



Fundamentals of Programming II Lab 06

```
package lecture0601;
public class Lecture0601 {
    public static void main(String[] args) {
        Square sqr = new Square(-24.86);
        System.out.println("Square Characteristics");
        System.out.printf("Side: %.2f\n", sqr.getSide());
        System.out.printf("Perimeter: %.2f", sqr.calculatePerimeter());
    }
}
class Square {
    private double side;
    public Square(double s) {
        side = s;
    }
    // This is a read property
    public double getSide() {
        return side;
    }
    double calculatePerimeter() {
        return side * 4;
    }
}
```

```
package lecture0602;
public class Lecture0602 {
    private static StoreItem create() {
        StoreItem item = new StoreItem(622805,
            "Black Leather Hand Bag",
            "Medium", 85.95);
        return item;
    }
    private static void show(StoreItem si) {
        System.out.println("\n=====");
        System.out.println("/-/Arrington Department Store/-/");
        System.out.println("-----");
        System.out.println("Customer Invoice");
        System.out.printf("Item #: %d\n", si.getItemNumber());
        System.out.printf("Description: %s\n", si.getName());
        System.out.printf("Item Size: %s\n", si.getSize());
        System.out.printf("Unit Price: %.2f\n", si.getUnitPrice());
        System.out.println("=====");
    }
    public static void main(String[] args) {
        StoreItem store = create();
        show(store);
    }
}
class StoreItem {
    private long itemNumber;
    private String name;
    private String size;
    private double price;
    public StoreItem() {
        this.itemNumber = 0;
    }
}
```



```
        this.name = "Unknown";
        this.size = "No Size";
        this.price = 0.00;
    }
    // A constructor used to initialize an item
    public StoreItem(long number, String itemName,
        String itemSize, double itemPrice) {
        this.itemNumber = number;
        this.name = itemName;
        this.size = itemSize;
        this.price = itemPrice;
    }

    public long getItemNumber() {
        return itemNumber;
    }
    // A property for the name of an item
    public String getName() {
        return name;
    }
    // A property for size of a merchandise
    public String getSize() {
        return size;
    }
    // A property for the marked price of an item
    public double getUnitPrice() {
        return price;
    }
}
```

```
package lecture0603;
public class Lecture0603 {
    public static void main(String[] args) {
        Square sqr = new Square();
        sqr.setSide(-24.86);
        System.out.println("Square Characteristics");
        System.out.printf("Side: %.2f\n", sqr.getSide());
        System.out.printf("Perimeter: %.2f\n", sqr.calculatePerimeter());
        System.out.printf("Area: %.2f", sqr.calculateArea());
        System.out.println("\n");
        sqr.setSide(24.86);
        System.out.println("Square Characteristics");
        System.out.printf("Side: %.2f\n", sqr.getSide());
        System.out.printf("Perimeter: %.2f\n", sqr.calculatePerimeter());
        System.out.printf("Area: %.2f", sqr.calculateArea());
    }
}

class Square {
    private double side;
    // This is a read property
    public double getSide() {
        return side;
    }
    // This is a write property
    public void setSide(double value) {
        side = value;
    }

    public double calculatePerimeter() {
        return side * 4;
    }
}
```



```
public double calculateArea() {
    return side * side;
}
}
```

```
package lecture0604;
public class Lecture0604 {
    private static StoreItem create() {
        StoreItem item = new StoreItem();
        item.setItemNumber(409527);
        item.setName("Manhattan - Cognac Calf");
        item.setSize("10 Å, Å½");
        item.setUnitPrice(275.95);
        return item;
    }

    private static void show(StoreItem si) {
        System.out.println("\n=====");
        System.out.println("/-/Arrington Department Store/-/");
        System.out.println("-----");
        System.out.println("Customer Invoice");
        System.out.printf("Item #: %d\n", si.getItemNumber());
        System.out.printf("Description: %s\n", si.getName());
        System.out.printf("Item Size: %s\n", si.getSize());
        System.out.printf("Unit Price: %.2f\n", si.getUnitPrice());
        System.out.println("=====");
    }

    public static void main(String[] args) {
        StoreItem store = create();
        show(store);
    }
}

class StoreItem {

    private long itemNumber;
    private String name;
    private String size;
    private double price;

    public StoreItem() {
        this.itemNumber = 0;
        this.name = "Unknown";
        this.size = "No Size";
        this.price = 0.00;
    }
    // A constructor used to initialize an item
    public StoreItem(long number, String itemName,
        String itemSize, double itemPrice) {
        this.itemNumber = number;
        this.name = itemName;
        this.size = itemSize;
        this.price = itemPrice;
    }
    // A property for the stock number of an item
    public long getItemNumber() {
        return itemNumber;
    }

    public void setItemNumber(long itemNumber) {
        this.itemNumber = itemNumber;
    }
}
```



```
}  
// A property for the name of an item  
public String getName() {  
    return name;  
}  
  
public void setName(String value) {  
    this.name = value;  
}  
// A property for size of a merchandise  
public String getSize() {  
    return size;  
}  
  
public void setSize(String value) {  
    this.size = value;  
}  
// A property for the marked price of an item  
public double getUnitPrice() {  
    return price;  
}  
  
public void setUnitPrice(double value) {  
    if (this.price < 0) {  
        this.price = 0.00;  
    } else {  
        this.price = value;  
    }  
}  
}
```

```
package lecture0605;  
public class Circle {  
  
    private double radius;  
  
    public double getRadius() {  
        return radius;  
    }  
  
    public void setRadius(double value) {  
        if (radius < 0) {  
            radius = 0.00;  
        } else {  
            radius = value;  
        }  
    }  
  
    public double calculateDiameter() {  
        return radius * 2;  
    }  
  
    public double calculateCircumference() {  
        return calculateDiameter() * 3.14159;  
    }  
  
    public double calculateArea() {  
        return radius * radius * 3.14159;  
    }  
}
```

```
package lecture0605;  
public class Lecture0605 {  
    public static void main(String[] args) {
```



```
Circle round = new Circle();
round.setRadius(25.55);
System.out.println("Circle Characteristics");
System.out.printf("Side: %f\n", round.getRadius());
System.out.printf("Diameter: %f\n",
    round.calculateDiameter());
System.out.printf("Circumference: %f\n",
    round.calculateCircumference());
System.out.printf("Area: %f\n",
    round.calculateArea());
}
}
```

```
package lecture0606;
public class Circle {

    private double radius;

    public double getRadius() {
        return radius;
    }

    public void setRadius(double value) {
        if (radius < 0) {
            radius = 0.00;
        } else {
            radius = value;
        }
    }

    public double calculateDiameter() {
        return radius * 2;
    }

    public double calculateCircumference() {
        return calculateDiameter() * 3.14159;
    }

    public double calculateArea() {
        return radius * radius * 3.14159;
    }
}
```

```
package lecture0606;
public class Sphere extends Circle{
}
}
```

```
package lecture0606;
public class Lecture0606 {
    public static void main(String[] args) {
        Circle round = new Circle();
        round.setRadius(25.55);
        System.out.println("Circle Characteristics");
        System.out.printf("Side: %f\n", round.getRadius());
        System.out.printf("Diameter: %f\n",
            round.calculateDiameter());
        System.out.printf("Circumference: %f\n",
            round.calculateCircumference());
        System.out.printf("Area: %f\n",
            round.calculateArea());
        Sphere ball = new Sphere();
        ball.setRadius(25.55);
    }
}
```



```
System.out.println("\nSphere Characteristics");
System.out.printf("Side: %f\n", ball.getRadius());
System.out.printf("Diameter: %f\n",
    ball.calculateDiameter());
System.out.printf("Circumference: %f\n",
    ball.calculateCircumference());
System.out.printf("Area: %f", ball.calculateArea());
}
}
```

```
package lecture0607;
public class Circle {
    private double radius;

    public double getRadius() {
        return radius;
    }

    public void setRadius(double value) {
        if (radius < 0) {
            radius = 0.00;
        } else {
            radius = value;
        }
    }

    public double calculateDiameter() {
        return radius * 2;
    }

    public double calculateCircumference() {
        return calculateDiameter() * 3.14159;
    }

    public double calculateArea() {
        return radius * radius * 3.14159;
    }

    public void ShowCharacteristics() {
        System.out.println("Circle Characteristics");
        System.out.printf("Side: %f\n", getRadius());
        System.out.printf("Diameter: %f\n",
            calculateDiameter());
        System.out.printf("Circumference: %f\n",
            calculateCircumference());
        System.out.printf("Area: %f\n",
            calculateArea());
    }
}
```

```
package lecture0607;
public class Sphere extends Circle {
}
```

```
package lecture0607;
public class Lecture0607 {
    public static void main(String[] args) {
        Circle round = new Circle();
        round.setRadius(25.55);
        round.ShowCharacteristics();
        Sphere ball = new Sphere();
        ball.setRadius(25.55);
        ball.ShowCharacteristics();
    }
}
```



```
package lecture0608;
public class Circle {
    private double radius;

    public double getRadius() {
        return radius;
    }

    public void setRadius(double value) {
        if (radius < 0) {
            radius = 0.00;
        } else {
            radius = value;
        }
    }

    public double calculateDiameter() {
        return radius * 2;
    }

    public double calculateCircumference() {
        return calculateDiameter() * 3.14159;
    }

    public double calculateArea() {
        return radius * radius * 3.14159;
    }

    public void ShowCharacteristics() {
        System.out.println("Circle Characteristics");
        System.out.printf("Side: %f\n", getRadius());
        System.out.printf("Diameter: %f\n",
            calculateDiameter());
        System.out.printf("Circumference: %f\n",
            calculateCircumference());
        System.out.printf("Area: %f\n",
            calculateArea());
    }
}
```

```
package lecture0608;
public class Cylinder extends Circle {

    private double height;

    public Cylinder() {
    }

    public double getHeight() {
        return height;
    }

    public void setHeight(double height) {
        height = height;
    }
}
```

```
package lecture0608;
public class Lecture0608 {
    public static void main(String[] args) {
        Circle round = new Circle();
        round.setRadius(25.55);
        round.ShowCharacteristics();
        Cylinder c1 = new Cylinder();
    }
}
```



```
        cl.setRadius(25.55);  
        cl.setHeight(30);  
        cl.ShowCharacteristics();  
    }  
}
```

```
package lecture0609;  
public class Circle {  
    private double radius;  
  
    public double getRadius() {  
        return radius;  
    }  
  
    public void setRadius(double value) {  
        if (radius < 0) {  
            radius = 0.00;  
        } else {  
            radius = value;  
        }  
    }  
  
    public double calculateDiameter() {  
        return radius * 2;  
    }  
  
    public double calculateCircumference() {  
        return calculateDiameter() * 3.14159;  
    }  
  
    public double calculateArea() {  
        return radius * radius * 3.14159;  
    }  
  
    public void ShowCharacteristics() {  
        System.out.println("Circle Characteristics");  
        System.out.printf("Side: %f\n", getRadius());  
        System.out.printf("Diameter: %f\n",  
            calculateDiameter());  
        System.out.printf("Circumference: %f\n",  
            calculateCircumference());  
        System.out.printf("Area: %f\n",  
            calculateArea());  
    }  
}
```

```
package lecture0609;  
public class Sphere extends Circle {  
  
    @Override  
    public double calculateArea() {  
        return 4 * getRadius() * getRadius() * 3.14159;  
    }  
  
    @Override  
    public void ShowCharacteristics() {  
        // Because Sphere is based on Circle, you can access  
        // any public member(s) of Circle without qualifying it(them)  
        System.out.println("\nSphere Characteristics");  
        System.out.printf("Side: %f\n", getRadius());  
        System.out.printf("Diameter: %f\n",  
            calculateDiameter());  
        System.out.printf("Circumference: %f\n",  
            calculateCircumference());  
    }  
}
```




```
        System.out.printf("Area: %f", calculateArea());  
    }  
}
```

```
package lecture0609;  
public class Lecture0609 {  
    public static void main(String[] args) {  
        Circle round = new Circle();  
        round.setRadius(25.55);  
        round.ShowCharacteristics();  
        Sphere ball = new Sphere();  
        ball.setRadius(25.55);  
        ball.ShowCharacteristics();  
    }  
}
```

```
package lecure0510;  
public class Circle {  
  
    private double radius;  
  
    public double getRadius() {  
        return radius;  
    }  
  
    public void setRadius(double value) {  
        if (radius < 0) {  
            radius = 0.00;  
        } else {  
            radius = value;  
        }  
    }  
  
    public double calculateDiameter() {  
        return radius * 2;  
    }  
  
    public double calculateCircumference() {  
        return calculateDiameter() * 3.14159;  
    }  
  
    public double calculateArea() {  
        return radius * radius * 3.14159;  
    }  
  
    public void ShowCharacteristics() {  
        System.out.println("Circle Characteristics");  
        System.out.printf("Side: %f\n", getRadius());  
        System.out.printf("Diameter: %f\n",  
            calculateDiameter());  
        System.out.printf("Circumference: %f\n",  
            calculateCircumference());  
        System.out.printf("Area: %f\n",  
            calculateArea());  
    }  
}
```

```
package lecture0610;  
public class Sphere extends Circle {  
  
    @Override  
    public double calculateArea() {  
        return 4 * getRadius() * getRadius() * 3.14159;  
    }  
}
```



```
public double calculateVolume() {
    return 4 * 3.14159 * getRadius()
        * getRadius() * getRadius() / 3;
}

@Override
public void ShowCharacteristics() {
// Because Sphere is based on Circle, you can access
// any public member(s) of Circle without qualifying it(them)
    System.out.println("\nSphere Characteristics");
    System.out.printf("Side: %f\n", getRadius());
    System.out.printf("Diameter: %f\n",
        calculateDiameter());
    System.out.printf("Circumference: %f\n",
        calculateCircumference());
    System.out.printf("Area: %f\n", calculateArea());
    System.out.printf("Volume: %f\n", calculateVolume());
}
}

package lecture0610;
public class Lecure0510 {
    public static void main(String[] args) {
        Circle round = new Circle();
        round.setRadius(25.55);
        round.ShowCharacteristics();
        Sphere ball = new Sphere();
        ball.setRadius(25.55);
        ball.ShowCharacteristics();
    }
}
```

```
package lecture0611;
public class Person {

    private String _name;
    private String _gdr;

    public Person() {
        this._name = "Not Available";
        this._gdr = "Unknown";
    }

    public Person(String name, String gender) {
        this._name = name;
        this._gdr = gender;
    }

    protected String getFullName() {
        return _name;
    }

    protected void setFullName(String value) {
        _name = value;
    }

    protected String getGender() {
        return _gdr;
    }

    protected void setGender(String value) {
        _gdr = value;
    }
}
```



```
public void show() {
    System.out.printf("Full Name: %s\n", this.getFullName());
    System.out.printf("Gender: %s", this.getGender());
}
}
```

```
package lecture0611;
public class Lecture0611 {
    public static void main(String[] args) {
        Person man = new Person();
        woman.setFullName("Sally Hamed");
        woman.setGender("Female");
        System.out.println("Staff Member");
        System.out.printf("Full Name: %s\n", woman.getFullName());
        System.out.printf("Gender: %s", woman.getGender());
    }
}
```

```
package lecture0612;
public class Circle {

    protected double radius;

    public double getRadius() {
        return radius;
    }

    public void setRadius(double value) {
        if (radius < 0) {
            radius = 0.00;
        } else {
            radius = value;
        }
    }

    public double calculateDiameter() {
        return radius * 2;
    }

    public double calculateCircumference() {
        return calculateDiameter() * 3.14159;
    }

    public double calculateArea() {
        return radius * radius * 3.14159;
    }

    public void ShowCharacteristics() {
        System.out.println("Circle Characteristics");
        System.out.printf("Side: %f\n", getRadius());
        System.out.printf("Diameter: %f\n",
            calculateDiameter());
        System.out.printf("Circumference: %f\n",
            calculateCircumference());
        System.out.printf("Area: %f\n",
            calculateArea());
    }
}
```

```
package lecture0612;
public class Cylinder extends Circle {

    private double height;
```



```
public Cylinder() {
}

public double getHeight() {
    return height;
}

public void setHeight(double h) {
    height = h;
}

public double calculateLateralArea() {
    return 2 * 3.14159 * radius * height;
}

public double calculateTotalArea() {
    return 2 * 3.14159 * radius * (height + radius);
}

public double calculateVolume() {
    return 3.14159 * radius * radius * height;
}

public void ShowCharacteristics() {
    System.out.println("Cylinder Characteristics");
    System.out.printf("Radius: %f\n", getRadius());
    System.out.printf("Height: %f\n", getHeight());
    System.out.printf("Base Area: %f\n", calculateArea());
    System.out.printf("Lateral Area: %f\n",
        calculateLateralArea());
    System.out.printf("Total Area: %f\n",
        calculateTotalArea());
    System.out.printf("Volume: %f\n", calculateVolume());
}
}

package lecture0612;

import java.util.Scanner;
public class Lecture0612 {
    private static Cylinder create() {
        double r, h;
        Cylinder cup = new Cylinder();
        Scanner scnr = new Scanner(System.in);
        System.out.print("Enter the Radius: ");
        r = scnr.nextDouble();
        System.out.print("Enter the Height: ");
        h = scnr.nextDouble();
        cup.setRadius(r);
        cup.setHeight(h);
        return cup;
    }

    public static void main(String[] args) {
        Cylinder tube = create();
        tube.ShowCharacteristics();
    }
}
```