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 honored 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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Design Considerations

Assumptions (In addition to Assignment Brief)

- Our MOBLIMA is used in a commercial and realistic setting. Where all users follow the logic of using a real Movie application.
- The staff accounts are fixed, i.e. no new account creation, and no existing account is modified/deleted by the admins.
- The admins will follow the format of settings values (similar to the predefined values).
- Movies, cinemas, and cineplexes information are initialized manually every time the program starts.
- Since the movie-goers are only identified by their email addresses, we assume movie-goers do not have access to others' email addresses, otherwise it would be a security concern.
- 24-hour clock time will be used
- There are only 4 Hall types: standard, premium or VIP, Imax 3D

Principles Used

Single Responsibility Principle

Our MOBLIMA achieves many functions of a Movie Booker, to do so, we implemented many Classes to manage each of the individual functions. Single Responsibility Principle summarizes to mean that one Class should only do one thing and therefore for a Class to change, there should only be one reason. This ties in with future development and scalability. In our MOBLIMA, we used Cineplex Class to manage Cineplexes and a CineplexHandler to handle all Cineplex objects. This applies for other functions of our MOBLIMA such as - Cinema, Movies, Seat, Shows, Users and Bookings. These handlers then perform their necessary operations and exchange individually possessed information. The MovieBooker Class is the main controller for our MOBLIMA, calling the necessary Classes that the user chooses in the menu displayed in MovieBookerApp. The Admin module is also split into different classes for the module to function; an AdminForm class to display the login interface, LoginObserver to manage the login status and an Admin class to handle the admin module. Additionally, we separated utility functions into different Classes as well, UtilityInputs for all user inputs and Settings Class to handle MOBLIMA settings.

By adhering to the Single Responsibility Principle, future adding of new functions into our MOBLIMA will not affect the existing functionalities. For example, when a function to manage Users is required, only classes associated with Users will be modified. Following that if an internal function whereby it is not interacted by applications users is to be added only the User and its handler class will be modified. To add on, if a new function that is 'front-facing' is required, only the MovieBooker and MovieBookerApp classes will need to be added.

Open-Closed Principle

Our MOBLIMA aims to create an environment where the application is scalable and new functions can be added easily without editing the existing and tested functionalities of the application. This aligns with the Open-Closed Principle where it states that Classes should be open for extension and closed to modifications. An example of this is how we designed our Controller/Handler classes, all functions perform their own specified tasks and are capable of functioning individually. This means that when adding a new function into the application, existing functions should not need to be edited since there is little co-dependence. In order to better prepare for future extensions, we return Entity objects instead of the required data types, meaning that the function to implement the required functionality will get and manage the relevant information from the Entity objects internally. This can be seen in our implementation of CinemaHandler, where Cinema entity is returned instead of the information required by the callee.

Our functions are closed for modifications and open for extensions since existing functions do not require change even if there are new functions to be added, while the new functions will be processing the information they require internally.

Another way we apply this principle is through the use of interfaces. For example, our MovieBookerApp interacts with the MovieBooker object through an interface MovieBookerInterface (i.e. MovieBookerApp uses a MovieBookerInterface to access functions implemented by MovieBooker). This way, should there be an addition in the logics of MovieBookerInterface (e.g. another way to search movies), all we need is to create a new concrete class implementing MovieBookerInterface with the new logics (e.g.

MovieBookerNew), and in MovieBookerApp.showUserView() method, we plug in an instance of MovieBookerNew as a parameter instead of MovieBooker.

Then, movieBooker.searchMovie() in the showUserView() method will now function based on the implementation of MovieBookerNew instead of MovieBooker. Therefore, this part of our program is open for extension in the sense that we can now extend the implementation of the function searchMovie() (there are two ways of searching for movies now, one based on MovieBooker and another based on MovieBookerNew); at the same time, it is also closed to modifications (we do not need to change the searchMovie() method of MovieBooker class nor showUserView()).

Liskov Substitution Principle

For every Entity there is a Handler class in our MOBLIMA. Each of Handler manage their individual and different types of data, however, there are common operations that contribute to the basic operation such as get and sets of our MOBILMA. These operations are implemented similarly whereby they take in unique keys for the operation in different handlers to align with the Liskov Substitution Principle; where it states that subclasses should be substitutable for their base classes. For example, Handler classes are responsible for managing and retrieving a list of the Entities they handle - seen in CinemaHandler, CineplexHandler, MovieHandler, SeatHandler, ShowHandler, UserHandler. If any of the Controller classes (which can be interpreted as the SuperHandler Interface) call to remove an object using the unique key, an unexpected exception will not be raised. The same can be seen for the initialization, adding and searching functions in the Handlers.

Interface Segregation Principle

This principle means to keep things separated, where there should not be one general-purpose interface such that a function that is not required is not forced to be implemented. In our MOBLIMA, we considered this principle by separating modules into their separate Controllers. For example, the BookingController and Admin are separated by their module functionality. Booking implements functions like retrieving seats that are not required by Admin. Another example is the Handlers for each separate Entity; not all Handlers need the same functions: for example MovieHandler requires a search function whereas UserHandler does not. Hence, we do not create a Handler interface and force UserHandler to implement a search function which is irrelevant to it. Splitting the interface any further is not required since at the current state of our MOBLIMA, each Handler/Controller is already limited to only their base functions. Therefore, the principle need not be applied any further in our MOBLIMA.

Dependency Inversion Principle

This principle states that all classes should depend upon interfaces and abstractions instead of concrete classes. This is interpreted as for higher level modules like MovieBookerApp, BookingController and Admin to be independent and non-detailed. Lower level modules like the Handlers to contain the details. In our MOBLIMA, we follow this principle which can be seen in the MovieBookerApp that shows the menu, implements MovieBooker and each option has one function to call the necessary Handler and functions. Similarly seen in Admin.

This principle is related to the Open-Closed principle where the design when implemented in considerations for the Open-Closed Principle will fulfill the Dependency Inversion Principle as well.

OO Concepts

Note: In this section, ‘user' refers to the classes/methods that use another class/method.

Abstraction

Abstraction in Object-Oriented programming intends to hide the implementations from users. This includes trivial methods, attributes, etc. that the user does not need to know when using the class. One of the ways to achieve this is by the use of interfaces and abstract classes, and using another concrete class to implement the interface, thus the user will only know methods in the interfaces and how to use them. In our project, we created an interface for the MovieBooker class (MovieBookerInterface), providing users with only the information about essential methods they need. Likewise, in the Admin module, the users can effectively utilize all of Admin class functions while only having access to essential methods defined in AdminLogic interface. Other methods that belong to the inner workings of Admin class (such as login()) are not accessible by the user, reducing the complexity for the user as well as preventing the users from accidentally making unwanted changes to the implementation of the class.

Encapsulation

Encapsulation refers to the act of hiding ‘inside' information from users. We exercised this concept carefully by making all attributes of classes private, or protected if it is needed in its derived class. This is so that all information related to a class is packed within that class and cannot be accessed by unwanted entities outside the class. If needed, we only allow access of certain information through get and set methods. For example, in the MovieHandler class, the list of movies managed by the class is a private attribute. Users cannot access that attribute freely, instead they have to use the pre-defined public getMovie/searchMovie (get methods) and createMovie/removeMovie (set methods) methods as channels to access. This way we can control and prevent unwanted accesses to the inner data of an object.

Inheritance

In our project we used inheritance for two reasons. Firstly, we created more specialized classes from more general classes: for example, specialized exception classes, or Settings class as a specialized java.util.Properties class. These specialized classes are customized with extra methods and attributes so that they are suited for use in our projects. Either they are added with new methods (e.g. print() method of Settings class), or the general methods from parent classes are overloaded (e.g. load() method of Settings class). This allows re-use of general classes to make our code more compact.

Secondly, it allows us to organize similar classes as a ‘family', with a general base class that regulates the most basic and general functions of the family and specialized child classes that actually carry out the different functions in different cases. An example of this is the Form ‘family', with base class Form and children SettingsForm and AdminForm. The Form class forces every class that inherits from it to have show()/exit() methods, which are the most basic functions of an UI. At the same time, its child classes will implement the show() method differently, because each ‘Form' will have a different way of displaying information.

New features

Our program was created with future enhancement and improvements in mind, such that minimal changes need to be made in order to change when we need to. With the current implementation of our design, we have a few features in mind that can help improve the application as well as user friendliness.

Reminder Feature

Our program can be modified to send a message via email or text a reminder for their booking on the day itself together with their electronic ticket (eTicket). We can add a method to the 'Booking Controller' class, SendReminderMessage, that automatically sends a pre-written message to the guest's mobile or email together with their eTicket at the start of the day of their booking. This can be easily changed as our current program stores users' details such as email, mobile number and the show details including the show time of the movie in the '`Ticket`' entity. With the list of tickets, we can periodically check and remove outdated tickets, and notify users if their show time is on the same day using APIs such as Twilio SMS. This illustrates that our program is designed with extensibility in mind.

User Login Feature

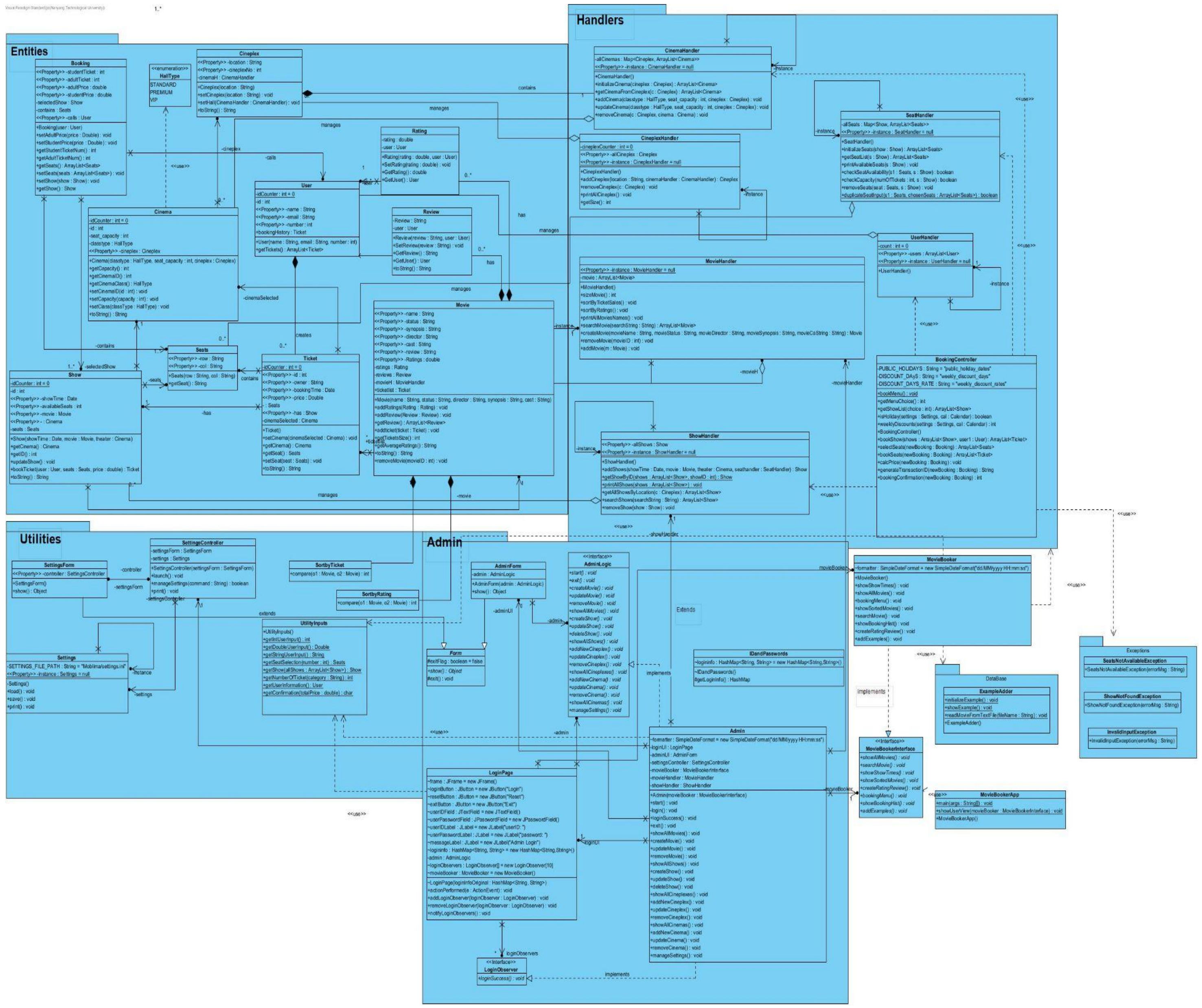
Similar to admin login, we can also implement a user login feature for users to enjoy a more personalized experience. With this implementation, we can add functionalities such as cart, birth-month vouchers and membership tiers so that returning/new users can enjoy more benefits like free upgrade of cinema classes or cheaper tickets. Our current design allows this to be implemented easily as we can extend the `'IDandPasswords'` file to create another set of Hashmap and load it into the `'LoginPage'` class. Just like the 'Admin' class, we can create a similar class `'UserController'` that implements `'LoginObserver'` to complete the login process.

Converting to Web Application

When designing our program, we segregated the outputs and inputs to a separate class so that it can easily be expanded on when we want to upgrade our application to a web application. WIth the logical separation of our program logic and input/output, we can easily change any printing format of our output or change the way we receive input from users. To do so, our input/output can easily be modified to insert HTML tags, making use of JSP technology.

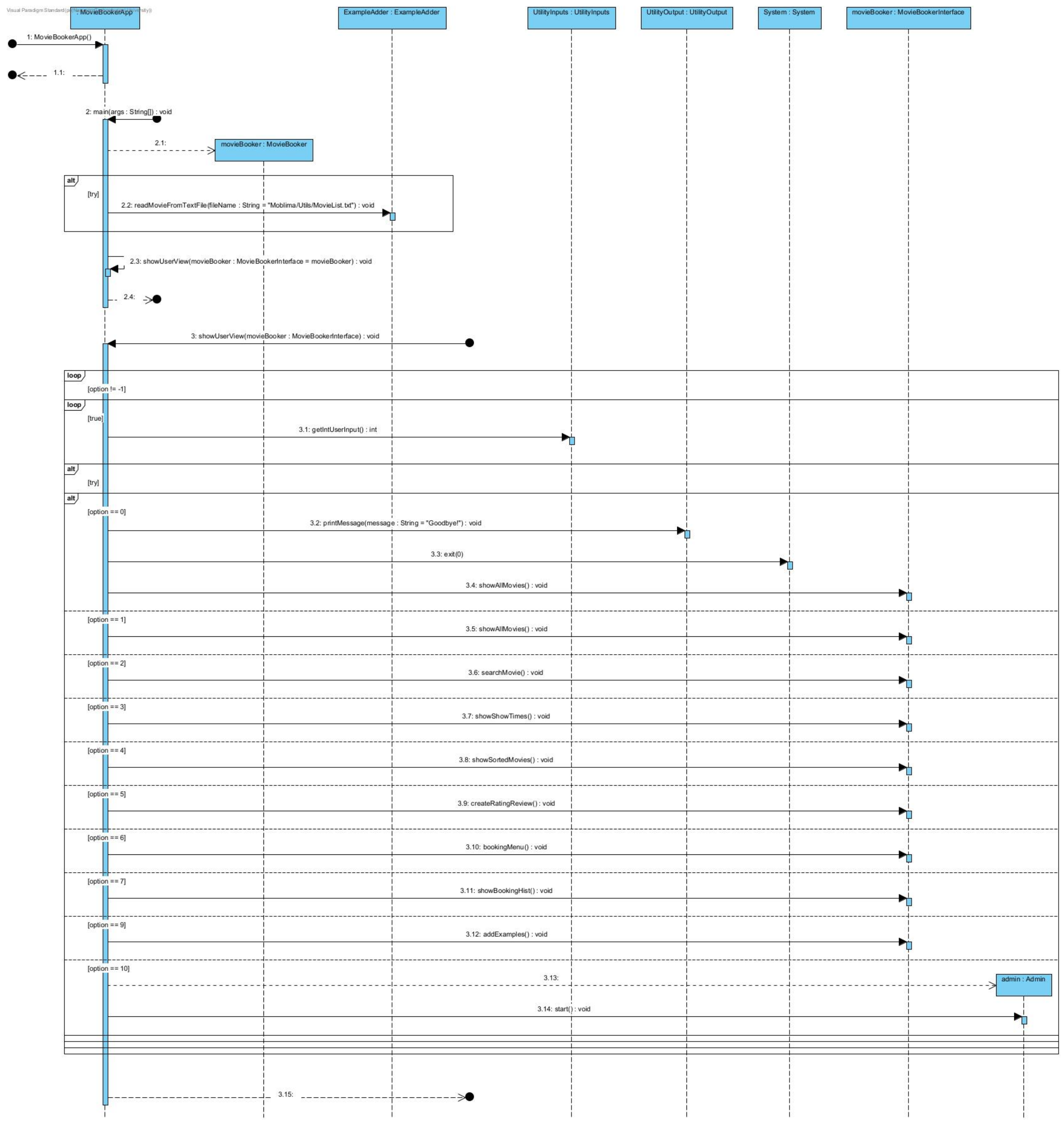
Detailed UML Diagram

See assignment folder for diagram in higher resolution.



Sequence diagram for MovieBookerApp

See assignment folder for diagram with higher resolution.


: MovieBookerApp
ExampleAdder : ExampleAdder
UtilityInputs : UtilityInputs
UtilityOutput : UtilityOutput
System : System
movieBooker : MovieBookerInterface
1: MovieBookerApp()
1.1:
2: main(args : String[]) : void
2.1:
movieBooker : MovieBooker
alt
[try]
2.2: readMovieFromTextFile(fileName : String = "Moblima/Utils/MovieList.txt") : void
2.3: showUserView(movieBooker : MovieBookerInterface = movieBooker) : void
2.4:
3: showUserView(movieBooker : MovieBookerInterface) : void
loop
[option != -1]
loop
[true]
3.1: getIntUserInput() : int
alt
[try]
alt
[option == 0]
3.2: printMessage(message : String = "Goodbye!") : void
3.3: exit(0)
3.4: showAllMovies() : void
[option == 1]
3.5: showAllMovies() : void
[option == 2]
3.6: searchMovie() : void
[option == 3]
3.7: showShowTimes() : void
[option == 4]
3.8: showSortedMovies() : void
[option == 5]
3.9: createRatingReview() : void
[option == 6]
3.10: bookingMenu() : void
[option == 7]
3.11: showBookingHist() : void
[option == 9]
3.12: addExamples() : void
[option == 10]
3.13:
admin : Admin
3.14: start() : void
3.15:

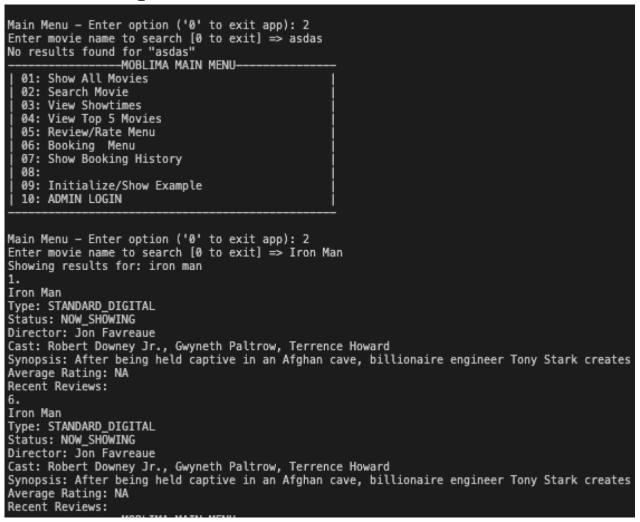
Testing Screenshots

Below are the screenshots of our application. Due to space limitations, we have only included the movie goers testing because we felt that it is more important due to how unpredictable users can be when using our application. Nonetheless, we have also done up the admin test cases and have attached it along with our submissions.

Test case & results

Search Movie

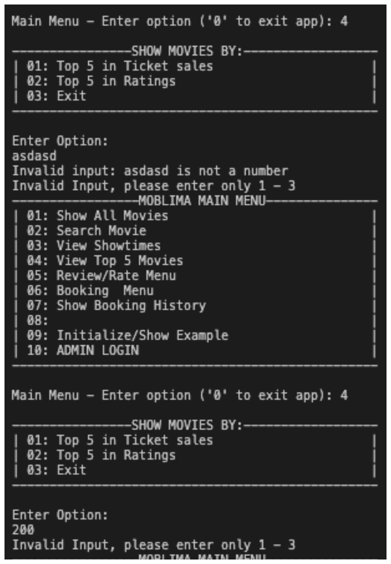
Incorrect Input



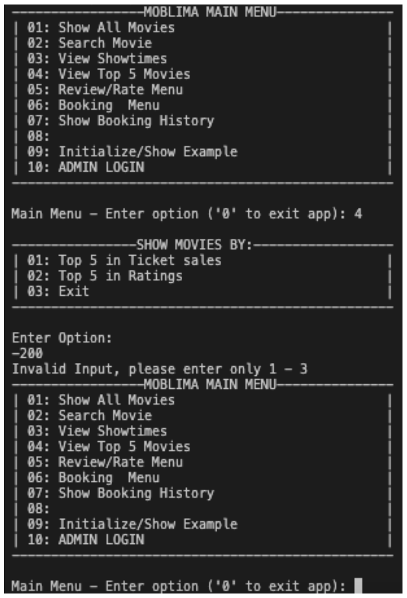
```
Main Menu - Enter option ('0' to exit app): 2
Enter movie name to search [0 to exit] => asdas
No results found for "asdas"
-----------------MOBLIMA MAIN MENU----------------
| 01: Show All Movies                             |
| 02: Search Movie                                |
| 03: View Showtimes                              |
| 04: View Top 5 Movies                           |
| 05: Review/Rate Menu                            |
| 06: Booking  Menu                               |
| 07: Show Booking History                        |
| 08:                                             |
| 09: Initialize/Show Example                     |
| 10: ADMIN LOGIN                                 |
--------------------------------------------------

Main Menu - Enter option ('0' to exit app): 2
Enter movie name to search [0 to exit] => Iron Man
Showing results for: iron man
1.
Iron Man
Type: STANDARD_DIGITAL
Status: NOW_SHOWING
Director: Jon Favreaue
Cast: Robert Downey Jr., Gwyneth Paltrow, Terrence Howard
Synopsis: After being held captive in an Afghan cave, billionaire engineer Tony Stark creates
Average Rating: NA
Recent Reviews:
6.
Iron Man
Type: STANDARD_DIGITAL
Status: NOW_SHOWING
Director: Jon Favreaue
Cast: Robert Downey Jr., Gwyneth Paltrow, Terrence Howard
Synopsis: After being held captive in an Afghan cave, billionaire engineer Tony Stark creates
Average Rating: NA
Recent Reviews:
```

View Top 5 Movie

Incorrect Input



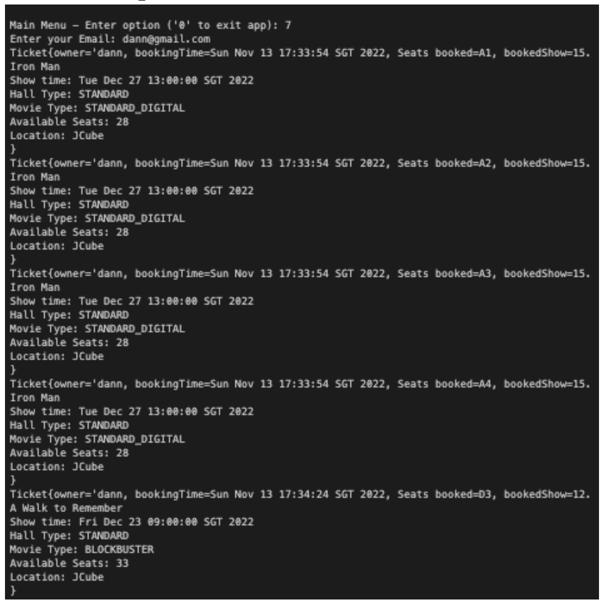
```
Main Menu - Enter option ('0' to exit app): 4

----------------SHOW MOVIES BY:-------------------
| 01: Top 5 in Ticket sales                       |
| 02: Top 5 in Ratings                            |
| 03: Exit                                        |
--------------------------------------------------

Enter Option:
asdasd
Invalid input: asdasd is not a number
Invalid Input, please enter only 1 - 3
-----------------MOBLIMA MAIN MENU----------------
| 01: Show All Movies                             |
| 02: Search Movie                                |
| 03: View Showtimes                              |
| 04: View Top 5 Movies                           |
| 05: Review/Rate Menu                            |
| 06: Booking  Menu                               |
| 07: Show Booking History                        |
| 08:                                             |
| 09: Initialize/Show Example                     |
| 10: ADMIN LOGIN                                 |
--------------------------------------------------

Main Menu - Enter option ('0' to exit app): 4

----------------SHOW MOVIES BY:-------------------
| 01: Top 5 in Ticket sales                       |
| 02: Top 5 in Ratings                            |
| 03: Exit                                        |
--------------------------------------------------

Enter Option:
200
Invalid Input, please enter only 1 - 3
```



```
-----------------MOBLIMA MAIN MENU----------------
| 01: Show All Movies                             |
| 02: Search Movie                                |
| 03: View Showtimes                              |
| 04: View Top 5 Movies                           |
| 05: Review/Rate Menu                            |
| 06: Booking  Menu                               |
| 07: Show Booking History                        |
| 08:                                             |
| 09: Initialize/Show Example                     |
| 10: ADMIN LOGIN                                 |
--------------------------------------------------

Main Menu - Enter option ('0' to exit app): 4

----------------SHOW MOVIES BY:-------------------
| 01: Top 5 in Ticket sales                       |
| 02: Top 5 in Ratings                            |
| 03: Exit                                        |
--------------------------------------------------

Enter Option:
-200
Invalid Input, please enter only 1 - 3
-----------------MOBLIMA MAIN MENU----------------
| 01: Show All Movies                             |
| 02: Search Movie                                |
| 03: View Showtimes                              |
| 04: View Top 5 Movies                           |
| 05: Review/Rate Menu                            |
| 06: Booking  Menu                               |
| 07: Show Booking History                        |
| 08:                                             |
| 09: Initialize/Show Example                     |
| 10: ADMIN LOGIN                                 |
--------------------------------------------------

Main Menu - Enter option ('0' to exit app):
```

Show Booking History

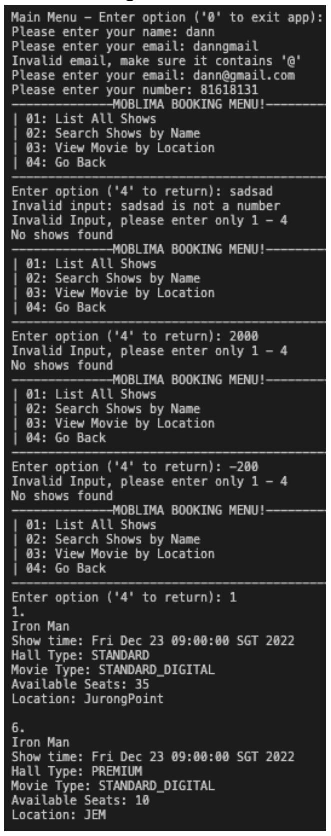
Incorrect Input



```
Main Menu - Enter option ('0' to exit app): 7
Enter your Email: dann@gmail.com
Ticket{owner='dann, bookingTime=Sun Nov 13 17:33:54 SGT 2022, Seats booked=A1, bookedShow=15.
Iron Man
Show time: Tue Dec 27 13:00:00 SGT 2022
Hall Type: STANDARD
Movie Type: STANDARD_DIGITAL
Available Seats: 28
Location: JCube
}
Ticket{owner='dann, bookingTime=Sun Nov 13 17:33:54 SGT 2022, Seats booked=A2, bookedShow=15.
Iron Man
Show time: Tue Dec 27 13:00:00 SGT 2022
Hall Type: STANDARD
Movie Type: STANDARD_DIGITAL
Available Seats: 28
Location: JCube
}
Ticket{owner='dann, bookingTime=Sun Nov 13 17:33:54 SGT 2022, Seats booked=A3, bookedShow=15.
Iron Man
Show time: Tue Dec 27 13:00:00 SGT 2022
Hall Type: STANDARD
Movie Type: STANDARD_DIGITAL
Available Seats: 28
Location: JCube
}
Ticket{owner='dann, bookingTime=Sun Nov 13 17:33:54 SGT 2022, Seats booked=A4, bookedShow=15.
Iron Man
Show time: Tue Dec 27 13:00:00 SGT 2022
Hall Type: STANDARD
Movie Type: STANDARD_DIGITAL
Available Seats: 28
Location: JCube
}
Ticket{owner='dann, bookingTime=Sun Nov 13 17:34:24 SGT 2022, Seats booked=D3, bookedShow=12.
A Walk to Remember
Show time: Fri Dec 23 09:00:00 SGT 2022
Hall Type: STANDARD
Movie Type: BLOCKBUSTER
Available Seats: 33
Location: JCube
}
```

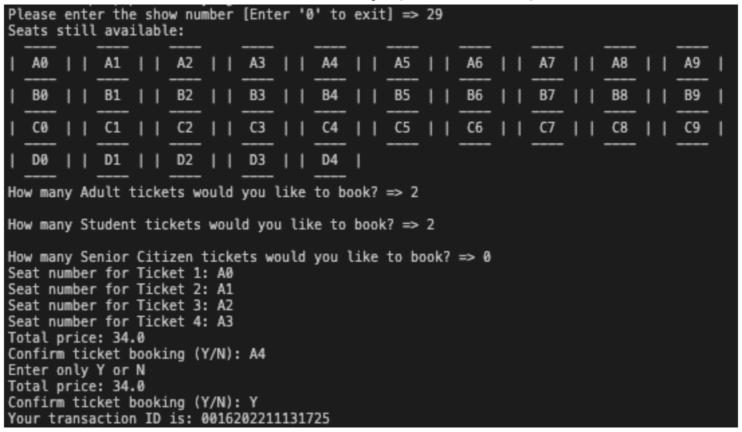
Booking Menu

Invalid Registration

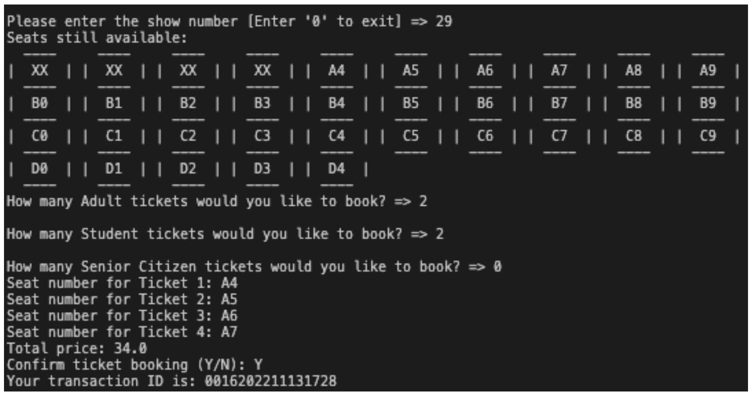


```
Main Menu - Enter option ('0' to exit app):
Please enter your name: dann
Please enter your email: danngmail
Invalid email, make sure it contains '@'
Please enter your email: dann@gmail.com
Please enter your number: 81618131
--------------MOBLIMA BOOKING MENU!---------
| 01: List All Shows
| 02: Search Shows by Name
| 03: View Movie by Location
| 04: Go Back
-------------------------------------------
Enter option ('4' to return): sadsad
Invalid input: sadsad is not a number
Invalid Input, please enter only 1 - 4
No shows found
--------------MOBLIMA BOOKING MENU!---------
| 01: List All Shows
| 02: Search Shows by Name
| 03: View Movie by Location
| 04: Go Back
-------------------------------------------
Enter option ('4' to return): 2000
Invalid Input, please enter only 1 - 4
No shows found
--------------MOBLIMA BOOKING MENU!---------
| 01: List All Shows
| 02: Search Shows by Name
| 03: View Movie by Location
| 04: Go Back
-------------------------------------------
Enter option ('4' to return): -200
Invalid Input, please enter only 1 - 4
No shows found
--------------MOBLIMA BOOKING MENU!---------
| 01: List All Shows
| 02: Search Shows by Name
| 03: View Movie by Location
| 04: Go Back
-------------------------------------------
Enter option ('4' to return): 1
1.
Iron Man
Show time: Fri Dec 23 09:00:00 SGT 2022
Hall Type: STANDARD
Movie Type: STANDARD_DIGITAL
Available Seats: 35
Location: JurongPoint

6.
Iron Man
Show time: Fri Dec 23 09:00:00 SGT 2022
Hall Type: PREMIUM
Movie Type: STANDARD_DIGITAL
Available Seats: 10
Location: JEM
```

Book Same Show Consecutively (Shows XX)

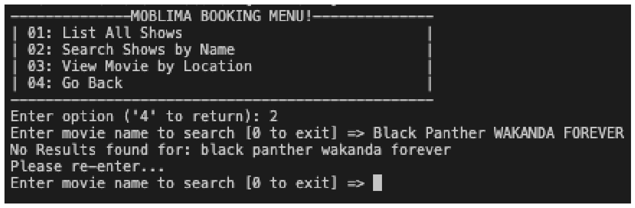


```
Please enter the show number [Enter '0' to exit] => 29
Seats still available:
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| A0 | | A1 | | A2 | | A3 | | A4 | | A5 | | A6 | | A7 | | A8 | | A9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| B0 | | B1 | | B2 | | B3 | | B4 | | B5 | | B6 | | B7 | | B8 | | B9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| C0 | | C1 | | C2 | | C3 | | C4 | | C5 | | C6 | | C7 | | C8 | | C9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| D0 | | D1 | | D2 | | D3 | | D4 |
  ----    ----    ----    ----    ----
How many Adult tickets would you like to book? => 2

How many Student tickets would you like to book? => 2

How many Senior Citizen tickets would you like to book? => 0
Seat number for Ticket 1: A0
Seat number for Ticket 2: A1
Seat number for Ticket 3: A2
Seat number for Ticket 4: A3
Total price: 34.0
Confirm ticket booking (Y/N): A4
Enter only Y or N
Total price: 34.0
Confirm ticket booking (Y/N): Y
Your transaction ID is: 0016202211131725
```



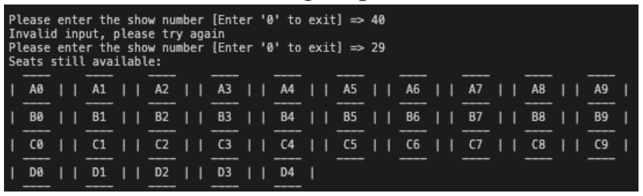
```
Please enter the show number [Enter '0' to exit] => 29
Seats still available:
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| XX | | XX | | XX | | XX | | A4 | | A5 | | A6 | | A7 | | A8 | | A9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| B0 | | B1 | | B2 | | B3 | | B4 | | B5 | | B6 | | B7 | | B8 | | B9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| C0 | | C1 | | C2 | | C3 | | C4 | | C5 | | C6 | | C7 | | C8 | | C9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| D0 | | D1 | | D2 | | D3 | | D4 |
  ----    ----    ----    ----    ----
How many Adult tickets would you like to book? => 2

How many Student tickets would you like to book? => 2

How many Senior Citizen tickets would you like to book? => 0
Seat number for Ticket 1: A4
Seat number for Ticket 2: A5
Seat number for Ticket 3: A6
Seat number for Ticket 4: A7
Total price: 34.0
Confirm ticket booking (Y/N): Y
Your transaction ID is: 0016202211131728
```

Search movie - no results



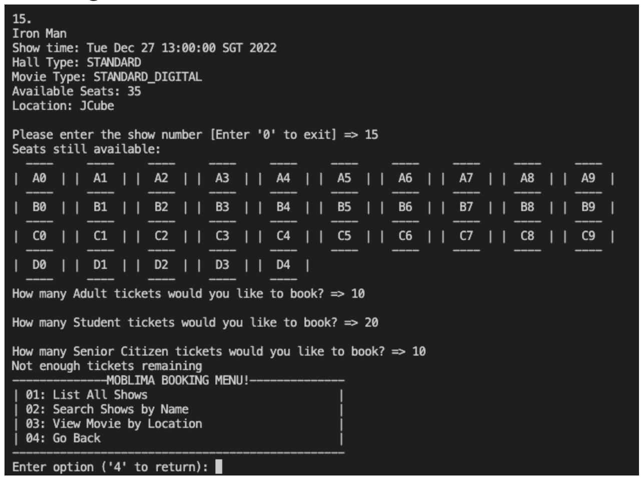
```
---------------MOBLIMA BOOKING MENU!---------------
| 01: List All Shows                              |
| 02: Search Shows by Name                        |
| 03: View Movie by Location                      |
| 04: Go Back                                     |
---------------------------------------------------
Enter option ('4' to return): 2
Enter movie name to search [0 to exit] => Black Panther WAKANDA FOREVER
No Results found for: black panther wakanda forever
Please re-enter...
Enter movie name to search [0 to exit] => 
```

List all shows - out of range input



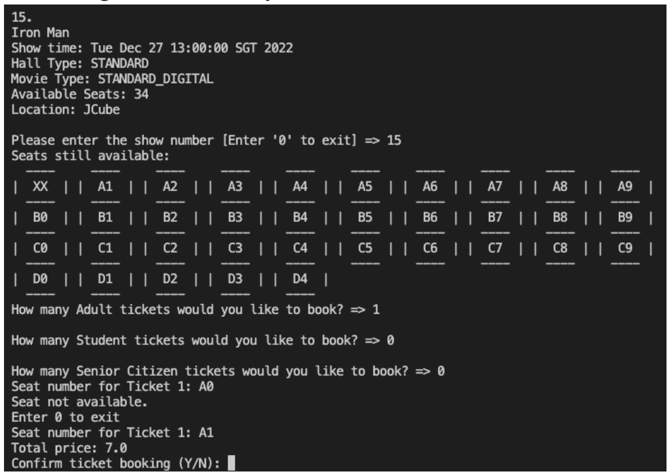
```
Please enter the show number [Enter '0' to exit] => 40
Invalid input, please try again
Please enter the show number [Enter '0' to exit] => 29
Seats still available:
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| A0 | | A1 | | A2 | | A3 | | A4 | | A5 | | A6 | | A7 | | A8 | | A9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| B0 | | B1 | | B2 | | B3 | | B4 | | B5 | | B6 | | B7 | | B8 | | B9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| C0 | | C1 | | C2 | | C3 | | C4 | | C5 | | C6 | | C7 | | C8 | | C9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| D0 | | D1 | | D2 | | D3 | | D4 |
  ----    ----    ----    ----    ----
```

Booking more seats than available



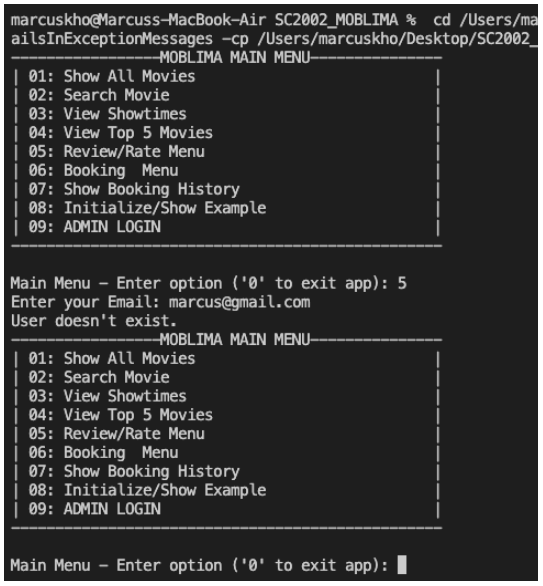
```
15.
Iron Man
Show time: Tue Dec 27 13:00:00 SGT 2022
Hall Type: STANDARD
Movie Type: STANDARD_DIGITAL
Available Seats: 35
Location: JCube

Please enter the show number [Enter '0' to exit] => 15
Seats still available:
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| A0 | | A1 | | A2 | | A3 | | A4 | | A5 | | A6 | | A7 | | A8 | | A9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| B0 | | B1 | | B2 | | B3 | | B4 | | B5 | | B6 | | B7 | | B8 | | B9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| C0 | | C1 | | C2 | | C3 | | C4 | | C5 | | C6 | | C7 | | C8 | | C9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| D0 | | D1 | | D2 | | D3 | | D4 |
  ----    ----    ----    ----    ----
How many Adult tickets would you like to book? => 10

How many Student tickets would you like to book? => 20

How many Senior Citizen tickets would you like to book? => 10
Not enough tickets remaining
--------------MOBLIMA BOOKING MENU!--------------
| 01: List All Shows                             |
| 02: Search Shows by Name                       |
| 03: View Movie by Location                     |
| 04: Go Back                                    |
--------------------------------------------------
Enter option ('4' to return): 
```

Choosing a seat already booked



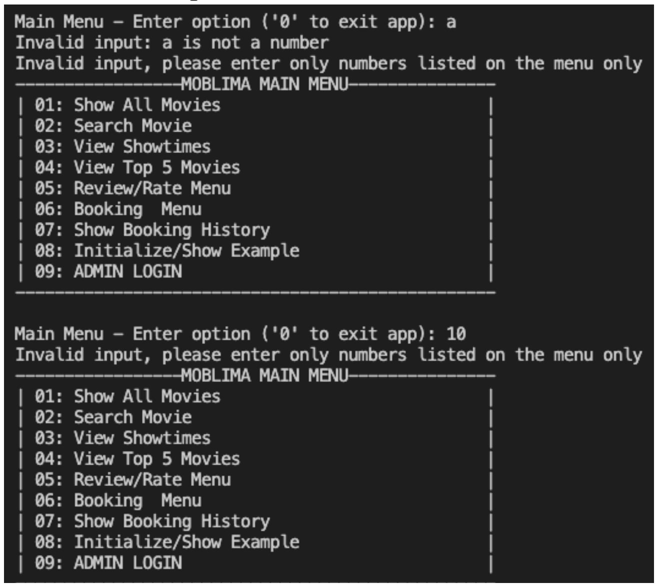
```
15.
Iron Man
Show time: Tue Dec 27 13:00:00 SGT 2022
Hall Type: STANDARD
Movie Type: STANDARD_DIGITAL
Available Seats: 34
Location: JCube

Please enter the show number [Enter '0' to exit] => 15
Seats still available:
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| XX | | A1 | | A2 | | A3 | | A4 | | A5 | | A6 | | A7 | | A8 | | A9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| B0 | | B1 | | B2 | | B3 | | B4 | | B5 | | B6 | | B7 | | B8 | | B9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| C0 | | C1 | | C2 | | C3 | | C4 | | C5 | | C6 | | C7 | | C8 | | C9 |
  ----    ----    ----    ----    ----    ----    ----    ----    ----    ----
| D0 | | D1 | | D2 | | D3 | | D4 |
  ----    ----    ----    ----    ----
How many Adult tickets would you like to book? => 1

How many Student tickets would you like to book? => 0

How many Senior Citizen tickets would you like to book? => 0
Seat number for Ticket 1: A0
Seat not available.
Enter 0 to exit
Seat number for Ticket 1: A1
Total price: 7.0
Confirm ticket booking (Y/N): 
```

Review a movie - new customer



```
marcuskho@Marcuss-MacBook-Air SC2002_MOBLIMA %  cd /Users/ma
ailsInExceptionMessages -cp /Users/marcuskho/Desktop/SC2002_
----------------MOBLIMA MAIN MENU---------------
| 01: Show All Movies                          |
| 02: Search Movie                             |
| 03: View Showtimes                           |
| 04: View Top 5 Movies                        |
| 05: Review/Rate Menu                         |
| 06: Booking  Menu                            |
| 07: Show Booking History                     |
| 08: Initialize/Show Example                  |
| 09: ADMIN LOGIN                              |
-------------------------------------------------

Main Menu - Enter option ('0' to exit app): 5
Enter your Email: marcus@gmail.com
User doesn't exist.
----------------MOBLIMA MAIN MENU---------------
| 01: Show All Movies                          |
| 02: Search Movie                             |
| 03: View Showtimes                           |
| 04: View Top 5 Movies                        |
| 05: Review/Rate Menu                         |
| 06: Booking  Menu                            |
| 07: Show Booking History                     |
| 08: Initialize/Show Example                  |
| 09: ADMIN LOGIN                              |
-------------------------------------------------

Main Menu - Enter option ('0' to exit app):
```

Invalid Menu Input



```
Main Menu - Enter option ('0' to exit app): a
Invalid input: a is not a number
Invalid input, please enter only numbers listed on the menu only
----------------MOBLIMA MAIN MENU---------------
| 01: Show All Movies                          |
| 02: Search Movie                             |
| 03: View Showtimes                           |
| 04: View Top 5 Movies                        |
| 05: Review/Rate Menu                         |
| 06: Booking  Menu                            |
| 07: Show Booking History                     |
| 08: Initialize/Show Example                  |
| 09: ADMIN LOGIN                              |
-------------------------------------------------

Main Menu - Enter option ('0' to exit app): 10
Invalid input, please enter only numbers listed on the menu only
----------------MOBLIMA MAIN MENU---------------
| 01: Show All Movies                          |
| 02: Search Movie                             |
| 03: View Showtimes                           |
| 04: View Top 5 Movies                        |
| 05: Review/Rate Menu                         |
| 06: Booking  Menu                            |
| 07: Show Booking History                     |
| 08: Initialize/Show Example                  |
| 09: ADMIN LOGIN                              |
```

Video Demonstration

Video file is too large.

It is uploaded to youtube, accessible at:

https://youtu.be/_khC2ohYmas

Also accessible at:

https://drive.google.com/file/d/1XwYjA9PIBIbyReHcGxt1TxSB9TIHYJjV/view?usp=sharing