

CONFIDEV CONSULTING

# SYSTEM REQUIREMENTS DOCUMENT (SyRS)

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## **Deliverable 4: System Requirements Specification Document**

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# 1. Introduction

## 1.1 System Purpose

The system to be designed as proposed by the ConfiDev Consulting Group for the Montreal Eaton Centre Development Project (henceforth referred to as MECD) will leverage the crossover between the shopping and dining experiences of the customers at the Eaton Centre. In doing so, the system will increase the loyalty of the centre's customers, enticing them to return to a shopping/dining experience at the centre, rather than an enticement of loyalty to a specific store, restaurant or cafe. In turn, the proposed system will satisfy the MECD's business goals of increasing sales, more repeat business of its customers and enhancement of the centre's public image.

## 1.2 System Scope

The proposed system is the **Shelby Loyalty System Application**. It addresses the current issue of a non-existent centre-wide reward-based system, which does not incentivize customers to return to a shopping/dining experience at the centre. Instead, customers return to a specific store/restaurant which may or may not be within the Eaton Centre. Furthermore, there is no current reward-providing crossover between the shopping and dining experiences of the centre.

The proposed loyalty system, therefore, provides a centre-wide rewards-based system where any purchase within the Eaton Centre results in customers gaining reward points. Customers are then able to redeem discounts and coupons to their preferred stores and restaurants using these reward points. In addition, a customer has a membership ranking, which increases in accordance with a customer's loyalty to the Eaton Centre. At higher levels of membership ranking, a customer receives more reward points when making a purchase at the Eaton Centre. Lastly, the customer may gain more reward points or increase their membership ranking by submitting online reviews or 'tagging' the Eaton Centre on social media. In turn, this enhances the Eaton Centre's public image and entices more customers to visit the centre.

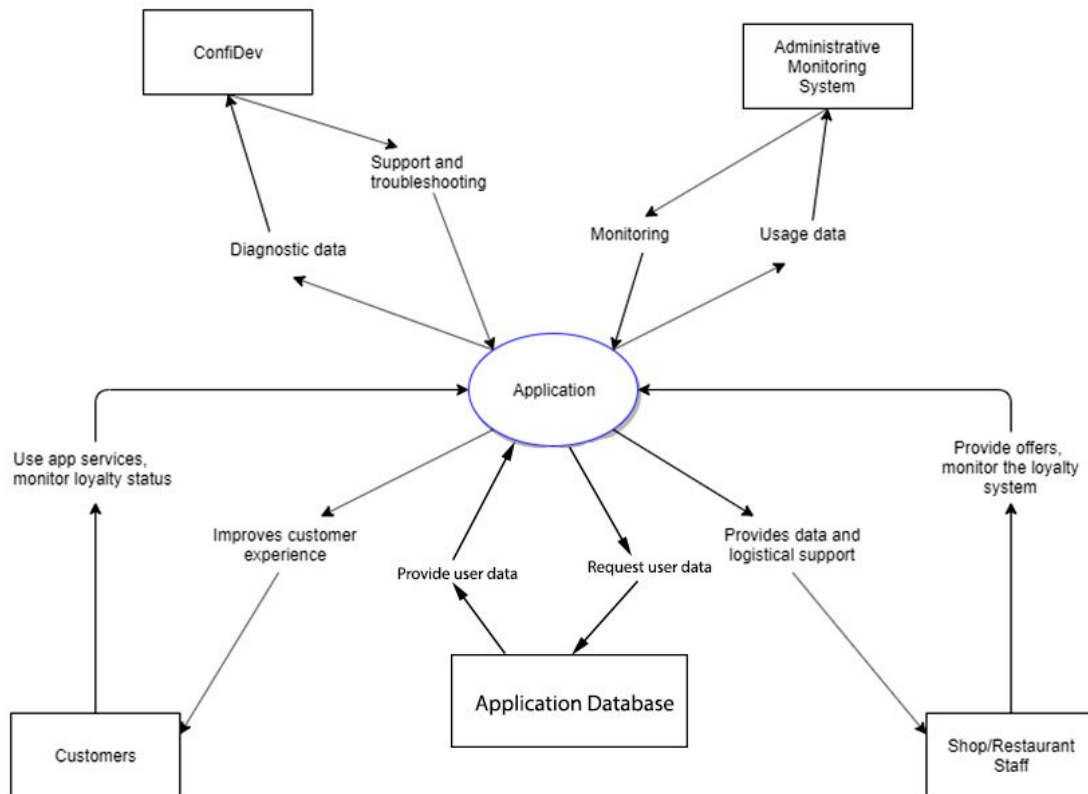
The proposed loyalty system will lead to a 15% increase in sales, a 20% increase in repeat business of the centre's customers and enhancement of the centre's public image.

To measure the success of the system, the system should meet the following: minimum download rate of 1500 downloads/month within the first three months, minimum usage rate of 750 unique customer visits/month within the first three months, minimum average usage rate of 15 visits per customer/month within the first three months.

To learn more about the business goals the system is to fulfill, refer to the High-Level Requirements Document (ConfiDev Consulting Group, 2019).

## 1.3 System Overview

### 1.3.1 System Context



### 1.3.2 System Functions

The **Shelby Loyalty System** is integrated into an **Eaton Centre Application** that is downloadable through the Google Play Store and Apple Application Store on any compatible smart device. The application provides the following features to address the issues discussed in **1.2 System Scope**:

#### 1. Membership Ranking

A customer that has registered themselves with the Shelby Loyalty System will have a membership ranking. This membership ranking represents the customer's loyalty to the Eaton Centre. At higher levels of membership ranking, the customer is able to earn more reward points when making purchases and receives exclusive offers. A customer may increase their membership ranking in the following ways:

##### a. Visiting the Eaton Centre without making a purchase

A customer can earn membership ranking just for making a visit to the Eaton Centre, without having to make a purchase. The customer has to remain in the Eaton Centre for at least 15 minutes for their 'visit' to be registered. A customer may register their visit by either:

I. Using the geolocation service on the Eaton Centre Application on their smart device. If the geolocation identifies a customer's location to be within the Eaton Centre for 15 continuous minutes, then the customer is awarded an increase in membership ranking.

II. Scanning their membership card at one of the Eaton Centre's interactive kiosks. There has to be an elapsed time of 15 minutes from the point at which their membership card is scanned (identifying Eaton Centre entry) to the point at which their membership card is scanned a second time (registering a 'visit' as valid).

**b. Submitting a Google Review about the Eaton Centre**

Using the Eaton Centre Application's integrated Google Review, a customer may provide a rating and description of the Eaton Centre. In doing so, a customer can gain membership ranking. A customer can only perform this action once.

**c. Facebook Eaton Centre Check-In**

Using the Eaton Centre Application's integrated Facebook Check-in, a customer may choose to display their Eaton Centre visit on their Facebook profile. In doing so, a customer can gain membership ranking. A customer may only perform this action once per visit, which is enforced by a 24-hour time limit between check-ins.

**d. Tagging the Eaton Centre in Social Media Posts**

Using the Eaton Centre Application's integrated social media posts to Instagram, Facebook, Snapchat and Twitter, a customer may choose to 'tag' the Eaton Centre in one of their social media posts. In doing so, a customer can gain membership ranking. A customer may only perform this action once per visit, which is enforced by a 24-hour time limit between posts.

**2. Reward Points**

A customer that has registered themselves with the Shelby Loyalty System will have a reward points balance. A customer may use their reward points to redeem store and restaurant coupons and discounts. A customer is able to submit their store/restaurant/item preferences in their user profile, to receive preference-specific offers. A customer can gain reward points by making a purchase at any store/restaurant within the Eaton Centre, as long as they choose to apply for their membership card at checkout.

**3. Coupons and Discounts**

Coupons and Discounts can be created by an Eaton Centre Manager, as well as, shop/restaurant employees. These coupons and discounts can then be redeemed by customers using their reward points balance.

### **1.3.3 User Characteristics**

The system will support three types of user privilege: Customer, Store/Restaurant Employee, and Eaton Centre Administrator. Depending on the privilege, each user type will have a different application viewpoint and interface. Customers will have access to customer functions, employees will have access to both customer and store management functions, and the Eaton Centre Administrators will have access to all customer, store management and administrative functions. Customers and Store/Restaurant Employees will only be able to utilize the system through the Eaton Centre mobile application, which is functional on any compatible smart device with a functioning internet connection. Centre Administrators will be able to utilize the system through both the Eaton Centre mobile application and an administrative website. The functionalities according to type of user privilege are as follows:

#### **1. Customer**

- View Eaton Centre interactive map
- View list of stores and restaurants
- View profile
  - View reward points balance
  - View membership ranking
  - View membership card
  - View personal information
- Edit profile
- View list of coupons and discounts
  - Redeem a coupon or discount
- Submit a Google review about Eaton Centre
- Tag the Eaton Centre on social media
- Check-In to Eaton Centre on Facebook
- Access support page

#### **2. Store/Restaurant Employee**

- Create advertisement
- View store/restaurant-specific usage analysis
  - View number of coupons used
  - View number of discounts used
- Add inventory of items to the application
- View store purchases by category of the item

#### **3. Centre Administrator**

- View application usage statistics
- View system security-self scan analysis
- View list of all customers sorted by their membership ranking
- Manage reward weightings for customers

## 2. References

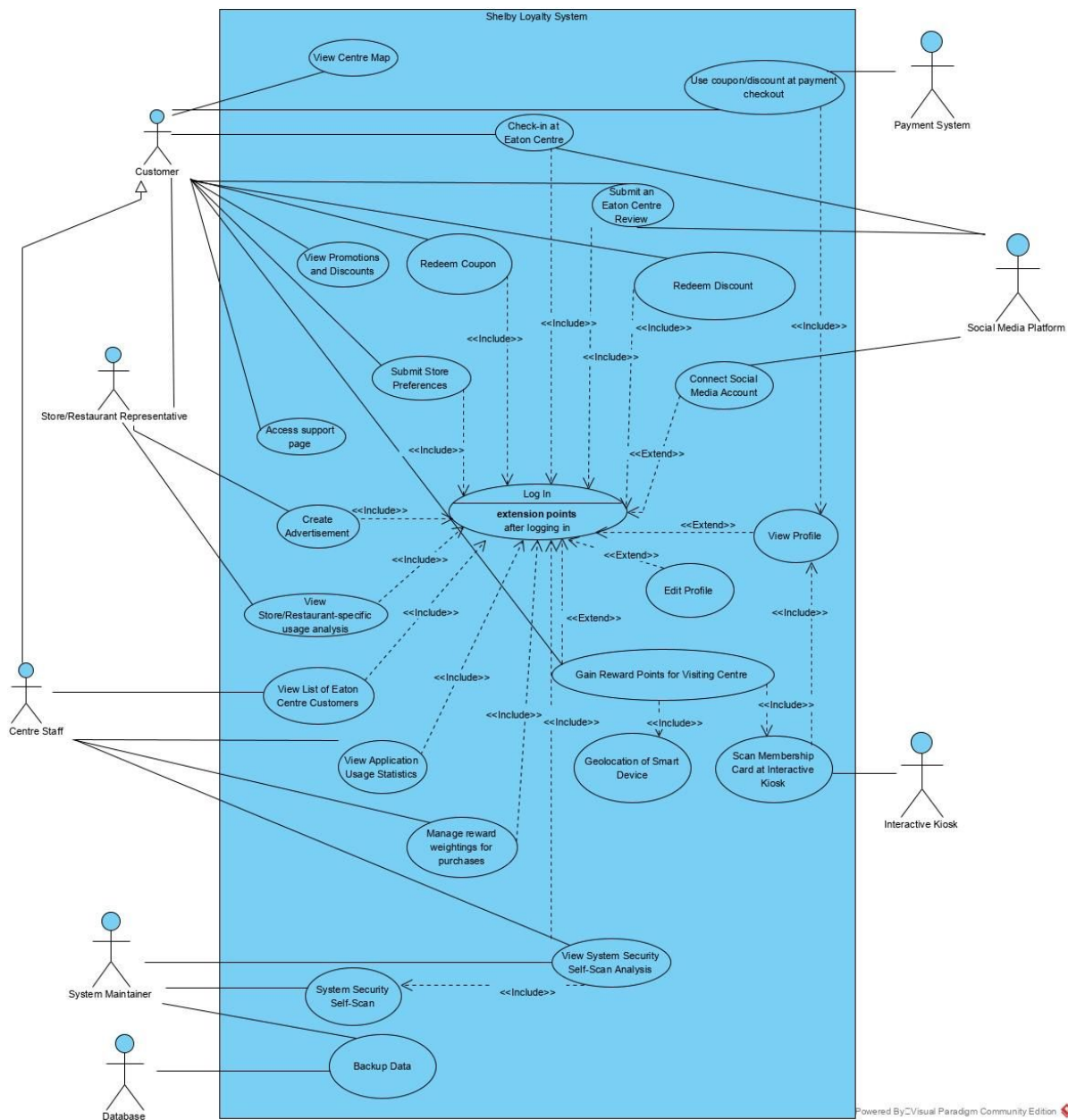
This section lists all documents used to write the System Requirements Specification (SyRS):

- ISO/IEC/IEEE 29148-2011(E) – Systems and software engineering – Life cycle process – Requirements engineering dated 2011-12-01
- Group 01 High Level Requirements Document
- The Personal Information Protection and Electronic Documents Act (PIPEDA) - <https://www.priv.gc.ca/en/privacy-topics/privacy-laws-in-canada/the-personal-information-protection-and-electronic-documents-act-pipeda/>
- Principle of Least Privilege (PoLP) - [https://en.wikipedia.org/wiki/Principle\\_of\\_least\\_privilege](https://en.wikipedia.org/wiki/Principle_of_least_privilege)
- Montreal Eaton Centre Website - <https://www.centreeatondemontreal.com/en/>





3.0.2 Use Case Diagram



## 3.1 Functional Requirements

### 3.1.1 Use Case 1: View Montreal Eaton Centre Map (Elie Elia)

<b>User Story</b>	“As a customer, I want to be able to know the specific path and directions I need to follow from my current location within the Montreal Eaton Centre in order to reach a desired amenity.”
<b>Acceptance Criteria</b>	<ul style="list-style-type: none"> <li>• User can choose and view the floor plan of a particular level of the Montreal Eaton Centre.</li> <li>• A search field is displayed which the user can access and use to search for a specific amenity.</li> <li>• Amenities are displayed on the respective level on the interactive map with their corresponding categorizational icon or name.</li> <li>• Selecting a displayed amenity on the map shall display the amenity’s information and promotions/discounts in a popup screen.</li> <li>• User can filter the category of amenities they would like to view through a list of amenities with toggle on/off buttons.</li> <li>• A user can view their current location within the Eaton Centre on the map.</li> <li>• User can view a path on the map from their current location within the Eaton Centre, to a desired reachable amenity.</li> </ul>

<i>Use Case: View the Montreal Eaton Centre Map</i>	
<b>ID</b>	UC-01
<b>Title</b>	View Montreal Eaton Centre Map
<b>Actors</b>	Customer, Eaton Centre Application System
<b>Intention</b>	The intention of the customer is to search for certain amenities available within the Montreal Eaton Centre, and follow a path to the desired amenity as a visual aid.
<b>Precondition</b>	User is connected to the internet. User has GPS location tracking service enabled on their smart device and has provided the application with access to their device’s GPS. User has the Eaton Centre Application open on their smart device.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. User indicates to the Eaton Centre Application System that they want to view the centre map.</li> <li>2. User inputs the amenity they would like to search for.</li> <li>3. Eaton Centre Application System lists the amenities that match the user’s input data.</li> <li>4. User selects one of the listed amenities.</li> <li>5. Eaton Centre Application System indicates the location of the selected amenity on the map to the user.</li> <li>6. Eaton Centre Application System displays Amenity Information Screen.</li> </ol>

	<p>7. User indicates to the Eaton Centre Application System that they want directions to the displayed amenity location.</p> <p>8. Eaton Centre Application System displays the Directions Screen.</p> <p>9. User indicates to the Eaton Centre Application System that they want directions to the displayed amenity location from their current GPS location.</p> <p>10. Eaton Centre Application System displays the path to the selected amenity location.</p> <p>11. Eaton Centre Application System displays a list of directions for the indicated path.</p>
<b>Alternatives/ Exceptions</b>	<p>1-11a: User decided not to use the Application's Map Service:</p> <p>1-11a.1: User closes map service; use case ends in failure.</p> <p>1-11b: User's smart device runs out of battery:</p> <p>1-11b.1: Application is closed; use case ends in failure.</p> <p>3a: Eaton Centre Application System could not find any amenities with the user's search input:</p> <p>3a.1: User decides to search for another amenity; use case continues at step 2.</p> <p>3b: Customer does not find their desired amenity in the list:</p> <p>3b.1 User indicates to the Eaton Centre Application System that they want to apply search filters to the Eaton Centre amenities; use case continues at step 2.</p> <p>10a: Eaton Centre Application System could not retrieve the user's current GPS location:</p> <p>10a.1: Eaton Centre Application System informs user about the error.</p> <p>10a.2: User indicates to the Eaton Centre Application System that they want the directions to the displayed amenity location from a nearby amenity location.</p> <p>10a.3: Eaton Centre Application System lists the amenities that match the user's input data</p> <p>10a.4: User selects a nearby amenity from the list of amenities; use case continues at step 10.</p>
<b>Postcondition (for success case)</b>	User has successfully located the desired amenity and the Eaton Centre Application System has displayed a path and a list of directions to the user to follow.
<b>Postcondition (for failure case)</b>	User has not been able to locate a desired amenity within the Eaton Centre.

### Related Requirements

Sys Req ID	Priority	Related Requirement
RF 0	High	The Eaton Centre Application System shall display the amenity information and coupons/discounts for the specific amenity selected by the user.

RF 1	Medium	The Eaton Centre Application System shall allow the user to save their selected amenity in a list of saved amenities.
RF 2	High	The Eaton Centre Application System shall display the most optimal travel path to the desired amenity 98% of the time.
RF 3	High	The Eaton Centre Application System shall determine an accurate current location of a user within the Eaton Centre using GPS functionality within 5 seconds 95% of the time.
RF 3	High	The Eaton Centre Application System shall determine the GPS location of a user within an accuracy distance range of 2m.
RF 4	High	The Eaton Centre Application shall be able to retrieve the entire list of amenities related to the search query within 3 seconds 95% of the time.
RF 5	High	The Eaton Centre Application System shall only display the list of amenities related to the search query in compliance with the applied categorizational amenity filters.
RF 6	High	The Eaton Centre Application System shall display the map of the specific level on which the selected amenity is located within 4 seconds 95% of the time.
RF 7	Medium	The Eaton Centre Application System shall highlight the selected amenity location in blue colour on the centre map.

### 3.1.2 Use Case 2: Check-in at Eaton Centre (Carl El Khoury)

<b>User Story</b>	“As a customer, I want to check-in at the Eaton-Centre to increase my membership ranking on the loyalty system and thus qualify for new rewards and offers ”
<b>Acceptance Criteria</b>	<ul style="list-style-type: none"> <li>• User can scan their barcode on any kiosk or information desk located in the Eaton Centre to verify that they have checked in</li> <li>• The user can display their account information after identification in order to track their ranking and points</li> <li>• Users using the mobile application who have geolocation enabled will get checked in automatically based on their GPS location after 15 minutes in the store.</li> <li>• The user becomes eligible for a points increase upon check-in.</li> </ul>

<i>Use Case: Check-in at the Eaton Centre</i>	
<b>ID</b>	UC-02

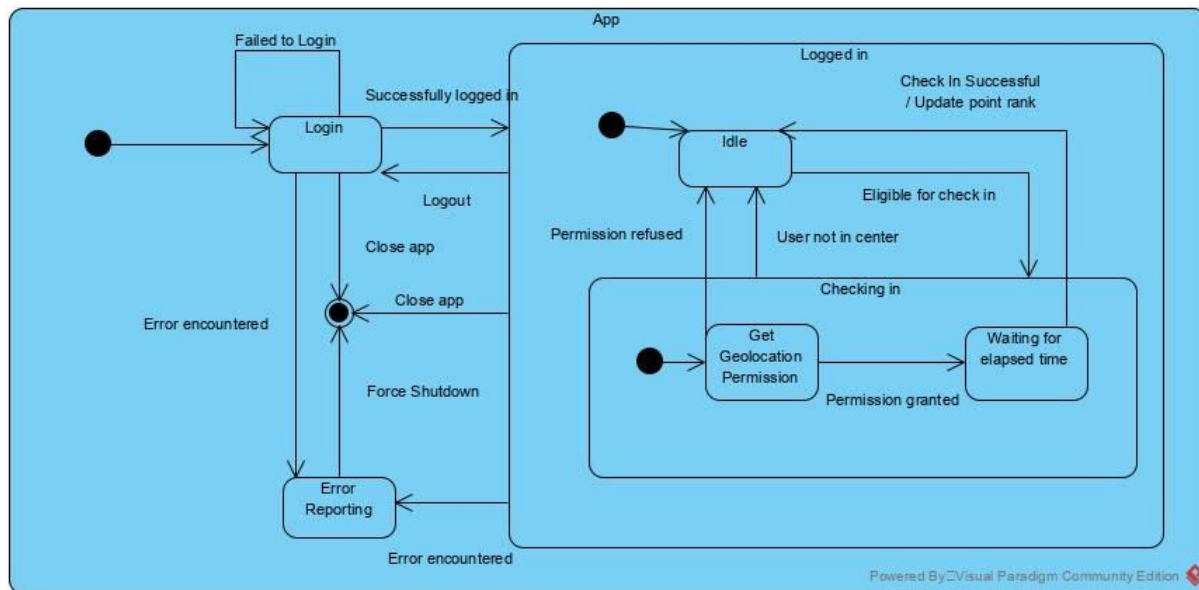
<b>Title</b>	Check-in at Eaton Centre
<b>Actors</b>	Customer
<b>Intention</b>	The intention of the user is to check-in at the Eaton Centre to be eligible for a point increase and for new offers/discounts
<b>Precondition</b>	Customer is registered on the loyalty system, is located at the Eaton Centre and is connected to the wifi
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. Customer opens loyalty system application</li> <li>2. The system queries the customer's geolocation and their elapsed time at the store and prompts them to check-in if they are eligible</li> <li>3. Customer chooses to check-in</li> <li>4. The system acknowledges the customer's request and shares updated account information</li> <li>5. Customer gets an updated rank number and information on new offers/discounts</li> </ol>
<b>Alternatives/ Exceptions</b>	<p>1-4a: User decides not to check-in; use case ends in failure</p> <p>2.a. The customer doesn't have geolocation enabled</p> <p>2.a.1: The system prompts the customer to enable geolocation</p> <p>2.a.1.a: The user enables geolocation; Use case continues from step 3</p> <p>2.a.1.b: The user disables geolocation and is prompted to head to a kiosk for check-in. The kiosk verify the customer's 15 minutes waiting time; Continues from step 3</p> <p>3.a: The user leaves the Eaton Centre before choosing the check-in; use case ends in failure</p>
<b>Postcondition (for success case)</b>	The user checks in successfully and receives extra rank points
<b>Postcondition (for failure case)</b>	The user does not check-in and does not receive any points

### Related Requirements

Sys Req ID	Priority	Related Requirement
RF 8	High	The Shelby Loyalty System shall validate the user's geolocation within 5 seconds 95% of the time.
RF 9	High	The Shelby Loyalty System shall successfully display the account information within 3 seconds 95% of the time.
RF 10	High	The Shelby Loyalty System shall edit account information within 4

		seconds 90% of the time.
RF 11	High	The Shelby Loyalty System shall retrieve and sort discounts/offers based on the customer preferences within 7 seconds 95% of the time.
RF 12	Medium	The Shelby Loyalty System shall keep track of user check-in information for future tailored customer experience.
RF 13	High	The Shelby Loyalty System shall compute the current and future eligibility for offers/discounts for the customer

### State Machine (Login and Reward Check-In):



### 3.1.3 Use Case 3: Submit an Eaton Centre Review (Preyansh Kaushik)

<b>User Story</b>	“As a customer, I want to post a review in order to share my experience at the Montreal Eaton Centre as well as to gain membership ranking on the loyalty system.”
<b>Acceptance Criteria</b>	<ul style="list-style-type: none"> <li>• User can select to submit a review in either textual or video format on the Shelby Loyalty System application.</li> <li>• For a textual review, a text field of maximum 140 characters is displayed which the user can access and use to type a textual review.</li> <li>• For a video review, a video component is displayed which allows the user to record a video of up to 2 minutes using their smart device’s camera.</li> <li>• User can switch between sharing a textual review and/or a video review seamlessly.</li> <li>• A user can share their review with externally linked social media accounts such as Facebook, Instagram, and Google Maps.</li> </ul>

<i>Use Case: Submit a Review</i>	
<b>ID</b>	UC-03
<b>Title</b>	Submit Review
<b>Actors</b>	Customer
<b>Intention</b>	The intention of the customer is to submit a review of the Eaton Centre.
<b>Multiplicity</b>	There can be multiple customers posting reviews at a time.
<b>Precondition</b>	The customer has a smartphone, has the Shelby Loyalty application installed, has logged in to the application, and is connected to wifi or a mobile data network.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. Customer indicates to the Shelby Loyalty System application that they wish to submit a review.</li> <li>2. The Shelby Loyalty System application displays the review screen.</li> <li>3. Customer indicates to the system that they wish to share a textual review.</li> <li>4. Customer types their review.</li> <li>5. Customer indicates to the system that they wish to share the review to Facebook.</li> <li>6. System acknowledges the request and shares the review to customer's requested social media account.</li> <li>7. System assigns a fixed amount of points to the customer for successfully sharing a review.</li> <li>8. System indicates to the user that the review was shared successfully.</li> </ol>
<b>Alternatives/ Exceptions</b>	<p>1-5a: User decides not to post a review.</p> <p>1-5a.1: User navigates away from the review screen; use case ends in failure.</p> <p>1-5b: User's smartphone device runs out of battery; use case ends in failure.</p> <p>1-5b.1: Application is closed; use case ends in failure.</p> <p>3a: Customer chooses to submit a video review.</p> <p>3a.1: Customer selects to record a video.</p> <p>3a.2: Customer records the video; use case continues at Use Case 5.</p> <p>5a: Customer chooses to share their review on another platform. Use case continues at Use Case 6.</p> <p>6a: The social media authentication fails.</p> <p>6a.1: The system prompts an error to the user; use case continues at Use case 5.</p> <p>6b: The network call to the customer's social media account fails.</p> <p>6b.1: The system prompts an error to the user; use case continues at Use case 5.</p> <p>7a: The customer has reached the max capacity of points to be assigned for reviews.</p> <p>7.a.1: The system does not update the customer's membership ranking for the review; Use case continues to Use Case 8.</p>
<b>Postcondition</b>	<p><u>Main scenario:</u> The customer's membership ranking are updated for rating.</p> <p><u>Alternatives:</u></p>

	The customer's membership ranking is not amended.
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### Related Requirements

Sys Req ID	Priority	Related Requirement
RF 14	High	The Shelby Loyalty System shall allow users to write a textual review of up to 140 characters.
RF 15	High	The Shelby Loyalty System shall allow users to submit a video review of up to 2 minutes.
RF 16	High	The Shelby Loyalty System shall allow users to submit reviews in either textual or video format.
RF 17	High	The Shelby Loyalty System shall allow users to share textual reviews to their linked Google Maps, Facebook, and Instagram accounts.
RF 18	High	The Shelby Loyalty System shall allow users to share video reviews to their linked Facebook and Instagram accounts.
RF 19	High	The Shelby Loyalty System shall post submitted reviews to the user's linked social media accounts within 5 seconds 96% of the time.
RF 20	High	The Shelby Loyalty System shall limit the customer to obtain points for only one review in a span of every 24 hours.

### 3.1.4 Use Case 4: View Promotions and Discounts

### 3.1.5 Use Case 5: Redeem Coupon (Christopher Boustros)

<b>User Story</b>	"As a customer, I want to redeem some or all of my coupons for discounts on store/restaurant purchases"
<b>Acceptance Criteria</b>	<ul style="list-style-type: none"> <li>• The Customer is logged in</li> <li>• The Customer has coupons available to redeem</li> <li>• The Customer selects an eligible coupon for a particular purchase that is made at a store/restaurant</li> <li>• The Customer does not select more than one coupon for a single purchase</li> <li>• The Customer is at checkout with a cashier</li> </ul>

<i>Use Case: Redeem Coupons</i>	
<b>ID</b>	UC-5
<b>Title</b>	Redeem Coupons



<b>Actors</b>	Customer
<b>Intention</b>	The intention of the Customer is to redeem a coupon for a store/restaurant purchase
<b>Precondition</b>	Customer is logged in and has coupons to redeem
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The Customer opens the coupon page</li> <li>2. The System displays all available coupons, along with the stores/restaurants where each coupon can be redeemed</li> <li>3. The Customer selects a particular coupon</li> <li>4. The System displays a barcode for the selected coupon and the conditions regarding which purchases are eligible for this coupon</li> <li>5. The Customer shows the coupon and its barcode to the cashier at a store/restaurant to be scanned at checkout for a particular purchase</li> <li>6. The System validates that the coupon is applicable for the purchase</li> <li>7. The System reduces the cost of the purchase by the discount of the applied coupon</li> <li>8. The Customer pays for the purchase</li> <li>9. The System marks the applied coupon as redeemed so that it is no longer displayed in the list of available coupons</li> </ol>
<b>Alternatives/ Exceptions</b>	<p>2a: The Customer has no available coupons  2a1: The System notifies the Customer that there are no available coupons to display  2a2: Use Case aborts</p> <p>3a: The Customer does not find a coupon that is applicable for the current purchase  3a1: Use Case aborts</p> <p>6a: The coupon is not valid that the restaurant/store or for the purchase being made or has expired  6a1: The System notifies the Customer that the coupon cannot be redeemed for this purchase  6a2: Use Case continues at step 2</p> <p>6b: Another coupon has already been applied for the current purchase  6b1: The System notifies the Customer that the coupon cannot be applied  6b2: Use Case continues at step 8</p>
<b>Postcondition (for success)</b>	The purchase is complete and the coupon has been redeemed.
<b>Postcondition (for failure; use case aborted)</b>	No coupon has been redeemed for the Customer's purchase. The Customer must pay the full price at checkout.

## Related Requirements

Sys Req ID	Priority	Related Requirement
RF 21	HIGH	The Shelby Loyalty System shall display the list of available coupons for a Customer within 3 seconds 95% of the time.
RF 22	HIGH	The Shelby Loyalty System shall display the barcode for a selected coupon within 5 seconds 95% of the time.
RF 23	HIGH	The Shelby Loyalty System shall validate whether a coupon can be redeemed for purchase within 5 seconds 90% of the time.
RF 24	HIGH	The Shelby Loyalty System shall apply the discount for a scanned coupon to the price of purchase within 7 seconds 90% of the time.
RF 25	HIGH	The Shelby Loyalty System shall mark a coupon as expired within 10 minutes after its expiration date/time 80% of the time.
RF 26	HIGH	The Shelby Loyalty System shall mark a coupon as redeemed within 5 seconds after it has been redeemed 95% of the time.

### 3.1.6 Use Case 6: Redeem Discount

### 3.1.7 Use Case 7: Submit Store Preferences

### 3.1.8 Use Case 8: Redeem Reward Points (Ragheed Qasmieh)

User Story	“As a Customer, I want to use some or all of my reward points in exchange for store-specific and/or restaurant coupons/discounts”
Acceptance Criteria	<ul style="list-style-type: none"><li>• The Customer is logged in</li><li>• The Customer is on the promotions page or received a popup/notification for points’ redemption</li><li>• The Customer has points to redeem.</li><li>• The Customer selects an offer that is applicable on the amount of points that he/she currently has.</li></ul>

Use Case: Redeem Reward Points	
ID	UC-8
Title	Redeem Reward Points
Actors	Customer
Intention	The intention of the Customer is to redeem their loyalty program points for a

	coupon/discount
<b>Precondition</b>	Customer is logged in and has points to redeem.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. Customer accesses Promotions page through the toolbar at the bottom of the page</li> <li>2. DO</li> <li>3. System displays Customer's point total, and redeeming options.</li> <li>4. Customer selects an offer from the available list.</li> <li>5. Customer approves the selected offer</li> <li>6. System validates if the offer's cost does not exceed the number of points the Customer currently has.</li> <li>7. System deducts the offer's cost from the points total and unlocks the selected offer.</li> <li>8. The offer is added to the Customer's list of coupons/discounts</li> <li>9. UNTIL Customer leaves Promotions page</li> </ol>
<b>Alternatives/ Exceptions</b>	<p>1a: Customer accesses Promotions page through an Alert: 1a1: Use case continues at step 3.</p> <p>3a: Customer decides not to redeem points: 3a1: Use case ends in failure.</p> <p>6a: System determines that the selected offer is not applicable for the Customer: 6a1: System informs Customer of the invalidity of the selected offer; use case continues at step 3.</p>
<b>Postcondition( for success case)</b>	Customer has successfully exchanged points for an offer.
<b>Postcondition( for failure case)</b>	Customer did not redeem an offer.

### Related Requirements

Sys Req ID	Priority	Related Requirement
RF 27	High	The Shelby Loyalty System shall allow the Customer to access the list of offers in less than 8 seconds 98% of the time.
RF 28	High	The Shelby Loyalty System shall provide the Customer with a list of offers that contains 80% of the offers from stores corresponding to the Customer's preferences list 90% of the time.
RF 29	High	The Shelby Loyalty System shall allow the Customer to access a list of offers only corresponding to the Customer's search.
RF 30	Medium	The Shelby Loyalty System shall inform the Customer that the offer redemption is successful within one minute of the Customer approval.

RF 31	Medium	The Shelby Loyalty System shall add the redeemed offer to the Customer's list of discounts/coupons within 30 seconds of Customer's approval 80% of the time
RF 32	Medium	The Shelby Loyalty System may offer the Customer the choice of using the offer within 5 seconds of redeeming it 95 % of the time.

### 3.1.9 Use Case 9: Connect Social Media Account

### 3.1.10 Use Case 10: Access Support Page

### 3.1.11 Use Case 11: Create Advertisement(Anas Shahid)

<b>User Story</b>	"As a store representative, I want to be able to create advertisements in order to promote my sale to the customers through the app. "
<b>Acceptance</b>	<ul style="list-style-type: none"> <li>• User can submit a textual or pictorial advertisement on the application.</li> <li>• For the textual advertisement, the maximum word count of 100 words is displayed on the application.</li> <li>• For the pictorial advertisement, the max image size of 5mb is displayed</li> </ul>

<i>Use Case: Create Advertisement</i>	
<b>ID</b>	UC - 11
<b>Title</b>	Create Advertisement
<b>Actors</b>	Store Representative, Manager
<b>Intentions</b>	The intention of the store representative is to create a new advertisement for their store for the display of customers of the app
<b>Precondition</b>	Store Representative is logged in to the Shelby Loyalty System. Representative is connected to internet.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. Store Representative navigates to the Advertisement tab in the app.</li> <li>2. Store Representative chooses to create a new advertisement for the sale.</li> <li>3. Store Representative fills the textbox with the advertisement.</li> <li>4. Store Representative chooses to upload image in the advertisement.</li> <li>5. Store Representative submits the request for advertisement.</li> <li>6. The System notifies the manager with the request.</li> <li>7. The manager chooses to accept the advertisement</li> <li>8. The advertisement is published on the Application.</li> </ol>

<b>Alternatives/ Exceptions:</b>	<p>1a: The application crashes: 1a.1: Use case ends in failure.</p> <p>2a: Store Representative decides not to create an advertisement: 2a.1: Use case ends in failure.</p> <p>3a: The user fills in the textbox over the standard set capacity: 3a.1: The system notifies the user about the error. Use case continues at step 3.</p> <p>4a: Image size is larger than standard set for upload: 4a.1: The system shall notify the user about the error. Use case continues at step 3.</p> <p>5a: Manager rejects the advertisement: 5a.1: System informs Store Representative about the rejection. Use case continues at step 2.</p> <p>7a: Manager chooses to reject the advertisement 7a.1: The System notifies the Store Representative with the response. Use case continues at step 3.</p>
<b>Postcondition (for success):</b>	Store Representative has successfully created an advertisement for the sale.
<b>Postcondition (for failure)</b>	Store Representative was unsuccessful in creating the advertisement for sale.

Sys Req ID	Priority	Related Requirement
RF 33	High	Upon pressing submit, The Shelby Loyalty System shall process the request of advertisement in less than 5 seconds 96% of the time.
RF 34	High	Upon uploading a picture, The Shelby Loyalty System shall upload the image within 3 seconds 98% of the time.
RF 35	Medium	Upon submitting the request for advertisement, The Shelby Loyalty System shall inform the Store Representative with a success message within 4 seconds 98% of the time.

### 3.1.12 Use Case 12: Log In (Patrick Ghazal)

<b>User Story</b>	As a Customer, I want to login to the application, to access its restricted features.
<b>Acceptance Criteria</b>	<ul style="list-style-type: none"> <li>The Customer must have an existing account on the application.</li> </ul>

<i>Use Case: Log In</i>	
<b>ID</b>	UC-12

<b>Title</b>	Log In
<b>Actors</b>	Customer
<b>Intention</b>	The intention of the Customer is to log in to the application.
<b>Precondition</b>	Customer already has an account on the application.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. Customer opens the application.</li> <li>2. Customer enters credentials and presses Log In button.</li> <li>3. System validates credentials and provides access to Customer.</li> </ol>
<b>Alternatives/ Exceptions</b>	3a: System does not recognize credentials 3a1: System clears the text fields and invites Customer to try again. 3a2: Use case resumes at step 2.
<b>Postcondition</b>	Customer is logged in.

### Related Requirements

Sys Req ID	Priority	Related Requirement
RF 36	High	The application shall allow 3 unsuccessful login attempts before locking the user's account.
RF 37	High	The application shall redirect the user to the register page if they attempt to login with non-existing credentials.
RF 38	High	The application shall open the Welcome page within 5 seconds 95% of the time upon a successful login.
RF 39	High	The application shall (in)validate credentials within 5 seconds 95% of the time.

#### 3.1.13 Use Case 13: View Application Usage Statistics

#### 3.1.14 Use Case 14: Edit Profile

#### 3.1.15 Use Case 15: View Profile

#### 3.1.16 Use Case 16: Gain Reward Points for Visiting Centre

#### 3.1.17 Use Case 17: Geolocation of Smart Device

#### 3.1.18 Use Case 18: Scan Membership Card at Interactive Kiosk

#### 3.1.19 Use Case 19: View Store/Restaurants specific usage analysis

#### 3.1.20 Use Case 20: Manage Reward Weightings for purchases

### **3.1.21 Use Case 21: View list of Eaton Centre customers**

### **3.1.22 Use Case 22: View system security self-scan analysis**

### **3.1.23 Use Case 23: System security self-scan**

## **3.2 Performance Requirements**

This section provides the performance requirements for the proposed Shelby Loyalty System in terms of priority ranking, from high to low.

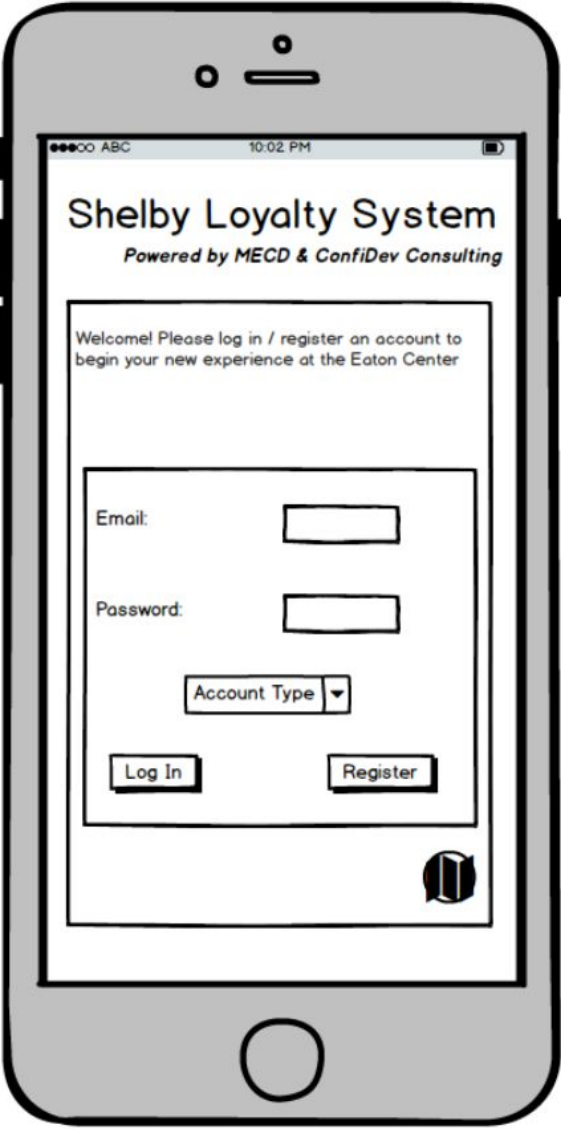
Sys Req ID	Priority	Performance Requirement
RP 1	High	The system shall have a mean transaction rate of 300 transactions/minute during peak usage periods.
RP 2	High	The system shall take no longer than 5 seconds to retrieve a response during normal usage.
RP 3	High	The notification process shall have a minimal throughput of 100 notifications/second.
RP 4	High	The system shall be able to handle a request rate of 100 transactions/second during peak usage periods.
RP 5	High	The system shall be able to handle at least 15000 active application users at a given time.
RP 6	High	The system shall authenticate the user's login credentials within three seconds.
RP 7	High	The system shall display the Eaton Centre Interactive Map within three seconds upon request.
RP 8	High	The Shelby Loyalty System Application shall be able to function on a smart device with a minimum of 1.5GB RAM.

## 3.4 System Interface

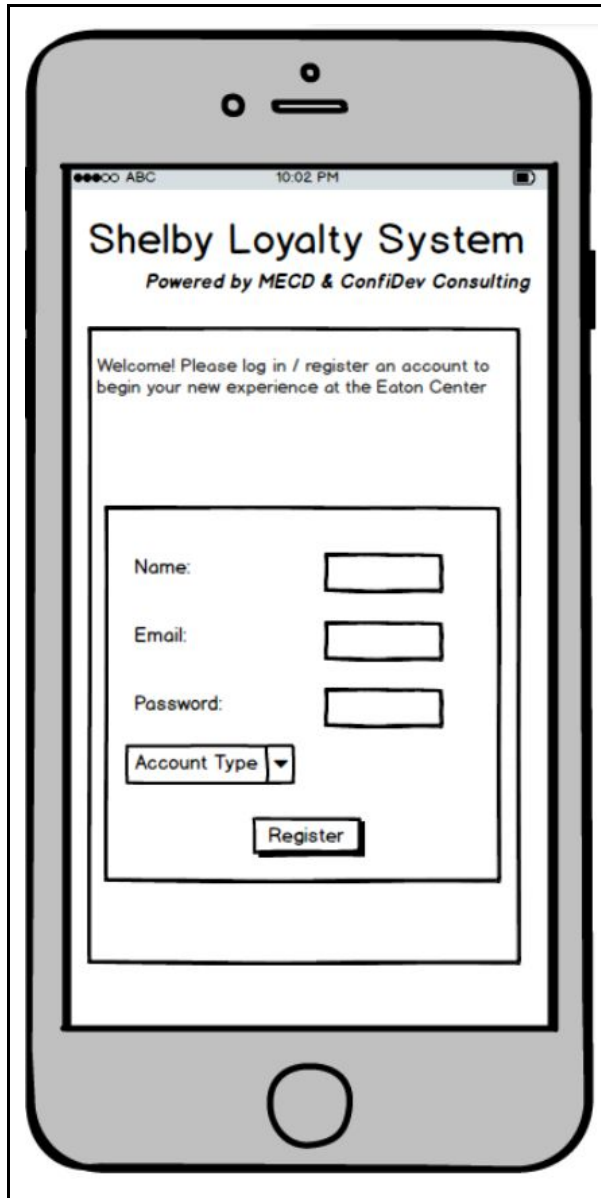
### 3.4.1 System Mockups

The Shelby Loyalty System application has three unique viewpoints based on the customer type of the user. The common pages across all users are the login page, registration page, and a view of the Eaton Centre map. For all other role-specific functionalities, the user must first log in.

#### Common Pages:

	<p><b><u>#1: Log In Page</u></b></p> <p>The login page for the Shelby Loyalty System is only viewed by the user the first time they open the application. A simple email verification is done if they select to register. Otherwise, the user can login directly into the application.</p> <p>The log-in feature, as referenced in our use case model, is paramount to the functionality and user experience on the application. Only certain features such as posting reviews, redeeming points, and more can be accessed upon login.</p> <p>The account type can be chosen between customer, manager, and store clerk depending on the role that the user wishes to log in as.</p> <p>Without successfully logging in or registering for an account, customers can only view the public floor map for the Eaton Centre. This screen can be navigated to by clicking the Google Maps icon.</p>
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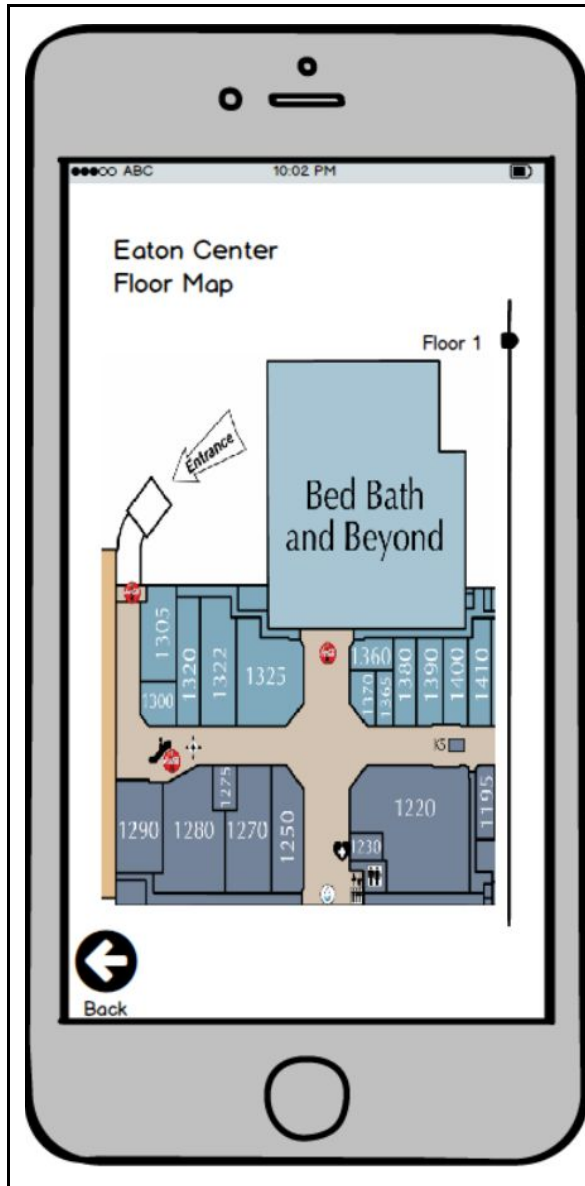




## **#2: Registration Page**

Users can create accounts on the application by providing information about their name, email, and password.

For store clerks and managers, an additional verification process off the main application takes place to ensure the credibility of the user.



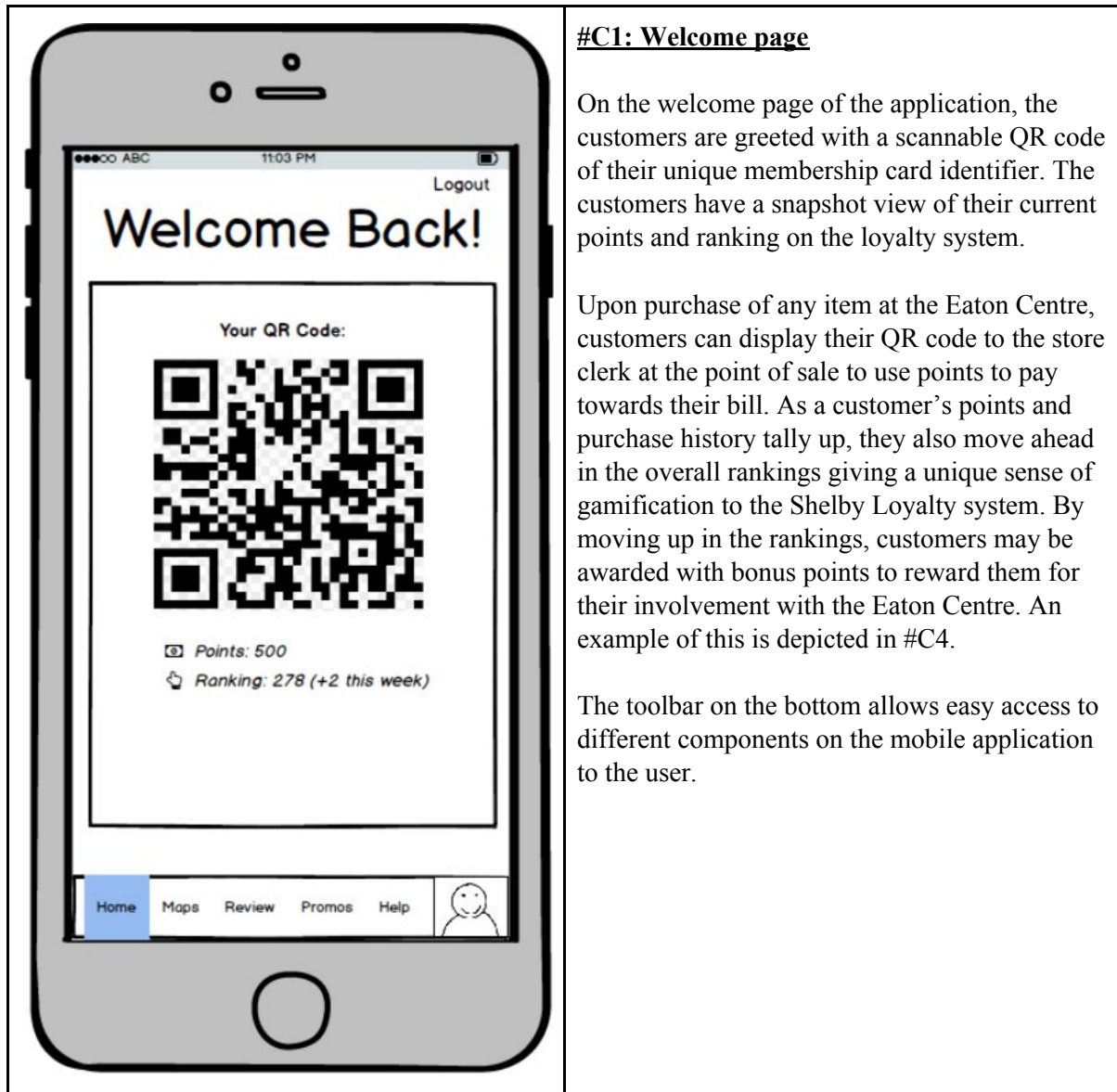
### **#3: Maps View**

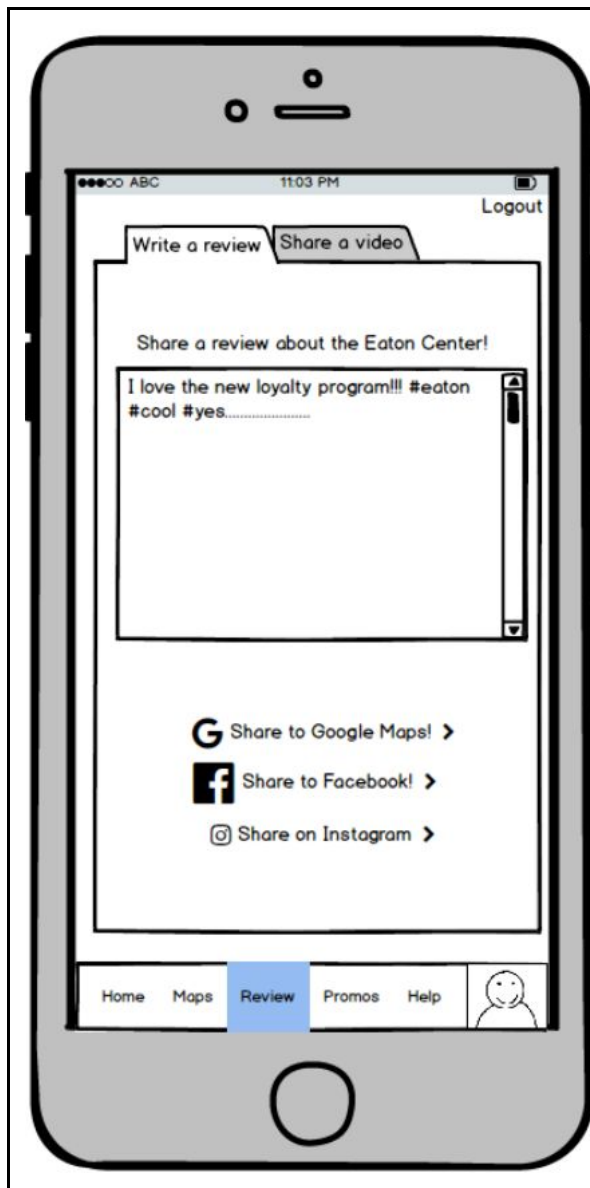
The maps view integrates a floor plan of every floor at the Eaton Centre..

A vertical scrollbar to move through different floors is displayed on the right. From this scrollbar, users will be rendered a different floor map view for the respective floor.

Finally, users can opt to return to the main page by clicking back at any time.

## i. Customer Viewpoint

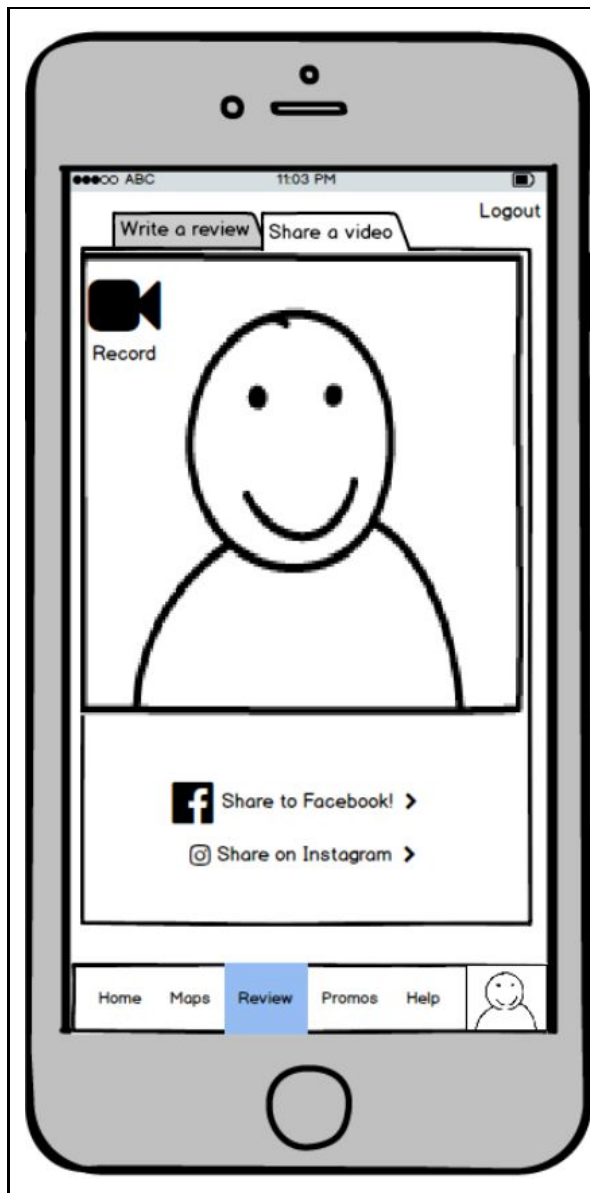




### **#C2: Share a review (Text)**

On the review tab, customers can share a review either by writing a review in text format or sharing a review in video format. Customers have a text area in which they enter the text and then optionally share it to google maps, facebook, or instagram by linking these third party services to their account.

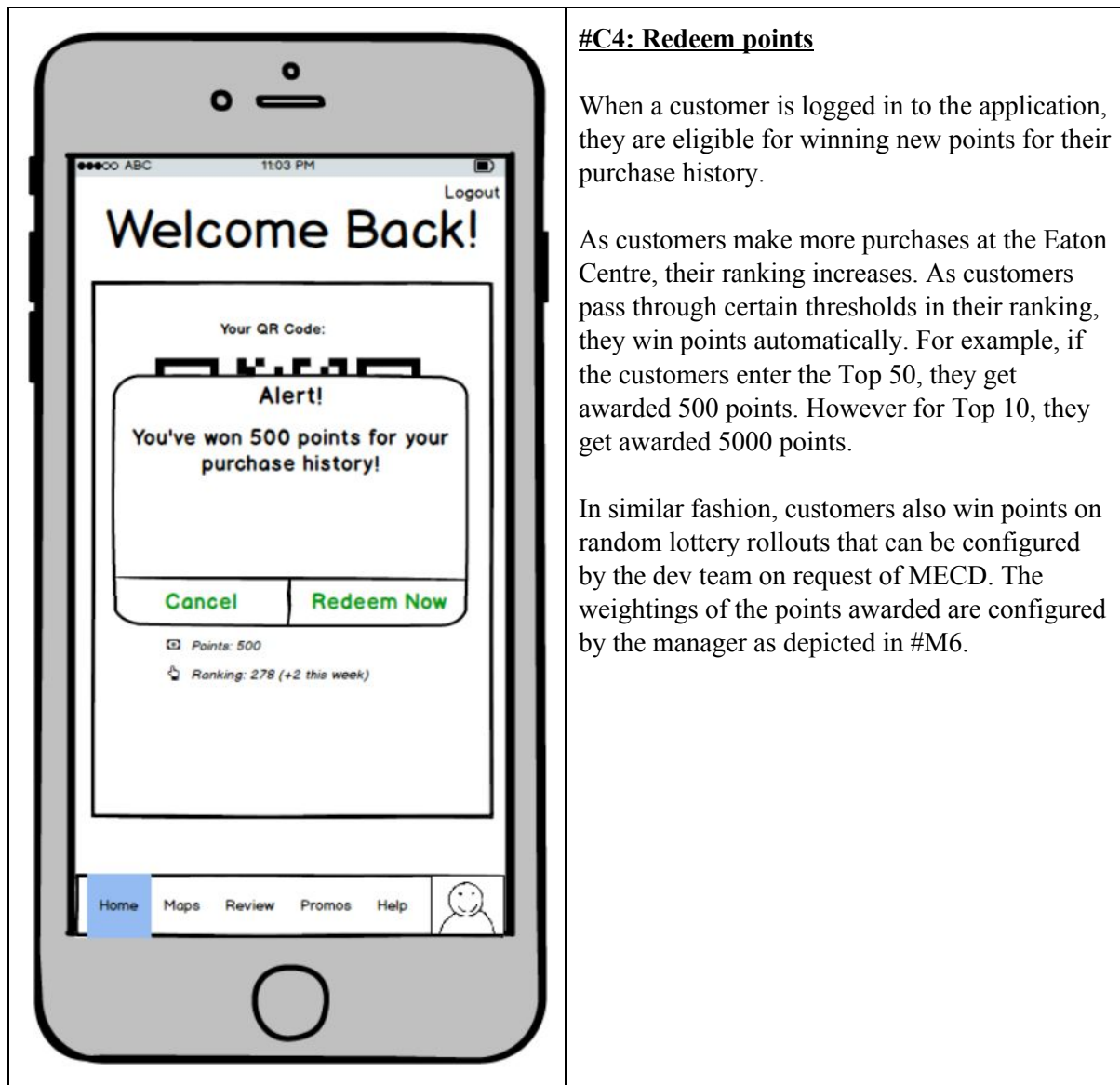
Customers automatically receive points based on the reviews they write. The number of relevant hashtags, reviews written, and reach on social media posts, is weighted accordingly and contributes to a customer's points. This encourages customers to write reviews and share positive experiences at the Centre.



### **#C3: Share a review (Video)**

On the review tab, alternatively, users can share a video recording of their experience at the Eaton Centre. The review video recording integrates with the Facebook stories and Instagram stories API allowing customers to share reviews onto their social media accounts.

By sharing reviews by video, customers earn more points in comparison to textual reviews.

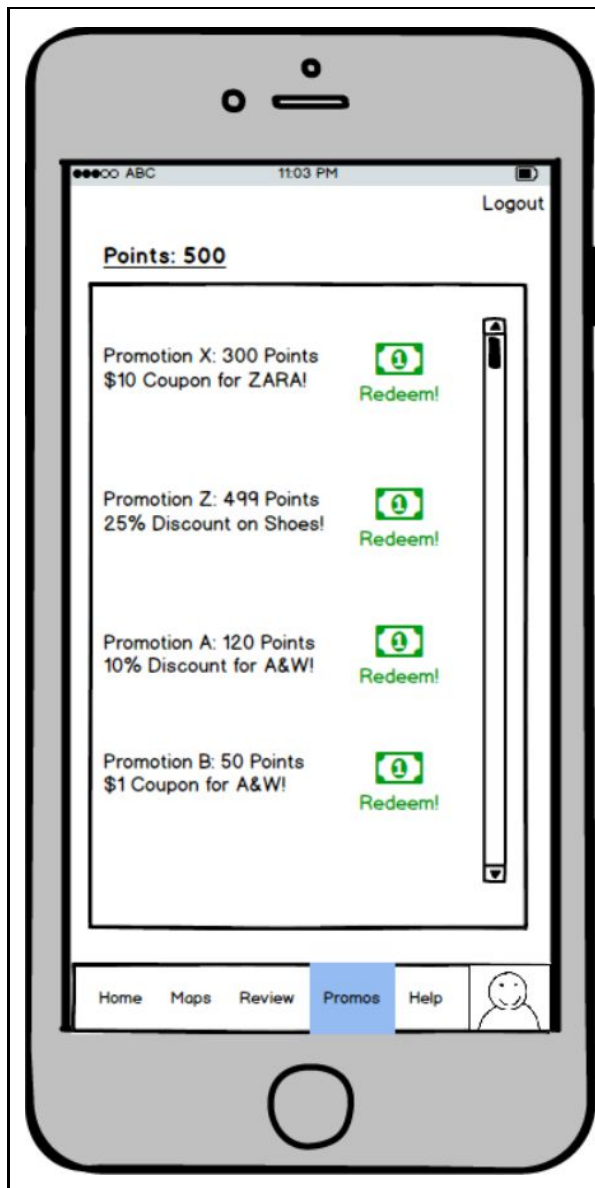


#### **#C4: Redeem points**

When a customer is logged in to the application, they are eligible for winning new points for their purchase history.

As customers make more purchases at the Eaton Centre, their ranking increases. As customers pass through certain thresholds in their ranking, they win points automatically. For example, if the customers enter the Top 50, they get awarded 500 points. However for Top 10, they get awarded 5000 points.

In similar fashion, customers also win points on random lottery rollouts that can be configured by the dev team on request of MECD. The weightings of the points awarded are configured by the manager as depicted in #M6.



#### **#C5: Redeem Coupons/Discounts**

The customer can view an active list of current promotions around at the Eaton Centre on the Promos tab. These promotions are sorted based on customer's store preferences and include both discounts and coupons available. Customers can choose to cash in their points to buy certain coupons.

Upon purchase of a coupon or discount, the offer is automatically linked to the customer's profile. Each promotional offer has a default expiry of 2 weeks but can be changed by the application administrator.

To use a redeemed coupon or discount at POS, customers are either notified by store employees at POS that they have an offer linked to their profile, or the customer can mention it directly. In either case, upon scanning the membership QR code from #C1, the offer is added to the customer's purchase.

## ii. Store Representative Viewpoint

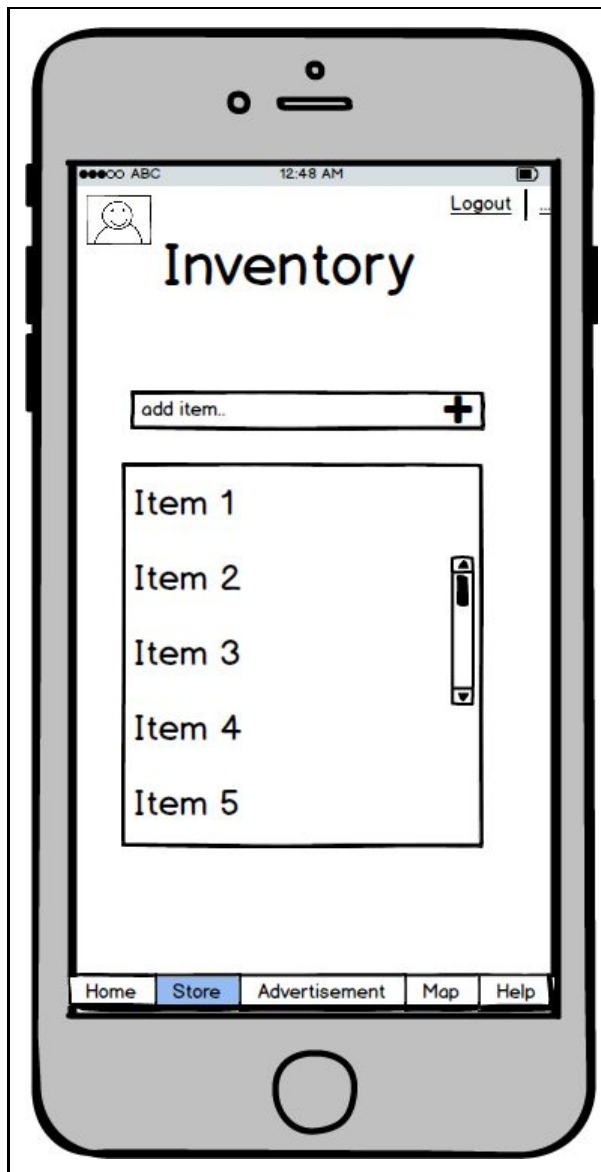
The image shows a mobile application interface for a store representative. The screen displays a 'Welcome Back!' message, a 'Logout' button, and a 'Statistics' section. The statistics section includes a line graph showing two data series over time. Below the graph, it displays 'Coupon used till date: 350' and 'Discount availed till date: 150'. At the bottom of the screen is a navigation bar with five buttons: 'Home', 'Store', 'Advertisement', 'Map', and 'Help'.

**#S1: Welcome Page**

On the welcome page of the application, the stats of the sale and rewards are displayed for the user. The store representative can view the amount of coupon used till date and also has the option to select a specific month to view the stats from that month only. Upon any usage of coupons or discounts, the stats get updated every 24 hours.

The toolbar on the bottom allows easy access to different components on the mobile application to the user.

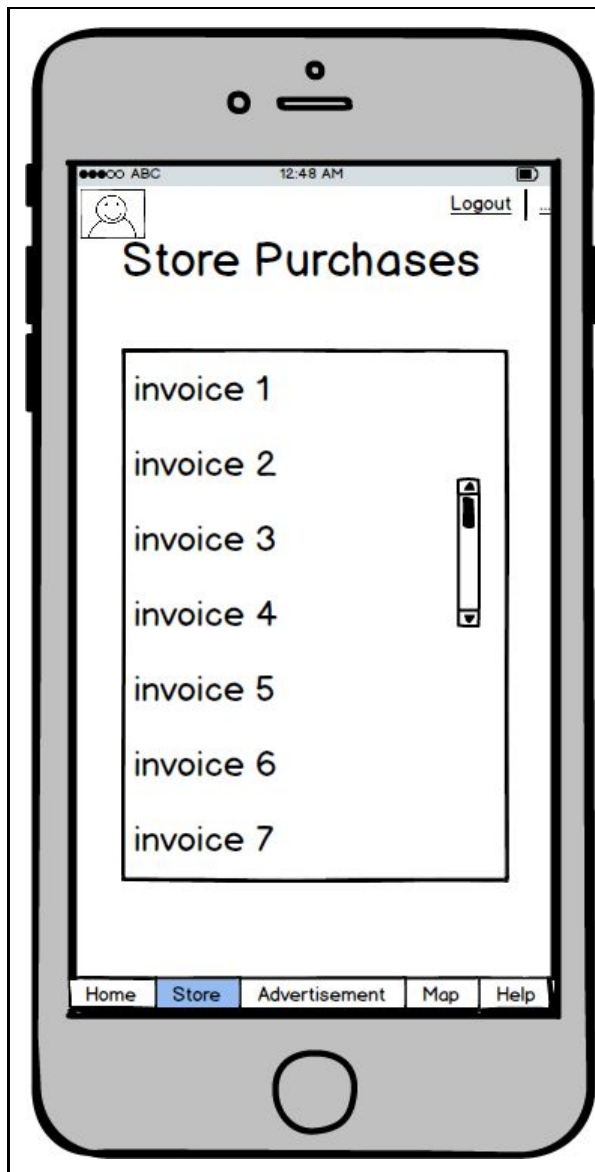




### **#S2: Store Inventory**

The store representative has the option to add inventory to the app. As the customers purchase any items, the Shelby Loyalty system automatically registers the purchase with a linked item on the application's database. The respective points can then be allocated.

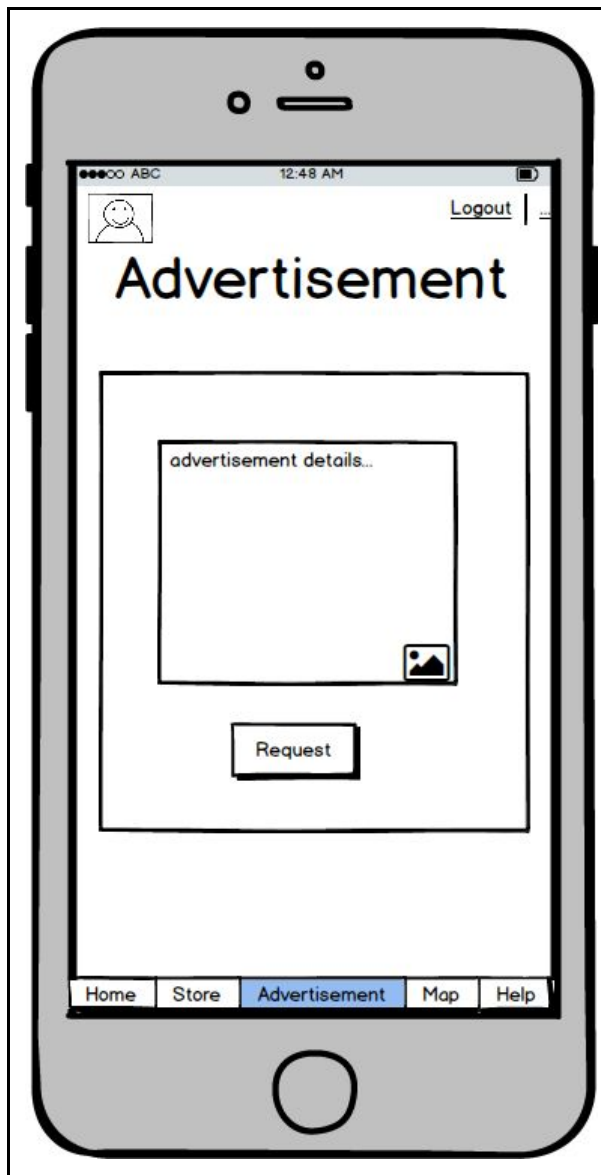
The store representative has the option to view the items and then if need be, delete an item from the inventory.



### **#S3: Store Purchases**

The store representative has the option to view all the invoices from the app. This way they have a portal which keeps track for all their invoices of the customers.

The store representative has the option to filter the invoices by amount spent, or by coupon/discounts.



#### **#S4: Store Advertisements**

The store representatives have the option to promote their sales through the app. They can fill in an advertisement and then request the manager to post it. Once it is posted the customers will get a push notification about the sale.

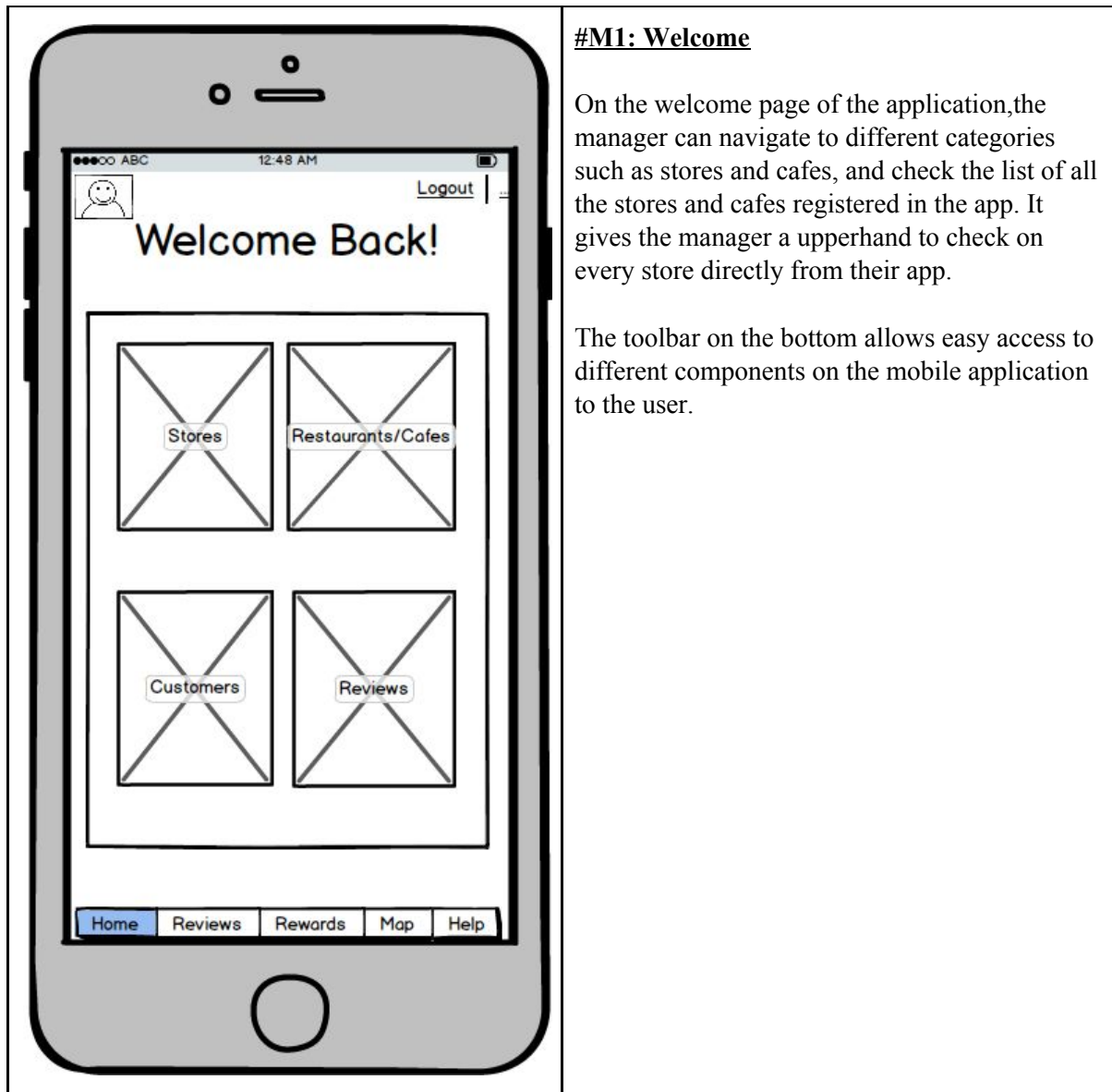
This feature will help the store to promote their business through the app, providing a better chance to a much better customer reach.



### **#S5: Help**

In case of any emergency or inquiry, the representatives have a point of contact where they can contact the admin through various portals.

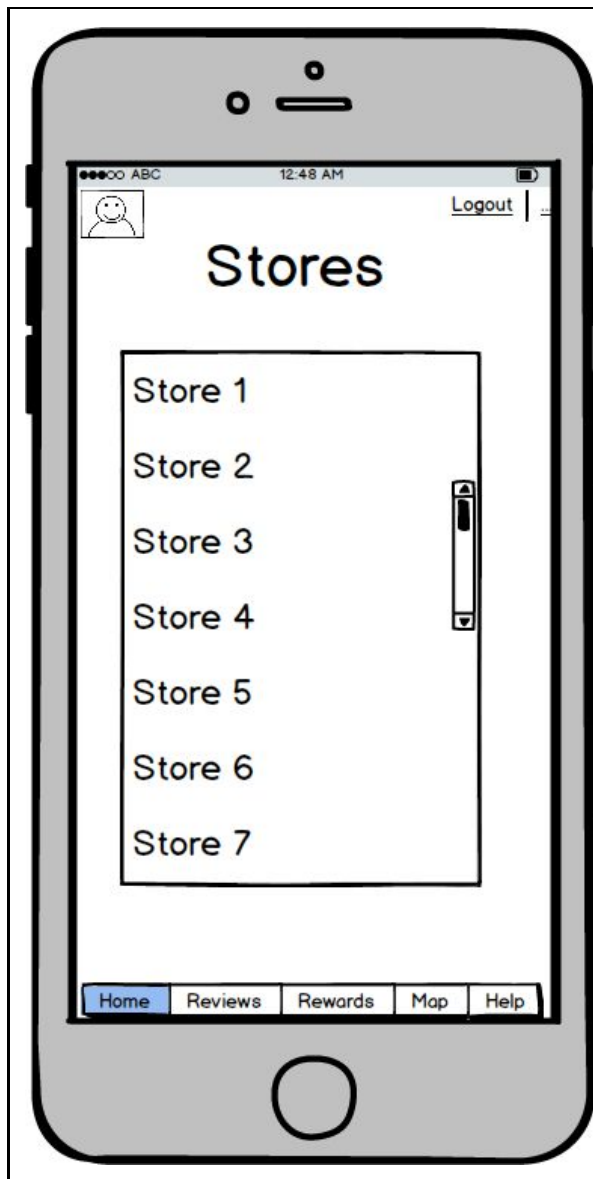
### iii. Manager Viewpoint



#### **#M1: Welcome**

On the welcome page of the application, the manager can navigate to different categories such as stores and cafes, and check the list of all the stores and cafes registered in the app. It gives the manager an upperhand to check on every store directly from their app.

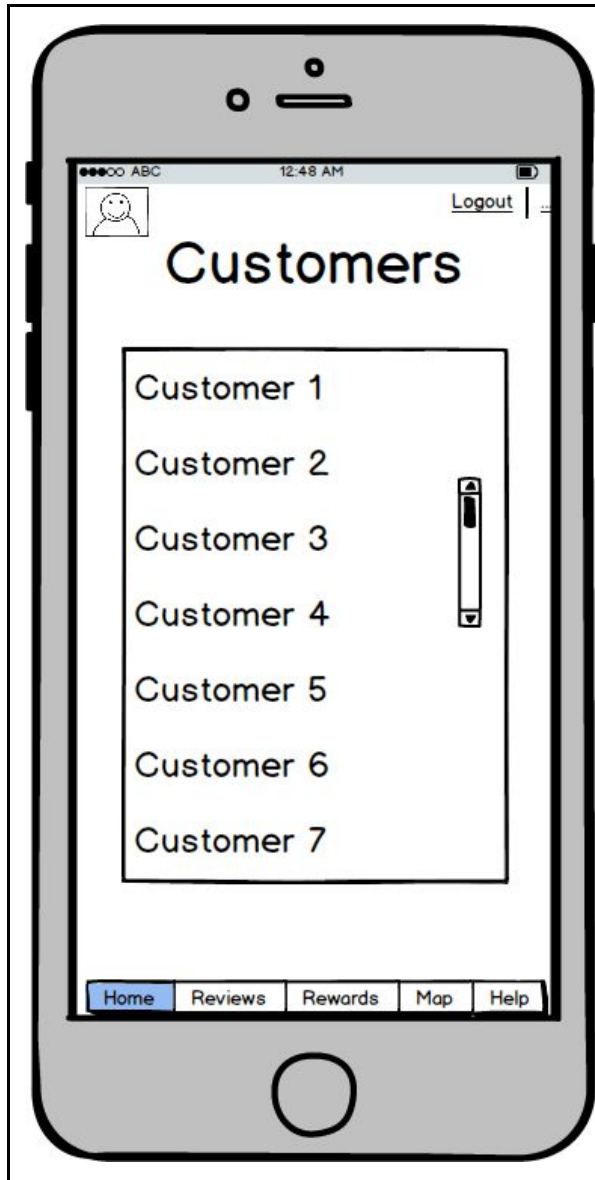
The toolbar on the bottom allows easy access to different components on the mobile application to the user.



### **#M2: View Stores**

On the Stores tab, the manager has access to view all the stores, check the amount of sales made by the day/month/year.

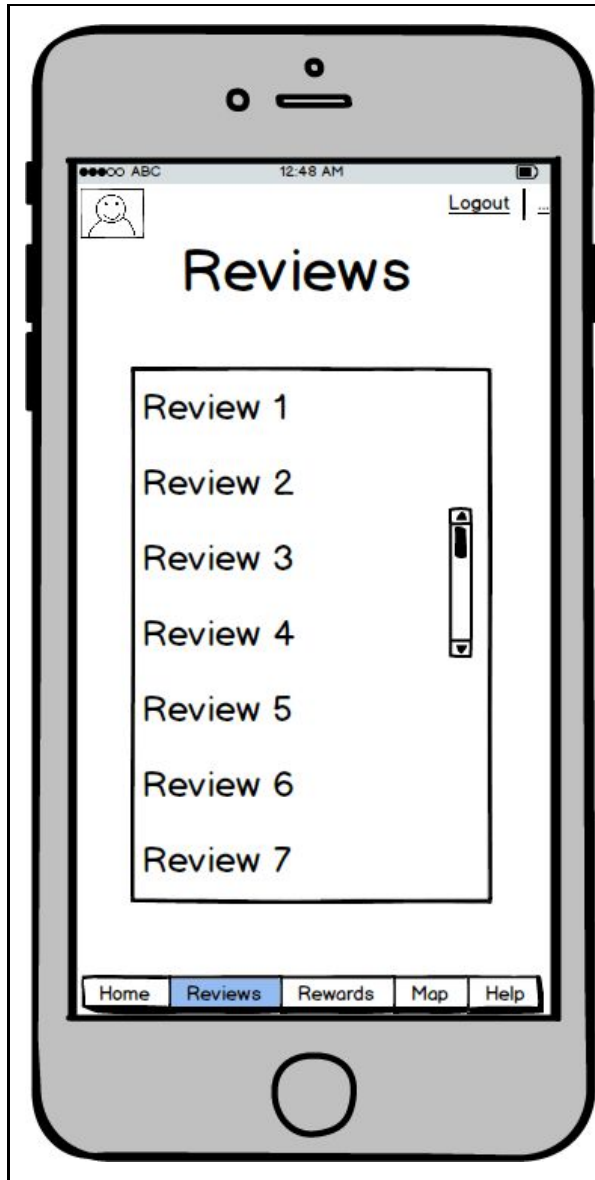
Upon clicking on the stores, the manager can also check the location of the store in the mall.



### **#M3: View Customers**

On the customers tab, the manager has the access to see all the customers who are registered for the app. They can also check the amount of sales the customers has made, the total amount of coupons given to the customers, and how much of the coupons are redeemed by the customer.

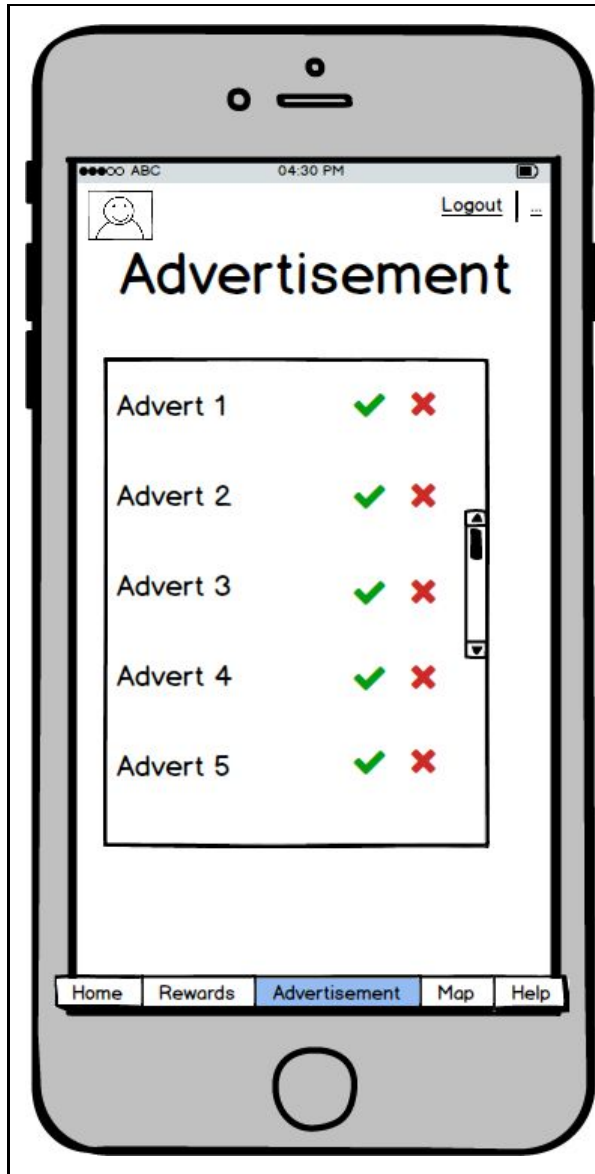
The manager can individually click on the customers and also has the option to filter through the customers and choose the ones they want to view.



#### **#M4: View Reviews**

The manager has a list of all the reviews received by the customers of the app. He can individually check the reviews and also has the option to reply to the reviews as a thanking message. The manager has the option to filter the reviews with either ratings or with date posted.

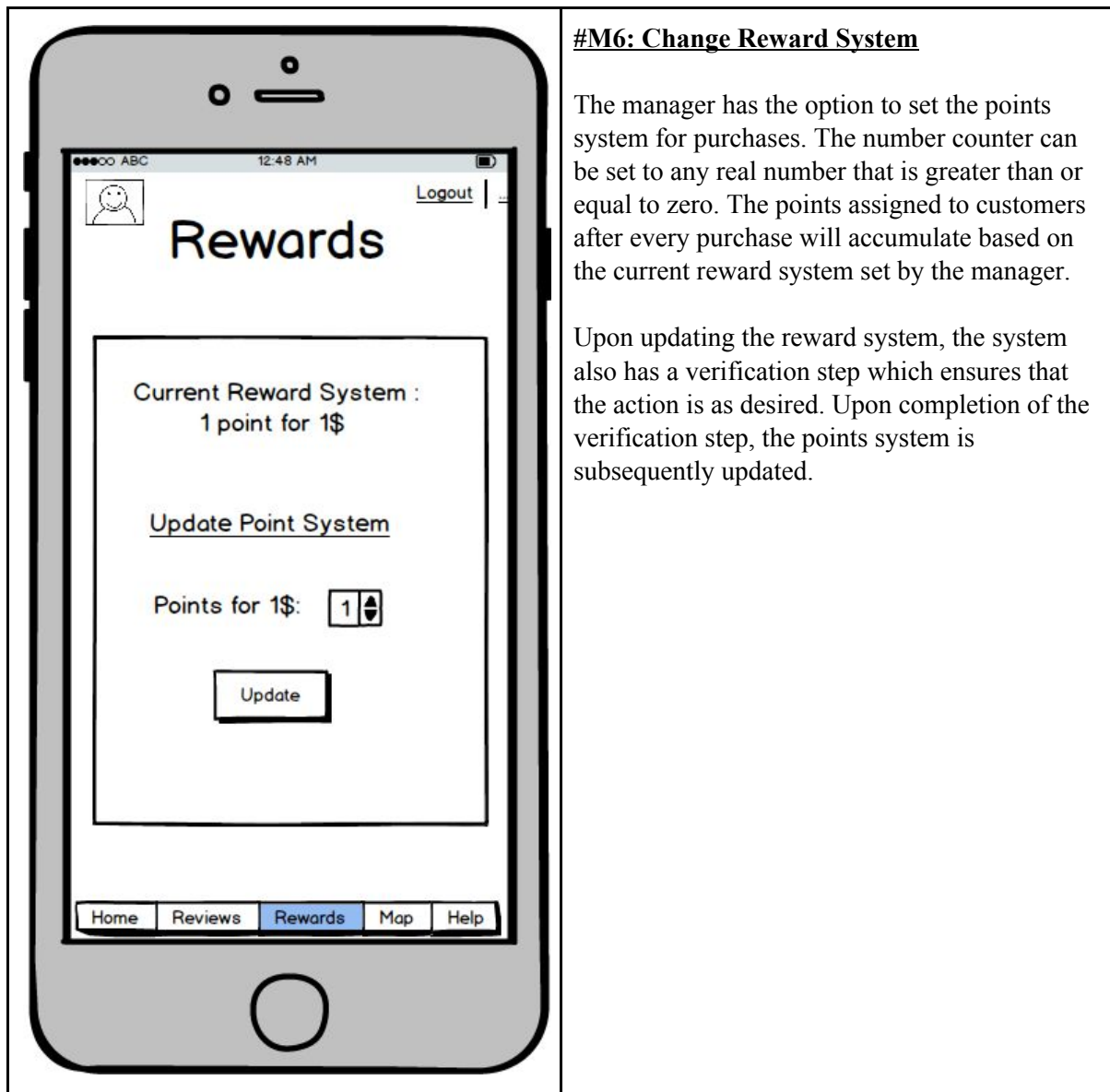




#### **#M5: Approve Advertisements**

The manager receives the list of all the requested advertisements from the store representatives. The manager has the option to view the advertisement, and then based on his choice accept the advertisement or reject it. If the advertisement is accepted then the customer gets a push notification stating the sale information.

If rejected, the store representative gets a notification stating failure in posting the advertisement.



#### **#M6: Change Reward System**

The manager has the option to set the points system for purchases. The number counter can be set to any real number that is greater than or equal to zero. The points assigned to customers after every purchase will accumulate based on the current reward system set by the manager.

Upon updating the reward system, the system also has a verification step which ensures that the action is as desired. Upon completion of the verification step, the points system is subsequently updated.



### **#M7: Help**

In case of any emergency or inquiry, the representatives have a point of contact where they can contact the admin through various portals.

### 3.5 System Operations

This section provides the requirements for the system operations which focus on maintainability and reliability. The requirements are ordered in ranking of priority from high to low.

#### 3.5.1 Maintainability Requirements

Sys Ref ID	Priority	Maintainability Requirement
MR 01	High	System maintenance shall occur once every six months.
MR 02	High	The Montreal Eaton Centre Mobile Loyalty App shall be upgradable through patches pushed to the digital distribution service (App Store) installed on the user's smart device.
MR 03	High	All application code shall be fully documented, including comments regarding authorship and the dates of any changes . Each function shall be commented with pre-and post-conditions with a consistent style established by the development team.
MR 05	High	Installation of a new version of the application shall not alter any data saved in the database or any personal user settings.
MR 06	High	Mean downtime for the system to undergo maintenance is five hours and the maintenance process shall not exceed seven hours in maximum.
MR 07	Medium	The cyclomatic complexity of code must not exceed 7.
MR 08	Medium	The maintenance cost per operating hour shall not exceed \$500.

### 3.5.2 Reliability Requirements

Sys Ref ID	Priority	Reliability Requirement
RR 1	High	The system shall perform a backup of the data saved in the application database once every two months.
RR 2	High	The system shall rely on a replicated database reliability of class four (less than 52.60 minutes of downtime per year) .
RR 3	High	The Shelby Loyalty System Application shall only be developed using long-term release external libraries with stable interfaces for maximum stability.
RR 4	High	The Shelby Loyalty System Application shall remain functional if an external API layer is rendered inaccessible.
RR 5	Medium	The Shelby Loyalty System shall utilize multiple servers at different locations to ensure balance loading functionality.

### 3.6 System Security

This subsection describes the various requirements ConfiDev proposes to ensure the system is secure against hackers and third-party applications.

Sys Ref ID	Priority	System Security Requirement
SS 1	High	The system shall not allow other external systems and third-party applications to alter any data.
SS 2	High	The Shelby Loyalty System Application shall only collect user data that is in compliance with the Canadian Personal Information Protection and Electronic Documents Act (PIPEDA)
SS 3	High	The system shall adhere to the Principle of Least Privilege (PoLP) (code should run with only the permissions it absolutely needs and no more)
SS 4	High	The system shall notify the administrator if malware is detected during a security scan.

SS 5	High	The system shall detect attempted access that fails authorisation requirements.
SS 6	Medium	The system shall collect the status of its security mechanisms every Sunday at 23h59.
SS 7	High	The system shall verify the identity of administrators before allowing them to use its root functions.
SS 8	High	The system shall not violate its security requirements as a result of updating data.
SS 9	Medium	The application shall detect at least 99% of intrusions within 10 seconds.
SS 10	High	All account modification events shall be logged. The event log shall contain date, time, user, action, object.
SS 11	High	The system shall store the user passwords in the form of salted and hashed data.
SS 12	Medium	Users shall receive notification of profile changes via preferred communication method of record when profile information is modified.
SS 13	High	Passwords shall never be viewable at the point of entry or at any other time.
SS 14	High	Each unsuccessful attempt by a user to access an item of data shall be recorded in an audit trail.
SS 15	High	Only holders of current security clearance can enter the server's room.
SS 16	High	The access permissions for system data may only be changed by the system's data administrator.
SS 17	High	The system must be available and behave reliably even under DOS attacks
SS 18	High	The system must ensure the integrity of the customer account information.

## 4. Verification

## 5. Appendices

### 5.1 Acronyms and Abbreviations

Abbreviation or Acronym	Definition
MECD	Montreal Eaton Centre Development Project
CVV	Card Verification Value
RI	Requirement Interface
RF	Functional Requirement
UC	Use Case
RP	Performance Requirement
SS	System Security Requirement
PIPEDA	The Personal Information Protection and Electronic Documents Act
PoLP	Principle of Least Privilege

## 5.2 Traceability Matrix

Goal/Business Requirement	Depends On
Increase sales and more repeat business of customers	3.1.2, 3.1.4, 3.1.5, 3.1.6, 3.1.8, 3.1.11, 3.1.17, 3.1.18
Enhancement of the Eaton Centre's public image.	3.1.3, 3.1.9, 3.1.10, 3.1.11
Leverage the opportunities in the crossover between the dining and shopping experiences of the Eaton Centre's customers to increase customer return rate to the Centre.	3.1.4, 3.1.5, 3.1.6, 3.1.8, 3.1.9, 3.1.11
The loyalty program will operate within mobile environments of shoppers.	3.1.2, 3.1.12, 3.1.16, 3.1.17, 3.1.18
The system's user interface to be adapted to the category of stores, restaurants, or cafés that a customer most frequently visits.	3.1.1, 3.1.7, 3.1.11
The system's user interface should have a different tailored viewpoint for the consumer, restaurants and shop owners, and the Centre administrators.	3.1.4, 3.1.10, 3.1.13, 3.1.15