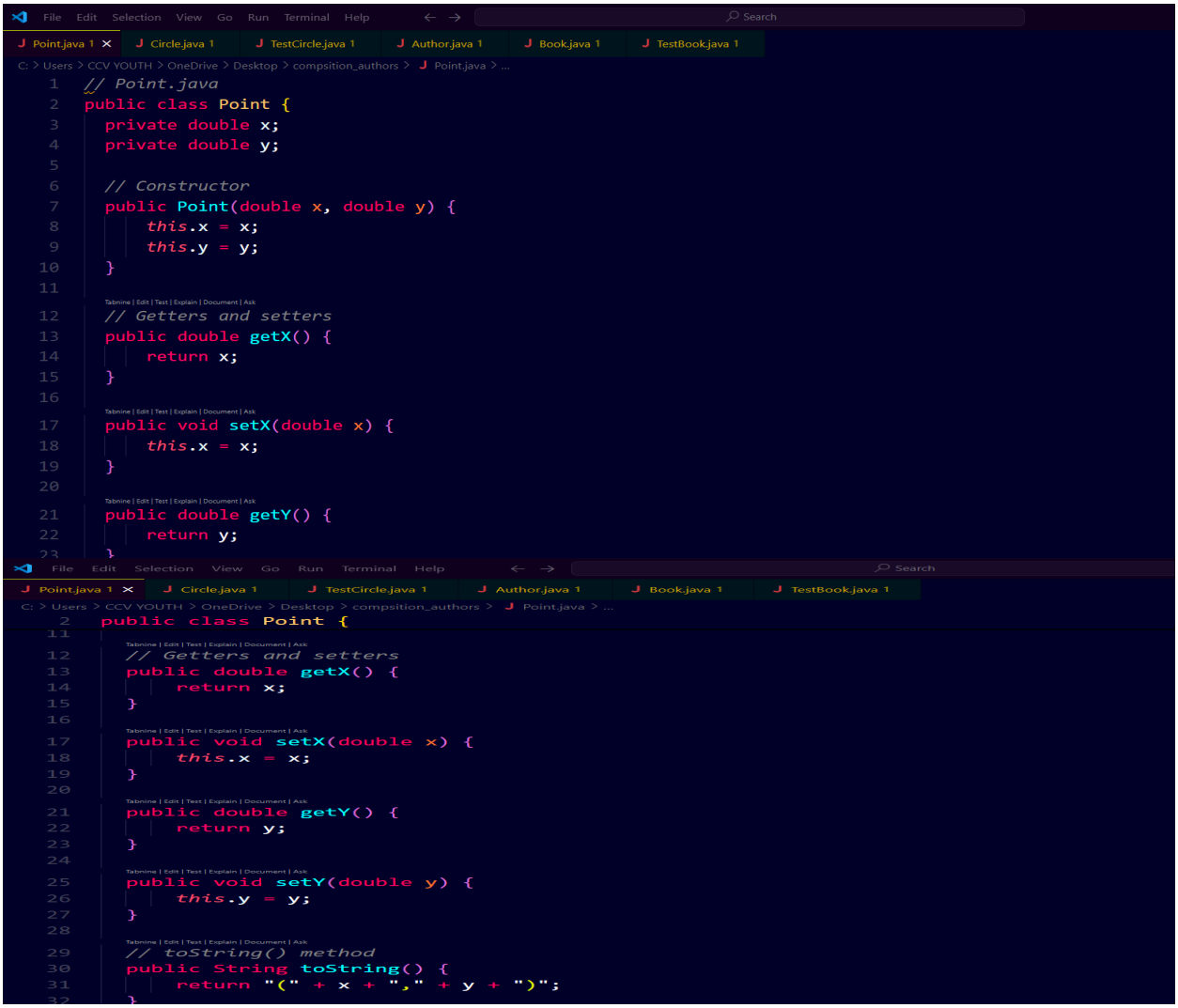
1. Point Class (Point.java)

Purpose:
The `Point` class represents a point in a 2D coordinate system with `x` and `y` coordinates. It provides getter and setter methods for these coordinates and a `toString()` method to represent the point in a readable format.



```java
// Point.java
public class Point {
    private double x;
    private double y;

    // Constructor
    public Point(double x, double y) {
        this.x = x;
        this.y = y;
    }

    // Getters and setters
    public double getX() {
        return x;
    }

    public void setX(double x) {
        this.x = x;
    }

    public double getY() {
        return y;
    }
```

```java
public class Point {

    // Getters and setters
    public double getX() {
        return x;
    }

    public void setX(double x) {
        this.x = x;
    }

    public double getY() {
        return y;
    }

    public void setY(double y) {
        this.y = y;
    }

    // toString() method
    public String toString() {
        return "(" + x + "," + y + ")";
    }
```

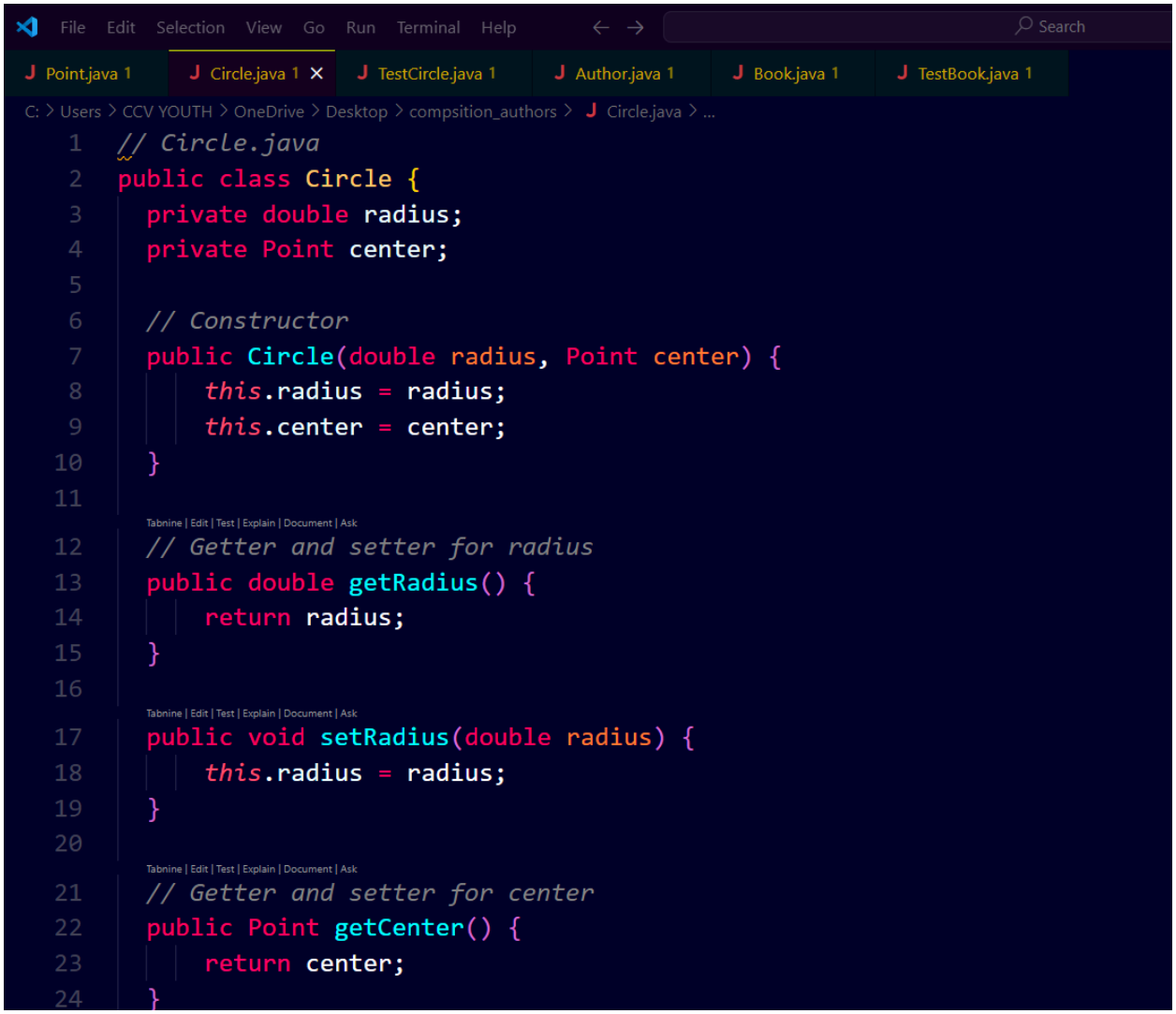
Explanation:

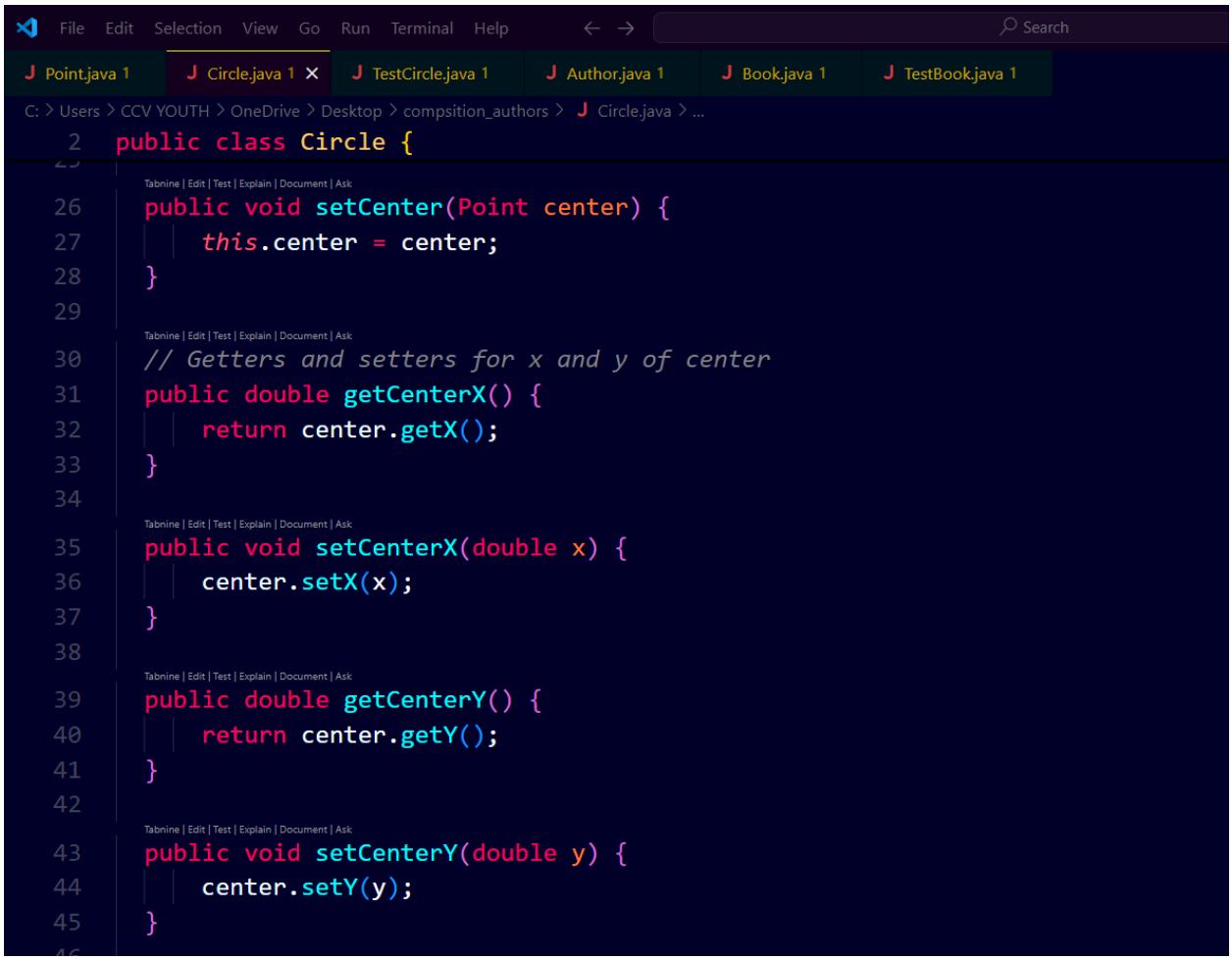
- **Constructor**: Initializes the `x` and `y` coordinates of the point.
- **Getter and Setter Methods**: Allow access and modification of the `x` and `y` coordinates.
- **`toString()` Method**: Provides a string representation of the point in the form `(x,y)`.

2. Circle Class (Circle.java)

Purpose:
The `Circle` class represents a circle with a specified `radius` and a `center`, which is a `Point`. It includes methods for modifying and retrieving the radius, center, calculating the distance between two circles' centers, and calculating the area and circumference of the circle.

Code:

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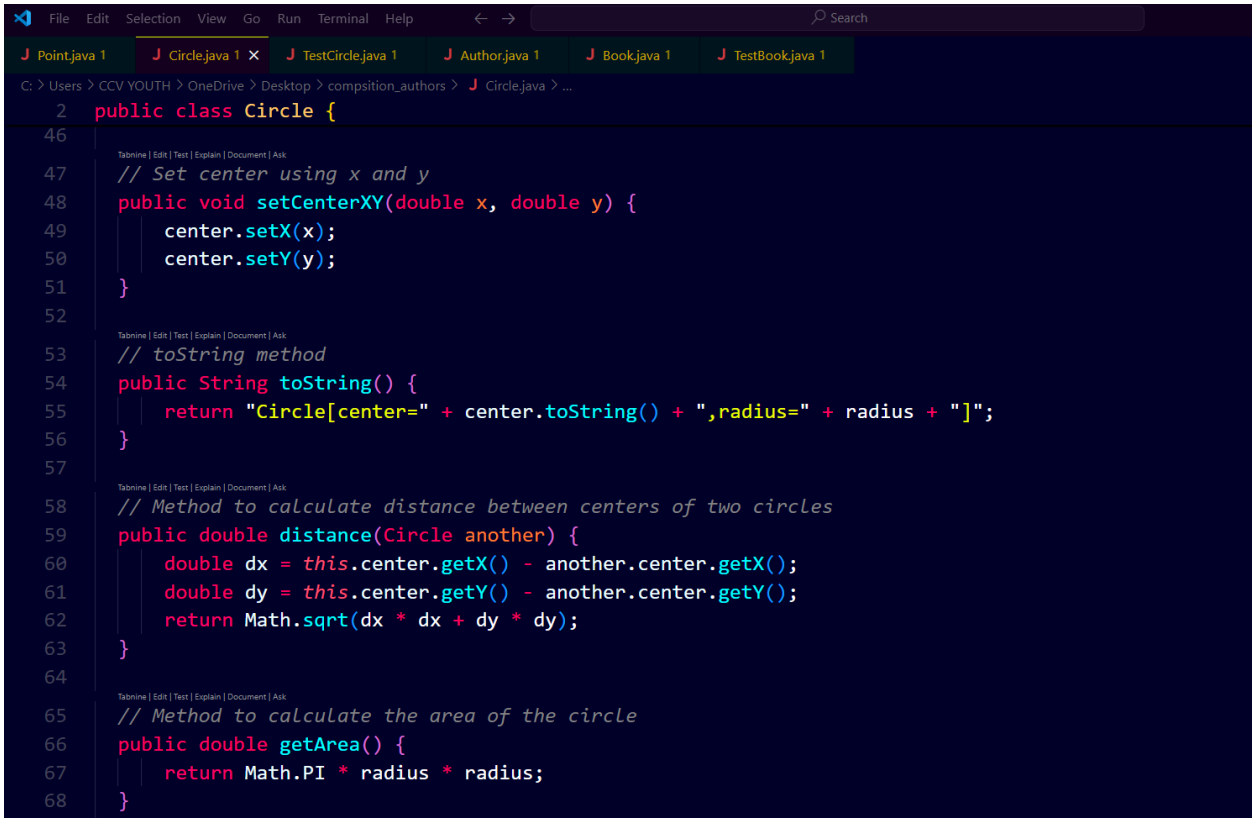
Author.java 1
Book.java 1
TestBook.java 1
C: > Users > CCV YOUTH > OneDrive > Desktop > compsition_authors > Circle.java > ...
public class Circle {
Tabnine | Edit | Test | Explain | Document | Ask
public void setCenter(Point center) {
this.center = center;
}
Tabnine | Edit | Test | Explain | Document | Ask
// Getters and setters for x and y of center
public double getCenterX() {
return center.getX();
}
Tabnine | Edit | Test | Explain | Document | Ask
public void setCenterX(double x) {
center.setX(x);
}
Tabnine | Edit | Test | Explain | Document | Ask
public double getCenterY() {
return center.getY();
}
Tabnine | Edit | Test | Explain | Document | Ask
public void setCenterY(double y) {
center.setY(y);
}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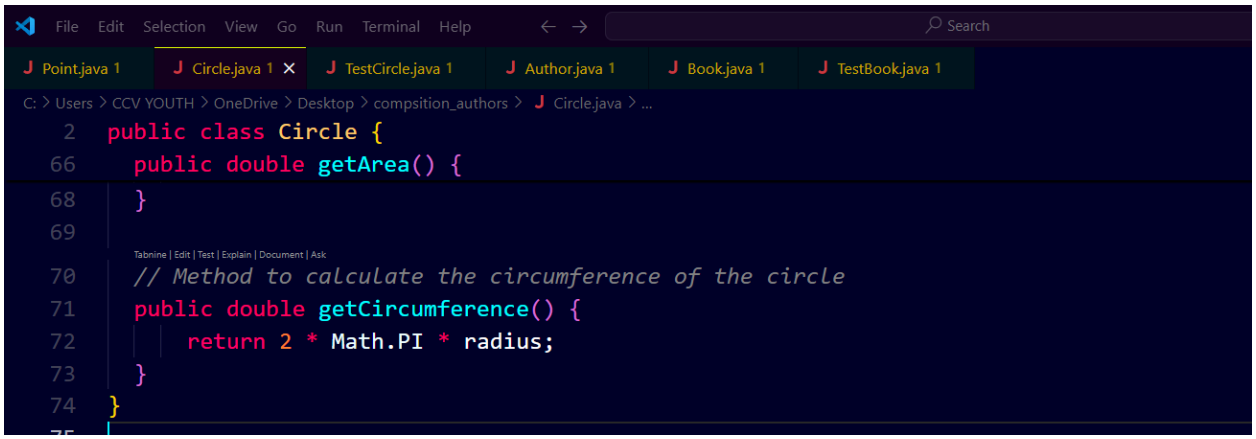
TestBook.java 1
C: > Users > CCV YOUTH > OneDrive > Desktop > compsition_authors > Circle.java > ...
public class Circle {
Tabnine | Edit | Test | Explain | Document | Ask
// Set center using x and y
public void setCenterXY(double x, double y) {
center.setX(x);
center.setY(y);
}
Tabnine | Edit | Test | Explain | Document | Ask
// toString method
public String toString() {
return "Circle[center=" + center.toString() + ",radius=" + radius + "]";
}
Tabnine | Edit | Test | Explain | Document | Ask
// Method to calculate distance between centers of two circles
public double distance(Circle another) {
double dx = this.center.getX() - another.center.getX();
double dy = this.center.getY() - another.center.getY();
return Math.sqrt(dx * dx + dy * dy);
}
Tabnine | Edit | Test | Explain | Document | Ask
// Method to calculate the area of the circle
public double getArea() {
return Math.PI * radius * radius;
}



Explanation:

- **Constructor**: Initializes the `radius` and `center` of the circle.
- **Getter and Setter Methods**: Provide access to the circle's radius and center. Separate methods are provided to access and set the x and y coordinates of the center.
- **`toString()` Method**: Returns a string that describes the circle, including its center's coordinates and radius.
- **`distance()` Method**: Computes the Euclidean distance between the centers of two circles.
- **`getArea()` and `getCircumference()` Methods**: Calculate and return the area and circumference of the circle, respectively.
-

3. Test Driver for Circle Class (TestCircle.java)

Purpose:
This test driver program demonstrates the usage of the `Circle` class by creating instances of circles, testing getter and setter methods, and calculating distances, areas, and circumferences.

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```java
// TestCircle.java
public class TestCircle {
    Run | Debug | Tabnine | Edit | Test | Explain | Document | Ask
    public static void main(String[] args) {
        // Create some points
        Point p1 = new Point(x:0, y:0);
        Point p2 = new Point(x:1, y:2);
        Point p3 = new Point(x:4, y:5);

        // Create some circles with points and radius
        Circle c1 = new Circle(radius:1.0, p1);
        Circle c2 = new Circle(radius:3.3, p2);
        Circle c3 = new Circle(radius:6.6, p3);

        // Output the circle information
        System.out.println("cl: " + c1);
        System.out.println("c2: " + c2);
        System.out.println("c3: " + c3);

        // Test Setters and Getters of c1
        c1.setCenterXY(x:11, y:12); // Set center to (11, 12)
        c1.setRadius(radius:13.3); // Set radius to 13.3
        System.out.println("\ncl: " + c1); // Output updated circle
        System.out.println("cl is: " + c1.getCenter()); // Output center
        System.out.println("Radius is: " + c1.getRadius()); // Output radius
```

Point.java 1 | Circle.java 1 | TestCircle.java 1 | Author.java 1 | Book.java 1 | TestBook.java 1

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```java
public class TestCircle {
    public static void main(String[] args) {

        // Set Center X and Y individually
        c1.setCenterX(x:21);
        c1.setCenterY(y:22);
        System.out.println("\nc1: " + c1); // Output updated circle
        System.out.println("cl's x is: " + c1.getCenterX()); // Output center X
        System.out.println("C1's y is: " + c1.getCenterY()); // Output center Y

        // Set Center using setCenterXY method
        c1.setCenterXY(x:31, y:32);
        System.out.println("\nc1: " + c1); // Output updated circle
        System.out.println("cl's x is: " + c1.getCenterX()); // Output center X
        System.out.println("cl's y is: " + c1.getCenterY()); // Output center Y

        // Test getArea() and getCircumference()
        System.out.println("\nArea of c1: " + c1.getArea());
        System.out.println("Circumference of c1: " + c1.getCircumference());

        // Test distance between c1 and c2
        double dist = c1.distance(c2);
        System.out.println("\nDistance between c1 and c2: " + dist);
    }
}
```

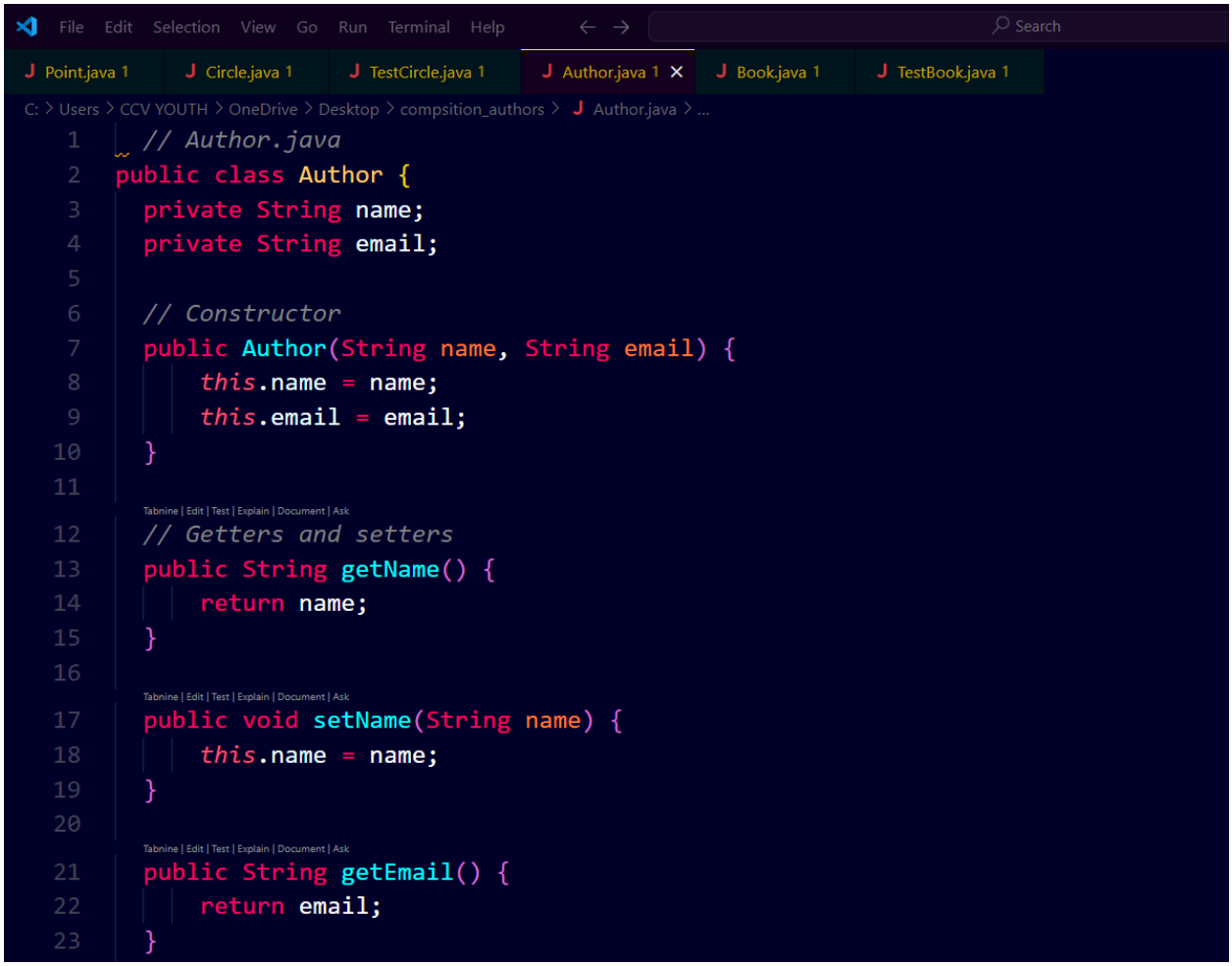
Explanation:

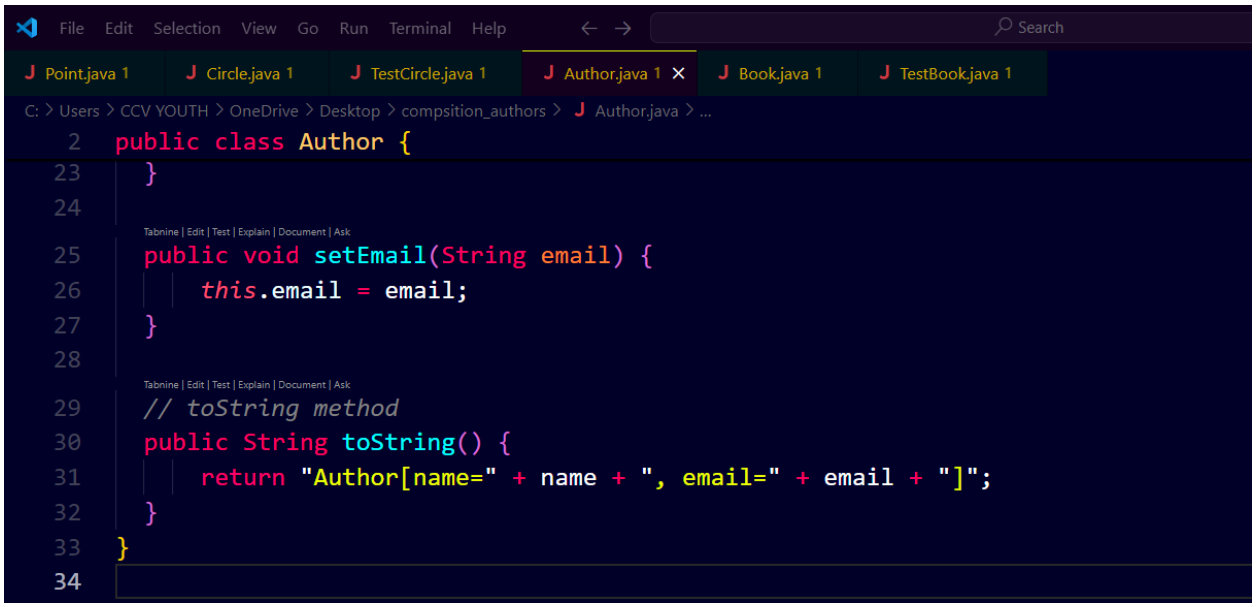
- This program tests the `Circle` class by:
    - Creating `Point` and `Circle` objects.
    - Setting and getting values for the circle's center and radius.
    - Displaying the results of area, circumference, and distance calculations.

4. Author Class (Author.java)

Purpose:
The `Author` class represents an author with a `name` and `email` address. It provides getter and setter methods for these attributes and a `toString()` method for displaying the author's information.

Code:





Explanation:

- **Constructor**: Initializes the `name` and `email` of the author.
- **Getter and Setter Methods**: Allow access to and modification of the `name` and `email`.
- **`toString()` Method**: Returns a string describing the author.

5. Book Class (Book.java)

Purpose:
The `Book` class represents a book with a `title`, `price`, and an `Author` object. It includes getter and setter methods for these attributes and a `toString()` method for displaying the book's details.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Author.java 1
Book.java 1
TestBook.java 1
C: > Users > CCV YOUTH > OneDrive > Desktop > compsition_authors > Book.java > ...
// Book.java
public class Book {
private String title;
private double price;
private Author author;
// Constructor
public Book(String title, double price, Author author) {
this.title = title;
this.price = price;
this.author = author;
}
Tabnine | Edit | Test | Explain | Document | Ask
// Getters and setters
public String getTitle() {
return title;
}
Tabnine | Edit | Test | Explain | Document | Ask
public void setTitle(String title) {
this.title = title;
}
Tabnine | Edit | Test | Explain | Document | Ask
public double getPrice() {
return price;
}


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Circle.java 1
TestCircle.java 1
Author.java 1
Book.java 1
TestBook.java 1
C: > Users > CCV YOUTH > OneDrive > Desktop > compsition_authors > Book.java > ...
public class Book {
Tabnine | Edit | Test | Explain | Document | Ask
public void setPrice(double price) {
this.price = price;
}
Tabnine | Edit | Test | Explain | Document | Ask
public Author getAuthor() {
return author;
}
Tabnine | Edit | Test | Explain | Document | Ask
public void setAuthor(Author author) {
this.author = author;
}
Tabnine | Edit | Test | Explain | Document | Ask
// toString method
public String toString() {
return "Book[title=" + title + ", price=" + price + ", " + author.toString() + "]";
}
}

Explanation:

- **Constructor**: Initializes the book with a `title`, `price`, and an `Author` object.
- **Getter and Setter Methods**: Provide access to and modification of the book's `title`, `price`, and `author`.
- **`toString()` Method**: Returns a string describing the book's title, price, and author.

6. Test Driver for Book Class (TestBook.java)

Purpose:
This program tests the `Book` class by creating an `Author` and a `Book` and printing the details.

Code:

Explanation:

- This program creates an `Author` and a `Book` object and prints the details of the book using the `toString()` method.

THE OUTPUT

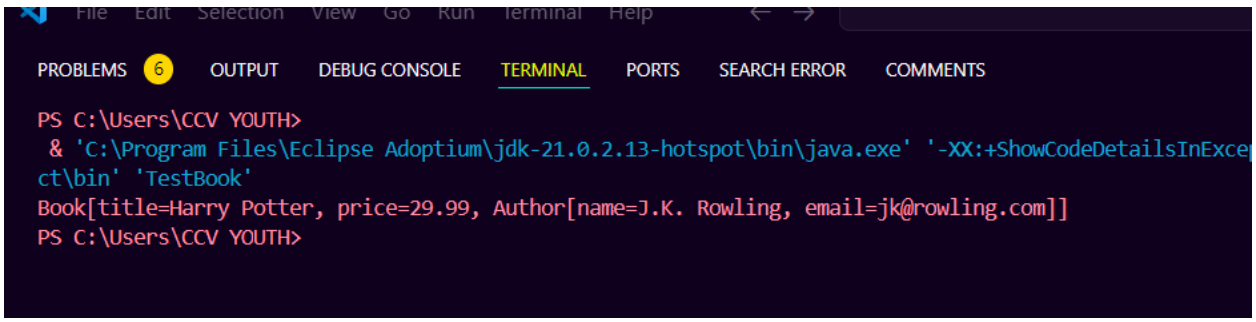
```
PS C:\Users\CCV YOUTH>
 & 'C:\Program Files\Eclipse Adoptium\jdk-21.0.2.13-hotspot\bin\java.exe' '-XX:+S
ct\bin' 'TestCircle'
c1: Circle[center=(0.0,0.0),radius=1.0]
c2: Circle[center=(1.0,2.0),radius=3.3]
c3: Circle[center=(4.0,5.0),radius=6.6]

c1: Circle[center=(11.0,12.0),radius=13.3]
c1 is: (11.0,12.0)
Radius is: 13.3

c1: Circle[center=(21.0,22.0),radius=13.3]
c1's x is: 21.0
C1's y is: 22.0

c1: Circle[center=(31.0,32.0),radius=13.3]
c1's x is: 31.0
c1's y is: 32.0
Exception in thread "main" java.lang.Error: Unresolved compilation problem:
        Math cannot be resolved to a variable

        at Circle.getArea(Circle.java:67)
        at TestCircle.main(TestCircle.java:40)
PS C:\Users\CCV YOUTH>
```



THE OUTPUT