

```
import java.util.*;

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 "[" + productId + "] " + productName + " (" + category + ")";
    }
}

public class ECommerceSearch {
    public static Product linearSearch(Product[] products, int targetId) {
        for (Product product : products) {
            if (product.productId == targetId) {
                return product;
            }
        }
        return null;
    }

    public static Product binarySearch(Product[] products, int targetId) {
        int left = 0, right = products.length - 1;
        while (left <= right) {
            int mid = (left + right) / 2;
            if (products[mid].productId == targetId) {
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        return products[mid];
    } else if (products[mid].productId < targetId) {
        left = mid + 1;
    } else {
        right = mid - 1;
    }
}
return null;
}

public static void printArray(Product[] products, String title) {
    System.out.println("\n" + title);
    for (Product product : products) {
        System.out.println(product);
    }
}

public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    System.out.print("Enter number of products: ");
    int n = scanner.nextInt();
    scanner.nextLine();
    Product[] productsOriginal = new Product[n];
    for (int i = 0; i < n; i++) {
        System.out.println("\nEnter details for product " + (i + 1));
        System.out.print("Product ID: ");
        int id = scanner.nextInt();
        scanner.nextLine();
        System.out.print("Product Name: ");
        String name = scanner.nextLine();
    }
}

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        System.out.print("Category: ");

        String category = scanner.nextLine();

        productsOriginal[i] = new Product(id, name, category);
    }

    System.out.print("\nEnter Product ID to search: ");

    int searchId = scanner.nextInt();

    Product resultLinear = linearSearch(productsOriginal, searchId);

    System.out.println("\n Linear Search Result:");

    if (resultLinear != null) {

        System.out.println("Product Found: " + resultLinear);

    } else {

        System.out.println("Product not found.");

    }

    Product[] productsSorted = Arrays.copyOf(productsOriginal, productsOriginal.length);

    Arrays.sort(productsSorted, Comparator.comparingInt(p -> p.productId));

    Product resultBinary = binarySearch(productsSorted, searchId);

    System.out.println("\n Binary Search Result:");

    if (resultBinary != null) {

        System.out.println("Product Found: " + resultBinary);

    } else {

        System.out.println("Product not found.");

    }

    printArray(productsOriginal, "Original Array (For Linear Search:");

    printArray(productsSorted, "Sorted Array (For Binary Search:");

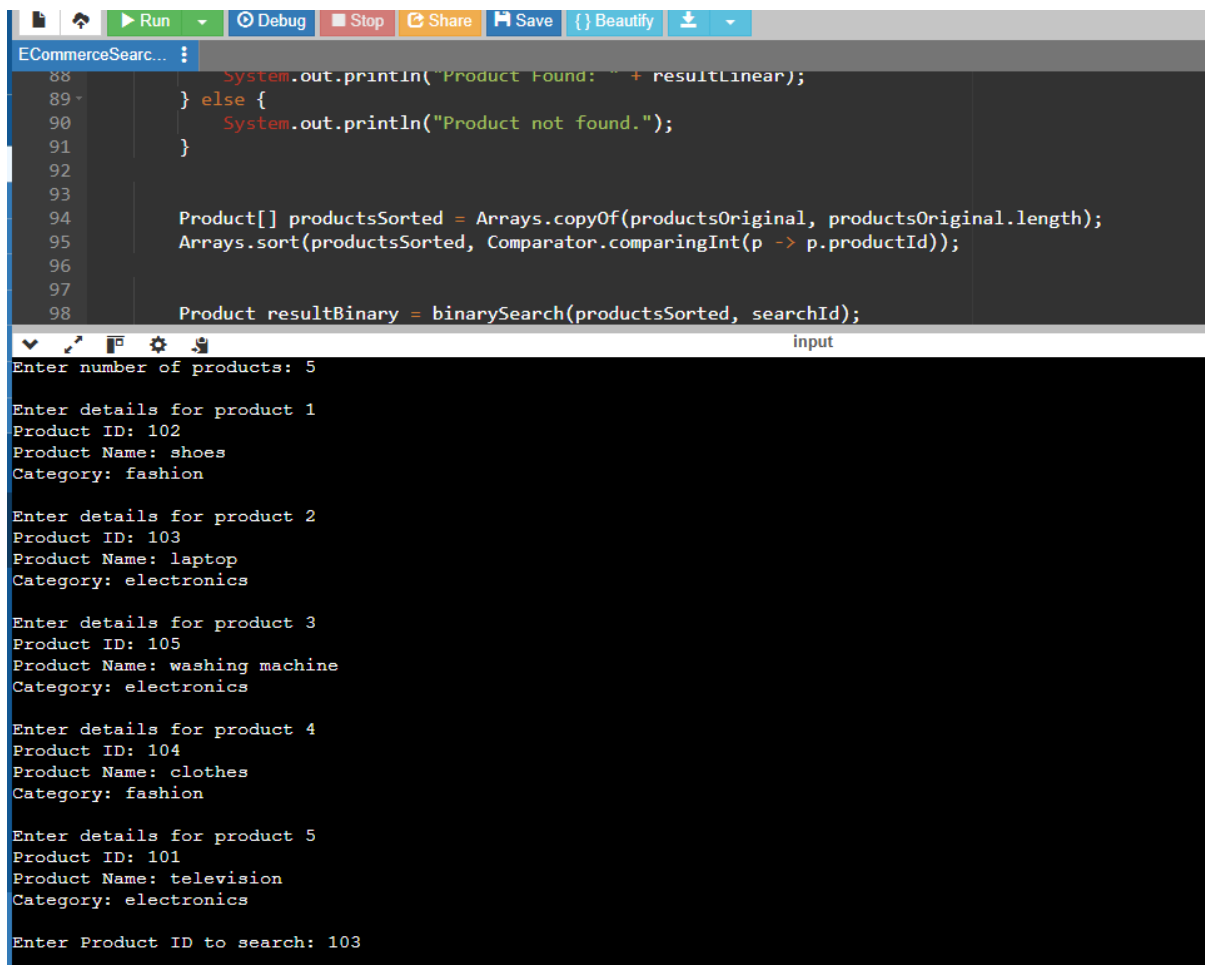
    scanner.close();

}

}

```

Output:



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ECommerceSearch... :
88         System.out.println("Product Found: " + resultLinear);
89     } else {
90         System.out.println("Product not found.");
91     }
92
93
94     Product[] productsSorted = Arrays.copyOf(productsOriginal, productsOriginal.length);
95     Arrays.sort(productsSorted, Comparator.comparingInt(p -> p.productId));
96
97
98     Product resultBinary = binarySearch(productsSorted, searchId);
```

input

Enter number of products: 5

Enter details for product 1
Product ID: 102
Product Name: shoes
Category: fashion

Enter details for product 2
Product ID: 103
Product Name: laptop
Category: electronics

Enter details for product 3
Product ID: 105
Product Name: washing machine
Category: electronics

Enter details for product 4
Product ID: 104
Product Name: clothes
Category: fashion

Enter details for product 5
Product ID: 101
Product Name: television
Category: electronics

Enter Product ID to search: 103

```
Enter Product ID to search: 103

Linear Search Result:
Product Found: [103] laptop (electronics)

Binary Search Result:
Product Found: [103] laptop (electronics)

Original Array (For Linear Search):
[102] shoes (fashion)
[103] laptop (electronics)
[105] washing machine (electronics)
[104] clothes (fashion)
[101] television (electronics)

Sorted Array (For Binary Search):
[101] television (electronics)
[102] shoes (fashion)
[103] laptop (electronics)
[104] clothes (fashion)
[105] washing machine (electronics)
```