

```
/* NAME: VAIBHAV KAWALE
 * BRANCH: S.E IT
 * BATCH: S4
 * ROLL NO.: 3083
 * ASSIGNMENT 4 DYNAMIC BINDING
 */
```

```
package _4_Assignment_DynamicBinding;
import java.util.*;
```

```
// Base class Shape
```

```
abstract class Shape {
    protected double dim1;
    protected double dim2;
```

```
    // Method to input data with validation
```

```
    public void inputData() {
        Scanner vk = new Scanner(System.in);
```

```
        // Validate first dimension input
```

```
        do {
```

```
            System.out.print("Enter the first dimension (positive value): ");
```

```
            while (!vk.hasNextDouble()) {
```

```
                System.out.println("Invalid input. Please enter a valid number.");
```

```
                vk.next(); // Clear invalid input
```

```
            }
```

```
            dim1 = vk.nextDouble();
```

```
            if (dim1 <= 0) {
```

```
                System.out.println("Dimension must be positive. Try again.");
```

```
            }
```

```
        } while (dim1 <= 0);
```

```
        // Validate second dimension input
```

```
        do {
```

```
            System.out.print("Enter the second dimension (positive value): ");
```

```
            while (!vk.hasNextDouble()) {
```

```
                System.out.println("Invalid input. Please enter a valid number.");
```

```
                vk.next(); // Clear invalid input
```

```
            }
```

```
            dim2 = vk.nextDouble();
```

```
            if (dim2 <= 0) {
```

```
                System.out.println("Dimension must be positive. Try again.");
```

```
            }
```

```
        } while (dim2 <= 0);
```

```
        // Abstract method to compute area
```

```
        public abstract void compute_area();
    }
```

```
// Derived class Triangle
```

```
class Triangle extends Shape {
```

```
    @Override
```

```
    public void compute_area() {
```

```
        double area = 0.5 * dim1 * dim2; // Formula for area of a triangle
```

```
        System.out.println("Area of Triangle: " + area);
```

```
    }
```

```
}
```

```
// Derived class Rectangle
```

```

class Rectangle extends Shape {
    @Override
    public void compute_area() {
        double area = dim1 * dim2; // Formula for area of a rectangle
        System.out.println("Area of Rectangle: " + area);
    }
}

// Main class to run the program
public class Calculate_Area {
    public static void main(String[] args) {
        Scanner vk = new Scanner(System.in);
        boolean continueProgram = true;

        while (continueProgram) {
            Shape shape; // Base class reference
            int choice = 0;

            // Validate menu choice input
            do {
                System.out.println("\nChoose shape to calculate area:");
                System.out.println("1. Triangle");
                System.out.println("2. Rectangle");
                System.out.println("3. Exit");

                while (!vk.hasNextInt()) {
                    System.out.println("Invalid input. Please enter a valid number (1, 2, or 3).");
                    vk.next(); // Clear invalid input
                }

                choice = vk.nextInt();

                if (choice < 1 || choice > 3) {
                    System.out.println("Invalid choice, please choose 1, 2, or 3.");
                }
            } while (choice < 1 || choice > 3);

            // Dynamic binding: Create object based on user's choice
            switch (choice) {
                case 1:
                    shape = new Triangle();
                    break;
                case 2:
                    shape = new Rectangle();
                    break;
                case 3:
                    System.out.println("Exiting program...");
                    continueProgram = false; // Exit the loop
                    continue; // Skip the rest of the loop
                default:
                    System.out.println("Invalid choice, please try again.");
                    continue; // Go to the next iteration
            }

            if (continueProgram) {
                // Input dimensions and compute area with validation
                shape.inputData(); // Get dimensions with validation
                shape.compute_area(); // Calculate and display area
            }
        }
    }
}

```

```
        vk.close();  
    }  
}
```