public class Main {  
 public static void main(String[] args) {  
 Product[] products = {  
 new Product("P001", "Mouse", "Electronics"),  
 new Product("P002", "Keyboard", "Electronics"),  
 new Product("P003", "Chair", "Furniture"),  
 new Product("P004", "Monitor", "Electronics"),  
 };  
 System.*out*.println("🔍 Linear Search for 'Chair':");  
 Product result1 = SearchUtils.*linearSearch*(products, "Chair");  
 System.*out*.println(result1 != null ? result1 : "Product not found");  
 System.*out*.println("\n📊 Sorting products for binary search...");  
 SearchUtils.*sortProducts*(products);  
 System.*out*.println("🔍 Binary Search for 'Chair':");  
 Product result2 = SearchUtils.*binarySearch*(products, "Chair");  
 System.*out*.println(result2 != null ? result2 : "Product not found");  
 }  
}

public class Product {  
 private String productId;  
 private String productName;  
 private String category;  
 public Product(String productId, String productName, String category) {  
 this.productId = productId;  
 this.productName = productName;  
 this.category = category;  
 }  
 public String getProductId() {  
 return productId;  
 }  
 public String getProductName() {  
 return productName;  
 }  
 public String getCategory() {  
 return category;  
 }  
 @Override  
 public String toString() {  
 return "[" + productId + "] " + productName + " (" + category + ")";  
 }  
}

import java.util.Arrays;  
import java.util.Comparator;  
public class SearchUtils {  
 public static Product linearSearch(Product[] products, String targetName) {  
 for (Product product : products) {  
 if (product.getProductName().equalsIgnoreCase(targetName)) {  
 return product;  
 }  
 }  
 return null;  
 }  
 public static void sortProducts(Product[] products) {  
 Arrays.*sort*(products, Comparator.*comparing*(Product::getProductName, String.*CASE\_INSENSITIVE\_ORDER*));  
 }  
 public static Product binarySearch(Product[] products, String targetName) {  
 int left = 0;  
 int right = products.length - 1;  
  
 while (left <= right) {  
 int mid = left + (right - left) / 2;  
 String midName = products[mid].getProductName();  
  
 int comparison = midName.compareToIgnoreCase(targetName);  
 if (comparison == 0) {  
 return products[mid];  
 } else if (comparison < 0) {  
 left = mid + 1;  
 } else {  
 right = mid - 1;  
 }  
 }  
 return null;  
 }  
}

OUTPUT:

