**BinarySearch.java**

import java.util.Arrays;

import java.util.Comparator;

public class BinarySearch {

    public static Product searchByName(Product[] products, String name) {

        // Sort by product name before binary search

        Arrays.sort(products, Comparator.comparing(Product::getProductName));

        int left = 0, right = products.length - 1;

        while (left <= right) {

            int mid = (left + right) / 2;

            int compare = products[mid].getProductName().compareToIgnoreCase(name);

            if (compare == 0) {

                return products[mid];

            } else if (compare < 0) {

                left = mid + 1;

            } else {

                right = mid - 1;

            }

        }

        return null;

    }

}

**LinearSearch.java**

public class LinearSearch {

    public static Product searchByName(Product[] products, String name) {

        for (Product product : products) {

            if (product.getProductName().equalsIgnoreCase(name)) {

                return product;

            }

        }

        return null;

    }

}

**Product.java**

public class Product {

    private int productId;

    private String productName;

    private String category;

    public Product(int productId, String productName, String category) {

        this.productId = productId;

        this.productName = productName;

        this.category = category;

    }

    public int getProductId() { return productId; }

    public String getProductName() { return productName; }

    public String getCategory() { return category; }

    @Override

    public String toString() {

        return "Product{" +

                "ID=" + productId +

                ", Name='" + productName + '\'' +

                ", Category='" + category + '\'' +

                '}';

    }

}

**Main.java**

public class Main {

    public static void main(String[] args) {

        Product[] products = {

            new Product(1, "Laptop", "Electronics"),

            new Product(2, "Shoes", "Footwear"),

            new Product(3, "Watch", "Accessories"),

            new Product(4, "Phone", "Electronics"),

            new Product(5, "T-shirt", "Clothing")

        };

        System.out.println("🔍 Linear Search for 'Watch':");

        Product linearResult = LinearSearch.searchByName(products, "Watch");

        System.out.println(linearResult != null ? linearResult : "Product not found");

        System.out.println("\n🔍 Binary Search for 'Watch':");

        Product binaryResult = BinarySearch.searchByName(products, "Watch");

        System.out.println(binaryResult != null ? binaryResult : "Product not found");

    }

}

**Output:**

