BJP5 Exercise 8.18: classRectangle

Show Header

Language/Type: Java classes constructors fields implementing instance methods
Author: Marty Stepp (on 2019/09/19)

Write a class called `Rectangle` that represents a rectangular two-dimensional region. Your `Rectangle` objects should have the following methods:

```
public Rectangle(int x, int y, int width, int height)
```

Constructs a new rectangle whose top-left corner is specified by the given coordinates and with the given width and height. Throw an `IllegalArgumentException` on a negative width or height.

```
public int getHeight()
```

Returns this rectangle's height.

```
public int getWidth()
```

Returns this rectangle's width.

```
public int getX()
```

Returns this rectangle's x-coordinate.

```
public int getY()
```

Returns this rectangle's y-coordinate.

```
public String toString()
```

Returns a string representation of this rectangle, such as `"Rectangle[x=1,y=2,width=3,height=4]"`.

Type your solution here:

```
1  public class Rectangle {
2
3      private int x;
4      private int y;
5      private int width;
6      private int height;
7
8      public Rectangle(int x, int y, int width, int height){
9          if (width < 0 || height < 0)
10             System.out.println("Error");
11
12         this.x = x;
13         this.y = y;
14         this.width = width;
15         this.height = height;
16     }
17
18     public int getHeight(){
19         return height;
20     }
21
22     public int getWidth(){
23         return width;
24     }
25
26     public int getX(){
27         return x;
28     }
29
30     public int getY(){
31         return y;
32     }
33
34     public String toString(){
35        return ["Rectangle[" + "x=" + x + ",y=" + y + ",width=" + width + ",height=" + height + "]"};
36     }
37
38 }
```

This is a **class problem.** Submit a complete Java class as described.

Submit

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You passed 3 of 3 tests.

BJP5 Exercise 8.19: constructorRectangle

Language/Type: Java classes constructors implementing Point
Author: Marty Stepp (on 2019/09/19)

Add the following constructor to your `Rectangle` class from the previous exercise:

```
public Rectangle(Point p, int width, int height)
```

Constructs a new rectangle whose top-left corner is specified by the given point and with the given width

(You don't need to write the class header or declare the fields; assume that this is already done for you. Ju
complete code in the box provided.) See previous exercises for a description of the `Rectangle` and `Poi`
members.

Type your solution here:

```
1 public Rectangle(Point p, int width, int height){
2     this.x = p.getX();
3     this.y = p.getY();
4     this.width = width;
5     this.height = height;
6 }
```

This is a **partial class problem.** Submit code that will become part of an existing Java class as described. You do not need to write t
class, just the portion described in the problem.

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You passed 3 of 3 tests.

BJP5 Exercise 8.20: containsRectangle

Language/Type: Java classes encapsulation implementing instance methods Point
Author: Marty Stepp (on 2019/09/19)

Add the following accessor methods to your `Rectangle` class from the previous exercises:

```
public boolean contains(int x, int y)
public boolean contains(Point p)
```

Returns whether the given `Point` or coordinates lie inside the bounds of this `Rectangle`. The edges ar
rectangle with [x=2,y=5,width=8,height=10] will return `true` for any point from (2, 5) through (10, 15) inc

(You don't need to write the class header or declare the fields; assume that this is already done for you.
complete code in the box provided.) Assume we are working in a graphics context where the upper left
and y increases as you move down. See previous exercises for a description of the `Rectangle` and `Po`
members.

Type your solution here:

```
1  public boolean contains(int x, int y){
2      int givenX = this.x;
3      int givenY = this.y;
4
5      return (givenX <= x && x <= givenX + width && givenY <= y && y <= give
6  }
7
8  public boolean contains(Point p){
9      return (this.x <= p.getX() && p.getX() <= this.x + width && this.y <=
10 }
```

This is a **partial class problem.** Submit code that will become part of an existing Java class as described. You do not need to writ
class, just the portion described in the problem.

Submit

You passed 4 of 4 tests.

BJP5 Exercise 8.21: unionRectangle

Language/Type: Java classes implementing instance methods
Author: Marty Stepp (on 2019/09/19)

Add the following method to your `Rectangle` class from the previous exercises:

```
public Rectangle union(Rectangle rect)
```

Returns a new `Rectangle` that represents the area occupied by the tightest bounding box that
the given other `Rectangle`. Your method should not modify the current `Rectangle` or the one
should create and return a new rectangle.

(You don't need to write the class header or declare the fields; assume that this is already done
complete code in the box provided.) See previous exercises for a description of the `Rectangle`

Type your solution here:

```
1  public Rectangle union(Rectangle rect){
2      int newX = Math.min(this.getX(), rect.getX());
3      int newY = Math.min(this.getY(), rect.getY());
4
5      int newWidth = Math.max(rect.getX() + (rect.getWidth() - newX), t
6
7      int newHeight = Math.max(rect.getY() + (rect.getHeight() - newY),
8
9      return (new Rectangle(newX, newY, newWidth, newHeight));
10
11 }
```

This is a **partial class problem.** Submit code that will become part of an existing Java class as described. You do not nee
class, just the portion described in the problem.

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You passed 3 of 3 tests.

BJP5 Self-Check 8.23: publicVsPrivate

Language/Type: Java classes encapsulation
Author: Marty Stepp (on 2019/09/19)

What is the difference between the public and private keywords?

a. ○ Public fields can be seen in two Java programs at a time while private fields can be seen in only one Jav
b. ○ The public keyword can only be used on methods, and the private keyword can only be used on fields.
c. ○ A class can be public, private, or both, depending on the situation.
d. ◉ Items declared public may be seen and used from any class, while items declared private may be seen a from within their own class.
e. ○ Public members are usable only in Java, while private members are usable in other programming langua
(order shuffled)

What items should be declared private?

a. ◉ Objects' fields should be declared private to provide encapsulation, so that external code can't make un modifications to the fields' values.
b. ○ All instance methods should be private to keep them from being called by malicious clients, for better se
c. ○ Classes should be declared private, but methods and fields should be public.
d. ○ Fields and constructors should both always be private, but methods should always be public.
e. ○ The most important field of a class should be private, but the other less important fields can be public.
(order shuffled)

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You passed 2 of 2 tests.

BJP5 Self-Check 8.24: accessPrivateFields

Language/Type: Java classes encapsulation fields
Author: Marty Stepp (on 2019/09/19)

When fields are made private, client programs cannot see them directly. How do you allow classes access to fields' values, without letting the client break the object's encapsulation?

a. ◉ Create an accessor method that returns the field's value.
b. ○ You must change it to be public, then re-compile the program.
c. ○ It is a trick question; private fields' cannot ever be accessed. That is the point of making them private.
d. ○ Create another class with the same field, but make it public. Then the two classes can both see the pri
e. ○ You have to also declare the field with the 'friend' keyword for another class to access it.
(order shuffled)

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You passed 1 of 1 tests.

Go to the next problem: setXYPoint

question #1: When fields are made private, client programs cannot see them directly. How
read these fields' values, without letting the client break the object's encapsulation?

BJP5 Self-Check 8.26: encapsulatedName

Language/Type: Java classes encapsulation implementing instance methods
Author: Marty Stepp (on 2019/09/19)

(You should complete Self-Check 8.7 before answering this question. You may also want to consult your solution 8.15, and 8.19.)

Encapsulate the `Name` class. Modify the existing code shown below to make its fields `private`, and add appropr methods to the class named `getFirstName`, `getMiddleInitial`, and `getLastName`.

Type your solution here:

```
1  // A Name object represents a person's name such as "John Q. Public".
2  public class Name {
3      private String firstName;
4      private char middleInitial;
5      private String lastName;
6
7      public Name(String first, char middle, String last) {
8          firstName = first;
9          middleInitial = middle;
10         lastName = last;
11     }
12
13     public String getFirstName(){
14         return firstName;
15     }
16
17      public char getMiddleInitial(){
18         return middleInitial;
19     }
20
21      public String getLastName(){
22         return lastName;
23     }
24
25 }
```

This is a **class problem.** Submit a complete Java class as described.

Submit

You passed 4 of 4 tests.