Data Structures and Algorithms

SuperSet ID:6412063

Exercise 2: E-commerce Platform Search Function

Code:

import java.util.Arrays;

import java.util.Comparator;

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;

    }

    public String toString() {

        return "Product ID: " + productId + ", Name: " + productName + ", Category: " + category;

    }

}

public class Search {

    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, right = products.length - 1;

        while (left <= right) {

            int mid = (left + right) / 2;

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

            if (compare == 0) {

                return products[mid];

            } else if (compare < 0) {

                left = mid + 1;

            } else {

                right = mid - 1;

            }

        }

        return null;

    }

    public static void main(String[] args) {

        Product[] products = {

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

            new Product(102, "Shoes", "Fashion"),

            new Product(103, "Phone", "Electronics"),

            new Product(104, "T-Shirt", "Clothing"),

            new Product(105, "Book", "Education")

        };

        System.out.println("Linear Search:");

        Product result1 = linearSearch(products, "Phone");

        System.out.println(result1 != null ? result1 : "Product not found");

        Arrays.sort(products, Comparator.comparing(p -> p.productName.toLowerCase()));

        System.out.println("\nBinary Search:");

        Product result2 = binarySearch(products, "Phone");

        System.out.println(result2 != null ? result2 : "Product not found");

    }

}

Output:

A close up of text

Description automatically generated