Question 1: Program comprehension

Why do the following two lines of code compile but cause a runtime error?

Number[] numberArray = new Integer[2];
numberArray[0] = new Double(1.5);

Show the output of the following code.

public class Test {
    public static void main(String[] args) {
        Number x = 3;
        System.out.println(x.intValue());
        System.out.println(x.doubleValue());
    }
}

What is wrong in the following code? (Note that the compareTo method for the Integer and Double classes was introduced in Section 10.7.)

public class Test {
    public static void main(String[] args) {
        Number x = new Integer(3);
        System.out.println(x.intValue());
        System.out.println(x.compareTo(new Integer(4)));
    }
}

What is wrong in the following code?

public class Test {
    public static void main(String[] args) {
        Number x = new Integer(3);
        System.out.println(x.intValue());
        System.out.println((Integer)x.compareTo(new Integer(4)));
    }
}

What is wrong in the following code?

public class Test {
    public static void main(String[] args) {
        Person[] persons = {new Person(3), new Person(4), new Person(1)};
        java.util.Arrays.sort(persons);
    }
}

class Person {
    private int id;
    
    Person(int id) {
        this.id = id;
    }
}
Question-2:

(Display calendars) Rewrite the `PrintCalendar` class in Listing 6.12 to display a calendar for a specified month using the `Calendar` and `GregorianCalendar` classes. Your program receives the month and year from the command line. For example:

```
java Exercise13_04 5 2016
```

This displays the calendar shown in Figure 13.9.

![Calendar Output](image)

**Figure 13.9** The program displays a calendar for May 2016.

Question-3:

(The `ComparableCircle` class) Define a class named `ComparableCircle` that extends `Circle` and implements `Comparable`. Draw the UML diagram and implement the `compareTo` method to compare the circles on the basis of area. Write a test class to find the larger of two instances of `ComparableCircle` objects.

Question-4:

(Use `BigInteger` for the `Rational` class) Redesign and implement the `Rational` class using `BigInteger` for the numerator and denominator.