile? (Choose all that apply.)

```
for(var friend in friends) {
   System.out.println(friend);
}
```

A. `Set`

B. `Map`

C. `String`

D. `int[]`

E. `Collection`

F. `StringBuilder`

G. None of the above

25. What is the output of the following code snippet?

```
6:  String instrument = "violin";
7:  final String CELLO = "cello";
8:  String viola = "viola";
9:  int p = -1;
10: switch(instrument) {
11:    case "bass" : break;
12:    case CELLO : p++;
13:    default: p++;
14:    case "VIOLIN": p++;
15:    case "viola": ++p; break;
16: }
17: System.out.print(p);
```

0

executed the case until finding the break

2

1

A. `-1`
B. `0`
C. `1`
D. `2`
E. `3`
F. The code does not compile.

26. What is the output of the following code snippet? (Choose all that apply.)

```
9:  int w = 0, r = 1;
10: String name = "";
11: while(w < 2) {
12:    name += "A";
13:    do {
14:       name += "B";
15:       if(name.length()>0) name += "C";
16:       else break;
17:    } while (r <=1);
18:    r++; w++; }
19: System.out.println(name);
```

r updated outside do/while

A. `ABC`
B. `ABCABC`
C. `ABCABCABC`
D. Line 15 contains a compilation error.
E. Line 18 contains a compilation error.
F. The code compiles but never terminates at runtime.
G. The code compiles but throws a `NullPointerException` at runtime.

27. What is printed by the following code snippet?

```
23: byte amphibian = 1;
24: String name = "Frog";
25: String color = switch(amphibian) {
26:    case 1 -> { yield "Red"; }
27:    case 2 -> { if(name.equals("Frog")) yield "Green"; }
28:    case 3 -> { yield "Purple"; }
29:    default -> throw new RuntimeException();
30: };
31: System.out.print(color);
```

✕ missing the else yield case

A. `Red`
B. `Green`
C. `Purple`
D. `RedPurple`
E. An exception is thrown at runtime.
F. The code does not compile.

28. What is the output of calling `getFish("goldie")`?

```
40: void getFish(Object fish) {
41:    if (!(fish instanceof String guppy))
42:       System.out.print("Eat!");
43:    else if (!(fish instanceof String guppy)) {
44:       throw new RuntimeException();
45:    }
46:    System.out.print("Swim!");
47: }
```

A. `Eat!`
B. `Swim!`
C. `Eat!` followed by an exception.
D. `Eat!Swim!`
E. An exception is printed.
F. None of the above

29. What is the result of the following code?

```
1: public class PrintIntegers {
2:    public static void main(String[] args) {
3:       int y = -2;
4:       do System.out.print(++y + " "); in the last iteration, value is 6
5:       while(y <= 5);
6: } }
```

A. `-2 -1 0 1 2 3 4 5`
B. `-2 -1 0 1 2 3 4`
C. `-1 0 1 2 3 4 5 6`
D. `-1 0 1 2 3 4 5`
E. The code will not compile because of line 5.
F. The code contains an infinite loop and does not terminate.