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 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.

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Important notes:

1. Name must **EXACTLY MATCH** the one printed on your Matriculation Card.

Introduction

DEMO VIDEO LINK: https://www.youtube.com/watch?v=JkkPFGq-Z-0

UML DIAGRAM: Click here**! (**Press download for full image**)**

This report documents the creation of the MOvie Booking and LIsting Management Application (MOBLIMA) application for SC2002 Object-Oriented Programming. As listed within the assignment requirements, the main features that we are tasked with creating are as follows:

1. Admin Module
    a. Login
    b. Create/Update/Remove movie listing
    c. Create/Update/Remove cinema showtimes and the movies to be shown
    d. Configure system settings
    e. Create/Update/Remove ratings and reviews
2. Movie Goer Module
    a. Search/List movie
    b. View movie details – including reviews and ratings
    c. Check seat availability and selection of seat/s
    d. Book and purchase ticket
    e. View booking history
    f. List the Top 5 ranking by ticket sales OR by overall reviewers' ratings
    g. Create ratings and reviews
    h. Create new movie goer
3. Guest Module

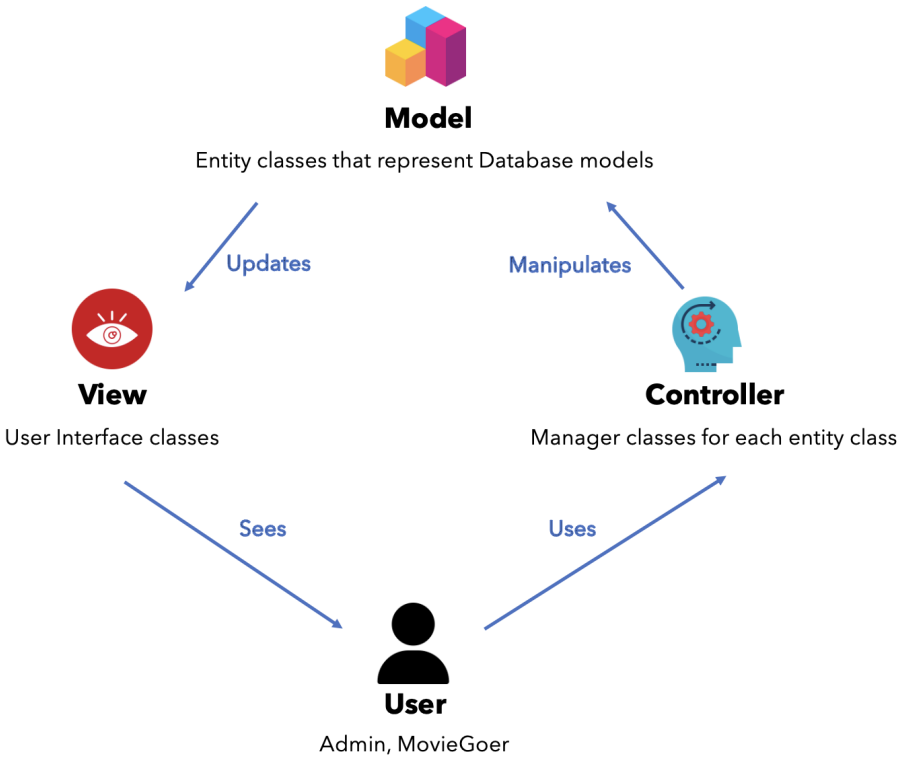
Data Dictionary

Term	Definition
Show	A movie screening at the cinema
Movie Type	Type of movie, such as 2D, 3D or Blockbuster
Theatre Class	Type of theatre, such as standard or platinum
Movie Goer	Customer planning to watch a movie

Design Considerations

Approach Taken

We decided that a **Model-View-Controller (MVC)** approach would work appropriately for the overall structure of our project. This decision was made through the identification that the entity classes are Models, the user-facing UI classes are Views, and the controller/manager classes are Controllers. In this fashion, our code structure is neatly segmented, and loose coupling can be achieved from the get-go. For instance, even though the Views need some level of knowledge on the Controllers (to invoke the Controller methods), we can freely change the code logic in Controllers, and the Views would require no corresponding changes.



With this in mind, we decided to achieve **loose coupling and high cohesion** by assigning a single manager class to encapsulate the logic for each model class. Each of these manager classes will perform CRUD operations on its own model only. For instance, to edit the functionality of creating a new Ticket, we would only have to edit the TicketManager class. This makes the code more maintainable, readable, testable, and reusable. If our application scales in the future, incorporating new classes would be easier since they will not break the existing structure of our code.

Design Principles

For the purpose of this MOBLIMA project, we applied the SOLID principle framework to actualize our application whilst adhering to the best practices of Object Oriented Programming. The following paragraphs document some examples whereby we implemented different aspects of the SOLID framework for our project.

Single Responsibility Principle

The Single Responsibility Principle states that a class should do one thing and therefore it should have only a single reason to change. An example of its implementation within our source code would be the Models package. The `Models` package is composed of entity classes for MOBLIMA, such as the Admin, Cineplex and Holiday models. This is the layer whereby we store our persistent data extracted from the .txt files that act as the data storage for the various fields that we utilise.

Through this method of structuring our `Models` package and subsequent upstream files, our classes are sufficiently partitioned to ensure that one class has a specific aspect and responsibility that they are in charge of. This allows us to avoid the creation of classes that have overlapping functions and couple different things that change for different reasons at different times.

Open-Closed Principle

The Open-Closed Principle requires that classes should be open for extension and closed to modification. An example of its implementation within our source code would be the `UserUI` abstract class. This abstract class is extensible to different types of users in the future, as they would extend the same base methods from the `UserUI` abstract class without needing to modify the `UserUI` class itself. In addition, if our application scales in the future to include additional entity and controller classes, these new controllers can simply extend the `Manager` interface without having to modify the interface itself.

Liskov Substitution Principle

The Liskov Substitution Principle states that objects of a superclass should be replaceable with objects of its subclasses without altering the correctness of the program. An example of its implementation within our source code would be the inheritance relationship between `MovieManagerMovieGoer` and `MovieManagerAdmin`. In the case of our source code, `MovieManagerAdmin` extends `MovieManagerMovieGoer`. In line with the Liskov Substitution Principle, `MovieManagerAdmin` does not demand more or return less than `MovieManagerMovieGoer`. As such, base functionality remains the same when an instance of `MovieManagerAdmin` is replaced by its subclass, `MovieManagerMovieGoer`.

Interface Segregation Principle

Segregation means keeping things separated, and the Interface Segregation Principle is about separating the interfaces. An example of its implementation within our source code would be the `Manager` interface.

Our `Manager` interface declares the read and write methods which are implemented in all manager classes, such as `Admin` Manager and `Cineplex` Manager. This ensures that our model is much more flexible, extendable, and the clients (in this case the relevant managers) do not need to implement any irrelevant logic because we provide only read and write related functionality in the Manager interface.

Dependency Inversion Principle

The Dependency Inversion principle states that our classes should depend upon interfaces or abstract classes instead of concrete classes and functions.

Through utilising the Manager interface for implementation of the read and write methods, our relevant Manager classes depend on the Manager interface instead of other classes that implement that interface. This ensures that resources are decoupled between classes to allow for greater amounts of interoperable and extensible methods across the application.

Assumptions Made

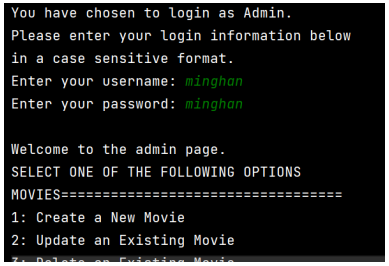
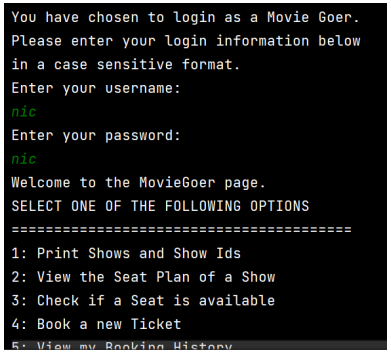
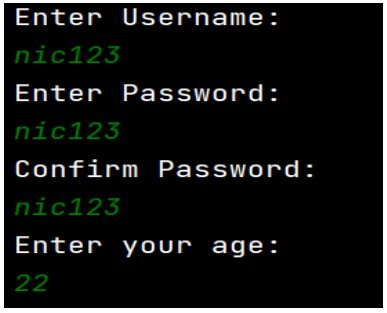
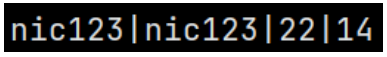
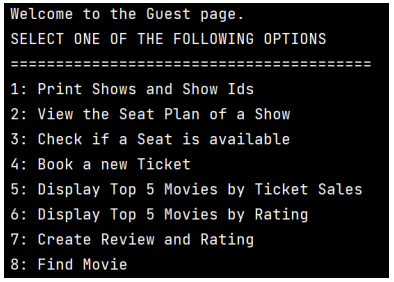
In the design of our application, we made the following assumptions:

1. No concurrent access as it is a single-user application.
2. Currency is in SGD and inclusive of Goods and Service Tax (GST).
3. There is no need for additional security features such as password encryption.
4. Payment will always be successful.
5. Our application does not interact with external services such as online payment services (VISA, MasterCard, PayLah etc).
6. There is no need for validation when purchasing discounted tickets such as Student/Senior Citizen tickets as this will be done upon entry to the theatre.
7. Not all MovieGoers will be logged in from the start. (*We circumvented this by allowing users to purchase tickets as Guests. After purchasing a ticket, our application will prompt users to create an account.)*
8. Users will not be allowed to create accounts with identical usernames. This applies to both Admins and MovieGoers. (*We implemented a check to enforce this.)*
9. Admins will not be allowed to create a new Show instance if its show-time conflicts with that of another show in the same theatre in the same cineplex on the same date. (*We implemented a check to enforce this.)*
10. Some holidays fall on different dates every year. Thus, we tagged each Holiday instance to the year it corresponds to for greater clarity *(e.g. Chinese New Year 2022).*
11. All students are of legal age (i.e. students can watch shows irregardless of movie rating)

Testing

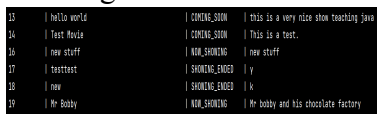
Note: For the sake of brevity, if user enters an invalid field, an error message will be displayed and the user will be prompted to enter the relevant parameters again

Login functionality

Features	Login as admin	Login as movie goer	Create new movie goer	Enter as guest	Exit application
User Inputs	Login as admin with correct credentials	Login as movie goer with correct credentials	User enters valid username and password	User selects to enter as guest	User selects to exit application
Application Outputs	User is navigated to Admin UI 	User is navigated to Movie Goer UI 	New user is created in database User input:  In database: 	User is navigated to Guest UI without signing in 	Application is terminated 

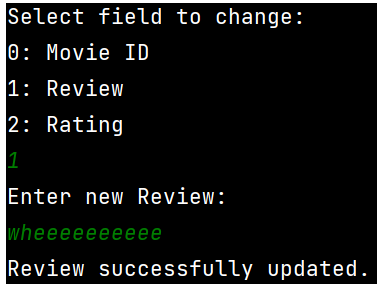
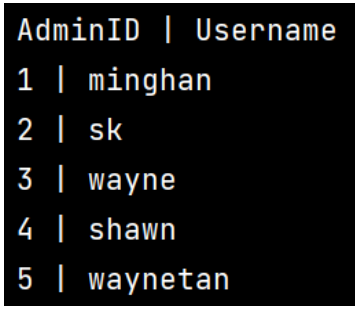
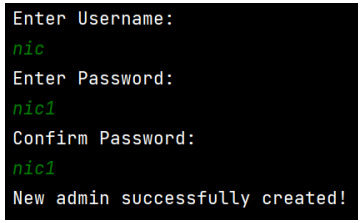
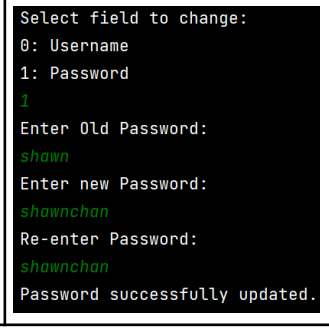
Admin

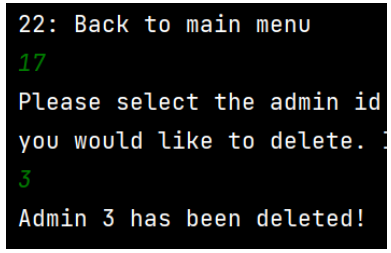
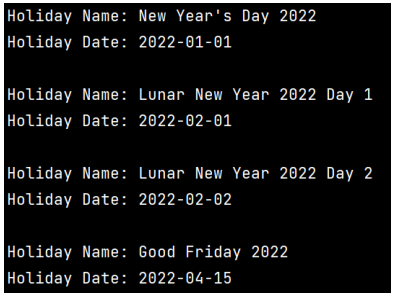
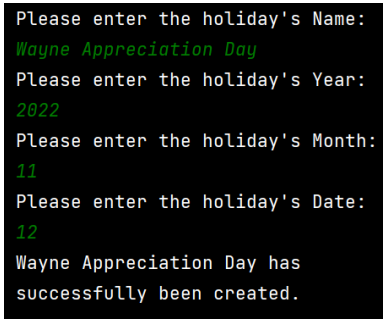
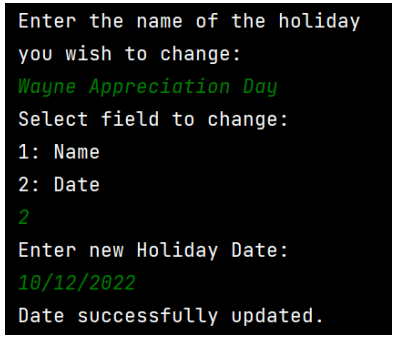
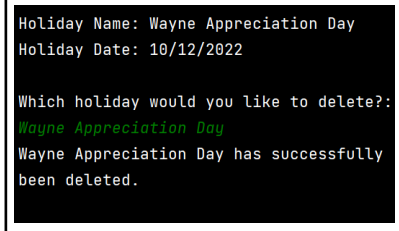
Features	Create new movie	Update existing movie	Delete existing movie	Create new show	Update existing show
User Inputs	Create new movie by providing valid movie title e.g., “blackhawk”, valid showing status e.g., “coming soon”, synopsis, director, cast, valid movie runtime, valid movie rating e.g., PG13, valid movie type e.g., 2D	Admin provides valid movie id, field to change e.g., End of Showing Date and valid field value. Admin can hence configure “End of Showing” date.	Admin enters valid movie id	Admin enters valid movie id, date, start time, theatre id, theatre class, cineplex. Only shows of movies with status “Preview” and “Now Showing” can be created.	Admin provides valid show id, field to change and field value

Application Outputs	Movie is created in database Enter Movie Rating: 0: G 1: PG13 2: NC16 3: M18 4: R21 1 Enter Movie Type: 0: 2D 1: 3D 2: BLOCKBUSTER 0 Movie successfully created!	Movie details are updated in database Select field to change: 0: Movie Title 1: Showing Status 2: Synopsis 3: Director 4: Cast 5: Runtime 6: Rating 7: Movie Type 8: End of Showing Date 8 Enter the Movie's Updated End of Showing Date: (format DD/MM/YYYY) 20/11/2022 End of Showing Date successfully updated.	Movie is deleted from database STOP SHOWING LIAO | 15 new stuff | 16 testtest | 17 new | 18 15 Movie successfully deleted!	Movie "new" has "Ended Showing" status  Only shows of movies with status "Preview" and "Now Showing" are displayed. Black Hawk | 9 ssg | 10 g | 11 wayne and his life | 12 hello world | 13 Test Movie | 14 new stuff | 16 Mr Bobby | 19 Enter Movie ID:	Show details are updated in database Select field to change: 0: Date 1: Start Time 2: End Time 3: Theatre 4: Theatre Class 5: Cineplex 0 Enter new Date (DD/MM/YYYY): 14/11/2022 Date successfully updated.

Features	Delete existing show	Print Price List	Update Prices	Print Rating and Reviews List	Create Rating and Review
User Inputs	Admin provides valid show id	Admin selects print price list	Admin selects price to change from list and provides update price	Admin selects print review and ratings list	Admin provides valid rating and reviews
Application Outputs	Show is deleted from database Bishan Town Hall | 3 | 14/11/2022 AMK Hub Mall | 2 | 14/11/2022 17 Show successfully deleted! In show database: 14|11/11/2022|14:30|14:42|3|PLATINUM|Jurong Point Junction|15| 14|14/11/2022|15:00|15:12|3|PLATINUM|Bishan Town Hall|16|	All prices are listed on screen Price List 1. Standard 2D Weekday (Mon-Wed) 10.5 2. Standard 2D Weekday (Thu) 10.5 3. Standard 2D Weekday (Fri before 6pm) 10.5 4. Standard 2D Weekend 14.5 5. Standard 2D Holiday 14.5 6. Standard 3D Weekday (Mon-Wed) 13.5 7. Standard 3D Weekday (Thu) 13.5 8. Standard 3D Weekday (Fri before 6pm)13.5 9. Standard 3D Weekend 16.5 10. Standard 3D Holiday 16.5 11. Standard BlockBuster Weekday (Mon-Wed) 15.5	The relevant price is updated in the database Select price to change from Price List: (Enter '0' to exit price update) 31 Update Student Price: 6 Price Updated Enter new price to update or '0' to exit	Rating and reviews list is displayed 9 Review ID | Movie ID | Rating | Review 1 | 12 | 1 | wheee 2 | 12 | 5 | its amazing 3 | 10 | 3 | okok lah 4 | 11 | 3 | its very good 5 | 9 | 5 | wow!!! 6 | 1 | 1 | ******!!! >:(	Rating and review is created in database Enter MovieID: 1 You are now reviewing: Black Panther: Wakanda Forever Enter a rating for this movie (1-5): 4 Enter your review for this movie. so cool!!!

Features	Update Rating and Review	Delete Rating and Review	Print admin list	Create new admin	Update existing admin
User Inputs	Admin provides valid review id and valid field value	Admin provides valid review id	User selects print admin list	Admin selects create new admin and provides valid admin username and password	Admin provides valid admin id and field value

Application Outputs	Rating and review is updated 	The review is deleted in the database 	Admin list is displayed on screen 	New admin is created and database is updated 	Admin details are updated 

Features	Delete existing admin	Print holiday list	Create a new holiday	Update an existing holiday	Delete an existing holiday
User Inputs	Admin provides valid admin id	Admin selects print holiday list	Admin selects create a new holiday and enters the valid fields	Admin selects update an existing holiday and enters the valid fields	Admin selects delete an existing holiday and enters a valid holiday name
Application Outputs	Admin is deleted 	List of holidays are displayed on the screen 	Holiday is created in database 	Holiday details are updated 	Holiday is deleted in database 

Movie Goer

Features	Check if a seat is available	Create review and rating	Find movie
User Inputs	User enters valid show id and seat	User selects create review and rating, then enters movie ID, rating, and review	User selects find movie and enters movie name
Application Outputs	Message displayed on availability of seat	Rating and review is saved in database	If a successful match is found, the movie details are displayed

	Which seat would you like to check is available? show id: 1 seat: A3 Seat has been taken!	You are now reviewing: wayne and his life Enter a rating for this movie (1-5): 5 Enter your review for this movie. so interesting! In rating and review database: 12|5|so interesting!|8|	Enter the name of the movie you wish to find: Ajoomma Movie found. Movie Title: Ajoomma Showing Status: NOW_SHOWING Synopsis: Auntie (Hong Huifang), is a middle-aged Singaporean woman Director: He Shuming Cast: Hong Huifang, Jung Dong-Hwan, Kang Hyung Suk, Yeo Jingoo Movie Runtime: 90 Movie Rating: NC16 Movie Type:BLOCKBUSTER

Features	Book a new ticket			
User Inputs	User enters valid show id, valid SINGLE seat and valid user age type to book ticket. Note: user can only book tickets for a show whose status is "Preview" and "Now Showing"	User enters valid show id, valid COUPLE seat and valid user age type to book ticket	**Ticket price is shown correctly when booking is done on any date**	**Ticket booking prices will differ based on different day of the week or holiday and type of cinema**
Application Outputs	Example: movie "new" has "Ended Showing" status | hello world | COMING_SOON | Test Movie | COMING_SOON | new stuff | NOW_SHOWING | testtest | SHOWING_ENDED | new | SHOWING_ENDED | Mr Bobby | NOW_SHOWING Only shows of movies with status "Preview" and "Now Showing" are displayed. Example: movie "new" CINEPLEX | THEATRE | DATE | START TIME | END TIME | MOVIE NAME AMK Hub Mall | 1 | 11/11/2022 | 14:00 | 16:00 | Black Panther: Wakanda Forever Bishan Town Hall | 2 | 12/11/2022 | 13:25 | 14:55 | Ajoomma Jurong Point Junction | 3 | 12/12/2021 | 09:00 | 11:00 | Deleted Bishan Town Hall | 1 | 12/12/2021 | 14:00 | 16:00 | Deleted Jurong Point Junction | 2 | 01/02/2023 | 12:11 | 15:11 | Deleted AMK Hub Mall | 3 | 12/12/2020 | 14:11 | 16:00 | Love Today (Tamil) Jurong Point Junction | 4 | 12/11/2014 | 12:00 | 15:00 | Ajoomma Jurong Point Junction | 2 | 12/12/2022 | 14:00 | 16:33 | Love Today (Tamil) Jurong Point Junction | 5 | 12/11/2022 | 12:00 | 12:01 | wayne and his life AMK Hub Mall | 3 | 13/11/2022 | 15:00 | 17:41 | Black Panther: Wakanda Forever Bishan Town Hall | 3 | 12/12/2022 | 21:00 | 23:05 | Black Adam Bishan Town Hall | 3 | 14/12/2022 | 21:00 | 23:05 | Black Adam Bishan Town Hall | 3 | 15/12/2022 | 19:00 | 19:01 | wayne and his life AMK Hub Mall | 1 | 12/12/2022 | 12:00 | 14:25 | Mr Bobby AMK Hub Mall | 1 | 12/12/2022 | 07:00 | 09:25 | Mr Bobby AMK Hub Mall | 1 | 17/12/2022 | 07:00 | 09:25 | Mr Bobby AMK Hub Mall | 7 | 12/12/2022 | 07:00 | 09:25 | Mr Bobby AMK Hub Mall | 1 | 02/05/2022 | 07:00 | 09:25 | Mr Bobby Single seat is booked | Theatre | Theatre Class | Date | Start Time | Day Type | Price | | 1 | STANDARD | 11/11/2022 | 14:00 | WEEKDAY | 12.0 |	Couple seat is booked Ticket(s) has been booked! Here is the receipt for your ticket(s): Ticket Id | Movie Title | Seat 49 | Black Panther: Wakanda Forever | I13 50 | Black Panther: Wakanda Forever | I14 In ticket database: 8|1|10|A6|STUDENT|WEEKDAY|0.0 10|1|5|E4|STUDENT|WEEKDAY|15.5 11|1|5|G9|STUDENT|WEEKDAY|15.5 12|1|5|G10|STUDENT|WEEKDAY|15.5	Standard price on a weekday date $10.50 on a normal weekday | Day Type | Price | | WEEKDAY | 10.5 | Holiday in configured on that date (2022-11-11) Please enter the holiday's Name: Wayne Appreciation Day Please enter the holiday's Year: 2022 Please enter the holiday's Month: 11 Please enter the holiday's Day of Month: 11 Wayne Appreciation Day has successfully been created. Ticket price is shown correctly $12 on holiday on 2022-11-1 Ticket(s) has been booked! | Price | | 12.0 |	$12.0 for ticket with day type "Weekday", and theatre class "Standard" | Theatre | Theatre Class | Date | Start Time | Day Type | Price | | 1 | STANDARD | 11/11/2022 | 14:00 | WEEKDAY | 12.0 | $27.0 for ticket with day type "Weekend", theatre class "Platinum" | Theatre | Theatre Class | Date | Start Time | Day Type | Price | | 7 | PLATINUM | 12/12/2022 | 07:00 | WEEKDAY | 27.0 |

Features	View my booking history	Display top 5 movies by ticket sales	Display top 5 movies by rating
User Inputs	User selects view my booking history	User selects display top 5 movies by ticket sales	User selects display top 5 movies by rating
Application Outputs	Booking history of user is displayed TID: AHM202211121501 Ticket ID: 32 Movie Goer ID: 5 Date/Time: 2022-11-12;15:01 TID: AHM202211121516 Ticket ID: 1 Movie Goer ID: 5 Date/Time: 2022-11-12;15:16 TID: AHM202211121516 Ticket ID: 2 Movie Goer ID: 5 Date/Time: 2022-11-12;15:16	Top 5 movies by ticket sales is displayed Top 5 movies by Ticket Sales: Black Panther: Wakanda Forever wayne and his life Love Today (Tamil) Ajoomma The Quintessential Quintuplets	Top 5 movies by rating is displayed Top 5 movies by Rating: Uunchai (Hindi) Black Hawk hello world wayne and his life Black Panther: Wakanda Forever

Features	Print Shows and Show Ids	View seat plan of a show
User Inputs	User selects print shows and shows ids. Note: only shows of movies with status “Preview” and “Now Showing” is displayed	The user enters a show id
Application Outputs	Example: movie “new” has “Ended Showing” status 17 | testtest | SHOWING_ENDED | y 18 | new | SHOWING_ENDED | k 19 | Mr Bobby | NOW_SHOWING | Mr bobby and his chocolate factory Only details of shows of movies with status “Preview” and “Now Showing” are displayed on the screen	Seat plan of show (showing available and unavailable seats) is displayed

```
CINEPLEX              | THEATRE | DATE       | START TIME | END TIME   | MOVIE NAME                      | ID
----------------------------------------------------------------------------------------------------------------
AMK Hub Mall          | 1       | 11/11/2022 | 14:00      | 16:00      | Black Panther: Wakanda Forever | 1
Bishan Town Hall      | 2       | 12/11/2022 | 13:25      | 14:55      | Ajoomma                        | 2
Jurong Point Junction | 3       | 12/12/2021 | 09:00      | 11:00      | Deleted                        | 3
Bishan Town Hall      | 1       | 12/12/2021 | 14:00      | 16:00      | Deleted                        | 4
Jurong Point Junction | 2       | 01/02/2023 | 12:11      | 15:11      | Deleted                        | 5
AMK Hub Mall          | 3       | 12/12/2020 | 14:11      | 16:00      | Love Today (Tamil)             | 6
Jurong Point Junction | 4       | 12/11/2014 | 12:00      | 15:00      | Ajoomma                        | 7
Bishan Town Hall      | 5       | 12/11/2025 | 12:00      | 14:00      | The Quintessential Quintuplets | 8
Jurong Point Junction | 2       | 12/12/2022 | 14:00      | 16:33      | Love Today (Tamil)             | 9
Jurong Point Junction | 3       | 12/11/2022 | 12:00      | 12:01      | wayne and his s life           | 10
AMK Hub Mall          | 3       | 13/11/2022 | 15:00      | 17:41      | Black Panther: Wakanda Forever | 11
Bishan Town Hall      | 3       | 12/12/2022 | 21:00      | 23:05      | Black Adam                     | 12
Bishan Town Hall      | 3       | 14/12/2022 | 21:00      | 23:05      | Black Adam                     | 13
Bishan Town Hall      | 3       | 15/12/2022 | 19:00      | 19:01      | wayne and his s life           | 14
Jurong Point Junction | 3       | 11/11/2022 | 14:30      | 14:42      | Test Movie                     | 15
```

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            1   2   3   4   5   6   7   8       9   10  11  12  13  14  15  16
 A | | | | [*] [*] [X] [0] [0] [X] [0] [0]  | | [0] [0] [0] [0] [0] [0] [0] [0]  | | | | A
 B | | | | [*] [*] [0] [0] [0] [0] [0] [0]  | | [0] [0] [0] [0] [0] [0] [0] [0]  | | | | B
 C | | | | [*] [*] [0] [0] [0] [0] [0] [0]  | | [0] [0] [0] [0] [0] [0] [0] [0]  | | | | C
 D | | | | [*] [*] [0] [0] [0] [0] [0] [0]  | | [0] [0] [0] [0] [0] [0] [0] [0]  | | | | D
 E | | | | [0] [0] [0] [0] [0] [0] [0] [0]  | | [0] [0] [0] [0] [0] [0] [0] [0]  | | | | E
 F | | | | [0] [0] [0] [0] [0] [0] [0] [0]  | | [0] [0] [0] [0] [0] [0] [0] [0]  | | | | F
 G | | | | [0   0] [0   0] [0   0] [0   0]  | | [0   0] [0   0] [0   0] [0   0]  | | | | G
 H | | | | [0   0] [0   0] [0   0] [0   0]  | | [0   0] [0   0] [0   0] [0   0]  | | | | H
 I | | | | [X   X] [X   X] [X   X] [0   0]  | | [*] [*] [0] [0] [0   0] [0   0]  | | | | I
Legend
   *    : no seat
  | |   : stairs/aisle
  [ ]   : single seat
  [   ] : couple seat
   0    : seat is available
   1    : seat is taken
```

Object-Oriented Concepts Utilised

Encapsulation

Encapsulation builds a barrier to protect an object's private data. Our source code implements multitudinous examples of encapsulation such as the various classes in the `Models` package which uses getter and setter methods to access variables to deny unintended access. This is especially important for Model classes that contain user information such as `admins.txt`.

Abstraction

Examples of abstraction within our application would be the various methods we implemented in our manager classes under controllers. The various class methods implemented do not require the user to understand the inner workings and implementation logic. Developers would only need to understand the business logic behind the applications to be able to utilise and extend from them.

Inheritance

A mechanism that defines a new class which inherits the properties and behaviours (methods) of a parent class. A specific example of inheritance in our source code would be the `MovieManagerAdmin` class which inherits from the `MovieManagerMovieGoer` class. This inheritance allows methods such as `findMovies` method to be inherited which reduces code duplicity.

Polymorphism

Polymorphism refers to means the ability of an object reference being referred to different types. An example of this within our application would be in our boundary classes whereby we implemented the `showSelections` method in our `UserUI` abstract class. This showSelections method then took on different forms in its implementation in the `AdminUI` and `MovieGoerUI` classes.

Proposed Features

Feature 1: QR Code Payment

Currently, our application does not process payment by users since booking a ticket and purchasing a ticket are taken to be the same thing. Moving forward, upon booking a ticket, we wish to **display a QR code that would enable users to make online payment**, much like how services such as PayLah generate dynamic QR codes for each payment instance.

How current design caters to feature: Incorporating this feature would require a Payment class, PaymentManager class, and the ZXing library. Due to our emphasis on the Single Responsibility Principle and the concept of loose-coupling, the integration of these new classes would not lead to changes in other Model/Controller classes since each Controller only manipulates its own Model.

Feature 2: Drinks & Snacks Packages

All cinemas in Singapore allow users to purchase drinks and snacks as bundles/deals along with tickets. To be congruent with this, we wish to add the Drinks and the Snacks model classes. Alongside this would be an **overloaded `calculatePrice` method in the TicketPriceManager class to accept 2 additional parameters**: `Drink drink` and `Snack snack` to calculate the final price after factoring in the drinks and snacks.

How current design caters to feature: Incorporating the 2 new model classes would be easy due to our adherence to the Single Responsibility Principle. In addition, the overloaded `calculatePrice` method is favoured over method overriding in a new Controller class which would violate the Liskov Substitution Principle. This happens because the subclass' calculatePrice method would require 2 additional parameters to the base class' calculatePrice method. An example of the proposed method overloading is as shown:

```
public static double calculatePrice(Show show, Ticket.UserAgeType
userAgeType, String strDate, Movie movie) {//…}

public static double calculatePrice(Show show, Ticket.UserAgeType
userAgeType, String strDate, Movie movie, Drink drink, Snack
snack) {//…}
```