**Roll No:36**

**1.Implement a package LibraryManagement with classes Book and Member. The Book class should have attributes like title, author, and ISBN, while the Member class should store member details. Use this package to create a simple library system.**

**Book.java**

```
package LibraryManagement;

public class Book {
    public String title;
    public String author;
    public String isbn;
    public String status;
    public Book(String t, String a, String i) {
        title = t;
        author = a;
        isbn = i;
        status = "Available";
    }
    public void displayBook() {
        System.out.println(title + " by " + author + " (ISBN: " + isbn + ") - " + status);
    }
}
```

**Member.java**

```
package LibraryManagement;

public class Member {
    public int memberId;
    public String name;
    public Member(int id, String n) {
        memberId = id;
        name = n;
    }
    public void borrow(Book b) {
        if (b.status.equals("Borrowed")) {
            System.out.println("Sorry, " + b.title + " is already borrowed.");
        } else {
            b.status = "Borrowed";
            System.out.println(name + " borrowed " + b.title);
        }
    }
    public void returnBook(Book b) {
        if (b.status.equals("Borrowed")) {
            b.status = "Available";
            System.out.println(name + " returned " + b.title);
        } else {
            System.out.println(b.title + " is not borrowed.");
        }
    }
    public void displayMember() {
        System.out.println("Member ID: " + memberId + ", Name: " + name);
    }
}
```

**LibrarySystem.java:**

```
import LibraryManagement.Book;
import LibraryManagement.Member;
public class LibrarySystem {
    public static void main(String[] args) {
        Book b1 = new Book("Wings of Fire", "A.P.J. Abdul Kalam", "111");
        Book b2 = new Book("Godaan", "Munshi Premchand", "222");
        Member m1 = new Member(1, "Amit");
        Member m2 = new Member(2, "Priya");
        b1.displayBook();
```

```
        b2.displayBook();
        if (b1.status.equals("Available")) {
            b1.status = "Borrowed";
            System.out.println("Amit borrowed " +
b1.title);
        if (b1.status.equals("Available")) {
            b1.status = "Borrowed";
            System.out.println("Priya borrowed " +
b1.title);
        } else {
            System.out.println("Sorry, " + b1.title + " is
already borrowed.");
        }
        if (b1.status.equals("Borrowed")) {
            b1.status = "Available";
            System.out.println("Amit returned " +
b1.title);
        }
        if (b1.status.equals("Available")) {
            b1.status = "Borrowed";
            System.out.println("Priya borrowed " +
b1.title);
        }
        m1.displayMember();
        m2.displayMember();
        b1.displayBook();
    }
}
```

**Output:**

```
Wings of Fire by A.P.J. Abdul Kalam (ISBN: 111) -
Available
Godaan by Munshi Premchand (ISBN: 222) -
Available
Amit took Wings of Fire
Sorry, Wings of Fire is already taken
Amit returned Wings of Fire
Sneha took Wings of Fire
Member ID: 1, Name: Amit
Member ID: 2, Name: Sneha
Wings of Fire by A.P.J. Abdul Kalam (ISBN: 111) -
Borrowed
```

**2. Create a package Ecommerce containing classes Product, Customer, and Order. Implement methods for placing an order, displaying product details, and calculating total order cost. Use this package in another program.**

**Product.java:**

```
package Ecommerce;
public class Product {
    public String name;
    public double price;
    public int quantity;
    public Product(String n, double p, int q) {
        name = n;
        price = p;
        quantity = q;
    }
    public void displayProduct() {
        System.out.println("Product: " + name);
        System.out.println("Price: ₹" + price);
        System.out.println("Available Quantity: " +
quantity);
        System.out.println();
    }
}
```

**Customer.java:**

```
package Ecommerce;
public class Customer {
    public int customerId;
    public String name;
    public Customer(int id, String n) {
```

```
        customerId = id;
        name = n;
    }

    public void displayCustomer() {
        System.out.println("Customer ID: " + customerId);
        System.out.println("Name: " + name);
        System.out.println();
    }
}
```

**Order.java**

```
package Ecommerce;
public class Order {
    public Customer customer;
    public Product product;
    public int orderQuantity;
    public Order(Customer c, Product p, int q) {
        customer = c;
        product = p;
        orderQuantity = q;
    }
    public void placeOrder() {
        if (product.quantity >= orderQuantity) {
            double total = product.price * orderQuantity;
            product.quantity = product.quantity - orderQuantity;
            System.out.println(customer.name + " placed an order for " + orderQuantity + " " + product.name + "(s)");
            System.out.println("Total cost: ₹" + total);
        } else {
            System.out.println("Sorry, only " + product.quantity + " " + product.name + "(s) available.");
        }
        System.out.println();
    }
}
```

**MainEcommerce.java:**

```
import Ecommerce.Product;
import Ecommerce.Customer;
import Ecommerce.Order;
public class MainEcommerce {
    public static void main(String[] args) {
        Product p1 = new Product("Mobile Phone", 15000, 10);
        Product p2 = new Product("Headphones", 2000, 5);
        Customer c1 = new Customer(1, "Rahul");
        Customer c2 = new Customer(2, "Sneha");
        p1.displayProduct();
        p2.displayProduct();
        c1.displayCustomer();
        c2.displayCustomer();
        Order o1 = new Order(c1, p1, 2);
        o1.placeOrder();
        Order o2 = new Order(c2, p2, 6); // Not enough stock
        o2.placeOrder();
        p1.displayProduct();
        p2.displayProduct();
    }
}
```

**Output:**

```
Product: Mobile Phone
Price: ₹15000.0
Available Quantity: 10
Price: ₹2000.0
```

Available Quantity: 5

Customer ID: 1

Name: Rahul

Customer ID: 2

Name: Sneha

Rahul placed an order for 2 Mobile Phone(s)

Total cost: ₹30000.0

Sorry, only 5 Headphones(s) available.

Product: Mobile Phone

Price: ₹15000.0

Available Quantity: 8

Product: Headphones

Price: ₹2000.0

Available Quantity: 5

**3. Create a package named MathOperations that contains classes for mathematical functions like floor, round, and ceil. Implement a program that uses these functions to perform operations on different numbers. (The Math class in Java contains the methods floor(), ceil(), and round())**

**FloorOperation.java**

```
package MathOperations;

public class FloorOperation {
    public double apply(double num) {
        return Math.floor(num);
    }
}
```

**CeilOperation.java:**

```
package MathOperations;

public class CeilOperation {
    public double apply(double num) {
        return Math.ceil(num);
    }
}
```

**RoundOperation.java**

```
package MathOperations;

public class RoundOperation {
    public long apply(double num) {
        return Math.round(num);
    }
}
```

**MainMath.java:**

```
import MathOperations.FloorOperation;

import MathOperations.CeilOperation;

import MathOperations.RoundOperation;


public class MainMath {
    public static void main(String[] args) {
        FloorOperation f = new FloorOperation();
        CeilOperation c = new CeilOperation();
        RoundOperation r = new RoundOperation();
        double num1 = 12.3;
        double num2 = 7.8;
        double num3 = 5.5;
        System.out.println("Floor of " + num1 + " = " +
f.apply(num1));
        System.out.println("Ceil of " + num2 + " = " +
c.apply(num2));
        System.out.println("Round of " + num3 + " = "
+ r.apply(num3));
    }
}
```

**Output:**

Floor of 12.3 = 12.0

Ceil of 7.8 = 8.0

Round of 5.5 = 6