DAY 8 PRACTICE QUESTIONS

1. Overloading

Problem Statement:
Create a class Calculator that performs addition operations. Overload the add method to handle the following cases:

- Add two integers.
- Add three integers.
- Add two double values.

Test Cases:

Input	Expected Output
add(5, 10)	15
add(1, 2, 3)	6
add(4.5, 5.5)	10.0

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2. Overriding

Problem Statement:
Create a superclass Animal with a method makeSound(). Create a subclass Dog that overrides the makeSound() method to print a dog-specific sound.

Test Cases:

Input	Expected Output
myAnimal.makeSound()	Animal makes a sound
myDog.makeSound()	Dog barks

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3. Dynamic Method Dispatch

Problem Statement:
Using the above Animal and Dog classes, demonstrate dynamic method dispatch by creating a method printSound(Animal a) that calls makeSound() on the passed object.

Test Cases:

Input	Expected Output
printSound(myAnimal)	Animal makes a sound
printSound(myDog)	Dog barks

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4. Final

Problem Statement:
Create a final class Car that represents a vehicle. Inside it, create a final method getModel() that returns the model of the car. Try to extend this class and see what happens.

Test Cases:

Input	Expected Output
Car myCar = new Car("Tesla Model S")	Car model: Tesla Model S

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5. Package

Problem Statement:
Create a package library.books containing a class Book with attributes like title, author, and price. Demonstrate how to use this package in a different class.

Solution:

File Structure:

- library/books/Book.java
- Main.java

Test Cases:

Input	Expected Output
Book myBook = new Book("Java Programming", "John Doe", 29.99)	Title: Java Programming\nAuthor: John Doe\nPrice: $29.99

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6. Interface

Problem Statement:
Create an interface Shape with methods area() and perimeter(). Implement this interface in two classes: Rectangle and Circle.

Test Cases:

Shape	Input Parameters	Expected Output
Rectangle	length=5, width=7	Area: 35.0, Perimeter: 24.0
Circle	radius=3.5	Area: 38.48451, Perimeter: 21.99115