

# CS4400 Database Project

Summer Semester 2016

Version 1.0

GTMovie.com

Look at the last page for edits made for each version. Please read the entire description of the project before starting to work on it.

## Purpose of the Project

Analyze, specify, design, implement, document and demonstrate an online system for buying movie tickets at GTMovie.com. You are required to use the classical methodology for database development. The system should be implemented using a relational DBMS that supports standard SQL queries. Class administrators will provide you with information about how to access a college-managed MySQL server in order to implement your database and the application. The professors must approve any other alternative implementations. ***In no circumstances can you use a tool that automatically generates SQL or automatically maps programming objects into the database. You also cannot use any other software like Access.*** Ask professors or TAs if you have doubts in which tools/languages/software are allowed.

## Project Phases

The three phases of the project cover the following work-processes from the Classical Methodology for Database Development (see notes on T-square under resources). Slides on database design methodology will be useful for phases I and II: These slides have been posted on T-square.

## Groups

Project groups may have 3 or 4 members. Groups of more than 4 or less than 3 will **NOT** be allowed. You are allowed to form groups across the three sections (A & B) of the class. A group may remove a member from further participation in the group when Phase I is turned in or when Phase II is turned in. A written

notification with a proper justification must be provided to the professor and the head TA at that time in hard-copy form.

## Deliverables

### Phase I (Electronic copy and hard copy)

**Deadline: June 10**

The deliverables include:

1. A cover page listing all members in the team with their respective sections, GT official email addresses and T-square usernames.
2. Enhanced Entity Relationship (EER) Diagram
3. Information Flow Diagram
4. A list of logical constraints that will be enforced. Do not include any constraints that can be shown in the EER diagram, but rather semantic, business logic related constraints. You are required to include at least three constraints, although a fully-specified system will probably have more than that. **Constraints that can be specified directly using ER notation will not count towards the three required.** Constraints related to data type are not accepted as constraints.
5. Any assumptions made with explanations.

Notes:

1. The EER must capture the constraints of the system as much as possible whenever applicable, i.e. total participation, super/sub class, weak entities.
2. The design of your system must satisfy all the constraints. You are allowed to make up additional assumptions and constraints as long as they do not conflict with the specified constraints and requirements. If possible, those additional assumptions and constraints should be included in the ER diagram. You must list all your assumptions and constraints; otherwise TA would mark your ER diagram wrong since they would not be able to know

you have made your own assumptions.

**Each group needs to turn in one hard copy (only one for the entire group), and each group member should upload an electronic copy on T-Square individually.** You will receive -5 penalty if you do not submit an electronic copy. Group numbers will be assigned to the groups after they are declared in Phase 1. **Please write down your Group Number clearly on all subsequent submissions.**

Phase II (Soft copy and hard copy)

**Deadline: July 8**

The deliverables include:

1. A cover page listing all members in the team with their respective sections, GT official email addresses and T-square usernames, **and group number** assigned in phase 1. **If you don't write your group number on the cover page, we will deduct 5 points.**
2. Copy of the ER Diagram (either from phase I (with any revisions) or from the solution provided)
3. Copy of the Information Flow Diagram from phase I (either from phase I (with any revisions) or from the solution provided)
4. Relational Schema Diagram (Identify primary and foreign keys and show referential integrity using arrows)
5. Create Table statements, including domain constraints, integrity constraints, primary keys, and foreign keys.

Note:

1. **Only one hard copy** should be turned in for the entire group, and each group member should upload an electronic copy on T-Square individually. You will receive -5 penalty if you do not submit an electronic copy.

Phase III (Soft copy and hard copy)

Electronic Submission Deadline: July 26

Project Demo Dates: July 25, 26

The electronic deliverables include:

1. A cover page with the **group number** and the group members' names.
2. A text file with all SQL statements for each task (follow the template in the phase II design methodology)

**Note:** A set of SQL statements may be required in order to complete one task. However, in such cases, the last SQL statement should show the output according to the specification. Views and nested queries may be used to support the tasks.

3. For heavy weight option, you also need to submit your source code. You need to develop the entire application as a stand-alone application including the front end, menu options and the control flow. The application must have all functionalities described in this document.

**Note:** Prior to the demo, the TAs will give guidelines for populating the database with data. The database has to be populated with this data set prior to the demo.

**You need to submit your electronic copy of phase 3 to T-Square before July 26.**

Each group member should upload an electronic copy on T-Square individually.

You will receive -5 penalty if you do not submit an electronic copy.

On demo day:

Bring your laptop and make sure you have a text file on your laptop with all your SQL queries just in case your application does not work. More details about demo will be discussed later this semester.

## Grading

The project will consist of three phases (deliverables) as well as a final demo to the TA.

**Phase I and Phase II** of the project are each worth 10% credit.

**Phase III** (20% for heavy-weight or 10% credit for light-weight, depending on option):

**Heavy Weight Option (20 %):** The students would be required to use the embedded SQL feature of MySQL which allows you to embed SQL statements in a standalone application.

**Light Weight option (10%):** The students would be required to demo the SQL queries on the MySQL console. Those who choose the light weight option would be required to take the Final exam.

Note that you can always change your option until the demo starts. Once TA starts to demo your project, you cannot change heavy-weight option to light-weight or vice versa.

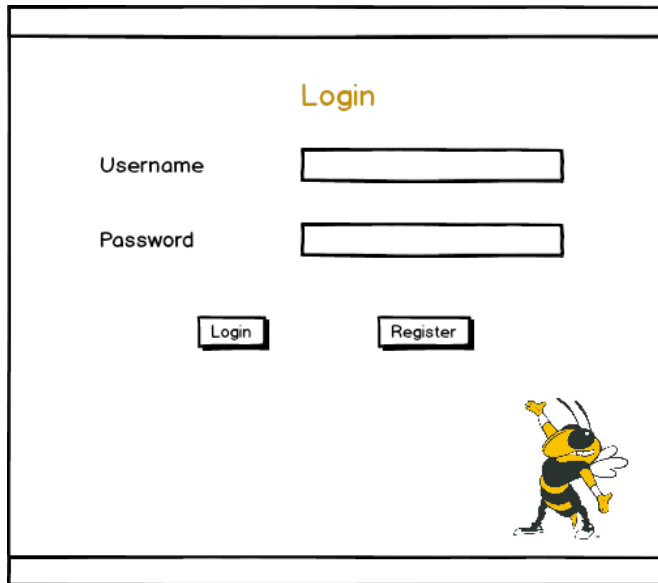
**Final Exam (10%):** This would be only taken by students who have opted for the lightweight phase III. Under no circumstances would a heavy weight option student be allowed to take the Final.

GTMovie.com is an online movie ticket reservation website. There are two types of users: managers and customers.

The following sections contain a functional description of the system along with some mockup screens. Each section would explain a particular functionality and then present an example screen about it. **You don't have to follow the UI designs, but your program needs to support all the functionalities.** These mockups are just for helping you to understand all the functionalities. A complete reorganization of the user interface is permissible as long as your application supports all the functionality listed below. The sections have been grouped by customer's functionalities and managers' functionalities.

For heavy option, you may implement the project as a traditional standalone application (e.g., using Java GUIs) or as a web application (e.g., using a web scripting language like PHP). There is no restriction on the choice of language (e.g., Java, Python, Javascript). We will also send an announcement about which languages/tools/software/platforms are allowed later this semester. (Do ask the professors for permission if in doubt.)

## 1. Log In



The diagram shows a login screen with a white background and a black border. At the top center, the word "Login" is written in orange. Below it, there are two input fields: one for "Username" and one for "Password", both with black outlines. Under the "Username" field is a "Login" button, and under the "Password" field is a "Register" button, both with black outlines. In the bottom right corner, there is a cartoon bee character with yellow and black stripes, wearing white gloves and shoes, and holding a small white object.

Fig 1: Log in

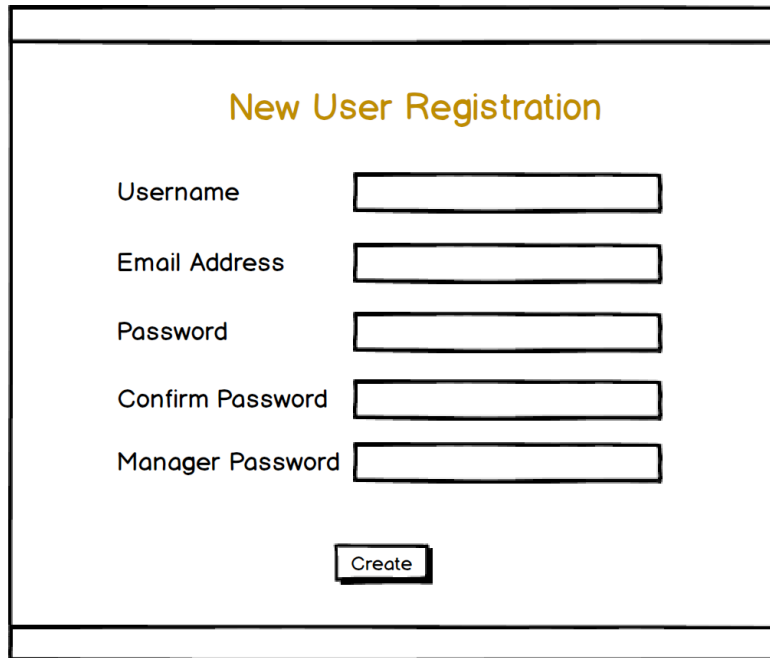
Fig 1 shows the login screen. All users must login before using this application. A valid username and password combination is required. If the user provides invalid login credentials, an error message should be shown on the screen.

If the user does not have an account yet, they can click on the register button to create an account.

### Note:

1. Username is **unique** for every user.
2. Since the customers and the managers use the same login screen, you need to check if the user is a customer or a manager.

## 2. New User Registration



The image shows a web form titled "New User Registration" in orange text. Below the title, there are five input fields with labels to their left: "Username", "Email Address", "Password", "Confirm Password", and "Manager Password". Each label is aligned to the left of its corresponding input field. At the bottom center of the form, there is a button labeled "Create".

Fig 2: New User Registration

After clicking register button in Figure 1, the user will be directed to the new user registration page.

To register a customer account:

The system needs to verify that all fields (except Manager Password) are filled, Username is available, and Password and Confirm Password are the same. Email address should be valid and unique. An error message should be shown if any of these requirements fails. **All these requirements also apply to creating manager accounts.**

To register a manager account:

The user need to have Manager Password in order to create a manager account. (Hence only people who know the manager password can create manager accounts.) The system also needs to check if the manager password is correct.

### Notes:

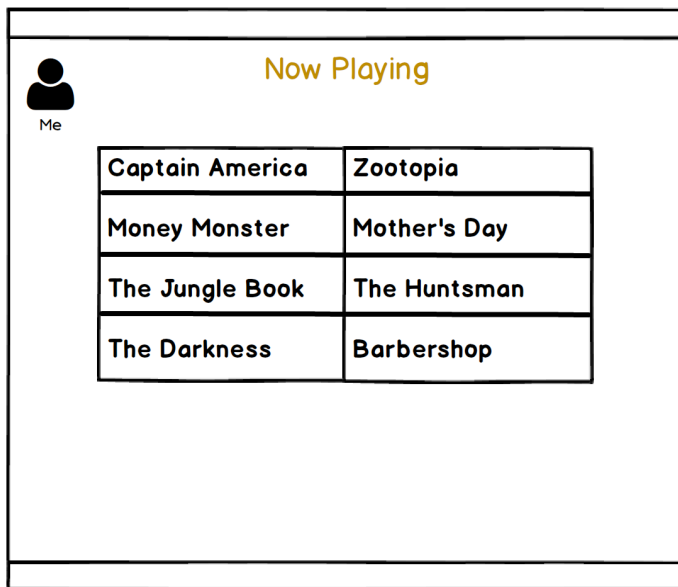
1. Email is **unique**.



2. Hint: You could have a 'System Info' entity in the database to store system information, such as the manager password.

## Customer Functionalities

### 1. Now Playing



Captain America	Zootopia
Money Monster	Mother's Day
The Jungle Book	The Huntsman
The Darkness	Barbershop

Figure 3: Now Playing

After logged in as customer, they would be taken to this window which lists out all the movies in theaters now. They can click on a movie to read overview/purchase ticket/ view & give reviews.

**Note:**

You still need to store the information of all movies even if they are not playing in the theaters.

## 2. Me

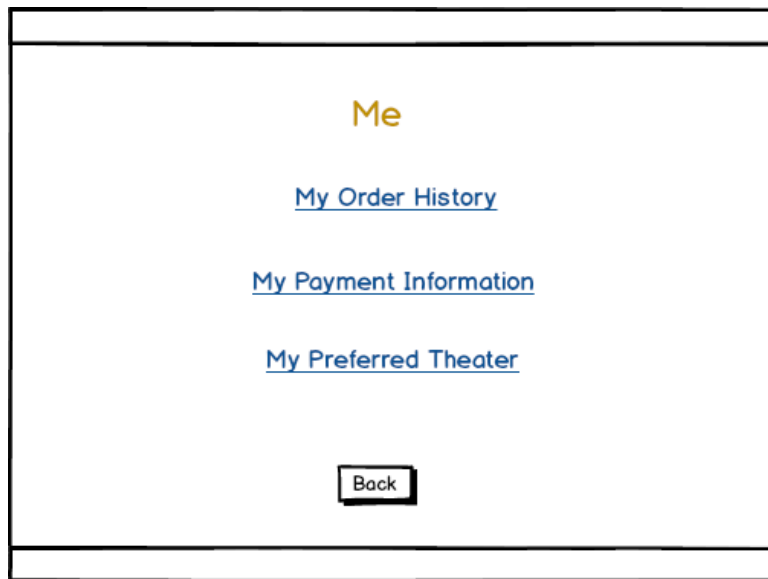


Figure 4: Me

On the left upper corner of Now Playing page, there is a Me button. Clicking on this button, customer will be directed to Me page, where they can view order history, saved card and saved theater.

## 3. Movie

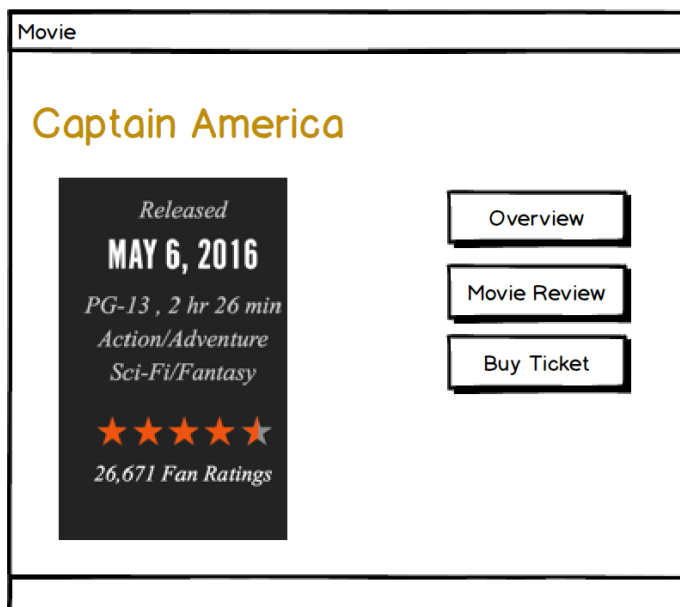


Figure 5: Movie

After clicking on a movie on Now Playing page, the customer will be directed to this page. The release date, rating (G, PG, PG-13, R,NC-17), length, genre, average rating (from reviews) of the movie should be shown on this page.

#### 4. Overview

Overview

## Captain America

*Synopsis*

In this superhero epic, the denizens of the Marvel Universe are forced to pick sides when Captain America ([Chris Evans](#)) and Iron Man ([Robert Downey Jr.](#)) come to blows over ideological differences. After a mission involving a new Avengers squad led by Cap ends with several civilian casualties in Lagos, the team are asked to sign an agreement that would force them to take orders from a United Nations panel. Tony Stark (aka Iron Man) pressures Cap to accept this new arrangement, in part because he feels deeply guilty about his own past recklessness; Captain America, however, fears that the Avengers will only be corrupted by bureaucracy. Their disagreement eventually escalates into all-out war when Cap's old friend Bucky Barnes ([Sebastian Stan](#)), now a brainwashed assassin known as the Winter Soldier, reenters the picture.

Captain America: Civil War brings back former Avengers characters such as Black Widow ([Scarlett Johansson](#)), Hawkeye ([Jeremy Renner](#)), Scarlet Witch ([Elizabeth Olsen](#)), War Machine ([Don Cheadle](#)), Falcon ([Anthony Mackie](#)), and Vision ([Paul Bettany](#)); it also dreges into the fray low-rent superhero Ant-Man ([Paul Rudd](#)), and introduces both the powerful African prince Black Panther ([Chadwick Boseman](#)) and a new, younger incarnation of Spider-Man ([Tom Holland](#)). Directed by [Anthony and Joe Russo](#). ~ Jack Rodgers, Rovi

Provided by Rovi

*Cast*

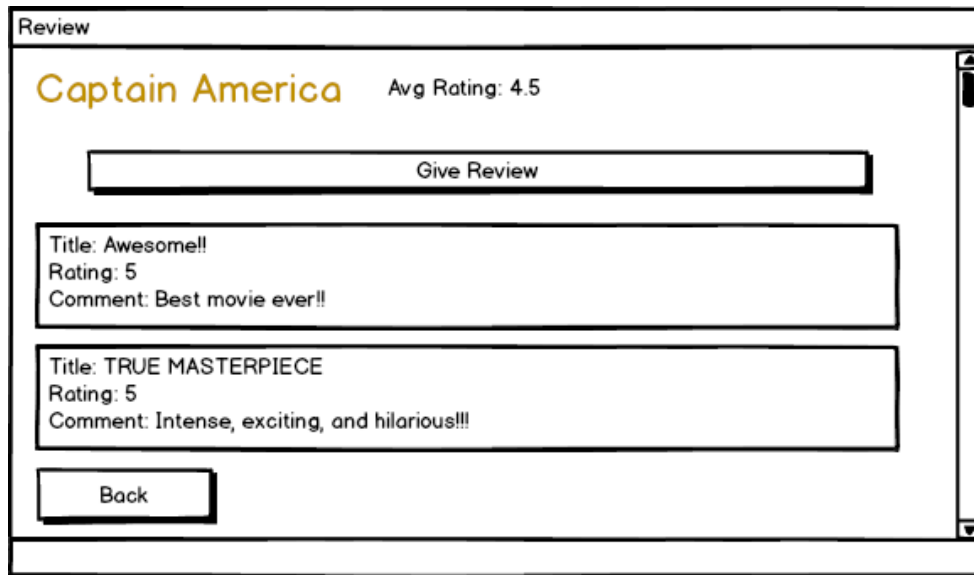
<a href="#">Chris Evans</a>	Steve Rogers/Captain America
<a href="#">Robert Downey, Jr.</a>	Tony Stark/Iron Man
<a href="#">Scarlett Johansson</a>	Natasha Romanoff/Black Widow
<a href="#">Sebastian Stan</a>	Bucky Barnes/Winter Soldier
<a href="#">Anthony Mackie</a>	Sam Wilson/Falcon

Back

Figure 6: Movie Overview

On this page, the customer can view the synopsis and the cast. For cast, you only need to show five people.

## 5. Review



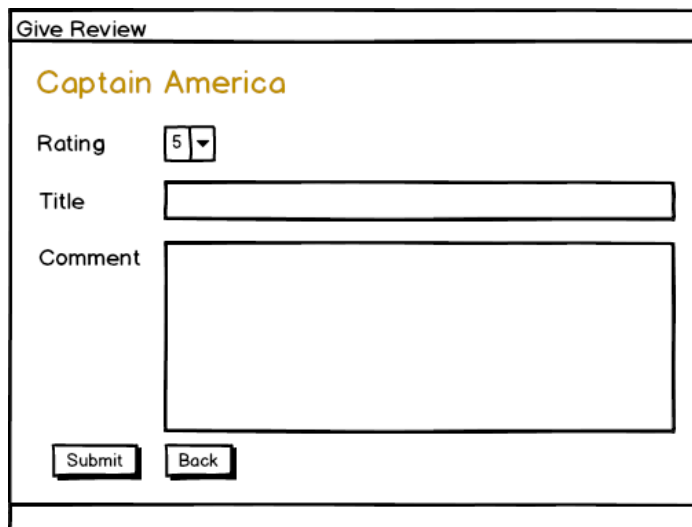
The 'Review' page for 'Captain America' features a title bar, the movie title, an average rating of 4.5, a 'Give Review' button, and two review entries. Each entry shows the title, rating, and comment. A 'Back' button is at the bottom.

Review	
<b>Captain America</b>	Avg Rating: 4.5
<a href="#">Give Review</a>	
Title: Awesome!! Rating: 5 Comment: Best movie ever!!	
Title: TRUE MASTERPIECE Rating: 5 Comment: Intense, exciting, and hilarious!!!	
<a href="#">Back</a>	

Figure 7: Review

The customer can view reviews on this page. Average rating should be calculated and shown on this page as well. The customer can also give review by clicking the Give Review button.

## 6. Give Review



The 'Give Review' page for 'Captain America' includes a title bar, the movie title, a rating dropdown menu (set to 5), text input fields for title and comment, and 'Submit' and 'Back' buttons.

Give Review	
<b>Captain America</b>	
Rating	5 ▼
Title	<input type="text"/>
Comment	<input type="text"/>
<a href="#">Submit</a>	<a href="#">Back</a>

Figure 8: Give Review

The customer can select a rating from 1 to 5 (1 being very bad and 5 being very good).

**Note:**

1. Customer can leave the comment part blank, but the title and rating fields must be filled.
2. Customer can only **give reviews** to movies that they have already watched (which means the system needs to check if the customer has purchased a ticket for this movie, and the status of the order should be 'completed'. The status of orders will be discussed later.)

7. Buy Ticket

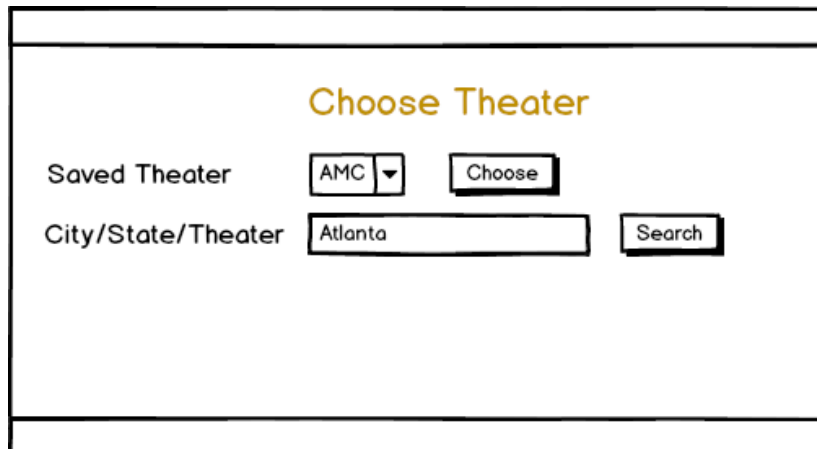
A web form titled "Choose Theater" in orange text. It contains two rows of input fields. The first row is labeled "Saved Theater" and includes a dropdown menu showing "AMC" with a downward arrow, followed by a "Choose" button. The second row is labeled "City/State/Theater" and includes a text input field containing "Atlanta" and a "Search" button. The form is enclosed in a black border.

Figure 9: Choose Theater

The customer can either choose a theater from their preferred theater list (will be discussed later) or search a theater.

## Results

☐ CINÉBISTRO AT TOWN BROOKHAVEN  
1004 Town Blvd., Atlanta, GA 30319

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☐ REGAL PERIMETER POINTE STADIUM 10  
1155 Mount Vernon Highway, Atlanta, GA 30338

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☐ AMC DINE-IN THEATRES BUCKHEAD 6  
3340 Peachtree Rd., Atlanta, GA 30326

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☒ REGAL ATLANTIC STATION 18  
261 19th Street NW, Atlanta, GA 30363

☐ Save this theater
 

Next

Figure 10: Search Theater Results

The customer can search a theater by name/city/state. This page shows the results. If the customer wants to save a theater into their preferred theater list, they can check the “save this theater” checkbox, so that they do not need to search for this theater every time.

## Select Time

Today	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
MAY 22	MAY 23	MAY 24	MAY 25	MAY 26	MAY 27	MAY 28

### CAPTAIN AMERICA: CIVIL WAR

PG-13 , 2 hr 26 min  
Action/Adventure, Sci-Fi/Fantasy

Select a movie time to buy tickets

5:20pm

6:00pm

8:15pm

8:50pm

9:30pm

5:30pm

8:05pm

10:40pm

Figure 11: Select Time

After selecting the theater, the customer can select the movie time. They can purchase a ticket up to 7 days ahead.

The screenshot shows a web interface for buying a movie ticket. At the top, it says "Buy Ticket" in orange. Below this, the movie title "CAPTAIN AMERICA: CIVIL WAR" is displayed in bold, with the rating "PG-13, 2 hr 26 min" underneath. To the right, the theater name "Regal Atlantic Station 18 IMAX & RPX" is shown, along with the address "261 19th Street NW, Atlanta, GA 30363". The movie time is "Sunday, May 22, 8:05pm". A horizontal line separates this information from the ticket selection section. The section is titled "How many ticket?" in orange. It contains three rows of ticket options: "Adult Matinee" with a quantity of 1 and a price of 11.54; "Senior" with a quantity of 0 and a price of 0 (calculated as 11.54 \* 80%); and "Child" with a quantity of 0 and a price of 0 (calculated as 11.54 \* 70%). Each row has a dropdown menu for selecting the quantity. A "Next" button is located at the bottom right of the form.

Ticket Type	Quantity	Price
Adult Matinee	1	* 11.54 = 11.54
Senior	0	* 11.54 * 80% = 0
Child	0	* 11.54 * 70% = 0

Next

Figure 12: Ticket

There are three types of tickets: adult, senior and child. Seniors can enjoy 20% off discount and children can enjoy 30% off discount.

**Hint:** You can store the discount information in 'system info' entity, so that you don't need to store the price three times.

Buy Ticket

CAPTAIN AMERICA:  
CIVIL WAR

PG-13, 2 hr 26 min

Sunday, May 22  
8:05pm

Regal Atlantic Station 18 IMAX &  
RPX

261 19th Street NW

Atlanta, GA 30363

Payment Information

Use a saved card

1234 ▼

Buy Ticket

Use a new card

Name on Card

Alier Hu

Card Number

1234 5678 9012 2541

CVV

123

Expiration Date

02/2018

☐ Save this card for later use

Submit

Figure 13: Payment Information

The customer can either use a saved card or enter a new card. If the customer wants to use a new card, all fields need to be filled and the expiration date should be greater than today. They can check “save this card for later use” checkbox to save this card into their saved card list.

16



Buy Ticket

CAPTAIN AMERICA:  
CIVIL WAR

PG-13, 2 hr 26 min

Sunday, May 22  
8:05pm

Regal Atlantic Station 18 IMAX &  
RPX

261 19th Street NW

Atlanta, GA 30363

Confirmation

Order ID

12345

Thank you for your purchase! Please save order ID for your records.

Figure 14: Confirmation

A unique order ID should be generated.

## 8. Order History

Customer will be directed to this page by clicking on “My Order History” link on Me page.

Order History

Order ID

Search

Select	Order ID	Movie	Status	Total Cost
<input checked="" type="radio"/>	12345	Captain America	Unused	\$1154
<input type="radio"/>	12346	Zootopia	Cancelled	\$5.23
<input type="radio"/>	14578	Angry Birds	Complete	\$20.65
<input type="radio"/>	24589	Iron Man	Complete	\$15.52

View Detail

Figure 15: Order History

Customer can view all their orders or search for an order by entering the order ID.

## 9. View Order Detail/ Cancel Order

<b>Order Detail</b>	
<b>CAPTAIN AMERICA: CIVIL WAR</b> <i>PG-13, 2 hr 26 min</i> <b>Sunday, May 22 8:05pm</b>	<b>Regal Atlantic Station 18 IMAX &amp; RPX</b> 261 19th Street NW Atlanta, GA 30363 1 adult ticket: \$11.54
<div>Cancel this orderBack</div>	

Figure 16: Order Detail/Cancel Order

Customer can view the detail of the order or cancel it on this page. You need to show all information as shown on the mockup screen except the poster. A \$5 cancellation fee will be deducted from the refund. You should update the total cost accordingly. The customer cannot cancel the order once the movie has started.

For example, the total cost of this order (see mockup) is \$11.54. If the customer wants to cancel this order, the total cost would become  $\$11.54 - \$5 = \$6.54$ .

### Note:

1. A cancelled order should not be removed from the database, but the system needs to know if an order has been cancelled or not. (See 'status' on 'Order History' page. 'unused' means the movie has not started, 'cancelled' means the order has been cancelled, 'completed' means the customer has used the ticket. Only 'unused' order can be cancelled.)

## 10. My Payment Information

Customer can view/delete their saved cards on this page.

### My Payment Information

Select	Card Number	Name on Card	Exp Date
<input checked="" type="radio"/>	0934 5678 9012 3456	James Bond	12/2019
<input type="radio"/>	5555 5555 5555 5555	Alier Hu	09/2017
<input type="radio"/>	1234 5678 9012 2541	Alier Hu	02/2018
<input type="radio"/>	0184 2048 0582 5939	James Bond	06/2020

Figure 17: My Payment Information

## 11. My Preferred Theater

Customer can view/delete their preferred cards on this page.

### My Preferred Theater

- ☐ CINÉBISTRO AT TOWN BROOKHAVEN  
1004 Town Blvd., Atlanta, GA 30319

---

- ☐ REGAL PERIMETER POINTE STADIUM 10  
1155 Mount Vernon Highway, Atlanta, GA 30338

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- ☐ AMC DINE-IN THEATRES BUCKHEAD 6  
3340 Peachtree Rd., Atlanta, GA 30326

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- ☒ REGAL ATLANTIC STATION 18  
261 19th Street NW, Atlanta, GA 30363

Figure 18: My Preferred Theater

## Manager Functionalities

## 1. Choose Functionality (manager view)

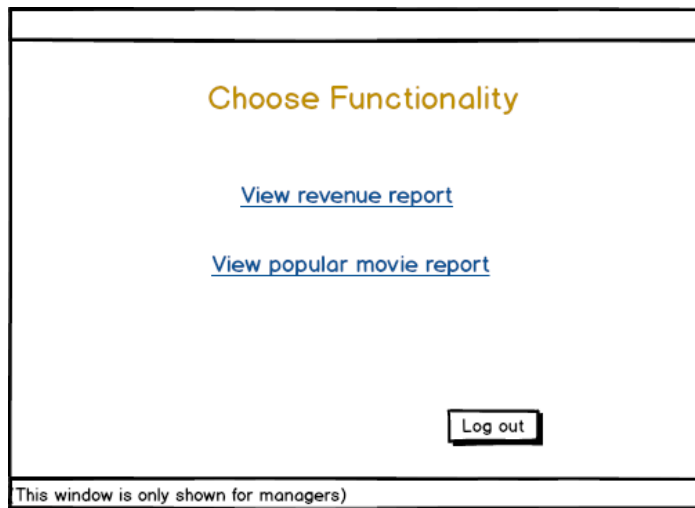


Figure 19: Choose Functionality (manager view)

If user have logged in as manager, they should be taken to this window.

Hint:

1. You need to consider whether these reports should be stored in the database.

## 2. View Revenue Report

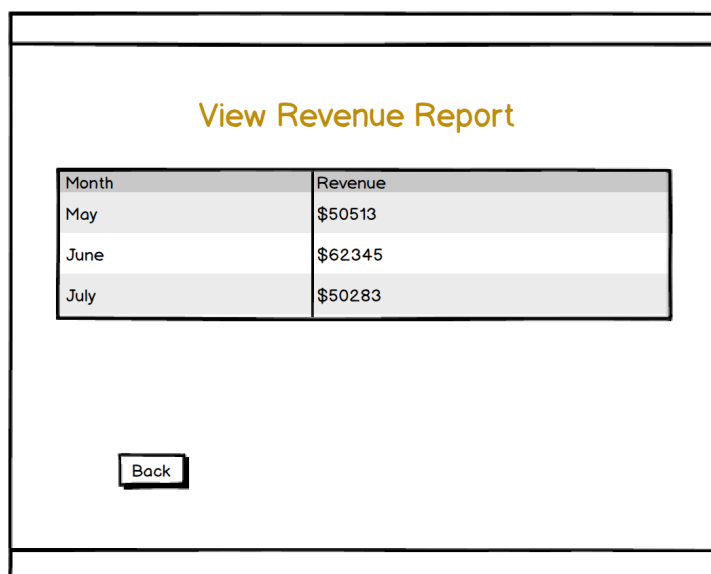


Figure 20: View Revenue Report

This report shows the total revenue of each month.

**Note:**

1. For this report, you only need to show three months.
2. Do not hardcode the reports. You need to write SQL statements for generating reports. This applies to all reports.

### 3. View Popular Movie Report

View Popular Movie Report		
Month	Movie	#of Orders
May	Captain America	6137
	Angry Birds	5135
	Zootopia	3907
June	Angry Birds	7282
	Alice in Wonderlands 2	6345
	Captain America	4082
July	Alice in Wonderlands	5975
	Star Trek	5168
	The Legend of Tarzan	4513

Back

Figure 21: View Popular Movie Report

This report shows the top 3 most popular movies (calculated by number of orders) of each month.

**Note:**

1. Similarly to the previous report, you only need to show three months.
2. Do not include cancelled orders.

## Document Version Info

Version	Notes	Date
1.0	EO final version	5/6/2016
1.1	Typo	6/2/2016