Assignment 1  
  
Description

I've successfully developed a console-driven Java program for Melbourne Cinema's booking management system, meeting the outlined functional requirements in three stages. In Stage A, you covered basic booking functionalities. Stage B extended the system to display individual seat statuses, and Stage C adopted an Object-Oriented approach for improved structure and maintainability. The system now efficiently handles bookings, refunds, and seat availability, providing a foundation for future enhancements and expansions.

Code  
package Assignment1;

import java.util.Scanner;

public class Demo {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.***in***);

// Display cinema setup and collect user inputs

System.***out***.println(" Welcome to Melbourne Cinema Booking System (MCBS) \n");

System.***out***.print("Enter the total number of rows in the cinema: ");

int numRows = scanner.nextInt();

scanner.nextLine(); // Consume the newline character

System.***out***.print("Enter the show's date: ");

String showDate = scanner.nextLine();

// Get seat prices for different categories from the user

System.***out***.print("Enter the following price for Standard seats:");

double standardPrice = scanner.nextDouble();

System.***out***.print("Enter the following price for Pensioner seats: :");

double pensionerPrice = scanner.nextDouble();

System.***out***.print("Enter the following price for Frequent seats:");

double frequentPrice = scanner.nextDouble();

// Create a CinemaBookingSystem object with user-provided data

Cinema cinema = new Cinema(numRows, showDate, standardPrice, pensionerPrice, frequentPrice);

while (true) {

// Display the main menu

*displayMenu*();

int choice = scanner.nextInt();

// Process the user's choice

switch (choice) {

case 1:

cinema.displayAvailableSeats();

break;

case 2:

// Book seats for the show

cinema.displayAvailableSeats();

*bookSeats*(cinema, scanner);

break;

case 3:

// Refund previously booked seats

cinema.displayAvailableSeats();

*refundSeats*(cinema, scanner);

break;

case 4:

// Display booking statistics to the user

cinema.displayStatistics();

break;

case 5:

// Exit the booking system and close the program

System.***out***.println("Thank you for using MCBS!");

scanner.close();

return;

default:

// Invalid choice, ask the user to try again

System.***out***.println("Invalid choice. Please try again.");

}

}

}

// Display the main menu

private static void displayMenu() {

System.***out***.println("\n ");

System.***out***.println("\* Melbourne Cinema Booking System (MCBS) ");

System.***out***.println(" ");

System.***out***.println("1. Display Available Seats");

System.***out***.println("2. Book Seats");

System.***out***.println("3. Refund Seats");

System.***out***.println("4. Display Statistics");

System.***out***.println("5. Exit");

System.***out***.print("Enter your choice: ");

}

// book seats based on user input

private static void bookSeats(Cinema cinema, Scanner scanner) {

System.***out***.print("Enter the number of seats to book: ");

int numSeatsToBook = scanner.nextInt();

cinema.bookSeats(numSeatsToBook);

}

// refund seats based on user input

private static void refundSeats(Cinema cinema, Scanner scanner) {

System.***out***.print("Enter the number of seats to refund: ");

int numSeatsToRefund = scanner.nextInt();

cinema.refundSeats(numSeatsToRefund);

}

}

code  
package Assignment1;

import java.util.Scanner;

public class Cinema {

private int numRows;

private String showDate;

private double standardPrice;

private double pensionerPrice;

private double frequentPrice;

private char[] seats;

// Constructor to create a movie object

public Cinema(int numRows, String showDate, double standardPrice, double pensionerPrice, double frequentPrice) {

this.setNumRows(numRows);

this.setShowDate(showDate);

this.setStandardPrice(standardPrice);

this.setPensionerPrice(pensionerPrice);

this.setFrequentPrice(frequentPrice);

setSeats(new char[numRows \* 10]);

initializeSeats();

}

public double getFrequentPrice() {

return frequentPrice;// Get price for a frequent visitor's seat

}

public void setFrequentPrice(double frequentPrice) {

this.frequentPrice = frequentPrice;// Set price for a frequent visitor's seat

}

public double getPensionerPrice() {

return pensionerPrice;// Get price for a senior citizen's seat

}

public void setPensionerPrice(double pensionerPrice) {

this.pensionerPrice = pensionerPrice;// Set price for a senior citizen's seat

}

public String getShowDate() {

return showDate;// Get the movie screening date

}

public void setShowDate(String showDate) {

this.showDate = showDate;// Set the movie screening date

}

public double getStandardPrice() {

return standardPrice;// Get price for a regular seat

}

public void setStandardPrice(double standardPrice) {

this.standardPrice = standardPrice;// Set price for a regular seat

}

// Initialize seats with '-' to show unreserved

private void initializeSeats() {

for (int i = 0; i < getSeats().length; i++) {

getSeats()[i] = '-';

}

}

// Display available seats in a grid

void displayAvailableSeats() {

System.***out***.println("\n");

System.***out***.println(" SCREEN ");

System.***out***.println(" ");

System.***out***.println(" ");

for (int i = 0; i < getNumRows(); i++) {

for (int j = 0; j < 10; j++) {

int seatNum = (i \* 10) + j + 1;

char status = getSeats()[(i \* 10) + j];

System.***out***.print(seatNum + ":" + status + " ");

if (j == 4) {

System.***out***.print(" ");

}

}

System.***out***.println();

}

System.***out***.println("Number of seats available : " + countAvailableSeats());

}

// Count the number of available seats

private int countAvailableSeats() {

int count = 0;

for (char status : getSeats()) {

if (status == '-') {

count++;

}

}

return count;

}

// Reserved number of seats

public void bookSeats(int numSeatsToBook) {

int S = 0;

int P = 0;

int F = 0;

boolean success;// indicate reservation success

if (numSeatsToBook <= 0 || numSeatsToBook > countAvailableSeats()) {

success = false;// Reservation not successful

} else {

Scanner scanner = new Scanner(System.***in***);

// Loop through seats to be booked

for (int i = 0; i < numSeatsToBook; i++) {

int seatType = 0;

// Prompt user to enter seat number

System.***out***.print("Enter seat number " + (i + 1) + ": ");

int seatNum = scanner.nextInt();

if (seatNum < 1 || seatNum > getNumRows() \* 10 || getSeats()[seatNum - 1] != '-') {

System.***out***.println("The number of seats booked is incorrect. Please try once more");

i--;

} else {

System.***out***.print("Enter the price category for " + seatNum

+ "(standard - 1, pensioner - 2, frequent patrons - 3): ");

seatType = scanner.nextInt();// Read seat type from user

scanner.nextLine();// Consume newline

switch (seatType) {

case 1:

getSeats()[seatNum - 1] = 'S';// Reserve as regular seat

S++;

break;

case 2:

getSeats()[seatNum - 1] = 'P';// Reserve as senior

P++;

break;

case 3:

getSeats()[seatNum - 1] = 'F';// Reserve as frequent

F++;

break;

default:

System.***out***.println("The number of seats booked is incorrect. Please try once more");

i--;

continue;

}

}

}

success = true;

}

if (success) {// Check if reservation successful and display message

System.***out***.println("Booking successful!");

displayBookingReceipt(numSeatsToBook, S, P, F);// Display booking

} else {

System.***out***.println("The number of seats booked is incorrect. Please try once more.");

}

}

public void refundSeats(int numSeatsToRefund) {

int S = 0;

int P = 0;

int F = 0;

boolean success;

if (numSeatsToRefund <= 0 || numSeatsToRefund > (getNumRows() \* 10) - countAvailableSeats()) {

success = false;

} else {

Scanner scanner = new Scanner(System.***in***);

for (int i = 0; i < numSeatsToRefund; i++) {

int seatType = 0;

System.***out***.print("Enter seat number " + (i + 1) + ": ");

int seatNum = scanner.nextInt();

if (seatNum < 1 || seatNum > getNumRows() \* 10 || getSeats()[seatNum - 1] == '-') {

System.***out***.println("The number of seats booked is incorrect. Please try once more.");

i--;

} else {

System.***out***.print("Enter the price category for " + seatNum

+ "(standard - 1, pensioner - 2, frequent patrons - 3): ");

seatType = scanner.nextInt();

scanner.nextLine();

switch (seatType) {

case 1:

getSeats()[seatNum - 1] = '-';

S++;

break;

case 2:

getSeats()[seatNum - 1] = '-';

P++;

break;

case 3:

getSeats()[seatNum - 1] = '-';

F++;

break;

default:

System.***out***.println("incorrect Seat type. Please try once more.");

i--;

continue;

}

}

}

success = true;

}

if (success) {

System.***out***.println("Refund successful!");

displayRefundReceipt(numSeatsToRefund, S, P, F);

} else {

System.***out***.println("Invalid number of seats to refund. Please try again.");

}

}

public void displayBookingReceipt(int numSeatsBooked, int S, int P, int F) {

double totalAmount = (getFrequentPrice() \* S) + (getPensionerPrice() \* P) + (getFrequentPrice() \* F);

System.***out***.println("\nReceipt");

System.***out***.println("\*\*\*\*\*\*\*");

System.***out***.println("Date: " + getShowDate());

System.***out***.println("Number of seats booked: " + numSeatsBooked);

System.***out***.println(S + " \* Standard @ $" + getStandardPrice() + " = $" + getFrequentPrice() \* S);

System.***out***.println(P + " \* Pensioner @ $" + getPensionerPrice() + " = $" + getPensionerPrice() \* P);

System.***out***.println(F + " \* Frequent Patrons @ $" + getFrequentPrice() + " = $" + getFrequentPrice() \* F);

System.***out***.println("Total: $" + totalAmount);

}

void displayRefundReceipt(int numSeatsRefunded, int S, int P, int F) {

double totalAmount = (getFrequentPrice() \* S) + (getPensionerPrice() \* P) + (getFrequentPrice() \* F);

System.***out***.println("\nReceipt");

System.***out***.println("\*\*\*\*\*\*\*");

System.***out***.println("Date: " + getShowDate());

System.***out***.println("Number of seats refunded: " + numSeatsRefunded);

System.***out***.println(S + " \* Standard @ $" + getStandardPrice() + " = $" + getFrequentPrice() \* S);

System.***out***.println(P + " \* Pensioner @ $" + getPensionerPrice() + " = $" + getPensionerPrice() \* P);

System.***out***.println(F + " \* Frequent Patrons @ $" + getFrequentPrice() + " = $" + getFrequentPrice() \* F);

System.***out***.println("Total: $" + totalAmount);

}

public void displayStatistics() {

int numSeatsBooked = (getNumRows() \* 10) - countAvailableSeats();

double percentageBooked = (numSeatsBooked / (double) (getNumRows() \* 10)) \* 100;

double averagePrice = (getStandardPrice() + getStandardPrice() + getFrequentPrice()) / 3;

System.***out***.println("\n=== Statistics ===");

System.***out***.println("Number of seats booked: " + numSeatsBooked);

System.***out***.println("Percentage of seats booked: " + String.*format*("%.2f", percentageBooked) + "%");

System.***out***.println("Average price of booked seats: $" + averagePrice);

}

public int getNumRows() {

return numRows;

}

public void setNumRows(int numRows) {

this.numRows = numRows;

}

public char[] getSeats() {

return seats;

}

public void setSeats(char[] seats) {

this.seats = seats;

}

}

Output

