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