



SC2002 - MOvie Booking and LIsting Management Application (MOBLIMA)






Tutorial : SSP3 Group : 6

Declaration of Original Work for SC/CE/CZ2002 Assignment

We hereby declare that the attached group assignment has been researched, undertaken, completed and submitted as a collective effort by the group members listed below.

We have honoured the principles of academic integrity and have upheld the Student Code of Academic Conduct in the completion of this work.

We understand that if plagiarism is found in the assignment, then lower marks or no marks will be awarded for the assessed work. In addition, disciplinary actions may be taken.

NAME	COURSE	LAB GROUP	SIGNATURE/DATE
Andy Leu Jun Yi (U2122941E)	SC2002	SSP3	 13/11/2022
Choo Zhen Hui (U2122536G)	SC2002	SSP3	 13/11/2022
Clement Tan Kang Hao (U2122052K)	SC2002	SSP3	 13/11/2022
Nithya Hariharan (U2123872G)	SC2002	SSP3	 13/11/2022
Sriram Kavita (U2120934G)	SC2002	SSP3	 13/11/2022

1. Design Considerations

a) Approach

We divided the modules between group members and worked on them individually. Upon realising that our classes had multiple overlapping regions, we resolved to organise our classes according to different packages. As such, we adopted the Model-View-Controller (MVC) framework, dividing our program into Controller, Verify, Model and View packages.

- ‘Model’ package has all the entity classes used in our application.
- ‘View’ package has all the classes related to the User Interface.
- ‘Controller’ package is responsible for managing the database text files and read, get, update, delete functions of cinemas, cineplexes, movies, movie time slots, transactions made by users, ticket costs, and holidays. Additionally, it is also responsible for handling different types of inputs from users.
- ‘Verify’ package contains all the classes which check whether a cinema, cineplex, movie, transaction and time slot created by the admins are valid.

b) Assumptions

- The user inputs of their personal information are valid. For example, the email entered by the user is an existing account.
- Movie age-restrictions will not be enforced through our program, but are instead verified physically at the cinema.
- Payment will always be successful as it will be made physically at the theatre.
- ‘Coming soon’ is when the movie does not start for more than a week and ‘Preview’ is when a movie starts less than a week from the current date.
- When a user books a movie on a day which is on the weekend and a public holiday, the price of the public holiday is taken into consideration and not the weekend while computing ticket cost.

c) Design Principles - Object-Oriented Principles

Abstraction

Abstraction refers to the important characteristics of an object which differentiate it from other objects. In our application an example of this property can be seen in the “Movie” class where we identify different objects of Movie with “ID” and “Name” attributes of the class.

Encapsulation

Encapsulation helps to protect data within a class as well as hide non-essential data. We restrict public access to data fields by privating them. This is useful to safeguard users personal

information entered during the booking of tickets. Additionally, we created getter and setter methods to retrieve and change the information if needed.

Inheritance

Inheritance is the concept of creating a hierarchy between classes with the property of inheriting attributes and methods from existing parent classes. This is very important to facilitate reusability of the code. We have implemented the same with the use of interface - 'TicketCostModifier' which is implemented by 'TicketCostType', 'CinemaType' and 'MovieType'.

d) Design Principles - SOLID Design Principles

S - Single Responsibility Principle

Single Responsibility Principle states that every class or module in the program should have only one responsibility or purpose. This ensures that there is never more than one reason for a class to change. Each package in our application - Controller, Verify, Model and View, has a specific responsibility. For example, the View package has all the classes related to the UI.

O - Open-Closed Principle

Open-Closed Principle states that objects and entities should not be modifiable yet extendable. Therefore, every time there is a new requirement or addition, only a specific part of the code needs to be changed. For example, if we want to add a type of cost modifier such as 'FoodCostType', which has different cost additions for different food items, we can add this class to the Model package and make it implement the interface 'TicketCostModifier', without modifying any other section of the code.

I - Integration Segregation Principle

The Integration Segregation Principle (ISP) states that classes should only be exposed to interfaces that it requires. Instead of using a general interface, we divided our abstract classes into specific interfaces to be used by classes following the same purpose. Our abstract classes are split into various types, such as movie, cinema and ticket cost. These are then used in the respective subclasses. For example, the interface 'MovieType' is used specifically in the 'Movie' subclass.

D - Dependency Injection Principle

The Dependency Injection Principle (DIP) fundamentally allows high level classes to be independent of low-level classes, allowing them to be simple to reuse in future expansion. We used multiple abstract classes and implemented them into the framework. Our interface

‘TicketCostModifier’ is implemented as ‘MovieType’, ‘CinemaType’, and ‘TicketCostType’, which are enum classes, representing the different criteria that can affect ticket prices.

2. Proposal of Features

2.1 Purchase of Food and Drinks

Currently, our program does not have the option to purchase food and drinks, which is an essential part of the movie-going experience. We propose an additional pricing of various food and drinks commonly sold in cinemas. Users can opt to purchase their desired food and drinks, and the corresponding costs will be added to the total price.

Our current design allows for **reusability**, whereby our abstract class ‘TicketCostModifier’, which is currently implemented in ‘TicketCostType’, can also be implemented in our new class ‘FoodCostType’. Next, the various types of food and drinks to be sold can be added as enumeration types. This is possible due to the **Open-Closed Principle**.

```
public interface TicketCostModifier {  
    //empty  
    //to be implemented by movietype, cinematype, ticketcosttype (student, senior, etc)  
}
```

Figure 1: ‘FoodCostType’ can implement abstract class ‘TicketCostModifier’

```
public enum TicketCostType implements TicketCostModifier{  
    Student,  
    Holiday,  
    Normal,  
    SeniorCitizen,  
    Weekend;  
}
```

Figure 2: The new ‘FoodCostType’ class will follow the existing ‘TicketCostType’ class

5.2 Discount for regular customers

Customers who have previously booked 5 tickets will get an option to use a discount voucher for their subsequent ticket bookings. They can choose whether to accept it or use it for the next time. The TicketCostType can have another enumerated value “Discount” whose value will be appended in ‘TicketCostManager’ using “newCostModifier” with the amount of the voucher. A binary variable “used” can be utilised to know whether the user applied the discount or not. If the user decides to not use the voucher, they will still have the option to use it for the next booking.

```
public void newCostModifier(TicketCostModifier costModifier, double cost){  
    ticketCostMap.put(costModifier, cost);  
}
```

3. UML DIAGRAM



4. Test Cases

4.1 Admin functions

4.1.1 Admin Registration and Login

S.No	Test Case	Output
1.	Entering already existing username during admin sign-up	<pre>Option List: 1. Register new Admin account 2. Login as Admin 1 Please enter your username admin Username is already taken! Please enter your username</pre>
2.	Login as admin with correct details	<pre>Please enter username: new_admin Please enter password: new_admin_password You have logged in successfully.</pre>
3.	Login as admin with incorrect details	<pre>Please enter username: new_admin Please enter password: new_admin_pswd Invalid Username or Password!</pre>

4.1.2 Admin - Movie Listing [Create/Update/Remove]

S.No	Test Case	Output
1.	Create a movie listing with end date of movie before start date	<pre>Please enter the Release Date of the Movie (DD/MM/YYYY): 12/11/2022 Please enter the End Date of the Movie (DD/MM/YYYY): 11/11/2022 End Date cannot be earlier than Start Date! Returning back to Main Menu...</pre>
2.	Create a movie listing with only 1 cast member	<pre>Please enter the Number of Casts (at least 2): 1 There must be at least 2 Cast Members! Returning to menu...</pre>
4.	Create a movie listing with a movie title that already exists	<pre>Movie already exists!</pre>
5.	Updating a movie listing with not existing ID	<pre>Please select the Movie to be updated by entering the Movie ID: 11 Invalid choice! Returning back to main menu</pre>

6.	Updating a movie listing with start date later than end date	Please enter the release date of the movie (DD/MM/YYYY): 13/12/2022 Start Date cannot be later than End Date! Returning back to main menu
7.	Removing movie listing with ID not existing	Please select the movie to be removed: 11 Invalid choice! Returning back to main menu
8.	Removing movie listing with existing ID	Please select the movie to be removed: 0 Movie 0 is removed successfully

4.1.3 Admin - Session Listing [Create/Update/Remove]

S.No	Test Case	Output
1.	Create a movie session with wrong date time format	Enter session date and time (DD/MM/YYYY HH:MM) : 12/3/21 2:30 Must be of pattern DD/MM/YYYY HH:MM!
2.	Update a movie session with new date time successfully	Please enter new date & time: 14/11/2022 12:20 Session 1 successfully updated!
3.	Update a movie session with a invalid new TimeSlot ID	Please select Timeslot ID to update: g Wrong input!
4.	Update a movie session with wrong movie ID	Please enter new Movie ID: 12 Movie does not exist! Returning back to Main Menu...
5.	Remove a movie session successfully	Please select timeslot ID to delete: 1 Session 1 successfully deleted!
6.	View movie sessions successfully	Please select a cineplex by entering the corresponding number: 1 Cinema: Causeway Point Cinema (CAU) Timeslot ID: 0 Movie Title: harry potter 1 Date: Sunday, 13/11/2022 12:20 Cinema: AMK Hub Cinema (AMK) There are no Movie Sessions in this cinema Cinema: Downtown East Cinema (DOW) There are no Movie Sessions in this cinema

4.1.4 Admin - Configure System Settings

S.No	Test Case	Output
1.	Display Public Holidays successfully	<pre>===== Holiday List ===== Holiday #1 - 13/11/2022</pre>
2.	Create a new holiday successfully	<pre>Enter date of holiday in DD/MM/YYYY format 25/12/2022 Successfully Created new Holiday</pre>
3.	Create new holiday with wrong date format	<pre>Enter date of holiday in DD/MM/YYYY format 12/3/21 Must be of pattern DD/MM/YYYY!</pre>
4.	Remove holiday successfully	<pre>Enter Date of Holiday to be removed in DD/MM/YYYY format: 13/11/2022 Holiday successfully removed!</pre>
5.	Set holiday charges successfully	<pre>Enter a New Price to set for Holidays: 5 New Price successfully set.</pre>
6.	Set weekend charges successfully	<pre>Enter a New Price to set for Weekend: 6 New Price successfully set</pre>

4.2 Guest functions

4.2.1 User Search and View Movies

S.No	Test Case	Output
1.	Search movie according to title with an incorrect title	<pre>Please enter the movie name: mission impossible Unable to find any movies!</pre>
2.	Search movie according to title with a correct title	<pre>Please enter the movie name: harry potter 1 Movie ID: 0 Movie Name: harry potter 1 Start Date: 2022-10-12 End Date: 2022-12-12 Director: JK Rowling Cast List: daniel radcliff, emma watson</pre>
3.	Search movie according to type with an incorrect type	<pre>Please select the Movie Type by entering the number: 4 Unable to find any movies!</pre>

5.	View movie details for an incorrect movie ID	Please enter the ID of the movie to view more details (Enter -1 to return to Guest Menu) 12 Movie does not exist! Returning back to main menu
6.	View movie details for a correct movie ID	Please enter the ID of the movie to view more details (Enter -1 to return to Guest Menu) 0 ID: 0 Title: harry potter 1 Type: 3D Status: Now Showing Synopsis: clueless wizard Movie Rating: PG13 Duration: 2.5 hour(s) Release Date: Wednesday, 12/10/2022 End Date: Monday, 12/12/2022 Director: JK Rowling Cast: daniel radcliff, emma watson Overall Review Rating: N/A Reviews: N/A

4.2.2 User Checking seat availability

S.No	Test Case	Output
1.	Checking seat availability for a incorrect session date and time	Please enter Date and Time (DD/MM/YYYY HH:MM) : 11/11/2022 13:20 Wrong input! =====
2.	Checking seat availability for correct details	Seat Layout: Seating List of Cinema: X = occupied, 0 = not occupied. =====

4.2.3 User Purchasing Ticket(s)

S.No	Test Case	Output
1.	Entering a cineplex and a movie name with no slots in that cineplex	Enter movie name to view currently available slots: harry potter 1 No Currently Available Slots for this Cineplex. Choose another Cineplex. =====
2.	Movie with status End of Showing not seen in the booking list.	=====

		<pre> Enter movie name to view currently available slots: harry potter 3 Movie no longer available for booking as it is No Longer Showing! </pre>
3.	<p>Booking a ticket on a holiday with Gold class</p> <p>14/12/2022 is a holiday in the database. (4SGD)</p> <p>Movie is 3D (3SGD)</p> <p>Gold class (3SGD)</p> <p>Normal/Standard(10SGD)</p> <p>Adding all, cost = 20 SGD</p>	<pre> ===== Cinema ID: DOW Cinema type: GoldClass Available Time Slots for -harry potter 1- at this Cinema: Date: 14/12/2022 15:00 ===== Select your Cinema ID/code (eg. AMK, CAU): DOW Select viewing date and time (Format: DD/MM/YYYY HH:MM): 14/12/2022 15:00 Enter the number of Tickets you want to purchase: 1 Enter age type for the 1 ticket (Student, Senior, Standard): Standard Total ticket cost: 20.0SGD </pre>
4.	<p>Booking a ticket on a holiday with Silver class</p> <p>Holiday (4SGD)</p> <p>Movie is 3D (3SGD)</p> <p>Silver class (1SGD)</p> <p>Normal/Standard(10SGD)</p> <p>Adding all, cost = 18SGD</p> <p>Difference in prices is demonstrated by changing the cinema type and keeping the rest of the values the same.</p>	<pre> ===== Cinema ID: AMK Cinema type: SilverClass Available Time Slots for -harry potter 1- at this Cinema: Date: 14/12/2022 17:00 ===== Select your Cinema ID/code (eg. AMK, CAU): AMK Select viewing date and time (Format: DD/MM/YYYY HH:MM): 14/12/2022 17:00 Enter the number of Tickets you want to purchase: 1 Enter age type for the 1 ticket (Student, Senior, Standard): Standard Total ticket cost: 18.0SGD </pre>
5.	<p>Booking a ticket on a weekend which is also a holiday</p> <p>25/12/2022 is a holiday and a weekend (4SGD)</p> <p>Movie is 2D (0SGD)</p> <p>Silver class (1SGD)</p> <p>Normal/Standard (10SGD)</p> <p>Adding all, cost = 15SGD</p>	<pre> Enter movie name to view currently available slots: harry potter 2 ===== Cinema ID: AMK Cinema type: SilverClass Available Time Slots for -harry potter 2- at this Cinema: Date: 25/12/2022 14:00 ===== Select your Cinema ID/code (eg. AMK, CAU): AMK Select viewing date and time (Format: DD/MM/YYYY HH:MM): 25/12/2022 14:00 Enter the number of Tickets you want to purchase: 1 Enter age type for the 1 ticket (Student, Senior, Standard): Standard Total ticket cost: 15.0SGD </pre>
6.	<p>Booking a ticket for a Senior citizen on a weekday</p> <p>Weekday (0SGD)</p> <p>Movie is 2D (0SGD)</p> <p>Bronze class (0SGD)</p> <p>Senior Citizen (6SGD)</p> <p>Adding all, cost = 6SGD</p>	<pre> ===== Cinema ID: ORC Cinema type: BronzeClass Available Time Slots for -harry potter 3- at this Cinema: Date: 16/11/2022 13:35 ===== Select your Cinema ID/code (eg. AMK, CAU): ORC Select viewing date and time (Format: DD/MM/YYYY HH:MM): 16/11/2022 13:35 Enter the number of Tickets you want to purchase: 1 Enter age type for the 1 ticket (Student, Senior, Standard): Senior Total ticket cost: 6.0SGD </pre>

8.	Booking a ticket for Student in a cinema of Gold class 15th is a weekday (0SGD) Movie is 3D (3SGD) Gold class (3SGD) Student(8SGD) Adding all, cost = 14SGD	<pre> ===== Cinema ID: DOW Cinema type: GoldClass Available Time Slots for -harry potter 1- at this Cinema: Date: 15/12/2022 16:00 ===== Select your Cinema ID/code (eg. AMK, CAU): DOW Select viewing date and time (Format: DD/MM/YYYY HH:MM): 15/12/2022 16:00 Enter the number of Tickets you want to purchase: 1 Enter age type for the 1 ticket (Student, Senior, Standard): Student Total ticket cost: 14.0SGD </pre>
10.	Booking a ticket with seat already taken	<pre> ===== SCREEN ===== O O O O O O X O ===== ENTRANCE ===== Choose Seat ID for Ticket 1 6 Seat is already occupied! </pre>

4.2.4 User Viewing Booking History

S.No	Test Case	Output
1.	User entering invalid email address	<pre> Please enter your email: abc Invalid email address! </pre>
2.	User entering valid email address with no previous bookings	<pre> Booking History (abc@gmail.com): Booking history is empty! Would you like to book a ticket now? Enter Y to start a new booking! </pre>
3.	User entering valid email address with previous bookings	<pre> Please enter your email: nithya@gmail.com Booking History (nithya@gmail.com): Transaction ID: AMK202211132139 Name: nithya Movie Title: harry potter 2 Mobile Number: 87654321 Transaction ID: AMK202211132212 Name: nithya Movie Title: harry potter 1 Mobile Number: 87654356 </pre>

4.2.5 List Top 5 ranking movies

S.No	Test Case	Output
1.	Listing top 5 movies according to ticket sales	<pre>===== No.1 Most Popular Movie by Ticket Sales ===== Movie ID: 0 Movie Title: harry potter 1 Movie Rating: 4.5 ===== No.2 Most Popular Movie by Ticket Sales ===== Movie ID: 2 Movie Title: harry potter 3 Movie Rating: 3 ===== No.3 Most Popular Movie by Ticket Sales ===== Movie ID: 1 Movie Title: harry potter 2 Movie Rating: 2.5 =====</pre>
2.	Listing to 5 movies according to ratings	<pre>===== No.1 Most Popular Movie by Ratings ===== Movie ID: 0 Movie Title: harry potter 1 Movie Rating: 4.5 ===== No.2 Most Popular Movie by Ratings ===== Movie ID: 2 Movie Title: harry potter 3 Movie Rating: 3 ===== No.3 Most Popular Movie by Ratings ===== Movie ID: 1 Movie Title: harry potter 2 Movie Rating: 2.5 =====</pre>

4.2.6 Rate Movie

S.No	Test Case	Output
1.	Rate and review a movie successfully	<pre>Please select the movie to be rated: 0 Please enter your rating (from 1-5): 4 Please enter your review (optional): very good You have successfully rated the movie!</pre>
2.	Rating movie with out of range (1-5) value	<pre>Please enter your rating (from 1-5): 6 Rating must be within the range of 1 to 5! Please try again.</pre>
3.	Rating a movie using a username which has previously rated the same movie before	<pre>Okay You have already rated this movie!</pre>

LINK FOR THE VIDEO DEMONSTRATION: <https://youtu.be/rubjpkPi6Gc>