

Big Blue Parking Genie

1. Introduction and Context

During large USU events, demand for parking is high and USU-owned parking spaces are limited. To help fix this problem, this project aims to build a system to allow users to list and rent parking spaces for USU events.

The system will allow customers to search through parking options in parking lots, driveways, lawns, and other privately owned parking options. Customers will be able to reserve and pay for parking spots through the system, and be given a way to validate their parking purchase to a parking lot attendant when they arrive at the lot.

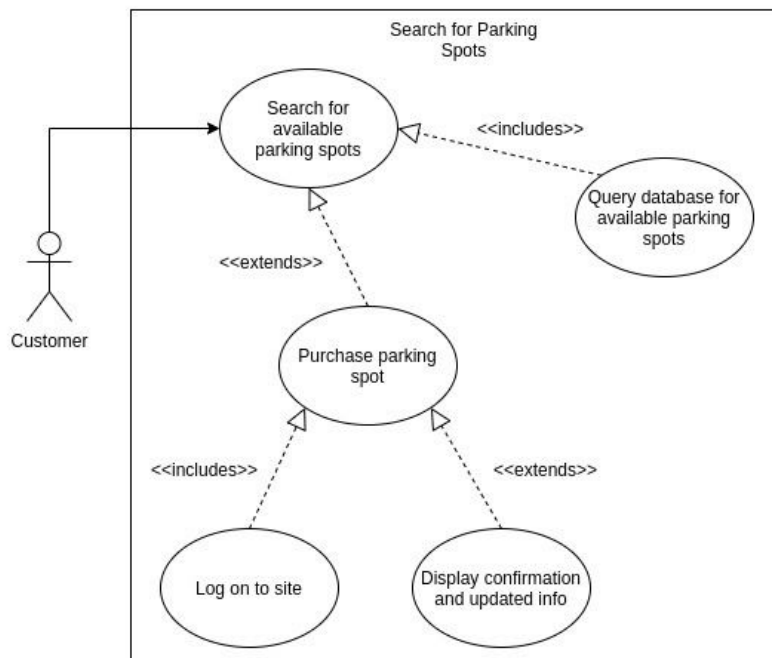
The system will allow parking lot owners to list their parking spaces, and will handle payment collection. It will also give parking lot owners a way to check customers' parking validations, as well as authorize other parking lot attendants to be able to check parking validations.

By giving private parking owners a platform to rent out their parking spaces, the system will alleviate the scarcity of parking usually experienced at large USU events.

2. Users and their Goals

The following UML use case diagrams will describe the system's actors and the actors' goals.

Figure 1 - Customer searches for parking spot



Participating actor: Customer

Entry Conditions:

- Customer wants to rent a parking spot

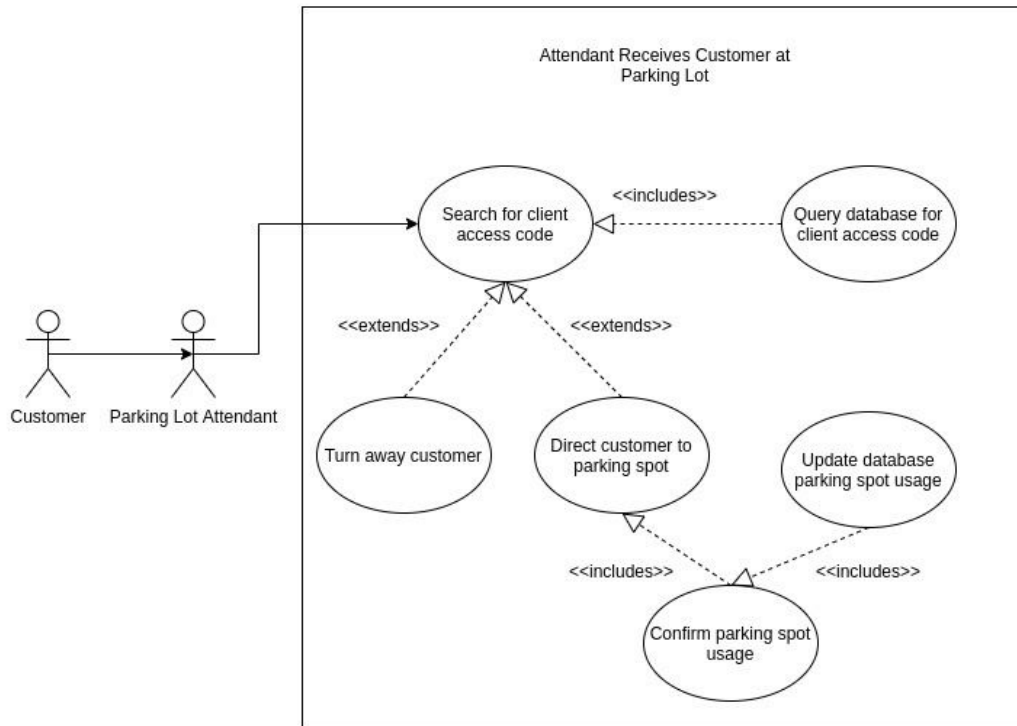
Exit Conditions:

- Customer purchases parking spot
- Customer stops searching for parking spot

Event Flow:

1. Customer logs on to system.
2. Customer requests available parking spots.
3. System displays available parking spots
4. Customer selects a parking spot.
5. Customer pays for parking spot.
6. System displays confirmation of purchase.

Figure 2 - Attendant receives Customer at Parking Lot



Participating Actors: Customer, Lot Attendant

Entry Condition:

- Customer arrives at parking lot

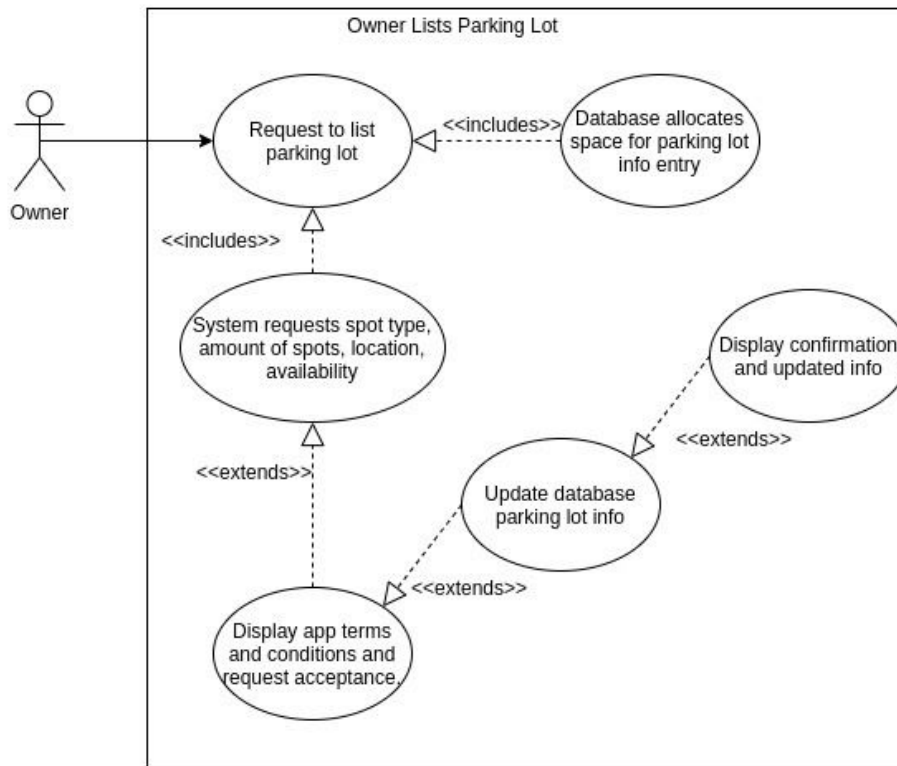
Exit Conditions:

- Customer is turned away
- Customer is directed to parking spot

Event Flow:

1. Customer arrives at parking lot.
2. Customer shows confirmation code to Lot Attendant.
 - a. If Customer does not have confirmation code, Lot Attendant turns Customer away.
3. Lot Attendant verifies confirmation code using System.
 - a. If confirmation code is correct, Lot Attendant directs Customer to parking spot.
 - b. If confirmation code is incorrect, Lot Attendant turns Customer away.

Figure 3 - Owner lists Parking Lot



Participating Actor: Owner

Entry Conditions:

- Owner is logged in

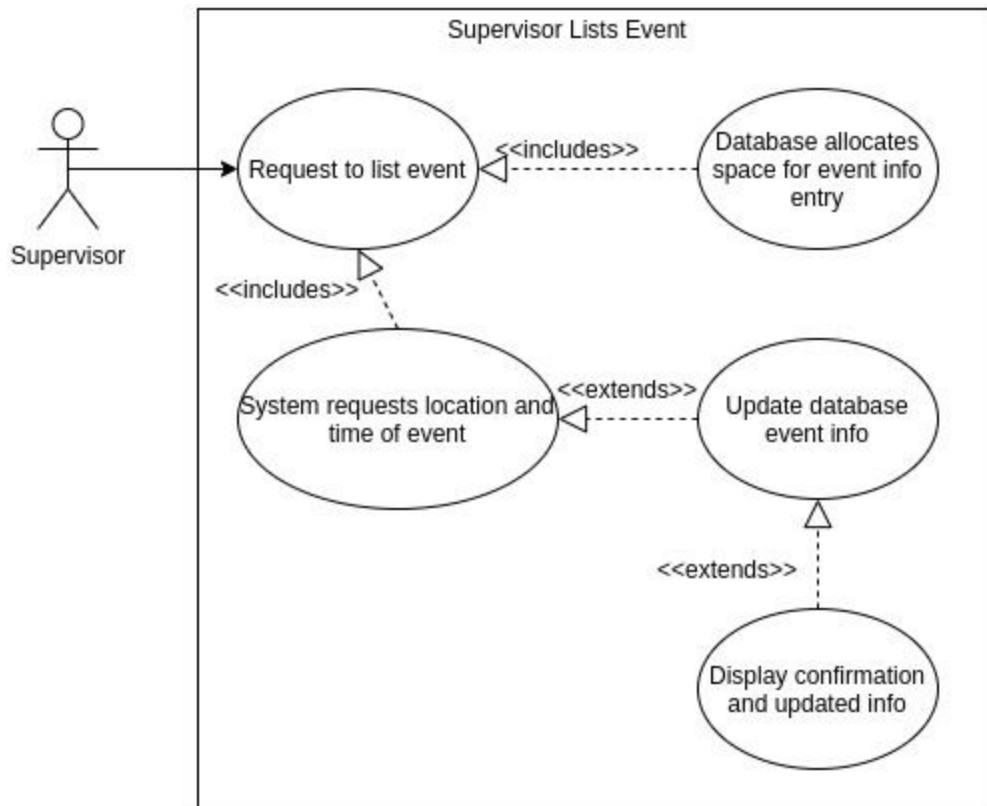
Exit Condition:

- Parking lot is listed in the system

Event Flow:

1. Owner requests to list parking lot
2. System requests parking lot information
3. Owner inputs information and accepts terms
4. System updates database
5. System displays confirmation to Owner that the parking lot is listed

Figure 4 - Supervisor lists Event



Participating Actor: Supervisor

Entry Condition:

- Supervisor is logged in to system

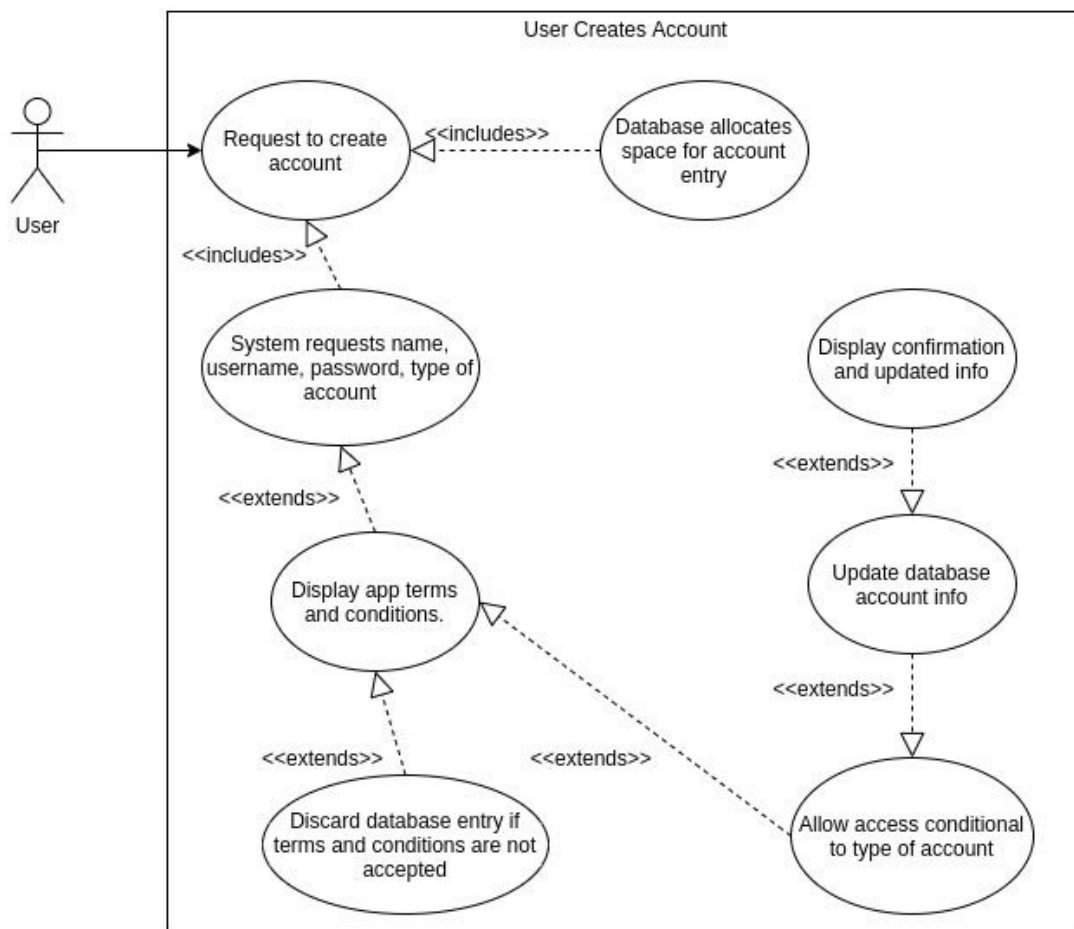
Exit Condition:

- Event is listed in system

Event Flow:

1. Supervisor requests to list event
2. System requests event information
3. Supervisor inputs information
4. System updates database
5. System displays confirmation to Supervisor that the event is listed

Figure 5 - User creates account



Participating Actor: User

Entry Condition:

- User wants to create an account

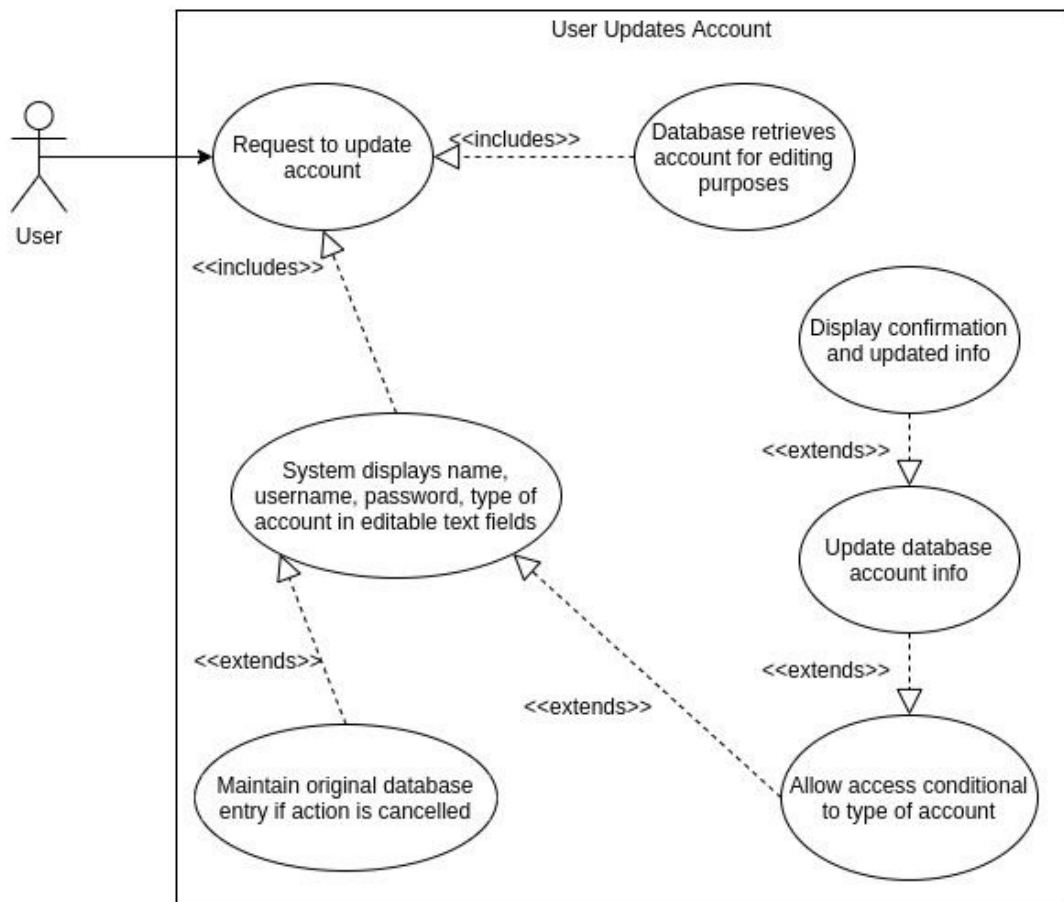
Exit Conditions:

- Account is created
- User rejects terms and account is not created

Event Flow:

1. User requests to create account
2. System requests User's information
3. System displays terms and conditions
 - a. If User accepts, account is created
 - b. If User declines, account is not created

Figure 6 - User updates account



Participating Actor: User

Entry Condition:

- User is logged in

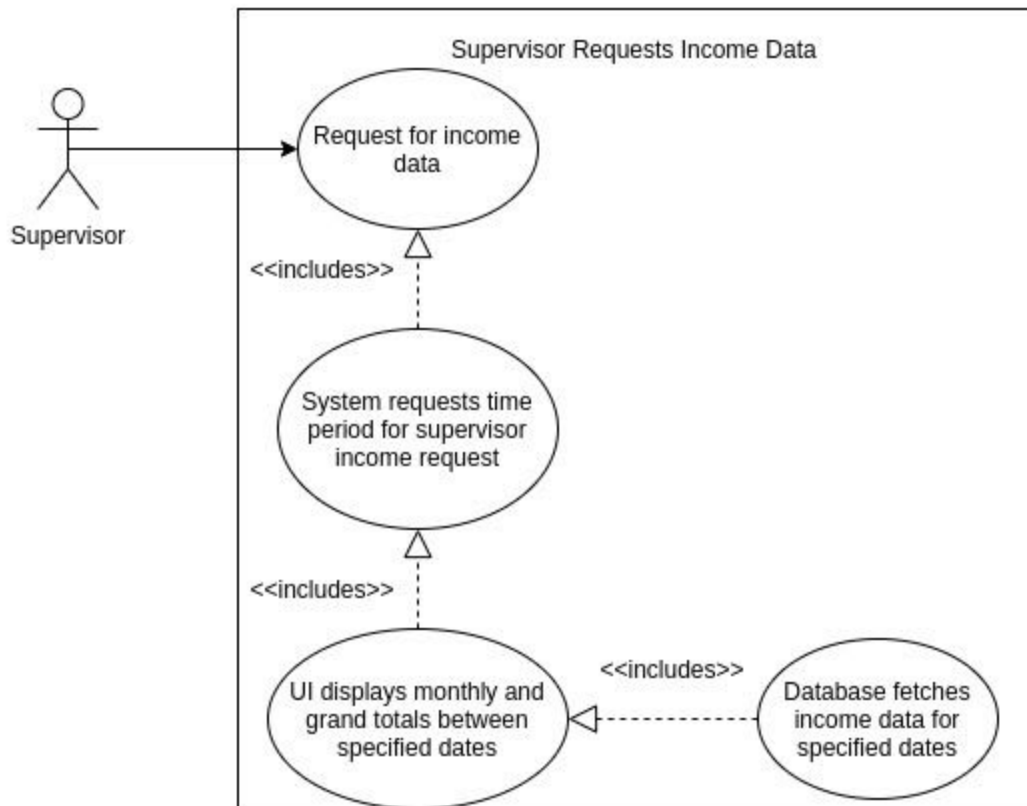
Exit Conditions:

- User cancels action
- User account is updated

Event Flow:

1. User requests to update account
2. System displays editable account features
3. User can edit fields
 - a. If user chooses to save, new account features are saved
 - b. If user chooses to cancel, account features are not saved

Figure 7 - Supervisor requests income data



Participating Actor: Supervisor

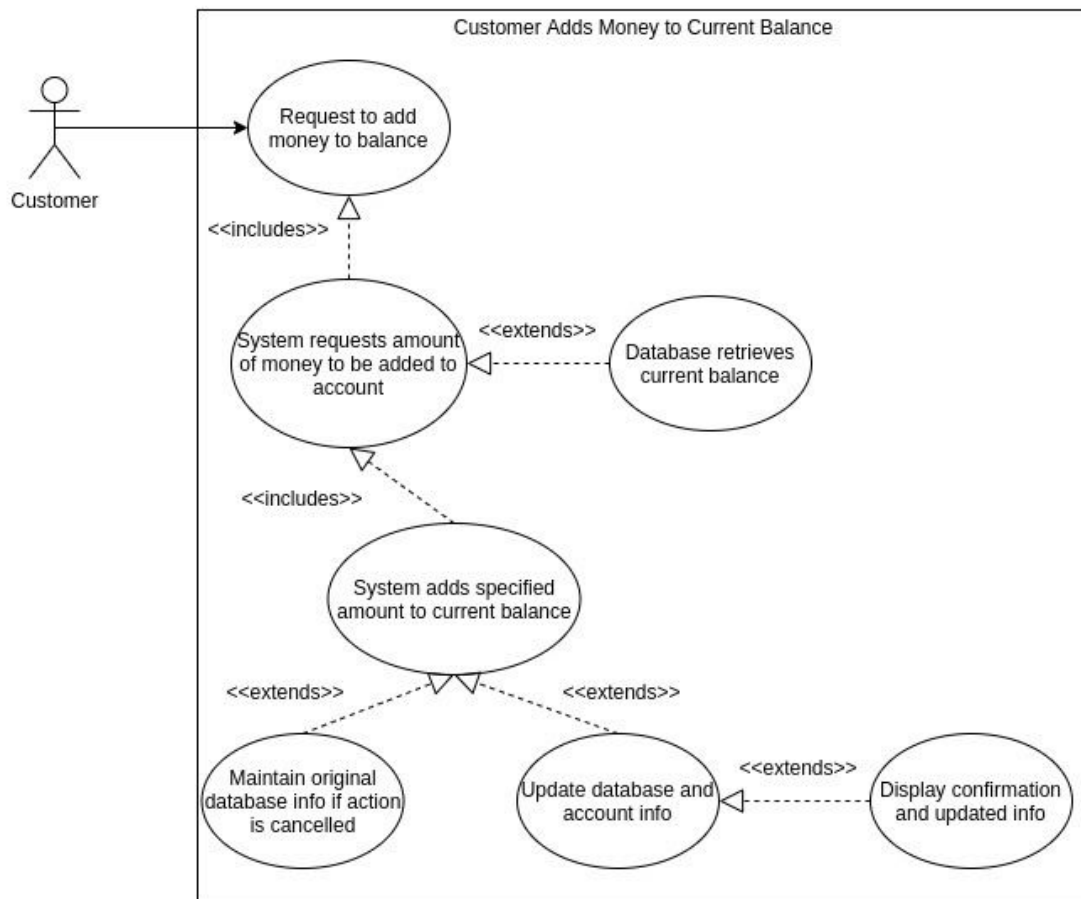
Entry Condition: Supervisor is logged in

Exit Condition: Supervisor navigates away from page

Event Flow:

1. Supervisor requests to see income data
2. Supervisor specifies time and date of desired data
3. System displays data

Figure 8 - Customer adds money to current balance



Participating Actor: Customer

Entry Condition:

- Customer is logged in

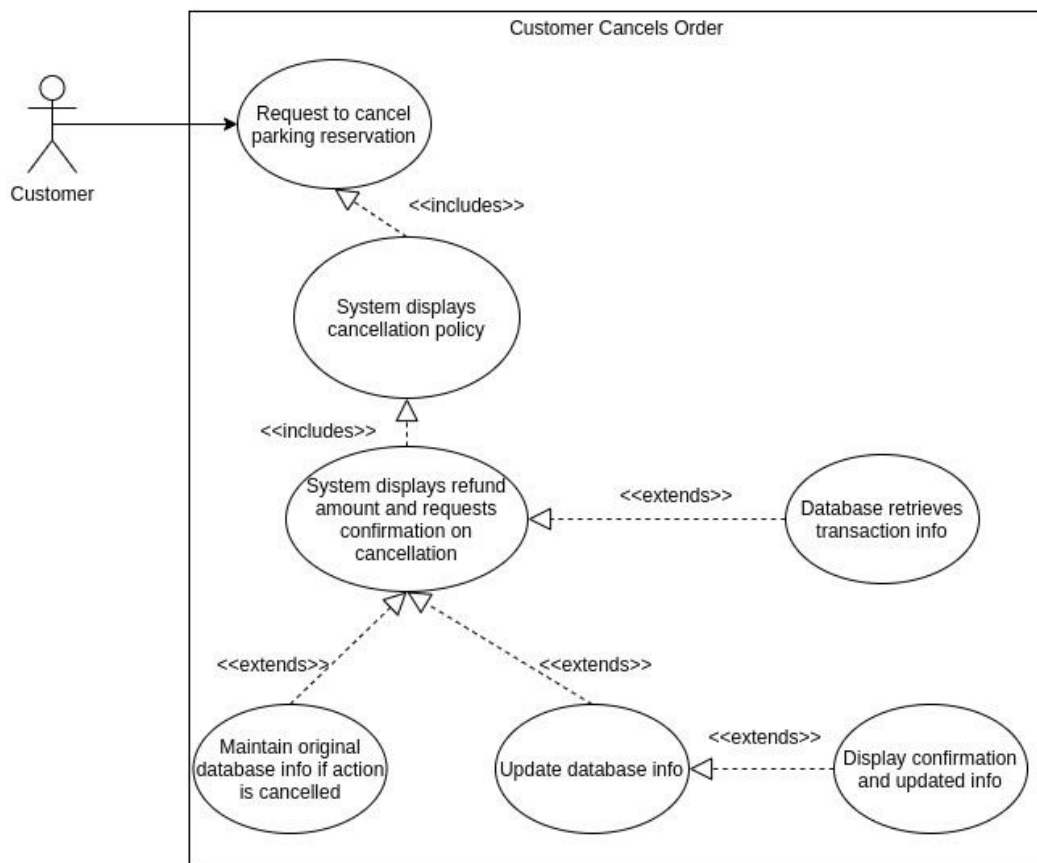
Exit Conditions:

- Money is added to the balance
- Action is cancelled

Event Flow:

1. Customer requests to add money to their balance
2. Customer inputs amount of money to enter
3. System saves new balance amount
4. System displays confirmation to Customer

Figure 9 - Customer cancels order



Participating Actor: Customer

Entry Conditions:

- Customer is logged in
- Customer has an order in the system

Exit Conditions:

- Order is cancelled
- Action is cancelled

Event Flow:

1. Customer requests to cancel reservation
2. System displays cancellation policy
3. System displays refund amount
4. System requests confirmation
 - a. If action is cancelled, no change is made to Customer's reservation or account balance
 - b. If action is confirmed, Customer's account is credited and reservation is removed

3. Functional Requirements

1. User Authentication and Access

- 1.1. The system must require all users to authenticate themselves before giving them access to the system.
 - 1.1.1. On first login, the system must allow the user to create an account with a username and password.
 - 1.1.1.1. The system must get the user's email address during account creation
 - 1.1.2. On subsequent login, the system must allow users to enter their username and password. If entered correctly, the user must be given access to the system. If entered incorrectly, the system must allow the user to try again.
- 1.2. Users can have a combination of the following access rights: Customer, Lot Attendant, Lot Owner, and Supervisor.
 - 1.2.1. Users with Customer rights must have access to all Customer features. See FR #3
 - 1.2.2. Users with Lot Owner rights must have access to all Lot Owner features. See FR #4
 - 1.2.3. Users with Lot Attendant rights must have access to all Lot Attendant features. See FR #5
 - 1.2.4. Users with Supervisor rights must have access to all Supervisor features. See FR #6

2. User Profile Features

- 2.1. The system will allow any authenticated user (one who is logged in) to modify their own password.
- 2.2. The system will allow any authenticated user (one who is logged in) to modify their own email address.
- 2.3. The system should not allow any user that does not have Supervisor rights to view or modify any other user profile
- 2.4. The system should allow users to view the balance of their account
- 2.5. The system should allow users to preload money into their account
 - 2.5.1. No real money is required, users can preload money by typing a number in
- 2.6. The system should allow users to withdraw money from their account

3. Customer Features

- 3.1. All users will be given Customer rights and will have access to all Customer features.
- 3.2. The system will allow users with Customer rights (hereafter referred to as "Customers") to browse, reserve, and pay for parking spaces.
 - 3.2.1. The system will allow Customers to select an event from a list. When the Customer selects an event, the system will display a list of available parking spaces.
 - 3.2.1.1. The system will display the address, distance from event location, type, and price of the available parking spaces to the Customer.
 - 3.2.2. Customers will be able to select a parking space from the list to rent.

- 3.2.3. If a Customer decides to rent a parking space, the system will require the Customer to pay for the parking space immediately.
 - 3.2.3.1. Customers pay for parking from their preloaded account balance
- 3.3. After a Customer pays for a parking space, the system must give the Customer a way to show the parking lot attendant that they have rented a parking space
 - 3.3.1. Confirmation codes can be a QR code or an access code, e.g. “ABC123”
- 3.4. The Customer should be able to view their parking spot reservations from their account.
 - 3.4.1. The Customer should be able to access their confirmation codes for their parking reservations from their account.
- 3.5. The Customer should have the ability to cancel their parking spot reservations
 - 3.5.1. Refunds will only be given if cancellation occurs at least 24 hours before the event time

4. Lot Owner Features

- 4.1. All users will be given Lot Owner rights and have access to all Lot Owner features.
- 4.2. The system will allow the users with Lot Owner rights (hereafter referred to as “Lot Owners”) to list parking spots to be rented for events.
 - 4.2.1. When listing a parking lot, the system will prompt the Lot Owner for the address of the lot, the event name, the distance from the lot to the event location, the type and number of parking spots, and their prices.
 - 4.2.2. The “type” refers to what the spot is best suited for, e.g. motorcycles, compact cars, normal cars, oversize, tailgating
- 4.3. Lot Owners can see how many of their parking spots have been rented
- 4.4. Lot Owners are also given Lot Attendant rights for their parking lots
- 4.5. Lot Owners should have the ability to give other user accounts Lot Attendant rights for their parking lots.
- 4.6. When Customers rent a parking place owned by a Lot Owner, 75% of the listed price will be deposited in the Lot Owner’s account
 - 4.6.1. This percentage can be changed by the Supervisor

5. Lot Attendant Features

- 5.1. Only users with Lot Attendant rights (hereafter referred to as “Lot Attendants”) should have access to Lot Attendant features.
- 5.2. To gain Lot Attendant rights for a parking lot, users must either be the Lot Owner for the lot or be given Lot Attendant rights by the parking lot’s owner.
 - 5.2.1. The system must provide a way for Lot Owners to authorize other users as Lot Attendants for their parking lots.
- 5.3. Lot Attendants must be able to check Customers in using the Customers’ QR code or access code
 - 5.3.1. The system must give Lot Attendants a way to scan or enter the code to validate that the Customer has rented a parking spot
 - 5.3.1.1. If a QR code is used, Lot Attendants can use a separate QR code scanning app on their phone, but the QR code must link back to the system for confirmation

- 5.3.2. After validation, the system must display the ID number of the parking spot the Customer has rented so the Lot Attendant can direct the Customer to their parking spot.

6. Supervisor Features

- 6.1. Only the user with Supervisor rights (hereafter referred to as the “Supervisor”) should have access to Supervisor features.
- 6.2. The Supervisor must have the ability to list events.
 - 6.2.1. When listing a new event, the system will prompt the Supervisor for the name, date, and address of the event
- 6.3. The system will deposit a percentage of all transactions made into the Supervisor’s account
 - 6.3.1. This percentage will start at 25%
 - 6.3.2. The Supervisor should be able to change this percentage
- 6.4. Supervisors should have the ability to view high-level usage statistics for the system.

4. Non-Functional Requirements

1. The system must use a database
 - 1.1. The system's database must store user account information, including the following fields: Username, Password, Email Address, Account Balance
 - 1.2. The system must store information about the parking lots represented in the system
 - 1.2.1. The system must keep track of individual parking spaces within a lot by representing them with integers from 1 to n
2. The team will use the Git version control system, with GitHub as a remote repository.
3. The system must be deployable
 - 3.1. Can be either locally hosted or hosted by a cloud service
4. The system's interface must be mobile device friendly.

5. Future Features

This section contains a list of features that are beyond the scope of the project, but could be implemented in future versions.

1. The system's list interface could be converted to a map interface, where parking lots are listed as graphical icons
2. The system could calculate distance from the event automatically, without requiring input from Lot Owners
3. The system could provide users with a map of their chosen parking lot to make it easier to find their spot
4. The system could email users a confirmation of their parking spot rental, which would include their access code

6. Glossary

This section contains a list of important terms and their definitions.

Customer - a user that uses the system to rent parking spaces that others have listed

Lot Attendant - a user, either a Lot Owner or authorized by a Lot Owner, that checks Customers' validations when Customers arrive at parking lots

Lot Owner - a user that lists parking spaces to be rented out

Supervisor - the user that lists events and collects part of all profits

System - refers to the application that the project aims to build

User - refers to any of the four types of users of the system (Customers, Lot Owners, Lot Attendants, Supervisor)