**Exercise 1: Implementing the Singleton Pattern**

public class Singleton {  
 public static Singleton *var*;  
 Singleton()  
 {  
 System.*out*.println("From Singleton");  
 }  
 public static Singleton getInstance()  
 {  
 if(*var*==null)  
 {  
 *var*=new Singleton();  
 }  
 return *var*;  
 }  
}

public class Main {  
 public static void main(String[] args) {  
 Singleton obj=Singleton.*getInstance*();  
   
 }  
}

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

public interface Shape {  
 void print();  
  
  
}  
 class Circle implements Shape{  
 @Override  
 public void print() {  
 System.*out*.println("A Circle");  
 }  
}  
  
class Rectangle implements Shape {  
 @Override  
 public void print() {  
 System.*out*.println("A Rectangle");  
 }  
}  
  
class Square implements Shape {  
 @Override  
 public void print() {  
 System.*out*.println("A Square");  
 }  
}

public class Main {  
 public static void main(String[] args) {  
  
 Shape shape1 = new Circle();  
 shape1.print();  
  
 Shape shape2 = new Rectangle();  
 shape2.print();  
  
 Shape shape3 = new Square();  
 shape3.print();  
 }  
}

**Exercise 3: E-commerce Platform Search Function**

public class Product {  
 public String id;  
 public String name;  
 public String category;  
 public double price;  
  
 public Product(String id, String name, String category, double price) {  
 this.id = id;  
 this.name = name;  
 this.category = category;  
 this.price = price;  
 }  
  
 public String getId() { return id; }  
 public String getName() { return name; }  
 public String getCategory() { return category; }  
 public double getPrice() { return price; }  
  
 @Override  
 public String toString() {  
 return "Product{" +  
 "id='" + id + '\'' +  
 ", name='" + name + '\'' +  
 ", category='" + category + '\'' +  
 ", price=" + price +  
 '}';  
 }  
}

import java.util.\*;  
  
  
public class SearchService {  
 private List<Product> productList;  
  
 public SearchService(List<Product> productList) {  
 this.productList = productList;  
 }  
  
 public List<Product> searchByName(String keyword) {  
 List<Product> result = new ArrayList<>();  
 for (Product product : productList) {  
 if (product.getCategory().toLowerCase().contains(keyword.toLowerCase())) {  
 result.add(product);  
 }  
 }  
 return result;  
 }  
  
 public List<Product> searchByNameAndPrice(String keyword, double minPrice, double maxPrice) {  
 List<Product> result = new ArrayList<>();  
 for (Product product : productList) {  
 if (product.getCategory().toLowerCase().contains(keyword.toLowerCase()) &&  
 product.getPrice() >= minPrice &&  
 product.getPrice() <= maxPrice) {  
 result.add(product);  
 }  
 }  
 return result;  
 }  
}

import java.util.\*;  
  
  
public class Main {  
 public static void main(String[] args) {  
 List<Product> products = Arrays.*asList*(  
 new Product("P101", "iPhone 14", "Phone", 65000),  
 new Product("P102", "Galaxy S23", "Phone", 30000),  
 new Product("P103", "Boat Headphones", "Audio Devices", 1000),  
 new Product("P104", "Paragon Shoes", "Footwear", 520)  
 );  
  
 SearchService searchService = new SearchService(products);  
  
 System.*out*.println("Search for 'phone':");  
 List<Product> result1 = searchService.searchByName("phone");  
 for (Product p : result1) {  
 System.*out*.println(p);  
 }  
  
 System.*out*.println("\nSearch for 'audio devices' with price between 10000 and 95550:");  
 List<Product> result2 = searchService.searchByNameAndPrice("audio devices",100 , 1500);  
 for (Product p : result2) {  
 System.*out*.println(p);  
 }  
 }  
}