

# **CS 3610: Software Engineering**

**Spring 2014**

## **Software Requirements Specification Document**

**Project Title**

***Theater Reservation System***

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**Due Date: Wednesday 3/12/2014**

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## Revision History

Date	Version	Description	Author
12-FEB-14	1.0	Initial Submission	

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# Software Requirements Specification

## 1. Introduction

### 1.1 Purpose

The Software Requirements Specification (SRS) provides an overview of the Theater Reservation System requirements. The SRS is the foundational document for how the Theater Reservation System will be used, composed, and how each component will communicate with each other component.

### 1.2 Scope

Theater Reservation Systems are horribly behind today's technological abilities. The films being shown in the theaters are using the latest technologies to grab attention. Theater reservation systems need to make available the speed, accuracy, and ease of use that draw moviegoers to films to the reservation systems. The reservation system is the film watcher's first interaction with a film, this initial interaction can contain the same level of technology used when making the films.

Potential theater customers will be able to access the theater system via Web page, kiosk, or app. The system will be able to provide not only reservations to the theater, but also reservations to a particular seat. The system will also provide suggestions, movie trailers, and user generated content.

### 1.3 Definitions, Acronyms and Abbreviations

- SRS – Software Requirements Specification
- NFC - Near field communication
- ECMA - International association associated with the standardization of communication systems.
- Biometric – Identification of humans based on their biological uniqueness
- QR code – two dimension bar codes that can contain information or hyperlinks
- ITSC - Information Technology Support Center
- App – programs designed for mobile electronic devices, user authentication occurs before installation and is persistent
- Kiosk – Free standing terminal that a person can use to access constrained software systems

### 1.4 References

- ECMA NFC specification - <http://www.ecma-international.org/publications/files/ECMA-ST/ECMA-352.pdf>
- ITSC QR code specification - [www.itsc.org.sg/pdf/synthesis08/Three\\_QR\\_Code.pdf](http://www.itsc.org.sg/pdf/synthesis08/Three_QR_Code.pdf)

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## 1.5 Overview

The remaining section of this document will contain the following :

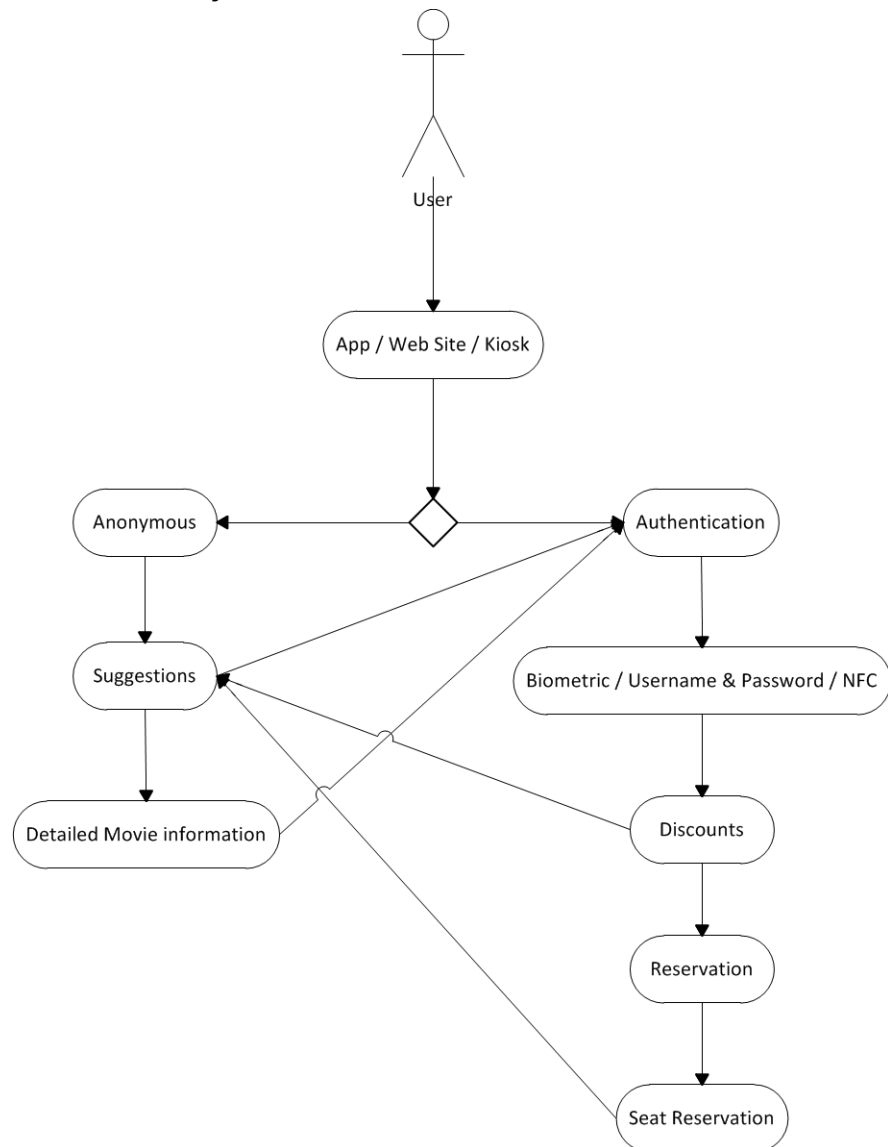
- Diagram of Use-Cases (with description tables)
- Analysis classes (with description tables)
- UML Sequence Diagrams
- UML Behavior Diagrams

## 2. Overall Project Description

The objective of this project is the development of a web-based theater ticket reservation system for the ABC Entertainment Company. The product will allow customers to create reservations online for specified movie showings at all ABC Entertainment Company Theaters. The product will be accessible through internet-connected computers, tablets, and mobile devices. Customers will have the option to purchase their tickets at the time of reservation. If no purchase is made initially, customers may choose to pick-up tickets at the specified theater's box office. With this option, customers will have until thirty minutes prior to scheduled showtime to claim their reservations in-person at the theater and complete their purchase. If the reservation is not claimed thirty minutes prior to scheduled showtime, the reservation will be canceled and the allotted seats will be released for purchase by the general public. Customers may also choose to complete their purchase for previously reserved seats online and print their tickets at home up to one hour prior to scheduled showtime. If customers choose the print option and do not complete purchase by the specified time, the reservation will be canceled and the seats will be released to the general public.

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## 2.1 Use-Case Model Survey



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<b>Use case name:</b> Initial contact		<b>ID:</b> 001	<b>Priority:</b> High
<b>Primary actor:</b> Unknown user	<b>Source:</b> User	<b>Use case type:</b> Technical	
<b>Interested Stakeholders:</b> Movie Theater			
<b>Brief description:</b> An unknown user opens the app / requests the web site / engages a kiosk. The user is then given the option to authenticate or continue anonymously			
<b>Precondition:</b> App / web site / kiosk is in a ready state			
<b>Trigger:</b> An unknown user opens the app / requests the web site / engages a kiosk			
<b>Relationships:</b> <b>Include:</b> Suggestions, View detailed movie information <b>Extends:</b> None <b>Depends On:</b> None			
<b>Typical flow of events:</b> 1. An unknown user opens the app / requests the web site / engages a kiosk 1. The user chooses to authenticate 1. Current flow is terminated and ID 003 is initiated 2. The user chooses to not authenticate 1. Current flow is terminated and ID 002 is initiated			
<b>Assumptions:</b> App / web site / kiosk can connect to the theater server through a secure connection			
<b>Implementation Constraints and Specifications:</b> Apps may be left in an authenticated state. Apps will always have initial contact as the first step, but if the user never logs out, the app stays authenticated.			

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<b>Use case name:</b> Suggestions		<b>ID:</b> 002	<b>Priority:</b> High
<b>Primary actor:</b> Anonymous user	<b>Source:</b> User	<b>Use case type:</b> Technical	
<b>Interested Stakeholders:</b> Movie Theater			
<b>Brief description:</b> Suggestions are generated by the system and displayed to the user			
<b>Precondition:</b> None			
<b>Trigger:</b> User opts to view suggestions			
<b>Relationships:</b> <div><b>Include:</b> View detailed movie information</div> <div><b>Extends:</b> None</div> <div><b>Depends On:</b> Initial contact</div>			
<b>Typical flow of events:</b> <div><div>1. Suggestions are made based on prior anonymous data collected at that location or user data</div><div><div>1. The location will be relative, multiple kiosks at the same postage address will be considered the same location</div><div>2. Mobile location data will be considered the same location if it is within 10 miles</div><div>3. Locations will overlap and share relative data</div></div><div>2. User is given the option to view detailed movie information.</div><div>3. User is given the option to view more suggestions</div></div>			
<b>Assumptions:</b> The GUI is designed in a manner that an option to authenticate or make a reservation is always available			
<b>Implementation Constraints and Specifications:</b> The options to authenticate or make a reservation are mutually exclusive			



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<b>Use case name:</b> View detailed movie information		<b>ID:</b> 003	<b>Priority:</b> Low
<b>Primary actor:</b> User	<b>Source:</b> User	<b>Use case type:</b> Technical	
<b>Interested Stakeholders:</b> Movie Theater			
<b>Brief description:</b> A user opts to view detailed movie information			
<b>Precondition:</b> Suggestions have been shown			
<b>Trigger:</b> User clicked on suggestion			
<b>Relationships:</b> <b>Include:</b> None <b>Extends:</b> Suggestions <b>Depends On:</b> None			
<b>Typical flow of events:</b> <div><div>1. The selection of the movie is kept in a database and associated with either the user or location</div><div>2. A screen is displayed where<div><div>1. User can authenticate to make a reservation or add a comment<div><div>1. If the user is already authenticated, this option is now to make reservation</div></div></div></div><div>2. User can view suggestions</div><div>3. User can watch movie trailer</div><div>4. User can view movie synopsis</div><div>5. User can view user generated comments<div><div>1. If user is authenticated, user can add comment</div></div></div></div></div>			
<b>Assumptions:</b> The movie details are interesting enough for the user to want to then make a movie reservation			
<b>Implementation Constraints and Specifications:</b> The user may enter an infinite loop of viewing detailed information and suggestions			

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<b>Use case name:</b> Authentication		<b>ID:</b> 004	<b>Priority:</b> High
<b>Primary actor:</b> User	<b>Source:</b> User	<b>Use case type:</b> Technical	
<b>Interested Stakeholders:</b> Movie Theater			
<b>Brief description:</b> A user will attempt to authenticate with the system			
<b>Precondition:</b> User have selected the option to authenticate			
<b>Trigger:</b> User has selected the option to authenticate			
<b>Relationships:</b> <b>Include:</b> Initial contact <b>Extends:</b> Discount <b>Depends On:</b> None			
<b>Typical flow of events:</b> <div><div>1. Authentication options will be given based on the device used to authenticate</div><div>2. User attempts to authenticate<div><div>1. If authentication is unsuccessful<div><div>1. the user is given the option to restart authentication, this will force a new check of environmental variables</div><div>2. The user is given the option to cancel authentication</div></div></div><div>2. If authentication is successful<div><div>1. The system checks for a discount</div><div>2. The user is given the option to view suggestions</div></div></div></div></div></div>			
<b>Assumptions:</b> Every app / computer / kiosk will allow at least user name / password authentication, devices have environmental variables that will be checked at runtime. These environmental variables are handled at the operating system level thus they are abstracted from this software			
<b>Implementation Constraints and Specifications:</b> Mobile devices, computers and kiosk technology is advancing constantly. Every device will have the software available to authenticate with all three methods.			

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<b>Use case name:</b> Discount		<b>ID:</b> 005	<b>Priority:</b> Low
<b>Primary actor:</b> User	<b>Source:</b> User	<b>Use case type:</b> Technical	
<b>Interested Stakeholders:</b> Movie Theater			
<b>Brief description:</b> A user is offered a discount			
<b>Precondition:</b> User is authenticated			
<b>Trigger:</b> User authentication			
<b>Relationships:</b> <b>Include:</b> None <b>Extends:</b> Authentication <b>Depends On:</b> None			
<b>Typical flow of events:</b> 1. Authentication options will be given based on the device used to authenticate 2. User attempts to authenticate 1. If authentication is unsuccessful 1. the user is given the option to restart authentication, this will force a new check of environmental variables 2. The user is given the option to cancel authentication 2. If authentication is successful 1. The system checks for a discount 2. The user is given the option to view suggestions 3. The user is given the option to make reservation			
<b>Assumptions:</b> Discounts will be offered globally, based on location or based on user			
<b>Implementation Constraints and Specifications:</b> The user is given a discount at one time and must enter the discount at payment time. Payment is outside the scope of this software.			

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<b>Use case name:</b> Make reservation		<b>ID:</b> 006	<b>Priority:</b> High
<b>Primary actor:</b> User	<b>Source:</b> User	<b>Use case type:</b> Technical	
<b>Interested Stakeholders:</b> Movie Theater			
<b>Brief description:</b> A user wants to make a reservation			
<b>Precondition:</b> User is authenticated			
<b>Trigger:</b> User selects the option to make reservation			
<b>Relationships:</b> <b>Include:</b> None <b>Extends:</b> None <b>Depends On:</b> Authentication			
<b>Typical flow of events:</b> <div><div></div><div>1. User opts to make a reservation</div><div>2. List of movies available are displayed</div><div>3. User clicked on movie to reserve</div><div>4. User is given option to reserve seat</div><div>5. User is given option to view suggestions</div></div>			
<b>Assumptions:</b> System is secure and working			
<b>Implementation Constraints and Specifications:</b> The list of movies available in theaters is small enough to be displayed.			

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<b>Use case name:</b> Make seat reservation		<b>ID:</b> 007	<b>Priority:</b> Low
<b>Primary actor:</b> User	<b>Source:</b> User	<b>Use case type:</b> Technical	
<b>Interested Stakeholders:</b> Movie Theater			
<b>Brief description:</b> A user wants to make a seat reservation			
<b>Precondition:</b> User has a reservation			
<b>Trigger:</b> User has made reservation and opts to reserve a seat			
<b>Relationships:</b> <b>Include:</b> None <b>Extends:</b> Make reservation <b>Depends On:</b> None			
<b>Typical flow of events:</b> 1. User opts to make a seat reservation 2. List of seats available are displayed 3. User clicked on seat to reserve 4. User is given option to view suggestions			
<b>Assumptions:</b> There is a seat available			
<b>Implementation Constraints and Specifications:</b> The list of seats available in theaters is small enough to be displayed.			

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<b>Use case name:</b> Admin panel		<b>ID:</b> 008	<b>Priority:</b> Low
<b>Primary actor:</b> Administrator	<b>Source:</b> Administrator	<b>Use case type:</b> Technical	
<b>Interested Stakeholders:</b> Movie Theater			
<b>Brief description:</b> An administrator wants to log on to the administrator panel			
<b>Precondition:</b> None			
<b>Trigger:</b> Administrator connects via the admin terminal			
<b>Relationships:</b> <b>Include:</b> Set discounts <b>Extends:</b> None <b>Depends On:</b> None			
<b>Typical flow of events:</b> <div><div>1. Administrator connect via a secure ssh connection to the administrator panel</div><div>2. Administrator panel is command line only</div><div>3. The administrator panel authenticates the administrator using only a SHA-256 fingerprint<div><div>1. Passwords or any other type of authentication will not be available.</div><div>1. Remote connections will only connect with SHA fingerprint</div><div>2. Physical access to the server will be securely restricted to authorized personnel</div></div></div><div>4. Administrator can query the list of all user generated and anonymous generated data</div><div>5. Administrator sets up discount trigger</div></div>			
<b>Assumptions:</b> Physical access to the server is only used to add remote admin access to the server			
<b>Implementation Constraints and Specifications:</b> Physical access to the server is securely restricted			

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<b>Use case name:</b> Set discounts		<b>ID:</b> 009	<b>Priority:</b> Low
<b>Primary actor:</b> Administrator	<b>Source:</b> Administrator	<b>Use case type:</b> Technical	
<b>Interested Stakeholders:</b> Users			
<b>Brief description:</b> An administrator is able to set discount triggers			
<b>Precondition:</b> None			
<b>Trigger:</b> Administrator opens discount interface			
<b>Relationships:</b> <div><b>Include:</b>None</div> <div><b>Extends:</b>Admin panel</div> <div><b>Depends On:</b>None</div>			
<b>Typical flow of events:</b> <div><div>1. Administrator will set discounts based on location or user</div><div>2. Location discounts will be be available to every user in a location</div><div>3. User discounts will only be extended to groups of users</div></div>			
<b>Assumptions:</b> Marketing department has given administrator an order for the system to offer discounts			
<b>Implementation Constraints and Specifications:</b> None			

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<b>Use case name:</b> Admin queries		<b>ID:</b> 010	<b>Priority:</b> Low
<b>Primary actor:</b> Administrator	<b>Source:</b> Administrator	<b>Use case type:</b> Technical	
<b>Interested Stakeholders:</b> Marketing department			
<b>Brief description:</b> An administrator can run SQL queries for the marketing department			
<b>Precondition:</b> Administrator is logged on			
<b>Trigger:</b> Administrator enters a SQL query			
<b>Relationships:</b> <b>Include:</b> None <b>Extends:</b> Admin panel <b>Depends On:</b> None			
<b>Typical flow of events:</b> <div><div>1. Administrator enters the SQL command line interface.</div><div>2. Administrator runs query</div><div>3. Data is returned to the marketing department however it is desired<div>1. Administrator has the option to verbally return data, generate reports, output CSV files</div></div></div>			
<b>Assumptions:</b> Marketing department wants data from the server			
<b>Implementation Constraints and Specifications:</b> The administrator will return raw data to the marketing department. The marketing department is responsible for all data analysis, interpretation and presentation.			



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## 2.2 Assumptions and Dependencies

- The product must be delivered by the deadline.
- The budget cannot be exceeded.
- Customer information must be secured and held to the strictest privacy constraints.
- The product must be easily accessible for all users with an internet-connected device.
- The product must be user-friendly and reliable.
- The product must have forward compatibility.
- App / web site / kiosk can connect to the theater server through a secure connections.
- Apps may be left in an authenticated state. Apps will always have initial contact as the first step, but if the user never logs out, the app stays authenticated.
- The GUI is designed in a manner that an option to authenticate or make a reservation is always available.
- The options to authenticate or make a reservation are mutually exclusive.
- The movie details are interesting enough for the user to want to then make a movie reservation.
- The user may enter an infinite loop of viewing detailed information and suggestions.
- Every app / computer / kiosk will allow at least user name / password authentication, devices have environmental variables that will be checked at run-time. These environmental variables are handled at the operating system level thus they are abstracted from this software.
- Mobile devices, computers and kiosk technology is advancing constantly. Every device will have the software available to authenticate with all three methods.
- Discounts will be offered globally, based on location or based on user.
- The user is given a discount at one time and must enter the discount at payment time. Payment is outside the scope of this software.
- System is secure and working.

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- The list of movies available in theaters is small enough to be displayed.
- Physical access to the server is only used to add remote admin access to the server.
- Physical access to the server is securely restricted.
- Marketing department has given administrator an order for the system to offer discounts.
- The marketing department asks for the data in a reasonable manner.
- The administrator will return raw data to the marketing department. The marketing department is responsible for all data analysis, interpretation and presentation.

### 3. Specific Requirements

#### External Interface Requirements

##### User Interfaces

The project is designed to be an application that can be accessed from several different types of devices. A user will access the application via a kiosk, app, or web browser. Each device will be only a front end to the same behind the scenes work. Each user interface will access the same content.

##### Hardware Interfaces

Servers will be necessary to host the system. Most server will need to be added as the theater system grows and expands with user content and user data.

##### Software Interfaces

The software will be designed with the Django framework for Python in mind, meaning framework packages will be used liberally. Additionally, it will likely use several external packages and/or pluggable Django applications to handle important aspects of many use cases.

##### Communication Interfaces

Nearly all communication with the server will take place using an HTTP RESTful API, handled by the Django framework. External pluggable Django applications will also handle communication with Facebook via the Facebook API.

#### 3.1 Classes/Objects

*Here, insert your conceptual UML class inheritance diagram.*

*After you conduct your CRC modeling exercise for all use-cases and decided on your potential "analysis" classes, use the following table format to describe these classes.*

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<b>Class Name:</b> User	
<b>Description:</b> Representation of a user which will contain individual user information required for authentication.	
<b>Attributes (fields)</b>	<b>Attribute Description</b>
String Name	Holds name of user
String Address	Holds address of user
String Phone	Holds phone 10-digit phone number of user (allows the entry of hyphens)
String Email	Holds email address of user
<b>Methods (operations)</b>	<b>Method Description</b>
Void setName	Sets user name
Void setAddress	Sets user address
Void setPhone	Sets user phone
Void setEmail	Sets user email
String getName	Returns user name
String getAddress	Returns user address
String getPhone	Returns user phone
String getEmail	Returns user email

<b>Class Name:</b> Theater	
<b>Description:</b> Contains information on a theater	
<b>Attributes (fields)</b>	<b>Attribute Description</b>
String TheaterName	Holds the theater name
String TheaterAddress	Holds the theater address
String TheaterZip	Holds the zip code of a theater
String TheaterPhone	Holds the theater phone number
List Movies	Holds the set of all movies showing at the theater on a present or future date
List Showtimes	Holds the set of showtimes of a selected movie on a

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	given date
Date TheaterDate	Holds the date to search within for movies playing in the theater
<b>Methods (operations)</b>	<b>Method Description</b>
Public void setTheaterName	Sets theater name
Public void setTheaterAddress	Sets theater address
Public void set TheaterZip	Sets theater zip
Public void setTheaterPhone	Sets theater phone number
Public void addMovie	Adds movie to the theater
Public void removeMovie	Removes movie from the theater
Public List getMovies	Returns the list of all movies at the theater
Public void addShowtime	Adds showtime to a movie at the theater
Public void removeShowtime	Removes showtime to a movie at the theater
Public List getShowtimes	Returns the list of showtimes for a movie at the theater
Public void setDate	Sets date for user to search within
Public Date getDate	Returns the date to search within
Public String getTheaterName	Returns theater name
Public String getTheaterAddress	Returns theater address
Public String getTheaterZip	Returns theater zip
Public String getTheaterPhone	Returns theater phone number

<b>Class Name:</b> Movie	
<b>Description:</b> Contains information on a movie	
<b>Attributes (fields)</b>	<b>Attribute Description</b>
String MovieName	Holds the name of the movie
String MovieRating	Holds the MPAA rating of the movie
String MovieLength	Holds the running time of the movie
String MovieRelease	Holds the release date of the movie
String MovieDescription	Hold a brief description of the movie

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Methods (operations)	Method Description
Public void setMovieName	Sets the name of the movie
Public void setMovieRating	Sets the rating of the movie
Public void setMovieLength	Sets the running time of the movie
Public void setMovieRelease	Sets the release date of the movie
Public void setMovieDescription	Sets the description of the movie
Public String getMovieName	Returns the name of the movie
Public String getMovieRating	Returns the rating of the movie
Public String getMovieLength	Returns the running time of the movie
Public String getMovieRelease	Returns the release date of the movie
Public String getMovieDescription	Returns the description of the movie
Public Theater getTheater	Returns a designated theater

### 3.2 Object Collaboration Diagrams

*Draw a UML object collaboration diagram.*

### 3.3 Sequence Diagrams

*Draw a UML sequence diagram for each use-case. The diagram is derived from the “Typical Flow of Event” section of the use-case description table.*

### 3.4 Object Behavior Diagrams

*Draw a UML State Transition Diagram for the entire application.*

### 3.5 Performance Requirements

- The kiosk need to be NFC enabled and have biometric reader.
- The database must be secure.
- The database needs to be indexed and cache enabled for faster query rate times
- Scheduled server maintenance must be made in a manner that the server operations are not disrupted.
- The web server must offer SSL for authentication.
- The server must have ample storage space.
- The server must be capable of handling high traffic

### 3.6 Other Requirements

- The chairs in the theater must be clearly marked.

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- The staff will be required to put a card on the seats that become reserved.

#### 4. Supporting Information

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