**ECommerce Search**

**EcommerceSearch.java**

import java.util.Arrays;

public class ECommerceSearch {

    public static void main(String[] args) {

        Product[] products = {

                new Product(101, "Laptop", "Electronics"),

                new Product(102, "Shampoo", "Personal Care"),

                new Product(103, "Chair", "Furniture"),

                new Product(104, "Book", "Education"),

                new Product(105, "Phone", "Electronics")

        };

        // Linear Search (no sorting needed)

        Product foundLinear = SearchFunctions.linearSearch(products, "Chair");

        System.out.println("Linear Search Result: " + foundLinear);

        // Sort products for Binary Search

        Arrays.sort(products, (a, b) -> a.productName.compareToIgnoreCase(b.productName));

        // Binary Search

        Product foundBinary = SearchFunctions.binarySearch(products, "Chair");

        System.out.println("Binary Search Result: " + foundBinary);

    }

}

**Product.java**

public class Product {

    int productId;

    String productName;

    String category;

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

        this.productId = productId;

        this.productName = productName;

        this.category = category;

    }

    @Override

    public String toString() {

        return "[" + productId + ", " + productName + ", " + category + "]";

    }

}

**SearchFunctions.java**

public class SearchFunctions {

    public static Product linearSearch(Product[] products, String targetName) {

        for (Product product : products) {

            if (product.productName.equalsIgnoreCase(targetName)) {

                return product;

            }

        }

        return null;

    }

    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;

            int comparison = products[mid].productName.compareToIgnoreCase(targetName);

            if (comparison == 0) {

                return products[mid];

            } else if (comparison < 0) {

                left = mid + 1;

            } else {

                right = mid - 1;

            }

        }

        return null;

    }

}

