Exercise 1: Inventory Management System

code:

1. Product.java:

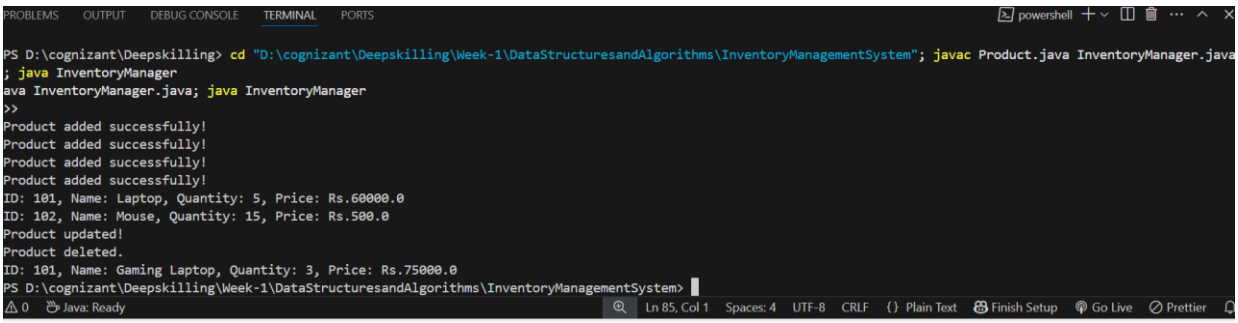
```
public class Product {
    private int productId;
    private String productName;
    private int quantity;
    private double price;

    public Product(int productId, String productName, int quantity, double price) {
        this.productId = productId;
        this.productName = productName;
        this.quantity = quantity;
        this.price = price;
    }

    public int getProductId() { return productId; }
    public String getProductName() { return productName; }
    public int getQuantity() { return quantity; }
    public double getPrice() { return price; }

    public void setProductName(String productName) { this.productName = productName; }
    public void setQuantity(int quantity) { this.quantity = quantity; }
    public void setPrice(double price) { this.price = price; }

    @Override
    public String toString() {
        return "ID: " + productId + ", Name: " + productName +
                ", Quantity: " + quantity + ", Price: Rs." + price;
    }
}
```

2.InventoryManager.java:

```
import java.util.HashMap;

public class InventoryManager {
    private HashMap<Integer, Product> inventory = new HashMap<>();

    public void addProduct(Product product) {
        inventory.put(product.getProductId(), product);
        System.out.println("Product added successfully!");
    }

    public void updateProduct(int productId, String name, int qty, double price) {
        Product p = inventory.get(productId);
        if (p != null) {
            p.setProductName(name);
            p.setQuantity(qty);
```

```
            p.setPrice(price);
            System.out.println("Product updated!");
        } else {
            System.out.println("Product not found.");
        }
    }
    public void deleteProduct(int productId) {
        if (inventory.remove(productId) != null) {
            System.out.println("Product deleted.");
        } else {
            System.out.println("Product not found.");
        }
    }

    public void displayInventory() {
        for (Product p : inventory.values()) {
            System.out.println(p);
        }
    }
    public static void main(String[] args) {
        InventoryManager manager = new InventoryManager();

        // Sample data
        manager.addProduct(new Product(101, "Laptop", 5, 60000));
        manager.addProduct(new Product(102, "Mouse", 15, 500));
        manager.displayInventory();

        manager.updateProduct(101, "Gaming Laptop", 3, 75000);
        manager.deleteProduct(102);
        manager.displayInventory();
    }
}
```

OUTPUT:



Exercise 2: E-commerce Platform Search Function

CODE:

1.Product.java:

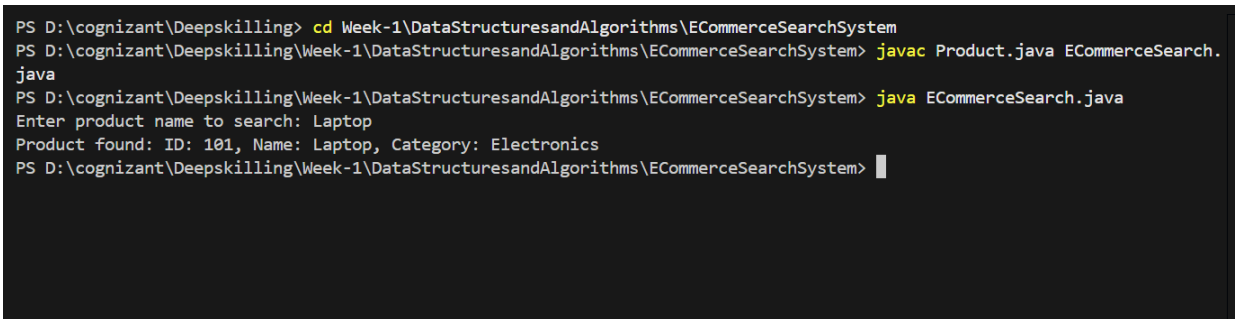
```
public class Product {
    private int productId;
    private String productName;
    private String category;

    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 "ID: " + productId + ", Name: " + productName + ", Category: " + category;
    }
}
```

2. EcommerceSearch.java:

```
import java.util.Arrays;
import java.util.Comparator;
import java.util.Scanner;

public class ECommerceSearch {
    public static Product binarySearch(Product[] products, String name) {
      int left = 0, right = products.length - 1;
      while (left <= right) {
         int mid = (left + right) / 2;
         int cmp = products[mid].getProductName().compareToIgnoreCase(name);
         if (cmp == 0)
            return products[mid];
         else if (cmp < 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, "Mouse", "Accessories"),
         new Product(103, "Shoes", "Footwear"),
         new Product(104, "Bag", "Bags"),
         new Product(105, "Keyboard", "Accessories")
      };
```

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

        Scanner sc = new Scanner(System.in);
        System.out.print("Enter product name to search: ");
        String searchName = sc.nextLine();

        Product result = binarySearch(products, searchName);
        if (result != null)
            System.out.println("Product found: " + result);
        else
            System.out.println("Product not found.");

        sc.close();
    }
}
```

OUTPUT :



Exercise 3: Sorting Customer Orders

CODE :

1.Order.java:

```
public class Order {
    private int orderId;
    private String customerName;
    private double totalPrice;
    public Order(int orderId, String customerName, double totalPrice) {
        this.orderId = orderId;
        this.customerName = customerName;
        this.totalPrice = totalPrice;
    }

    public int getOrderId() { return orderId; }
    public String getCustomerName() { return customerName; }
    public double getTotalPrice() { return totalPrice; }

    @Override
    public String toString() {
        return "OrderID: " + orderId + ", Customer: " + customerName + ", Total Price: " + totalPrice;
    }
}
```

2. OrderSorter.java:

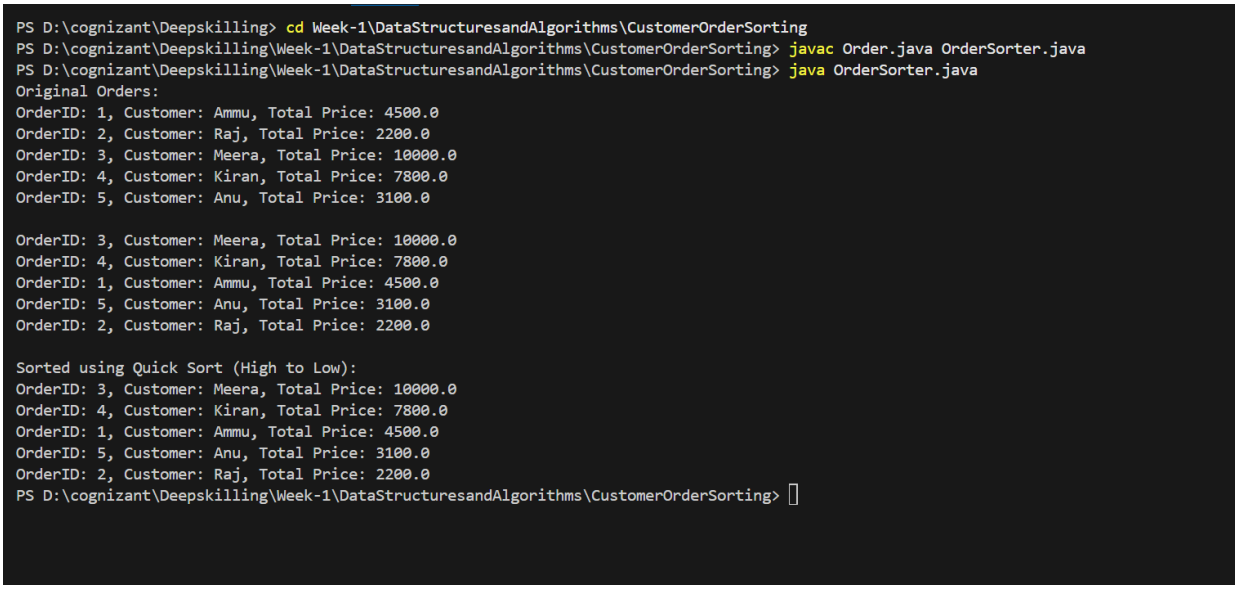
```
public class OrderSorter {

    // Bubble Sort
    public static void bubbleSort(Order[] orders) {
```

```
    int n = orders.length;
    for (int i = 0; i < n - 1; i++) {
        for (int j = 0; j < n - i - 1; j++) {
            if (orders[j].getTotalPrice() < orders[j + 1].getTotalPrice()) {
                // Swap
                Order temp = orders[j];
                orders[j] = orders[j + 1];
                orders[j + 1] = temp;
            }
        }
    }
}

// Quick Sort
public static void quickSort(Order[] orders, int low, int high) {
    if (low < high) {
        int pi = partition(orders, low, high);
        quickSort(orders, low, pi - 1);
        quickSort(orders, pi + 1, high);
    }
}

private static int partition(Order[] orders, int low, int high) {
    double pivot = orders[high].getTotalPrice();
    int i = low - 1;
    for (int j = low; j < high; j++) {
        if (orders[j].getTotalPrice() > pivot) { // Descending order
            i++;
            Order temp = orders[i];
```

```
            orders[i] = orders[j];
            orders[j] = temp;
        }
    }
    Order temp = orders[i + 1];
    orders[i + 1] = orders[high];
    orders[high] = temp;
    return i + 1;
}

public static void displayOrders(Order[] orders) {
    for (Order order : orders) {
        System.out.println(order);
    }
}

public static void main(String[] args) {
    Order[] orders = {
        new Order(1, "Ammu", 4500),
        new Order(2, "Raj", 2200),
        new Order(3, "Meera", 10000),
        new Order(4, "Kiran", 7800),
        new Order(5, "Anu", 3100)
    };
    System.out.println("Original Orders:");
    displayOrders(orders);
    System.out.println("\nSorted using Bubble Sort (High to Low):");
    bubbleSort(orders);
    displayOrders(orders);
```

```
        // Reset orders
        orders = new Order[] {
            new Order(1, "Ammu", 4500),
            new Order(2, "Raj", 2200),
            new Order(3, "Meera", 10000),
            new Order(4, "Kiran", 7800),
            new Order(5, "Anu", 3100)
        };

        System.out.println("\nSorted using Quick Sort (High to Low):");
        quickSort(orders, 0, orders.length - 1);
        displayOrders(orders);
    }
}
```

OUTPUT :



Exercise 4: Employee Management System

CODE:

1. **Employee.java:**

```
public class Employee {
    private int employeeId;
    private String name;
    private String position;
    private double salary;

    public Employee(int employeeId, String name, String position, double salary) {
        this.employeeId = employeeId;
        this.name = name;
        this.position = position;
        this.salary = salary;
    }

    public int getEmployeeId() { return employeeId; }
    public String getName() { return name; }
    public String getPosition() { return position; }
    public double getSalary() { return salary; }

    @Override
    public String toString() {
        return "ID: " + employeeId + ", Name: " + name + ", Position: " + position + ",
Salary: " + salary;
    }
}
```

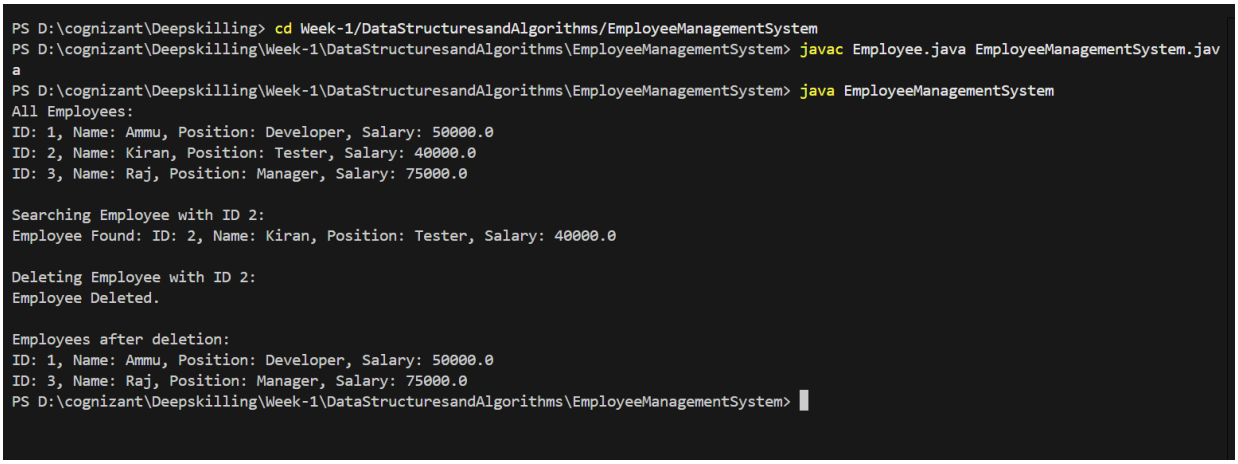
2. **EmployeeManagementSystem.java :**

```
public class EmployeeManagementSystem {
    private Employee[] employees = new Employee[10];
    private int count = 0;

    public void addEmployee(Employee emp) {
        if (count < employees.length) {
            employees[count++] = emp;
```

```
    } else {
        System.out.println("Employee list is full!");
    }
}

public void traverseEmployees() {
    for (int i = 0; i < count; i++) {
        System.out.println(employees[i]);
    }
}

public void searchEmployee(int empId) {
    for (int i = 0; i < count; i++) {
        if (employees[i].getEmployeeId() == empId) {
            System.out.println("Employee Found: " + employees[i]);
            return;
        }
    }
    System.out.println("Employee Not Found!");
}

public void deleteEmployee(int empId) {
    for (int i = 0; i < count; i++) {
        if (employees[i].getEmployeeId() == empId) {
            for (int j = i; j < count - 1; j++) {
                employees[j] = employees[j + 1];
            }
            employees[--count] = null;
            System.out.println("Employee Deleted.");
            return;
        }
    }
    System.out.println("Employee Not Found.");
}

public static void main(String[] args) {
    EmployeeManagementSystem ems = new EmployeeManagementSystem();

    ems.addEmployee(new Employee(1, "Ammu", "Developer", 50000));
    ems.addEmployee(new Employee(2, "Kiran", "Tester", 40000));
```

```
        ems.addEmployee(new Employee(3, "Raj", "Manager", 75000));

        System.out.println("All Employees:");
        ems.traverseEmployees();

        System.out.println("\nSearching Employee with ID 2:");
        ems.searchEmployee(2);

        System.out.println("\nDeleting Employee with ID 2:");
        ems.deleteEmployee(2);

        System.out.println("\nEmployees after deletion:");
        ems.traverseEmployees();
    }
}
```

OUTPUT :



Exercise 5: Task Management System

CODE:

1. Task.java :

```
public class Task {
    int taskId;
    String taskName;
    String status;
    public Task next;

    public Task(int taskId, String taskName, String status) {
        this.taskId = taskId;
        this.taskName = taskName;
        this.status = status;
        this.next = null;
    }

    @Override
    public String toString() {
        return "Task ID: " + taskId + ", Name: " + taskName + ", Status: " + status;
    }
}
```

2. TaskManager.java :

```
public class TaskManager {
    Task head = null;
    public void addTask(int id, String name, String status) {
        Task newTask = new Task(id, name, status);
        if (head == null) {
            head = newTask;
        } else {
            Task current = head;
            while (current.next != null) {
                current = current.next;
            }
            current.next = newTask;
        }
        System.out.println("Task added: " + newTask.taskName);
    }
    public void traverseTasks() {
        if (head == null) {
            System.out.println("No tasks to show.");
            return;
        }
        Task current = head;
        System.out.println("All Tasks:");
        while (current != null) {
            System.out.println(current);
            current = current.next;
```

```
        }
    }
    public static void main(String[] args) {
        TaskManager manager = new TaskManager();

        manager.addTask(1, "Design UI", "Pending");
        manager.addTask(2, "Develop API", "In Progress");
        manager.addTask(3, "Write Tests", "Pending");

        manager.traverseTasks();
    }
}
```

OUTPUT :

```
PS D:\cognizant\Deepskilling> cd Week-1\DataStructuresandAlgorithms\TaskManagementSystem
PS D:\cognizant\Deepskilling\Week-1\DataStructuresandAlgorithms\TaskManagementSystem> javac Task.java TaskManager.java
PS D:\cognizant\Deepskilling\Week-1\DataStructuresandAlgorithms\TaskManagementSystem> java TaskManager
Task added.
Task added.
Task added.

All Tasks:
Task ID: 1, Name: Design UI, Status: Pending
Task ID: 2, Name: Develop API, Status: In Progress
Task ID: 3, Name: Write Tests, Status: Pending

Searching Task with ID 2:
Task found: Task ID: 2, Name: Develop API, Status: In Progress

Deleting Task with ID 2:
Task deleted.

Tasks after deletion:
Task ID: 1, Name: Design UI, Status: Pending
Task ID: 3, Name: Write Tests, Status: Pending
PS D:\cognizant\Deepskilling\Week-1\DataStructuresandAlgorithms\TaskManagementSystem>
```

Exercise 6: Library Management System

CODE :

1.Book.java :

```
public class Book {
    int bookId;
    String title;
    String author;

    public Book(int bookId, String title, String author) {
        this.bookId = bookId;
        this.title = title;
        this.author = author;
    }

    @Override
    public String toString() {
        return "Book ID: " + bookId + ", Title: " + title + ", Author: " + author;
    }
}
```

2. LibraryManager.java :

```
import java.util.Arrays;
import java.util.Comparator;

public class LibraryManager {

    public static Book linearSearch(Book[] books, String title) {
        for (Book book : books) {
```

```
        if (book.title.equalsIgnoreCase(title)) {
            return book;
        }
    }
    return null;
}

public static Book binarySearch(Book[] books, String title) {
    int low = 0, high = books.length - 1;

    while (low <= high) {
        int mid = (low + high) / 2;
        int comparison = books[mid].title.compareToIgnoreCase(title);

        if (comparison == 0) return books[mid];
        else if (comparison < 0) low = mid + 1;
        else high = mid - 1;
    }

    return null;
}

public static void main(String[] args) {
    Book[] books = {
        new Book(101, "The Alchemist", "Paulo Coelho"),
        new Book(102, "To Kill a Mockingbird", "Harper Lee"),
        new Book(103, "1984", "George Orwell"),
        new Book(104, "Pride and Prejudice", "Jane Austen"),
        new Book(105, "The Great Gatsby", "F. Scott Fitzgerald")
```

```
        };
        System.out.println("\n🔍 Linear Search Result:");
        Book found = linearSearch(books, "1984");
        System.out.println(found != null ? found : "Book not found.");
        Arrays.sort(books, Comparator.comparing(b -> b.title.toLowerCase()));

        System.out.println("\n🔍 Binary Search Result:");
        Book found2 = binarySearch(books, "Pride and Prejudice");
        System.out.println(found2 != null ? found2 : "Book not found.");
    }
}
```

OUTPUT :

Exercise 7: Financial Forecasting

CODE :

1.Forecast.java :

```
public class Forecast {
    public static double predictFutureValue(double currentValue, double growthRate, int years) {
        if (years == 0) {
            return currentValue;
        }
        return predictFutureValue(currentValue * (1 + growthRate), growthRate, years - 1);
    }

    public static void main(String[] args) {
        double presentValue = 10000;
        double growthRate = 0.1;
        int years = 5;
        double futureValue = predictFutureValue(presentValue, growthRate, years);
        System.out.printf("Future value after %d years: ₹%.2f\n", years, futureValue);
    }
}
```

OUTPUT :

```
PS D:\cognizant\Deepskilling> cd Week-1/DataStructuresandAlgorithms/FinancialForecasting
PS D:\cognizant\Deepskilling\Week-1\DataStructuresandAlgorithms\FinancialForecasting> javac Forecast.java
PS D:\cognizant\Deepskilling\Week-1\DataStructuresandAlgorithms\FinancialForecasting> java Forecast
Future value after 5 years: Rs 16105.10
PS D:\cognizant\Deepskilling\Week-1\DataStructuresandAlgorithms\FinancialForecasting>
```