**WEEK-1**

**Design Principles And Patterns**

**Exercise 1: Implementing the Singleton Pattern:**

**Singleton.java**

package exercise1\_singleton;

public class Singleton {

private static Singleton *instance*;

private Singleton() {

System.***out***.println("Singleton instance created.");

}

public static Singleton getInstance() {

if (*instance* == null) {

*instance* = new Singleton();

}

return *instance*;

}

public void showMessage() {

System.***out***.println("Hello from Singleton!");

}

}

**Main.java**

package exercise1\_singleton;

public class Main {

public static void main(String[] args) {

Singleton obj1 = Singleton.*getInstance*();

Singleton obj2 = Singleton.*getInstance*();

if (obj1 == obj2) {

System.*out*.println("Both references point to the same Singleton instance.");

}

obj1.showMessage();

}

}

A screenshot of a computer

AI-generated content may be incorrect.

**Exercise 2: Implementing the Factory Method Pattern**

**Book.java**

package exercise2\_factory;

public class Book implements Product {

*@Override*

public void create() {

System.*out*.println("Book created.");

}

*@Override*

public double getPrice() {

return 299.0;

}

}

**Camera.java**

package exercise2\_factory;

public class Camera implements Product {

*@Override*

public void create() {

System.***out***.println("Camera created.");

}

*@Override*

public double getPrice() {

return 15999.0;

}

}

**Laptop.java**

package exercise2\_factory;

public class Laptop implements Product {

*@Override*

public void create() {

System.***out***.println("Laptop created.");

}

*@Override*

public double getPrice() {

return 49999.0;

}

}

**Phone.java**

package exercise2\_factory;

public class Phone implements Product {

*@Override*

public void create() {

System.***out***.println("Phone created.");

}

*@Override*

public double getPrice() {

return 19999.0;

}

}

**Product.java**

package exercise2\_factory;

public interface Product {

void create();

double getPrice(); }

**ProductFactory.java**

package exercise2\_factory;

public class ProductFactory {

public Product getProduct(String type) {

switch (type.toLowerCase()) {

case "book":

return new Book();

case "phone":

return new Phone();

case "laptop":

return new Laptop();

case "camera":

return new Camera();

default:

System.***out***.println("Unknown product type.");

return null;

}

}

}

**Main.java**

package exercise2\_factory;

import java.util.Scanner;

public class Main {

public static void main(String[] args) {

ProductFactory factory = new ProductFactory();

Scanner scanner = new Scanner(System.***in***);

System.***out***.print("Enter product type (Book/Phone/Laptop/Camera): ");

String input = scanner.nextLine();

Product product = factory.getProduct(input);

if (product != null) {

product.create();

System.***out***.println("Price: ₹" + product.getPrice());

}

}

}

A screenshot of a computer

AI-generated content may be incorrect.