Homework assignment 07

Complete the following programs for this week’s homework.

Programming assignments

Pong Part 2 - ball (40 points)

Continuing our Pong game, create a class PongBall that has the following properties:

Data fields:

- size
- x and y position
- Speed x and speed y of the ball
- direction for x and y, (1 or -1)
- references to the game and the paddle

Methods:

- A constructor where you pass a reference to the game PApplet and the paddle
- A draw method
  - that moves the ball to a new x and y position, taking into account the speed and direction
  - draws an ellipse for the ball
  - checks to see if it should bounce (method below)
- A method to check for bounce
  - if the ball hits the left or right side of the screen, the x direction should change
  - if the ball hits the top of the screen, the y direction should change
  - if the ball is down by the paddle, it should check to see if it's touching the paddle and bounce, otherwise, it should fall off the screen

Create an instance of the PongBall class and run it in your game!

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Triangle class (60 points)

Given the class GeometricObject below, write a subclass Triangle with the following properties:
- Three doubles - side1, side2, and side3 with default values of 1.0 for the lengths of the sides
- A no-arg constructor that creates a default triangle
- A constructor that takes in 3 doubles for sides to create a triangle. **Note:** In triangles, the sum of any 2 sides is greater than the other side. The constructor should check to make sure that is the case and throw an `IllegalArgumentException` if you try to make a triangle that doesn't follow the rule.
- Getters for all 3 sides
- A `getArea()` method that returns the area of the triangle
- A `getPerimeter()` method that returns the perimeter
- A `toString()` method that returns a string description of the triangle like: "Triangle: side 1 = 1.0, side 2 = 1.0, side 3 = 1.0"

Then write a test program that creates an `ArrayList` of 5 triangle objects. Set each of the following properties to something other than the default:

- three sides of the triangle
- the color
- the Boolean value to indicate whether the triangle is filled

You can enter these by hand, no need to ask the user. Wrap them in a try-catch block and make sure that the constructor exception is handled and tells the user if the rule is broken.

The program should then loop through the `ArrayList` and print out the sides, color and whether each Triangle is filled

```java
public class GeometricObject {
    private String color = "white";
    private boolean filled;
    private java.util.Date dateCreated;

    /** Construct a default geometric object */
    public GeometricObject(){
        dateCreated = new java.util.Date();
    }

    /** Construct a geometric object with the specified color and filled value */
    public GeometricObject(String color, boolean filled){
        dateCreated = new java.util.Date();
        this.color = color;
        this.filled = filled;
    }

    /** Return color */
    public String getColor(){
        return color;
    }...
```
public String getColor(){
    return color;
}

/** Set color */
public void setColor(String color) {
    this.color = color;
}

/** Return filled. Since filled is boolean, 
its getter method is named isFilled */
public boolean isFilled() {
    return filled;
}

/** Set a new filled */
public void setFilled(boolean filled) {
    this.filled = filled;
}

/** Get dateCreated */
public java.util.Date getDateCreated() {
    return dateCreated;
}

/** Return a string representation of this object */
public String toString() {
    return "created on " + dateCreated + 
    "\ncolor: " + color + 
    " and filled: " + filled;
}

Create a new class and copy that in.

Remember that comments and good naming conventions factor into your grade! Don't forget.