# ASSIGNMENT - 3
# Java Operators and Decision Constructs

1. Which of the following variable types is not permitted in a `switch` statement?

   A. `String`

   B. `double`

   C. `int`

   D. `char`

2. What is the value of `tip` after executing the following code snippet?

```
int meal = 5;
int tip = 2;
int total = meal + (meal>6 ? ++tip : --tip);
```

   A. `1`

   B. `2`

   C. `3`

   D. `6`

3. What is the output of the following application?

```
package registration;
public class NameCheck {
   public static void main(String... data) {
      String john = "john";
      String jon = new String(john);
      System.out.print((john==jon)+" "+(john.equals(jon)));
   }
}
```

   A. `true true`

   B. `true false`

   C. `false true`

   D. `false false`

4. What is the output of the following application?

```
package planning;
public class ThePlan {
   public static void main(String[] input) {
      int plan = 1;
```

```
      plan = plan++ + --plan;
      if(plan==1) {
         System.out.print("Plan A");
      } else { if(plan==2) System.out.print("Plan B");
      } else System.out.print("Plan C");
   }
}
```

A. `Plan A`

B. `Plan B`

C. `Plan C`

D. None of the above

5. Which of the following statements about a `default` branch in a `switch` statement is correct?

   A. All `switch` statements must include a `default` statement.

   B. The `default` statement is required to be placed after all `case` statements.

   C. Unlike a `case` statement, the `default` statement does not take a value.

   D. A `default` statement can only be used when at least one `case` statement is present.

6. What is the value of `thatNumber` after the execution of the following code snippet?

```
long thatNumber = 5 >= 5 ? 1+2 : 1*1;
if(++thatNumber < 4)
   thatNumber += 1;
```

   A. `3`

   B. `4`

   C. `5`

   D. The answer cannot be determined until runtime.

7. Which statement immediately exits a `switch` statement, skipping all remaining `case` or `default` branches?

   A. `exit`

   B. `break`

   C. `goto`

D. `continue`

8. Which statement about ternary expressions is true?

A. In some cases, both expressions to the right of the conditional operator in a ternary expression will be evaluated at runtime.

B. Ternary expressions require parentheses for proper evaluation.

C. The ternary expressions are a convenient replacement for an if-then-else statement.

D. Ternary expressions support `int` and `boolean` expressions for the left-most operand.

9. What is the output of the following application?

```
package voting;
1: public class Election {
2:     public void calculateResult(Integer candidateA, Integer
candidateB) {
3:        boolean process = candidateA == null ||
candidateA.intValue() < 10;
4:        boolean value = candidateA && candidateB;
5:        System.out.print(process || value);
6:     }
7:     public static void main(String[] unused) {
8:        new Election().calculateResult(null,203);
9:     }
10: }
```

A. `true`

B. `false`

C. The code does not compile.

D. The code compiles but throws a `NullPointerException` on line 3 at runtime.

10. What is the output of the following application?

```
package dinosaur;
public class Park {
   public final static void main(String... arguments) {
      int pterodactyl = 6;
      long triceratops = 3;
      if(pterodactyl % 3 >= 1)
         triceratops++;
         triceratops--;
```

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

A. `2`

B. `3`

C. `4`

D. The code does not compile.

11. Which statement about if-then statements is true?

A. An if-then statement is required to have an `else` statement.

B. If the `boolean` test of an if-then statement evaluates to `false`, then the target clause of the if-then statement will still be evaluated.

C. An if-then statement is required to cast an object.

D. An if-then statement can execute a single statement or a block `{}`.

12. What is the output of the following application?

```
package restaurant;
public class Pieces {
   public static void main(String[] info) {
      int flair = 15;
      if(flair >= 15 && flair < 37) {
         System.out.print("Not enough");
      } if(flair==37) {
         System.out.print("Just right");
      } else {
         System.out.print("Too many");
      }
   }
}
```

A. `Not enough`

B. `Just right`

C. `Too many`

D. None of the above

13. Which statement about `case` statements of a `switch` statement is not true?

A. A `case` value can be `final`.

B. A `case` statement must be terminated with a `break` statement.

C. A `case` value can be a literal expression.

D. A `case` value must match the data type of the `switch` variable, or be able to be promoted to that type.

14. Given the following truth table, which operator for the `boolean` expressions `x` and `y` corresponds to this relationship?

| | **`x = true`** | **`x = false`** |
|---|---|---|
| **`y = true`** | `true` | `false` |
| **`y = false`** | `false` | `false` |

A. `--`

B. `++`

C. `||`

D. `&&`

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

```
int hops = 0;
int jumps = 0;
jumps = hops++;
if(jumps)
   System.out.print("Jump!");
else
   System.out.print("Hop!");
```

A. `Jump!`

B. `Hop!`

C. The code does not compile.

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

16. Fill in the blanks: The _____ operator increases the value of a variable by `1` and returns the new value, while the _____ operator decreases the value of a variable by `1` and returns the original value.

A. pre-increment [`++v`], pre-decrement [`--v`]

B. pre-increment [`++v`], post-decrement [`v--`]

C. post-increment [`v++`], pre-decrement [`--v`]

D. post-increment [`v++`], post-decrement [`v--`]

17. What is the output of the following application?

```
package jungle;
public class TheBigRace {
   public static void main(String[] in) {
      int tiger = 2;
      short lion = 3;
      long winner = lion+2*(tiger + lion);
      System.out.print(winner);
   }

}
```

A. `11`

B. `13`

C. `25`

D. None of the above

18. Given the following code snippet, assuming `dayOfWeek` is an `int`, what variable type of `saturday` is not permitted?

```
final _________ saturday = 6;
switch(dayOfWeek) {
   default:
      System.out.print("Another Weekday");
      break;
   case saturday:
      System.out.print("Weekend!");
}
```

A. `byte`

B. `long`

C. `int`

D. None of the above

19. Given the following code snippet, what is the value of `dinner` after it is executed?

```
int time = 11;
int day = 4;
String dinner = time > 10 ? day ? "Takeout" : "Salad" :
"Leftovers";
```

A. `Takeout`

B. `Salad`

C. The code does not compile but would compile if parentheses were added.

D. None of the above

20. What is the output of the following application?

```
package recreation;
public class Dancing {
   public static void main(String[] vars) {
      int leaders = 10 * (2 + (1 + 2 / 5);
      int followers = leaders * 2;
      System.out.print(leaders + followers < 10 ? "Too few" :
"Too many");
   }
}
```

A. `Too few`

B. `Too many`

C. The code does not compile.

D. The code compiles but throws a division by zero error at runtime.

21. What is the output of the following application?

```
package schedule;
public class PrintWeek {
   public static final void main(String[] days) {
      System.out.print(5 + 6 + "7" + 8 + 9);
   }
}
```

A. `56789`

B. `11789`

C. `11717`

D. The code does not compile.

22. Fill in the blanks: The_____ operator is used to find the difference between two numbers, while the_____ operator is used to find the remainder when one number is divided by another.

A. `/, %`

B. `-, %`

C. `%, <`

D. `-, ||`

23. What is the output of the following application?

```
package transporter;
public class Rematerialize {
   public static void main(String[] input) {
      int dog = 11;
      int cat = 3;
      int partA = dog / cat;
      int partB = dog % cat;
      int newDog = partB + partA * cat;
      System.out.print(newDog);
   }
}
```

A. `9`

B. `11`

C. `15`

D. The code does not compile.

24. What is the output of the following application?

```
package dessert;
public class IceCream {
   public final static void main(String... args) {
      int flavors = 30;
      int eaten = 0;
      switch(flavors) {
         case 30: eaten++;
         case 40: eaten+=2;
         default: eaten--;
      }
      System.out.print(eaten);
   }
}
```

A. `1`

B. `2`

C. `3`

D. The code does not compile.

25. What is the output of the following application?

```
package mode;
public class Transportation {
   public static String travel(int distance) {
      return distance<1000 ? "train" : 10;
   }
   public static void main(String[] answer) {
      System.out.print(travel(500));
   }
}
```

A. `train`

B. `10`

C. The code does not compile.

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

26. Fill in the blanks: Given two non-null `String` objects with reference names `apples`_____ and `oranges`, if `apples oranges` evaluates to `true`, then `apples`_____ `oranges` must also evaluate to `true`.

A. `==`, `equals()`

B. `!=`, `equals()`

C. `equals()`, `==`

D. `equals()`, `=!`

27. For a given non-null `String myTestVariable`, what is the resulting value of executing the statement `myTestVariable.equals(null)`?

A. `true`

B. `false`

C. The statement does not compile.

D. The statement compiles but will produce an exception when used at runtime.

28. How many `1`s are outputted when the following application is compiled and run?

```
package city;
public class Road {
   public static void main(String... in) {
      int intersections = 100;
      int streets = 200;
```

```
      if (intersections < 150) {
         System.out.print("1");
      } else if (streets && intersections > 1000) {
         System.out.print("2");
      } if (streets < 500)
         System.out.print("1");
      else
         System.out.print("2");
   }
}
```

A. None

B. One

C. Two

D. The code does not compile.

29. Which statement about the logical operators `&` and `&&` is true?

A. The `&` and `&&` operators are interchangeable, always producing the same results at runtime.

B. The `&` operator always evaluates both operands, while the `&&` operator may only evaluate the left operand.

C. Both expressions evaluate to `true` if either operand is `true`.

D. The `&` operator always evaluates both operands, while the `&&` operator may only evaluate the right operand.

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

```
int x = 10, y = 5;
boolean w = true, z = false;
x = w ? y++ : y--;
w = !z;
System.out.print((x+y)+" "+(w ? 5 : 10));
```

A. The code does not compile.

B. `10 10`

C. `11 5`

D. `12 5`

31. What is the output of the following application?

```
package bob;
```

```
public class AreYouBob {
   public static void main(String[] unused) {
      String bob = new String("bob");
      String notBob = bob;
      System.out.print((bob==notBob)+" "+(bob.equals(notBob)));
   }
}
```

A. `true true`

B. `true false`

C. `false true`

D. `false false`

32. What is the value of `12 + 6 * 3 % (1 + 1)` in Java?

A. `0`

B. `12`

C. `14`

D. `None of the above`

33. Given the following truth table, the `boolean` variables `p` and `q`, and the expression `p ^ q`, what are the missing values in the truth table, starting with the first column?

| | **p = true** | **p = false** |
|---|---|---|
| **q = true** | false | true |
| **q = false** | | |

A. `false` and `true`

B. `false` and `false`

C. `true` and `true`

D. `true` and `false`

34. Which of the following is not a possible result of executing the following application?

```
public class ConditionallyLogical {
   public static void main(String... data) {
      if(data.length>=1
            && (data[0].equals("sound") || data[0].equals
("logic"))
```

```
            && data.length<2) {
         System.out.print(data[0]);
      }
   }
}
```

A. Nothing is printed.

B. `sound` is printed.

C. The application throws an exception at runtime.

D. `logic` is printed.

35. Fill in the blanks: The operators `+`,_____ ,_____ ,_____ , and `++` are listed in the same or increasing level of operator precedence.

~~A. `*`, `--`, `/`~~

B. `%`, `-`, `*`

~~C. `/`, `*`, `%`~~

~~D. `*`, `-`, `/`~~

36. What statement about the `^` operator is correct?

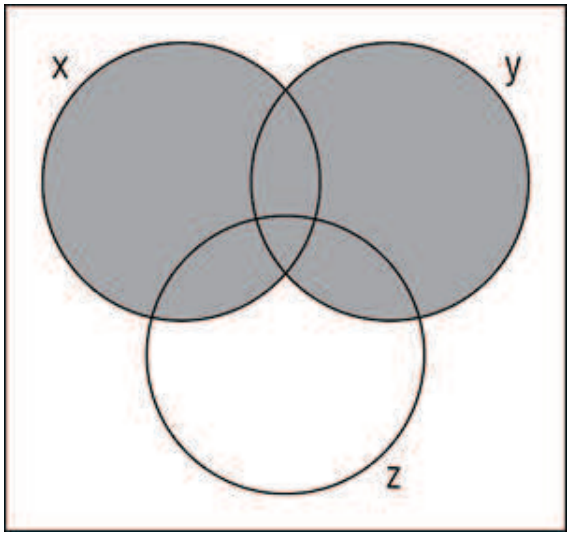
A. If one of the operands of `^` is `true`, then the result is always `true`.

~~B. There is a conditional form of the operator, denoted as `^^`.~~

~~C. If both operands of `^` are `true`, the result is `true`.~~

~~D. The `^` operator can only be applied to `boolean` values.~~

37. Given the following Venn diagram and the variables, `x`, `y`, and `z`, which Java expression most closely represents the filled-in region of the diagram?




A. `x || z`

B. `y || (y && z)`

C. `x || y`

D. `y && x`

38. What variable type of `red` allows the following application to compile?

```
package tornado;
public class Kansas {
   public static void main(String[] args) {
      int colorOfRainbow = 10;
      ________ red = 5;
      switch(colorOfRainbow) {
         default:
            System.out.print("Home");
            break;
         case red:
            System.out.print("Away");
      }
   }
}
```

A. `long`

B. `double`

C. `int`

D. None of the above

39. Which two operators would be used to test if a number is equal to or greater

than `5.21` but strictly less than `8.1`?

A. `>` and `<=`

B. `>=` and `>`

C. `<` and `>=`

D. `<` and `>`

10. What is the output of the following application?

```
package transporter;
public class TurtleVsHare {
   public static void main(String[] arguments) {
      int turtle = 10 * (2 + (3 + 2) / 5);
      int hare = turtle < 5 ? 10 : 25;
      System.out.print(turtle < hare ? "Hare wins!" : "Turtle
wins!");
   }
}
```

A. `Hare wins!`

B. `Turtle wins!`

C. The code does not compile.

D. The code compiles but throws a division by zero error at runtime.

11. What is the output of the following application?

```
public class CountEntries {
   public static int getResult(int threshold) {
      return threshold > 5 ? 1 : 0;
   }
   public static final void main(String[] days) {
      System.out.print(getResult(5)+getResult(1)
         +getResult(0)+getResult(2)+"");
   }
}
```

A. `0`

B. `1`

C. `0000`

D. `1000`

12. What is the output of the following application?

```
package yoyo;
public class TestGame {
   public String runTest(boolean spinner, boolean roller) {
      if(spinner = roller) return "up";
      else return roller ? "down" : "middle";
   }
   public static final void main(String pieces[]) {
      final TestGame tester = new TestGame();
      System.out.println(tester.runTest(false,true));
   }
}
```

A. `up`

B. `middle`

C. `down`

D. The code does not compile.

13. Fill in the blanks: The_____ operator is `true` if either of the operands are `true`, while the_____ operator flips a `boolean` value.

A. `+`, `-`

B. `&&`, `!`

C. `|`, `-`

D. `||`, `!`

14. Given the following code snippet, what is the value of `movieRating` after it is executed?

```
int characters = 5;
int story = 3;
double movieRating = characters <= 4 ? 3 : story>1 ? 2 : 1;
```

A. `2.0`

B. `3.0`

C. The code does not compile but would compile if parentheses were added.

D. None of the above

15. Fill in the blanks: A `switch` statement can have_____ `case` statements and_____ `default` statements.

A. at most one, at least one

B. any number of, at most one

C. at least one, any number of

D. at least one, at most one

16. Which of the following is not a possible result of executing the following application?

```
public class OutsideLogic {
   public static void main(String... weather) {
      System.out.print(weather[0]!=null
            && weather[0].equals("sunny")
            && !false
         ? "Go Outside" : "Stay Inside");
   }
}
```

A. Nothing is printed.

B. The application throws an exception at runtime.

C. `Go Outside` is printed.

D. `Stay Inside` is printed.

17. What is the value of `(5 + (!2 + 8) * 3 - 3 % 2)/2` in Java?

A. `2`

B. `11`

C. `16`

D. None of the above

18. Given the following truth table, the `boolean` variables `w` and `z`, and the expression `w || z`, what are the missing values in the truth table, starting with the first row?

| | **`w = true`** | **`w = false`** |
|---|---|---|
| **`z = true`** | `true` | |
| **`z = false`** | | `false` |

A. `false` and `false`

B. `true` and `false`

C. `true` and `true`

D. `false` and `true`

49. Fill in the blanks: The operators -,_____ ,_____ ,_____ , and `%` are listed in the same or increasing level of operator precedence.

A. `+`, `/`, `*`

~~B. `--`, `-`, `*`~~

~~C. `++`, `/`, `*`~~

~~D. `*`, `++`, `%`~~

50. What is the output of the following application?

```
public class Baby {
   public static String play(int toy, int age) {
      final String game;
      if(toy<2)
         game = age > 1 ? 1 : 10; // p1
      else
         game = age > 3 ? "Ball" : "Swim"; // p2
      return game;
   }
   public static void main(String[] variables) {
      System.out.print(play(5,2));
   }
}
```

A. `Ball`

B. `Swim`

C. The code does not compile due to `p1`.

D. The code does not compile due to `p2`.