



HACETTEPE UNIVERSITY
COMPUTER ENGINEERING DEPARTMENT

BBM 104: INTRODUCTION TO PROGRAMMING LABORATORY II - 2022 SPRING

Assignment 4

May 13, 2022

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1 Problem Definition

A reservation system for a cinema saloon will be implemented.

Features of the reservation system:

Login

Signup

Choosing Desired Film

Choosing Desired Hall

Choosing Desired Seat

Admin Controls

Extra Feature

2 Explanation of My Implementation

3 separate packages (CinemaReservationSystem, contains driver classes, SystemDataTypes, contains data types custom made for the assignment, and SystemWindows, contains required windows of cinema reservation system) implemented in this assignment. Cinema Reservation System, a driver class to maintain the application flow, and Utils class which used to store paths of data provided by instructors, implemented. User, Film, Hall, SeatRecord classes implemented to store the corresponding data in corresponding HashMaps, from backup file. Usernames, film names, and halls used as keys to User, Film, and SeatRecord HashMaps, respectively. As stated in assignment pdf, same hall name can be used for more than one film. Thus a new HallKey class implemented to use as a key for Hall HashMap. These classes' corresponding equals and hashCode methods implemented, to easily manipulate datas stored. SystemWindows classes are used to implement needed windows, such as login window, signup window, etc.

An extra feature, that grants free film ticket win chance to any user that purchases more than 5 tickets, implemented. A new try chance given to user, after 5 tickets bought for (an admin also can buy tickets, and thus grants the user a try chance) that user. A minor glitch represents in this feature, which is discussed in detail, in Problems Faced in Extra Feature section of the report. Additionally, profile pictures deployed for each user, in order to implement formerly stated extra feature. In order to use free tickets extra feature, a user needs to buy at least 5 tickets. Tickets can be for different halls as well as the same hall. After buying, user needs to click 5 times to the profile picture at the film selection window (Note that clicks must be fast, since there is a hidden countdown at the background). In return a new window comes up to the screen, that asks to the user "Do you feel lucky?". Win chance of a free ticket is approximately 14%.

Moreover, a pop-up that asks user "Are you sure you want to quit?" implemented, which prevents misclicks to close button of the window and saving the backup.dat file.

3 Problems Faced

3.1 Problems faced in Base Application

Ban time, which will be applied when a user tries to login to the system wrong too many times. Ban time feature cannot be implemented easily with `sleep()` or similar methods, since JavaFX methods are single-threaded. Thus this feature assumed to implement with "`LocalDateTime.now().toLocalTime().toSecondOfDay()`" method and some mathematical manipulations. This solution abandoned after finding out a bug. The bug arises when a user tries to login to the system at midnight, resulting in `toSecondOfDay()` method to behave funny. Thus "`System.currentTimeMillis()`" method and some mathematical manipulations implemented to achieve desired feature.

Seat images, reserved or empty, will be added to hall screen. Since an Image View can have only one position on the stage, same Image View cannot be placed to every seat cell again and again. Thus a helper method that creates a new Image View with desired image designed and the desired feature implemented

3.2 Problems faced in Extra Feature

Designed extra feature also needed system to wait for some time. But unlike problem previously stated, "`System.currentTimeMillis()`" method and mathematical manipulation solution cannot be applied, since this time feature required the update some JavaFX nodes with time. To achieve the desired output, JavaFX's `TimeLine` object used.

Also a small glitch, which allows users to try their luck to win free tickets, and then refund their tickets (which are needed to try their luck at the first time), presents in the system. A hard control mechanism to fix the glitch not implemented, since such a control mechanism would result in breaking the backup file and cinema reservation system, which clearly stated in the assignment pdf that should not be applied. Instead, a soft control mechanism implemented, which if a user tries his/her luck and then refunds his/her tickets, he/she must buy 5 tickets, and then also buy 5 new tickets to re-try their luck.

4 Benefits of this System

System allows regular users to buy tickets for their desired films, while allowing non-coder admins to easily update film system. Updating the system will be needed when a new movie comes to the theatre, an old hall needs to be closed, or a user needed to be promoted/demoted to admin status, or club member status...

5 Benefits of GUI

A graphical user interface is a good invention, to let non-coder people to easily use and understand their personal computers, unlike old computers which requires a certain level of knowledge.

References

JavaFX TimeLine Class

JavaFX FileChooser Class