Exercises

3. Suppose that `a` and `b` are `boolean` values. Show that the expression `(!(a && b) && (a || b)) || ((a && b) || !(a || b))` is equivalent to `true`.

   `(False And True)`
   Or
   `(True && False)`

   `False`
   Or
   `True`

   `True`

4. Suppose that `a` and `b` are `int` values. Simplify the following expression: `(!(a < b) && !(a > b))`

   `same as (a == b), only if values are equals the condition will be true`

6. Why does `10/3` give `3` and not `3.33333333`?

   Java interprets an integer operation and gives an integer result.

7. What do each of the following print?
   a. `System.out.println(2 + "bc");` prints: 2bc it concatenates number 2 and string “bc” giving the string 2bc
   b. `System.out.println(2 + 3 + "bc");` prints: 5bc First it does an integer operation giving 5, then it concatenates with string “bc” giving the string 5bc
   c. `System.out.println((2+3) + "bc");` prints: 5bc prints: 5bc it concatenates the result of 2+3 encapsulated into (), and string “bc” giving the string 5bc
   d. `System.out.println("bc" + (2+3));` prints: bc5 The string “bc” concatenates with the result of integers between () giving an string result as “bc5”

e. `System.out.println("bc" + 2 + 3);` prints: bc23 Integers are treated as strings due those are being added to the string “bc”

Explain each outcome.

9. What do each of the following print?

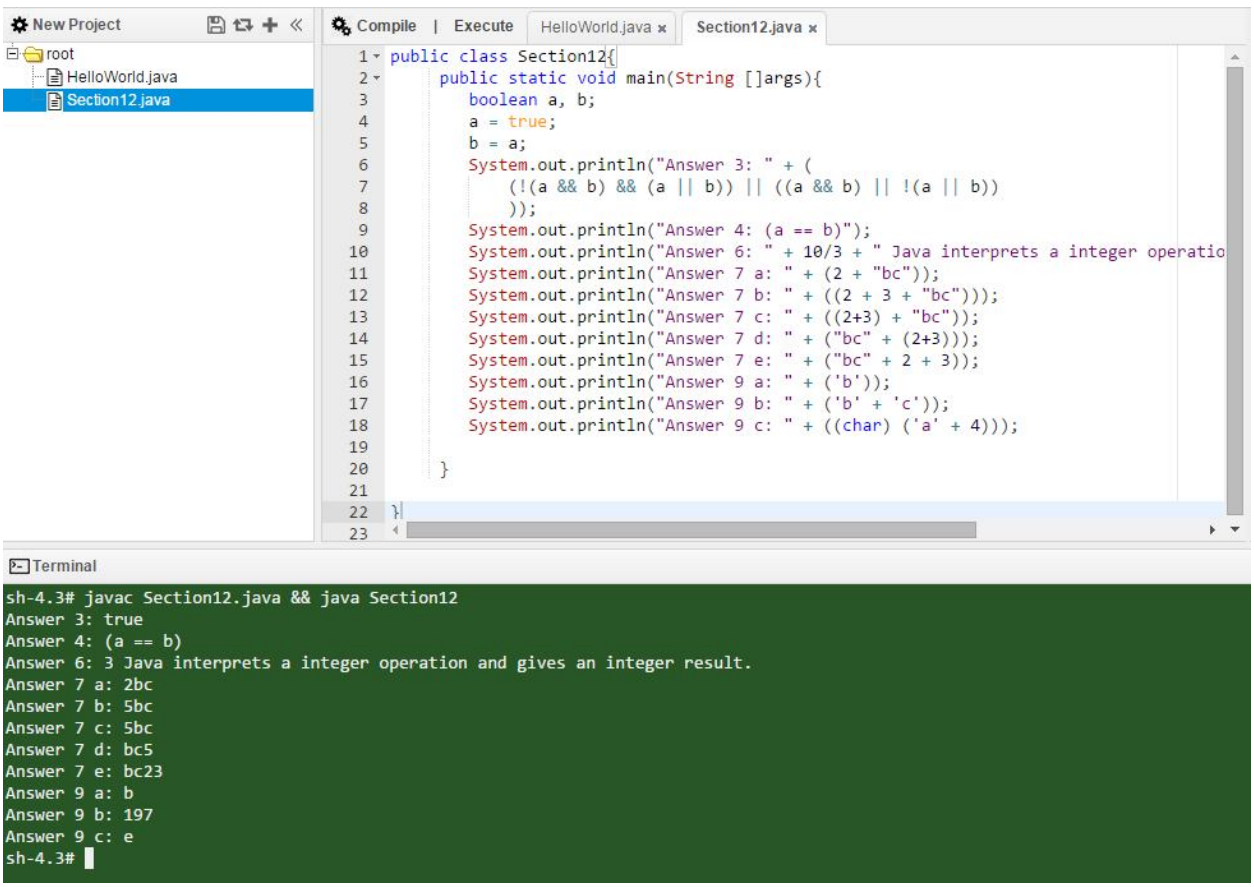
   a. `System.out.println('b'); Only print character b`

   b. `System.out.println('b' + 'c'); Compiler interprets character operations as ascii decimal number , b equals to 98 and c 99 = 197`

   c. `System.out.println((char) ('a' + 4)); a on ascii is 97 plus 4, and the (char) converts 101 to character = e on ascii code.`

   Explain each outcome.

   A java program to test exercises 3..9:



10. Suppose that a variable a is declared as `int a = 2147483647` (or equivalently, `Integer.MAX_VALUE`). What do each of the following print?

   a. `System.out.println(a); 2147483647`

b. `System.out.println(a + 1);` - 2147483648

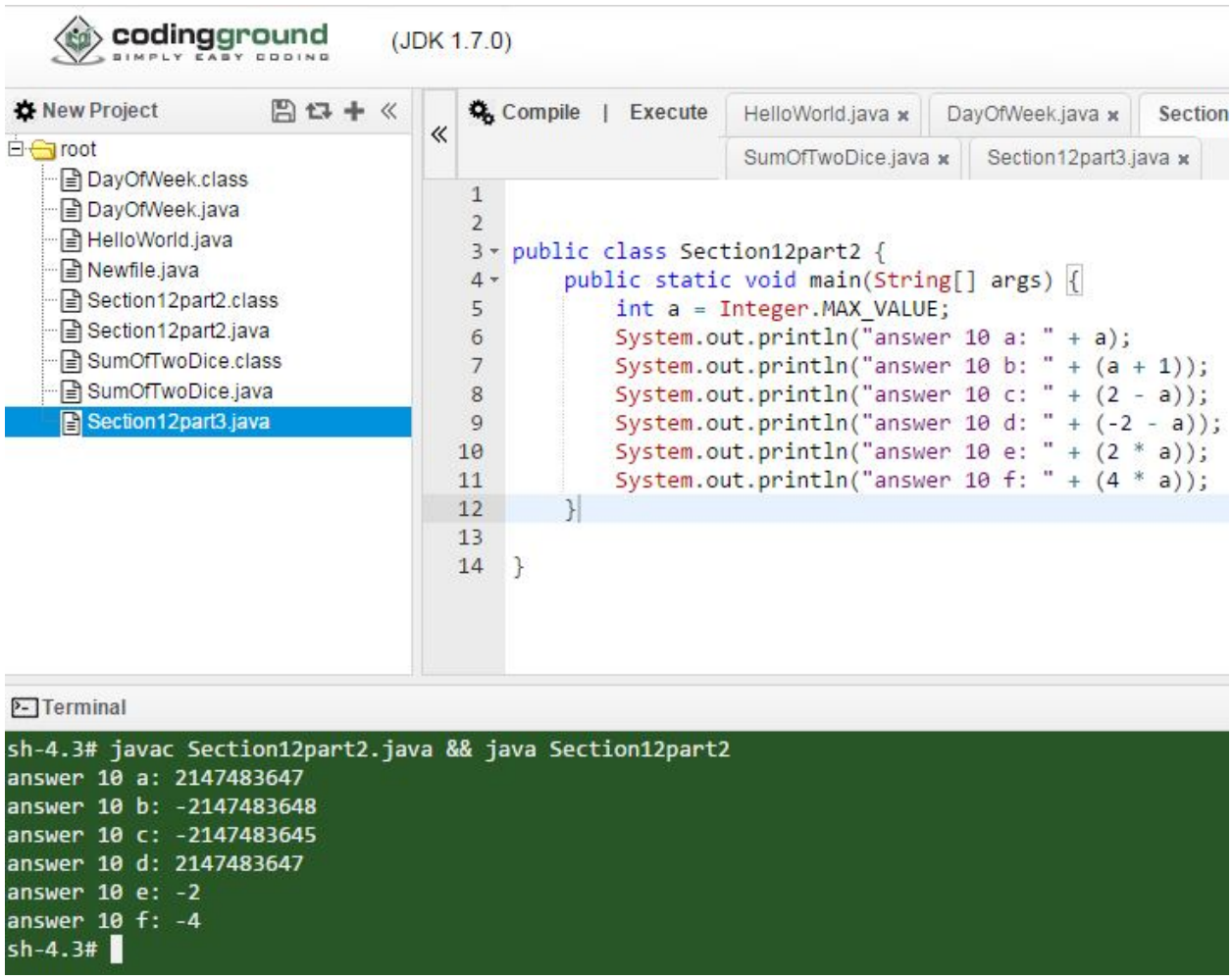
c. `System.out.println(2 - a);` - 2147483645

d. `System.out.println(-2 - a);` 2147483647

e. `System.out.println(2 * a);` -2

f. `System.out.println(4 * a);` -4

Explain each outcome.



11. Suppose that a variable a is declared as `double a = 3.14159`. What do each of the following print?

    a. `System.out.println(a); 3.14159  prints out assigned value`

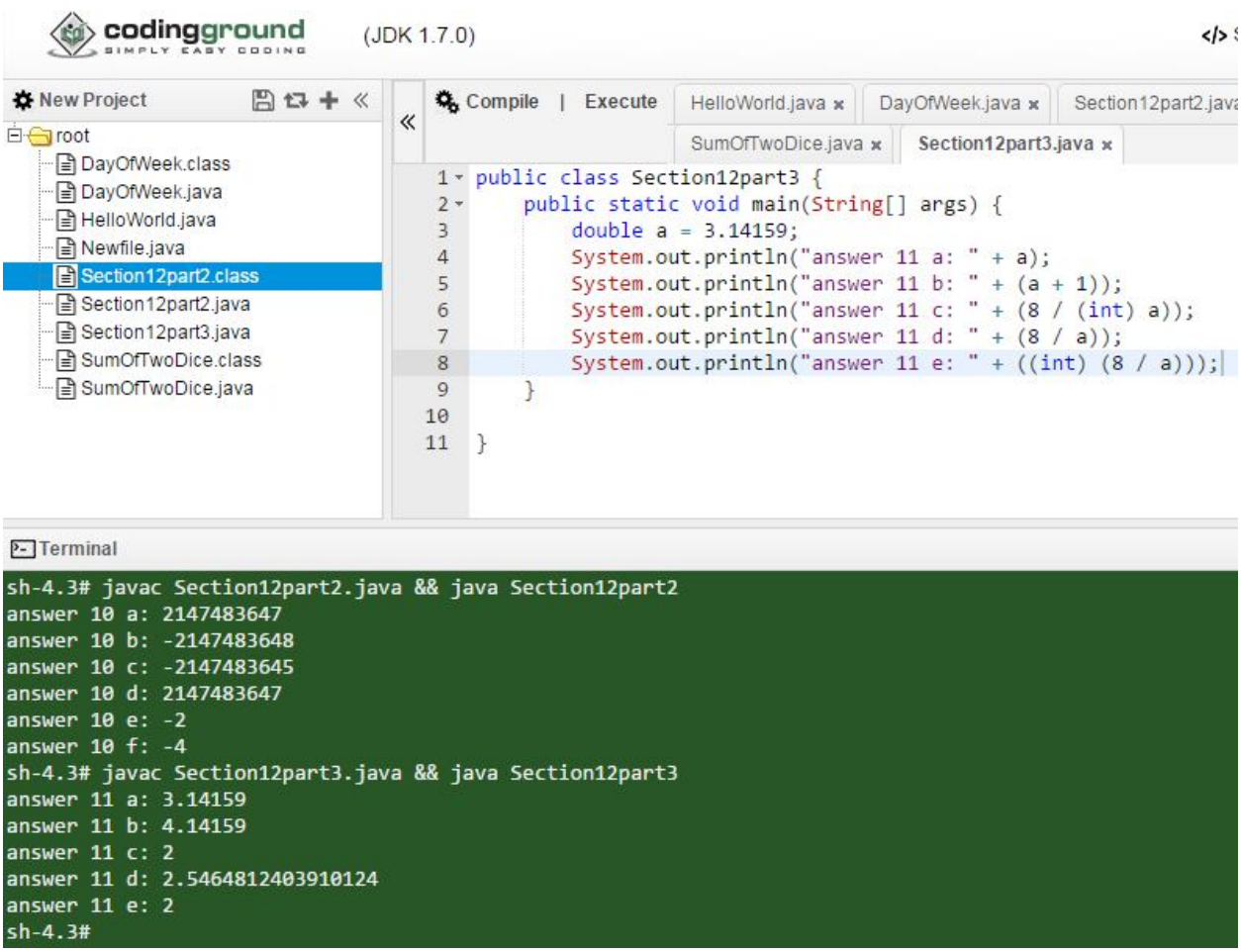
    b. `System.out.println(a + 1); 4.14159 prints out a value plus 1`

    c. `System.out.println(8 / (int) a); 2 Divide 8 / converted a value to integer , it returs an integer due is an operation between integers.`

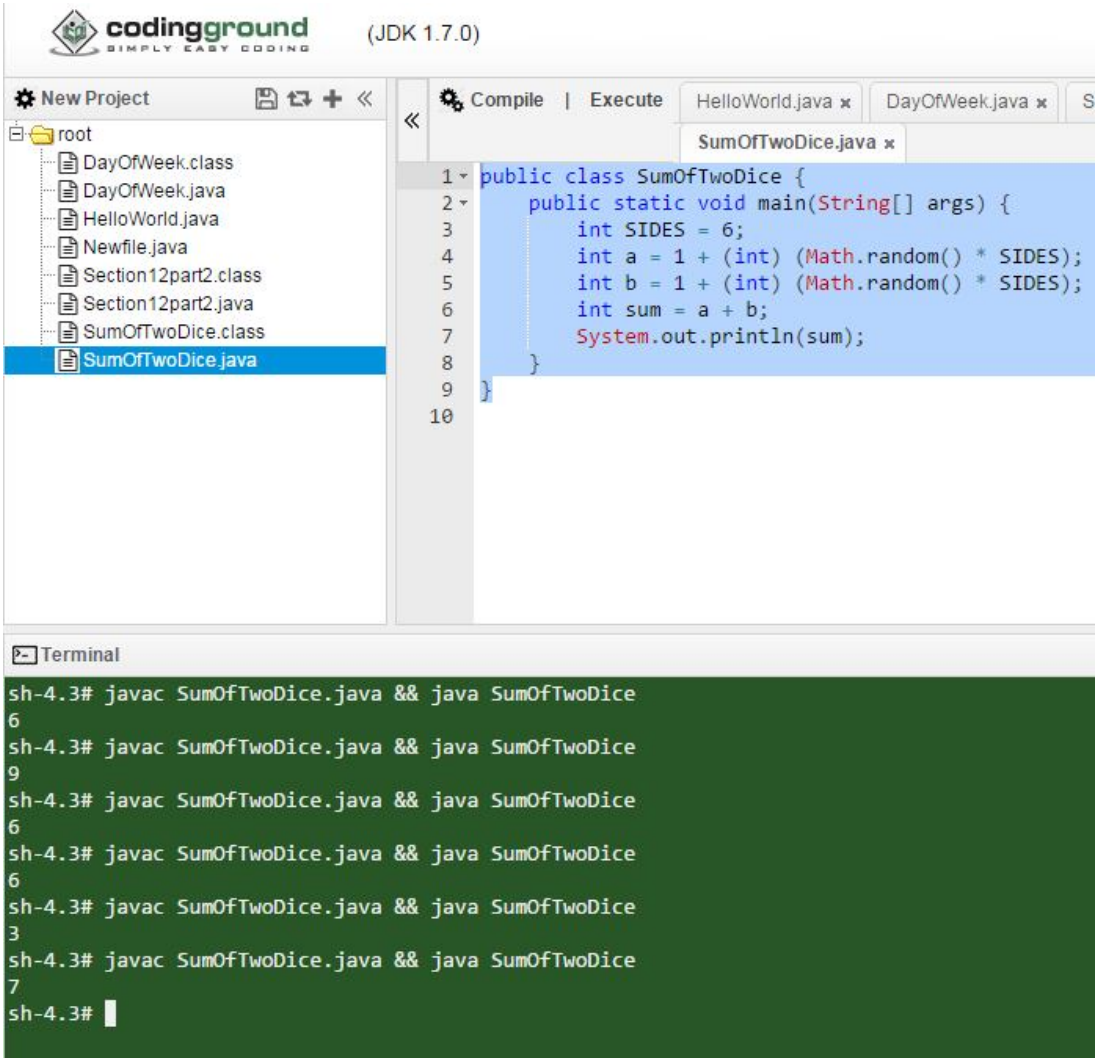
    d. `System.out.println(8 / a); 2.54648124039101  It returns a double due is an operation between doubles`

    e. `System.out.println((int) (8 / a)); 2 It converts to integer the result of division 8/a`

    Explain each outcome.



20. Write a program SumOfTwoDice.java that prints the sum of two random integers between 1 and 6 (such as you might get when rolling dice).



Creative Exercises

29. **Day of the week.** Write a program DayOfWeek.java that takes a date as input and prints the day of the week that date falls on. Your program should take three command-line arguments: `m` (month), `d` (day), and `y` (year). For `m` use 1 for January, 2 for February, and so forth. For output print 0 for Sunday, 1 for Monday, 2 for Tuesday, and so forth. Use the following formulas, for the Gregorian calendar: