

Movie Ticketing System

Software Requirements Specification

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Group 1

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Document Approval

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1. Introduction

The introduction to this Software Requirements Specification (SRS) provides a layout of all the SRS with purpose, scope, definitions, acronyms, abbreviations, references and overview of the SRS. The goal of this document is to provide an in-depth insight and analysis of the complete Movie Ticketing system. The full requirements of the Movie Ticketing system are written in this document.

1.1 Purpose

The purpose of the software requirement specification is to outline all aspects of the software's functionality which allows for proper execution and usability. Requirements are presented to communicate the customers' requirements and how those requirements are addressed through software development processes. This document will help developers as they work through the software development lifecycle (SDLC).

1.2 Scope

The scope of this document is confined to the features and requirements of the Movie Ticketing system. It primarily focuses on the online and electronic aspect of the Movie Ticketing system, which will process purchases, log data, and display movie information, among a variety of other processes defined in this document. The ticketing system will be user friendly, in the sense that it will be minimalistic and will constantly be updated, allowing the user to easily access and input data as needed.

1.3 Definitions, Acronyms, and Abbreviations

PCI DSS – Payment Card Industry Data Security Standard

API – Application Programming Interface

1.4 References

IEEE Std 830-1998, IEEE Recommended Practice for Software Requirements Specifications.¹

Your 2025 Guide to Writing a Software Requirements Specification – SRS Document, dated 30 January 2025.²

How to Write an SRS Document (Software Requirements Specification Document), dated 17 January 2023.³

1.5 Overview

The rest of this SRS document gives a description of the system, as well as who uses it, the components needed for it, and the data and code requirements for it as well. In section 2, it will provide a general description of the Movie Ticketing system. Section 3 dives into the specifics of the system, and what each of those specific components requires, both customer side and service side. Section 4 lists the analysis models used to gather and decide on requirements for the Movie Ticketing system.

2. General Description

2.1 Product Perspective

The Movie Ticketing system will function in relation to a constantly updated movie database(s), credit card companies, payment gateways, cloud hosting service(s), ticket printers, mapping service(s), and theater management systems.

2.2 Product Functions

This Movie Ticketing software will have the ability to process payment data, return movie data, alter movie seating data, email receipts, keep and return food purchasing data, and keep a database of user accounts.

2.3 User Characteristics

The users include anyone who decides to purchase a movie ticket(s). All the users need to know is how to do a simple aim, click, as well as enter in information, like browsing on other general websites.

2.4 General Constraints

Constraints include compliance with the PCI DSS, website compatibility with major web browsers, compliance with privacy laws, and 99.99% uptime.

2.5 Assumptions and Dependencies

Users are assumed to have a stable connection to the internet. The purchasing software is dependent on third party payment processors (e.g., PayPal). The movie information is reliant on external movie databases being updated and accurate. It is reliant on the functionality of movie theater ticket kiosks and ticket scanners.

3. Specific Requirements

3.1 External Interface Requirements

This section specifies user interface characteristics and requirements for interfacing with external hardware, software and communication means which support the systems operation.

3.1.1 User Interfaces

- The system should present the user with movie posters.
- The system should present a cart icon to navigate to the checkout page.
- The system should present a profile icon to log in.
- The system user interface should be easy to navigate.
- The system should utilize a subtle color template.
- The system should utilize uniform navigation between screens.
- The system should support touchscreen navigation.
- The system should include a plus symbol to increase the number of tickets.
- The system should include a minus symbol to decrease the number of tickets.

3.1.2 Hardware Interfaces

- The system should be hosted on a webserver.

3.1.3 Software Interfaces

- The system should utilize a secure API to process payments.
- The system should utilize a secure email sending service.
- The system should query a database to present the users' requested information.

3.1.4 Communications Interfaces

- The system should support an Ethernet internet connection.
- The system should support a Wi-Fi internet connection.
- The system should support a minimum of 4G cellular network.

3.2 Functional Requirements

This section outlines core requirements which ensure the system functions as necessary. Requirements contain input and outputs to provide a clear understanding of the system's functionality.

3.2.1 Purchasing of Movie Tickets

3.2.1.1 Introduction

- The system should allow the user to purchase a movie ticket.

3.2.1.2 Inputs

- The system should allow the user to utilize a payment method.

3.2.1.3 Processing

- The system should ensure the user enters valid payment information.

3.2.1.4 Outputs

- The system should email the user a receipt of their purchase.

3.2.1.5 Error Handling

- The system should validate the user's payment information and provide notification if the payment method was not successful.

3.2.2 Purchasing of Concession Items

3.2.2.1 Introduction

The system should allow the user to purchase items from the concession stand.

3.2.2.2 Inputs

The system should allow users to utilize a payment method.

3.2.2.3 Processing

The system should ensure the user enters valid payment information.

3.2.2.4 Outputs

The system should email the user a receipt of their purchase.

3.2.2.5 Error Handling

The system should notify the user when a payment is unsuccessful

3.2.3 Displaying Movies

3.2.3.1 Introduction

The system should display all available movies for the user to purchase tickets.

3.2.3.2 Inputs

The system should respond to mouse clicks so the user may see further movie information.

3.2.3.3 Processing

The system should call a new page for the selected movie.

3.2.3.4 Outputs

The system should display a new page containing the clicked movies information

3.2.3.5 Error Handling

The system should notify the user when there are errors navigating to a new page.

3.2.4 Seat Selection

3.2.4.1 Introduction

The system should allow the user to select their desired seats.

3.2.4.2 Inputs

The system should allow the user to click the desired seats from an outline of the theater's seating arrangement

3.2.4.3 Processing

The system should ensure that the seat selected has not already been selected by another person.

3.2.4.5 Error Handling

The system should notify the user when selecting a seat that is unavailable.

3.2.5 Shopping Cart Functionality

3.2.5.1 Introduction

The system should allow the user to add various items to their shopping cart to be purchased at checkout.

3.2.5.2 Inputs

The system should allow the user a clickable option to add items.

3.2.5.3 Processing

The system should account for every new item that has been added to the shopping cart, including the total number of items and total price.

3.2.5.4 Error Handling

The system should notify the user if an item was not successfully added to their cart.

3.2.6 Navigation

3.2.6.1 Introduction

The system should contain a home page which displays a list of available movies

The system should display a summary page when clicking on a movie.

The system should have a checkout page where the user can input payment information.

The system should have an account creation page.

The system should have a page for password reset.

3.2.6.2 Inputs

The system should accept clicks to trigger page navigation.

3.2.6.3. Processing

The system should retrieve the page associated with the user's click.

3.2.6.4 Error Handling

The system should notify the user when there is an error retrieving the requested page.

3.2.7 Account Creation/Log In

3.2.7.1 Introduction

The system should allow the user to create an account.

The system should allow the user to log into their account.

The system should accept a password that is at least 10 characters long.

The system should accept a password that contains at least 1 number.

The system should accept a password that contains at least 1 special character.

3.2.7.2 Inputs

The systems should require an email for account creation.

The system should require a password for account creation.

3.2.7.3 Processing

The system should create and store the user's profile to a database.

The system should notify the user that their account was created.

3.2.6.4 Error Validation

The system should validate the entered email address.

The system should validate the entered password.

The system should notify the user if an invalid email address was entered.

The system should notify the user if an invalid password was entered.

3.2.8 Account Retrieval

3.2.8.1 Introduction

The system should allow the user to reset their password.

The system should send an authentication email to the users' email address.

3.2.8.2 Inputs

The system should respond to the users' clicks to reset their password.

3.2.8.3 Processing

The system should send an email address to the email address provided

3.2.8.4 Error Validation

The system should notify the user when the email address they entered is not that of an account.

The system should notify the user when an invalid email address is entered.

3.3 Use Cases

3.3.1 Purchasing Tickets No Sign in and Prints Tickets

Name: Movie Ticketing System

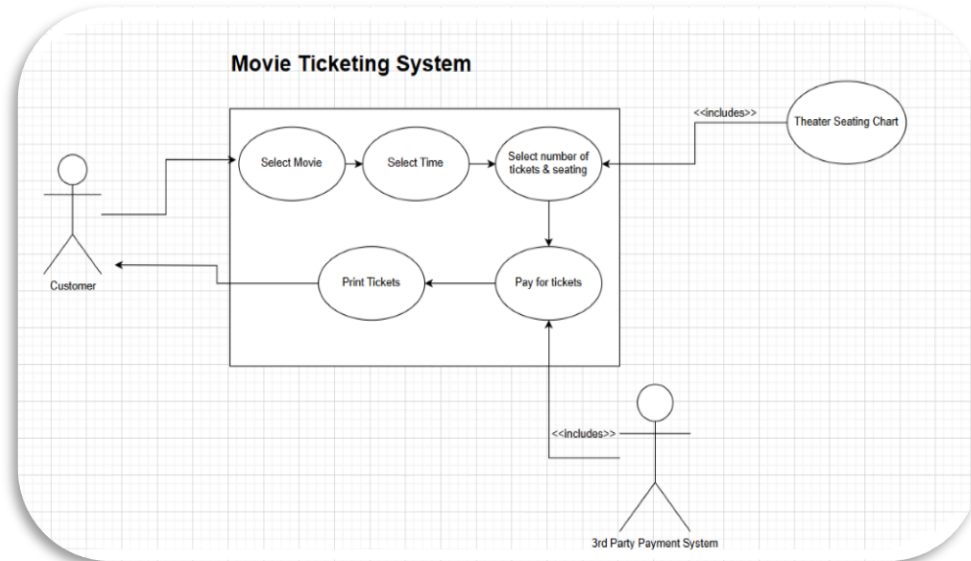
Actor(s): User

Flow of events:

1. User navigates to movie ticketing system.
2. User signs in to an account with the theater.
3. User selects a film.
4. User selects an available time for selected film.
5. User selects the total number of tickets and seating selection.
6. User pays for tickets.
7. User chooses to have tickets printed.
8. User receives printed tickets.

Entry Conditions:

1. Users must have successfully accessed the system.



3.3.2 User Signs In To Purchase Tickets and Emails Tickets

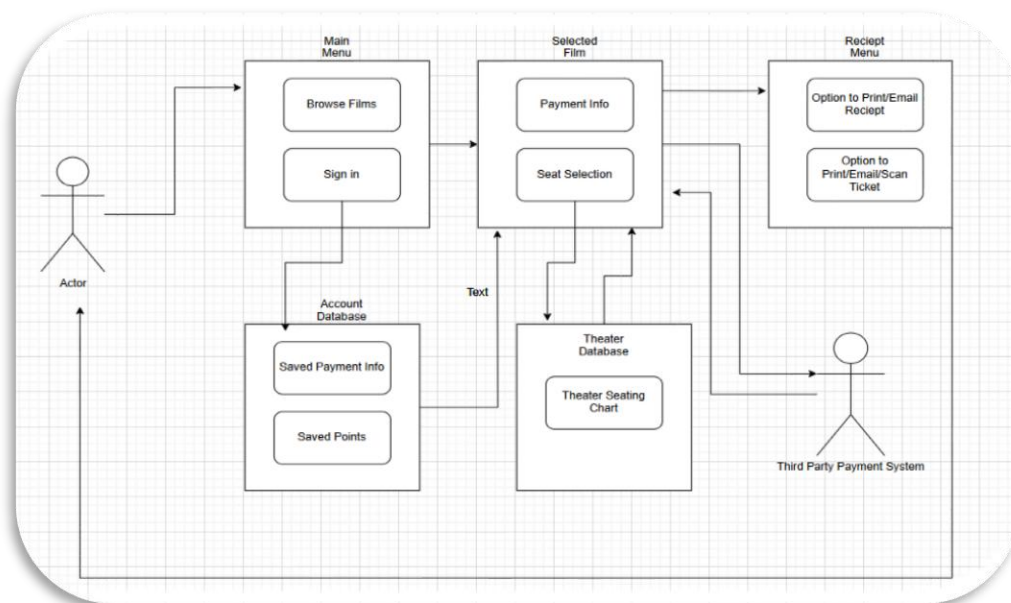
Actor(s): Customer

Flow of events:

1. User navigates to movie ticketing system.
2. User signs in to an account with the theater.
3. User selects a film.
4. User selects an available time for selected film.
5. User selects the total number of tickets and seating selection.
6. User pays for tickets.
7. User chooses to have ticket emailed.
8. User receives email of ticket.

Entry Conditions:

2. Users must have successfully accessed the system.



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3.2.3 User Creates a Profile

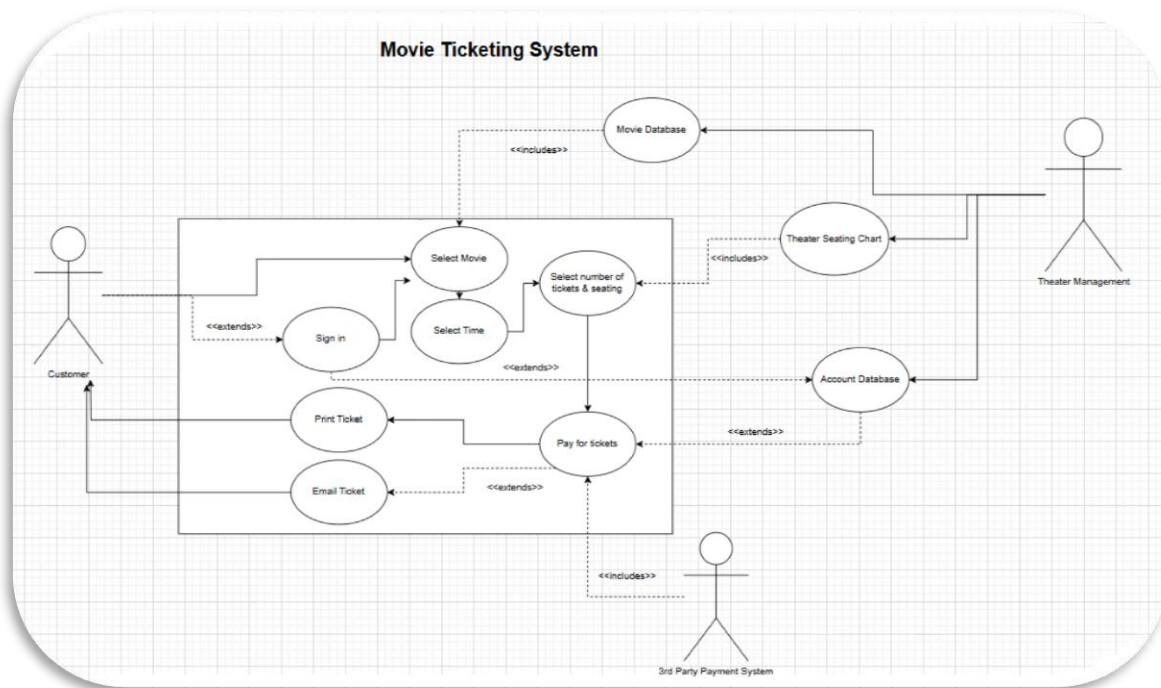
Actor(s): User

Flow of events:

1. User navigates to movie ticketing system.
2. User selects to create a user account.
3. User enters email and enters a password
4. System validates that email and password are in proper format
5. System sends a confirmation email to the user's email
6. User confirms email
7. User information is saved to database

Entry Conditions:

3. Users must have successfully accessed the system.



3.4 Classes / Objects

3.4.1 Movie

3.4.1.1 Attributes

Name: Movies name

Rating: Movies rating

Length: Play time of the movie in minutes

Description: Brief description of the movie's plot

3.4.2 Movie Ticket

3.4.2.1 Attributes

Price: US dollars

Date: Date movie will be playing

Serial Number: a unique identifier number for each ticket

3.4.3 Concession Item

3.4.3.1 Attributes

Name: Identifies the concession item

Price: US Dollars

3.4.4 User

3.4.3.1 Attributes

First Name: User's First name

Last Name: User's Last name

Email: To be associated with the account

Password: To access the account

3.4.3.2 Functions

Save: save/update users information to the database

3.4.5 Cart

3.4.3.1 Attributes

Movie Tickets: List of movie tickets the user has added to the cart

Concession Items: List of concession items the user has added to the cart

Total Price: US Dollars the user will pay at checkout

3.4.3.2 Functions

Checkout: Calls the payment API to process payment

Add Item: Adds the passed item to the cart

3.4.6 Payment Information

3.4.3.1 Attributes

Card Number: Payment card's number

Routing Number: Bank's routing number

Account Number: Bank's account number

3.4.3.2 Functions

Save: Save payment information entered to the database

3.4.7 Movie Theater

3.4.7.1 Attributes

Number: Identify the theater

Available Seats: List of available seats available in the theater

Movies: List of movies that are playing at this theater

3.4.3.2 Functions

RemoveSelectedSeats: Pass the selected user seats and remove them from list of available seats

ResetSeatAvailability: After the movie has shown, resets the list of available seats

3.4.8 Seat

3.4.8.1 Attributes

Row: Assigns an alphabetic value to the seat from A-H

Number: Assigns a number to the seat from 1-9

3.5 Non-Functional Requirements

The following requirements outline the behavior of the Movie Ticketing System. These requirements allow for assessing and measuring how the system performs as it is accessed and operated by the user.

3.5.1 Performance

The system should ensure that all pages are loaded within 3 seconds.

The system should operate at a minimum internet speed of 10mbps.

The system should operate on all major internet browsers.

3.5.2 Reliability

The system should operate with at least a 95% level of reliability.

The system should implement reliable database architecture.

The system should utilize a reliable web-based framework.

3.5.3 Availability

The system should be accessible at any time of day.

The system should be hosted on at least 2 servers for redundancy.

The system should accommodate at least 200 simultaneous users.

3.5.4 Security

The system should utilize a secure payment processing system.

The system should encrypt all user information.

The system should provide a secure means to retrieve passwords.

3.5.5 Maintainability

The system should allow for new items to be updated effectively.

The system should be modularized to increase debugging efficiency.

3.5.6 Portability

The system should be accessible on PC, Mac, and all mobile devices.

3.6 Inverse Requirements

The system should not allow a user to retrieve their password if they have confirmed their identity.

The system should not allow a user to buy tickets for a movie that is full.

The system should not allow a user to select a seat that has already been selected.

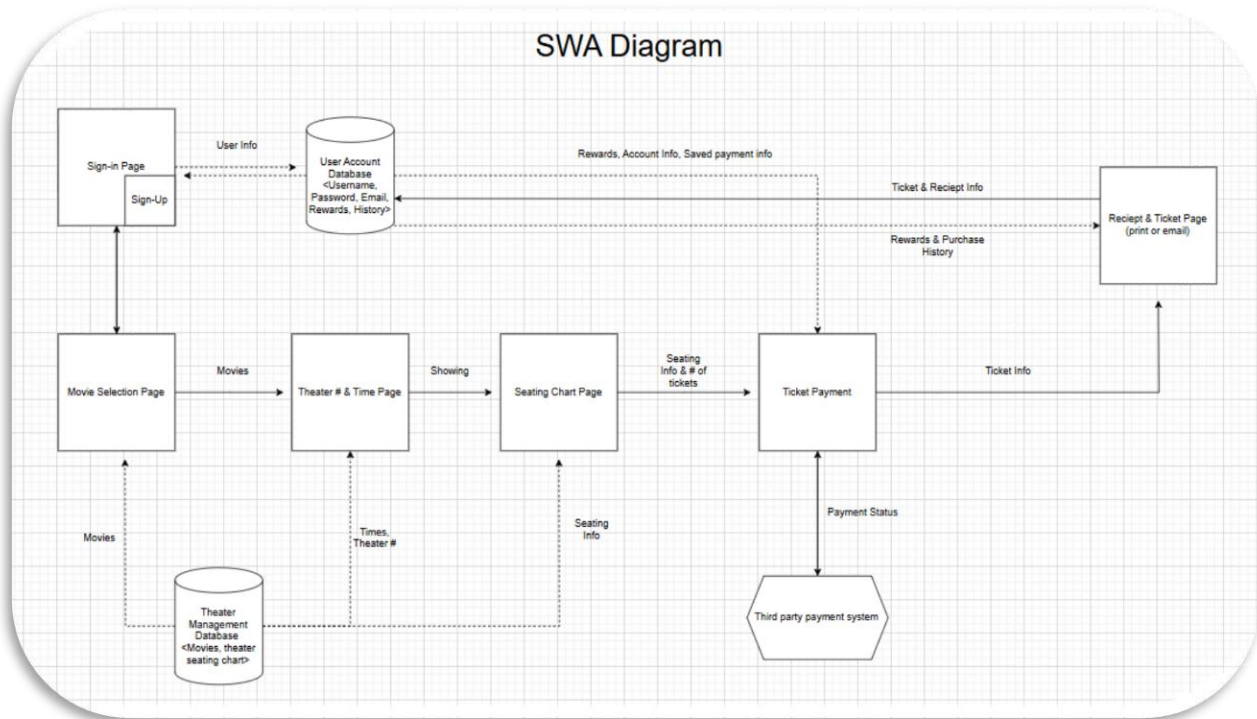
4. Software Design Specifications

4.1 Overview

This specification for the Movie Ticketing system outlines the system's architectural framework, and components' interactions with each other. The section gives an alternate view of the system, specifically aimed towards helping developers understand its implementation. The system uses an object-oriented design, helping to manage primary "objects" such as users, shopping carts, and payment information. The Software Architectural Diagram depicts, in a general sense, how the user interface will look, but also how the developer builds that interface, and how each of the components of it interact. The UML Diagram gives a detailed look at the classes and their attributes and methods. The development of this system will be divided into separate tasks, with a six-week timeline of completion. Ryan will handle the user authentication, as well as database integration, taking around three weeks. David will develop code for the movie selection page, seat reservation page, and the ticketing system; his work will last approximately four weeks. The payment processing and receipt generation will be taken care of by Anthony in three weeks. Following the completion of their respective tasks, team members will collaboratively test and debug for two weeks before deployment of the system.

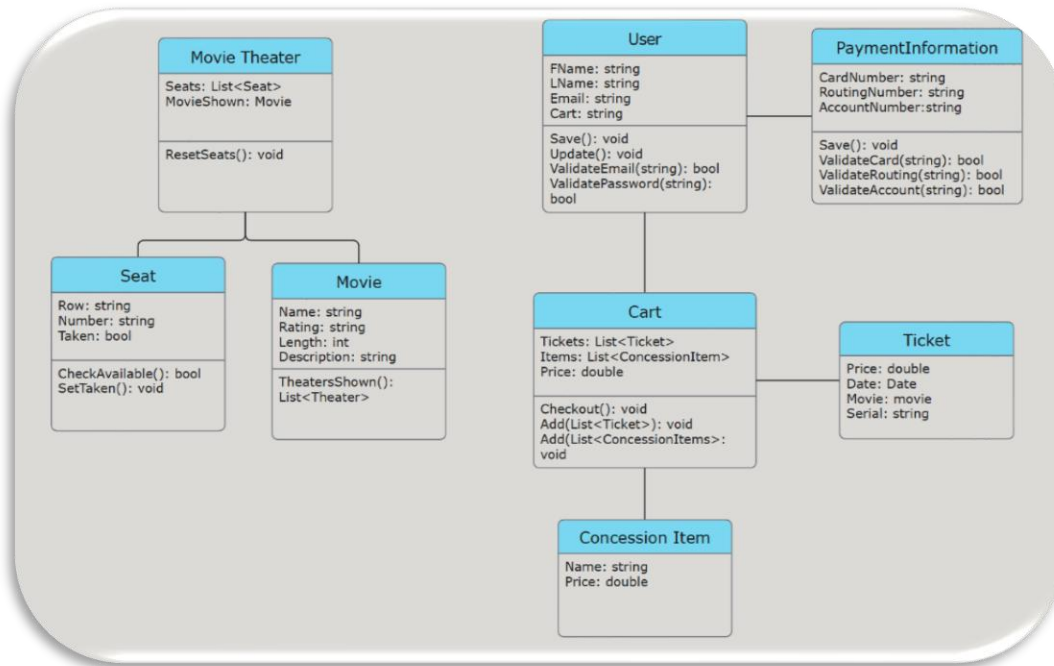
4.2 Software Architectural Diagram

The given Software Architectural Diagram illustrates a high-level visual depiction of the main components and how they interact with one another. The components consist of databases, web pages, and processes. It highlights modules such as user authentication, movie selection, reserving seats, and payment processing.



4.3 UML Diagram

The provided Unified Modeling Language (UML) Diagram provides a visual representation of the system design. Each container represents a class. Each class contains its variables, data types, and methods and methods' return type. A description of each class, variable and method is included below:



Movie Theater

Seats: A List of type `Seat`. This list contains all the available seats within the theater. Each seat must be tracked as assigned or unassigned.

Movie: A theater will be assigned a `Movie` which is currently playing

ResetSeats(): Allows for resetting all seats to available once the movie has finished playing

Seat

Row: This string will be a single character from A-H to represent the row placement.

Number: This string will be a single number from 1-9 to represent the seat number within the row.

CheckAvailable(): Checks if the seat is available. Returns true if available and false if it is taken.

SetTaken(): Sets the bool for taken to true.

Movie

Name: this string will store the movie's name

Rating: string will store the movie's rating allowing users to consider the movies content.

Length: an integer to show the movies running length time in minutes so the user may know how long they should expect to be at the theater

TheatersShown(): Returns the list of theaters which are playing the movie.

User

Fname: string to store the user's first name

Lname: string to store the user's last name

Email: string to store the users email

Password: string to store the users password

Cart: an instance of the cart class to store the items the user wishes to purchase

Save(): save the user's information to the database. Create a new entity in the database. Returns no value.

Update(): update existing user's information. Returns no value.

ValidateEmail(string): process and validate the passed email. Returns true if email is valid, otherwise returns false.

ValidatePassword(string): process and validate the passed password. Returns true if password is valid, else returns false;

Cart

Tickets: List of data type Tickets used to store the movie tickets the user has added to his cart.

Items: List of data type Items used to store the items the user has added to his cart.

Price: double variable to store the total price the user will have to pay at checkouts

Checkout(): adds up the price of all tickets and items in cart and prompts the user for payment.

Add(List<Ticket>): passes a list of tickets and adds each item to the cart's Ticket List

Add<List<Items>): passes a list of items and adds each item to the cart's Item List

Concession Item

Name: string to store the concession items name

Price: string to store the concession item's price

Ticket

Price: double to store the tickets price

Data: Data to store the date the ticket's movie will show

Movie: a ticket will be assigned a Movie class object to represent the movie the ticket was purchased for.

Serial: a unique identifier number to validate ticket

PaymentInformation

CardNumber: a string to store the user's credit card number

RoutingNumber: a string to store the user's bank's routing number

Account Number: a string to store the user's bank's account number

Save(): method to save the user's payment information

ValidateCard(string): returns true if card number is valid, else returns false.

ValidateRouting(string): returns true if routing number is valid, else returns false.

ValidateAccount(string): returns true if account number is valid, else return false.

5. Test Plan

5.1 Test Plan Overview

This test plan provides the strategy and scope for the specific test cases laid out in the Excel spreadsheet; the test cases are used to confirm that the Movie Ticketing System works according to the SRS. The goal here is to make sure that all requirements (e.g. making and processing payments, picking seats, selecting movies, etc.) are tested at all levels.

5.2 Test Objectives

- To make sure that each class (component) functions as specified in the SWA
- To confirm correct module interaction (e.g., User to Cart to Ticket, Movie Theater to Seat or Movie)
- To make sure that the system meets requirements such as high performance, good reliability, and strong security.
- To eventually identify and document any issues with the software and anything out of the norm

5.3 Scope of Testing

In-Scope:

- Functional Requirements: Purchasing of movie tickets, purchasing of concession items, displaying movies, seat selection, shopping cart display, account management, and payment processing.
 - Non-functional Requirements: Performance, reliability (availability), security
- Out-of-Scope: Third-party payment service quality, physical printing of tickets

5.4 Test Strategy

Our testing strategy will cover three main levels:

1. Unit Testing
 - Focusing on testing the individual classes and their methods and variables
 - Performed as each class is implemented
2. Integration Testing
 - Checks the functionality of interactions between the related components (e.g., checking that adding a seat to cart correctly updates the availability of seats for the next user)
3. System Testing
 - Makes sure that the entire system (the UI and the backend) checks off the SRS requirements
 - Includes the usability, performance, and functional checks in a production simulated environment

5.5 Test Environment

OS: Test on Windows 10/11, macOS, mobile devices (iOS, Android)

Software:

- Browsers: Chrome, Firefox, Safari, Edge
- Database: MySQL
- Payment API: virtualized and sandboxed environment for credit card validations
- Tools; JUnit, Selenium (for UI automation tests)

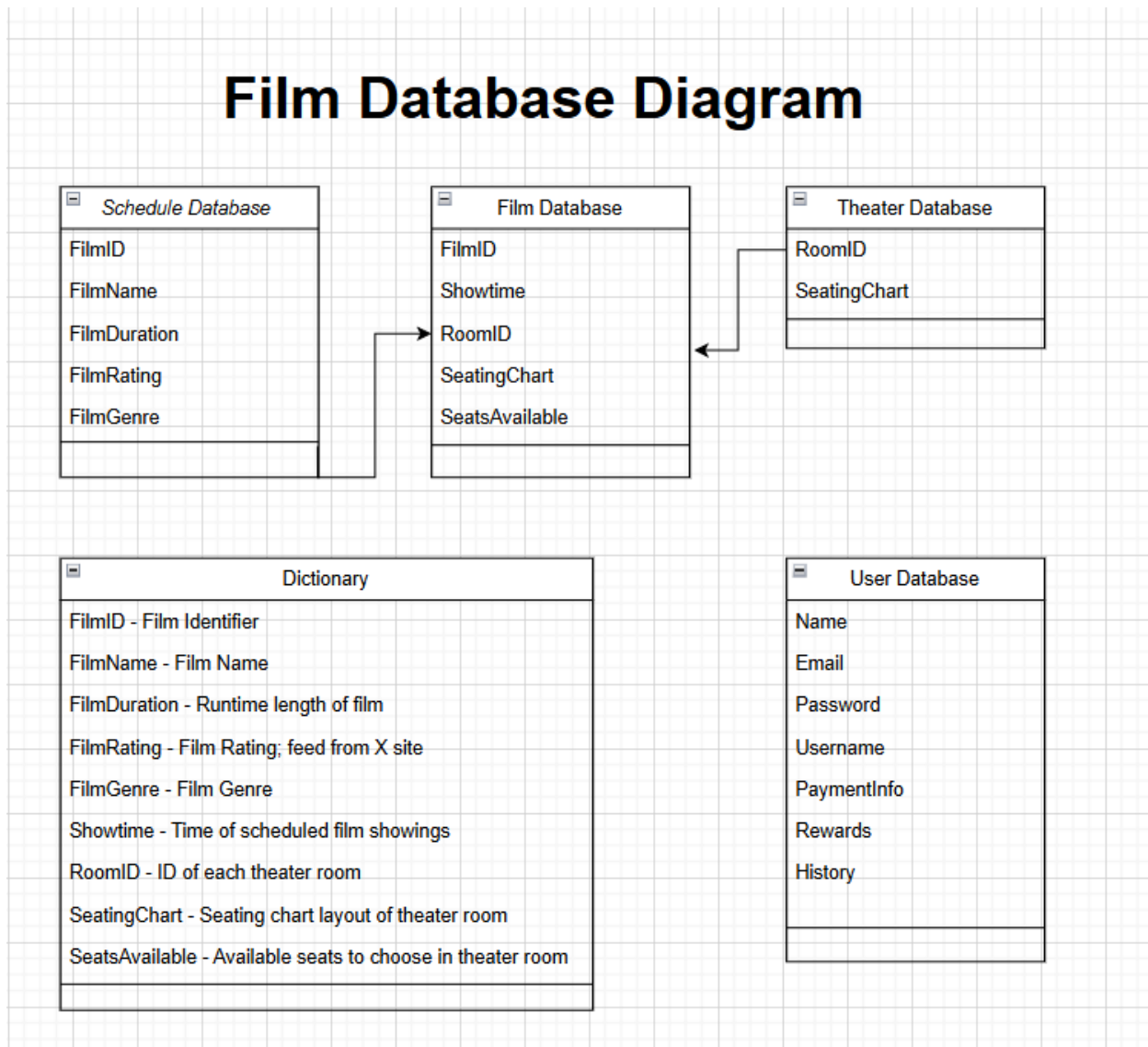
5.6 Test Plan

Refer to the link below for the software test plan. The test plan is an excel spreadsheet which outlines testing steps along with expected results to ensure the system operates as expected.

Test Plan GitHub link: github.com/davidmht1/SRS-REPO

6. Data Management Strategy

6.1 Data Management Diagram



6.2 Data Management Strategy

The movie ticketing system will use a relational SQL database to implement our data management strategy. The reason SQL will be used for the movie ticketing system is due to the complex queries that can be run, as well as the relational integrity of the data. It is also essential for the ACID-compliant transactions. This is important in particular for the movie ticketing system because of the immediate seat reservations, the user payments, and the movie schedules. The system is divided into four primary databases: Schedule database, Film database, Theater database, and User database. The diagram above shows how the database components are linked to one another; for example, the film database links the Schedule database and Theater Database

by the keys “FilmID” and “Room ID”. The User Database is independent, due to the sensitive nature of the data held in it. There was a consideration for a NoSQL solution, like MongoDB, but since there is less consistency and relational complexity, we opted for SQL instead.

3.7 Design Constraints

Specify design constraints imposed by other standards, company policies, hardware limitation, etc. that will impact this software project.

3.8 Logical Database Requirements

Will a database be used? If so, what logical requirements exist for data formats, storage capabilities, data retention, data integrity, etc.

3.9 Other Requirements

Catchall section for any additional requirements.

4. Analysis Models

List all analysis models used in developing specific requirements previously given in this SRS. Each model should include an introduction and a narrative description. Furthermore, each model should be traceable the SRS's requirements.

4.1 Sequence Diagrams

4.3 Data Flow Diagrams (DFD)

4.2 State-Transition Diagrams (STD)

5. Change Management Process

Identify and describe the process that will be used to update the SRS, as needed, when project scope or requirements change. Who can submit changes and by what means, and how will these changes be approved.

A. Appendices

Appendices may be used to provide additional (and hopefully helpful) information. If present, the SRS should explicitly state whether the information contained within an appendix is to be considered as a part of the SRS's overall set of requirements.

Example Appendices could include (initial) conceptual documents for the software project, marketing materials, minutes of meetings with the customer(s), etc.

A.1 Appendix 1

A.2 Appendix 2