Use Cases

This document identifies the main actors in the system. For each of the actors, it identifies its use cases under different scenarios.

Actors:

1. Customer (Patron)
2. Enforcement Officer
3. System

USE CASES FOR PATRON:

Use Case UC1: Registration

Primary Actor: Patron
Level: User level
Stakeholders and Interests:

- Patron: Wants to register to the system in order to request a parking reservation
- Toronto Parking Authority: They benefit from patron's signing up for the virtual system as it reduces the need for them to physically go collect parking fees from single space parking meters
- Enforcement Officers: They get access to the patron's information making it easier for them to manage parking spots and to bill fine tickets.

Precondition:

Patron must have a valid driver's license and own/have access to a vehicle.

Success Guarantee (Postconditions):

- The patron is registered to the system and has access to all the facilities offered.
- Enforcement Officers will have access to the registered patron's profile.

Main success scenario (or basic flow):

1. The Patron visits the SaaP and decides to register.
2. The Patron sets a username and password for their account.
3. The Patron answers the security question(s).
4. The system ensures that the username selected is unique and the chosen password is well constructed (at least 8 characters, at least 1 number, at least 1 special character).
5. The Patron starts filling in the required information for registration including email address, other personal information, license plate number(s) associated with their vehicle(s), its type and desired payment method.
6. The Patron submits the information once done.

7. The system determines whether the payment method is valid, the email address is well-formed and the entered home address is in a valid geographical location (eg. in Canada).
8. The Patron gets a confirmation message containing their username.

Extensions (or alternative flows):

3a. If the username is taken, indicate an error, suggest a unique username and allow them to enter a new one.

3b. If the password is not well constructed, indicate an error, highlight missing fields and allow the patron to re-enter.

7a. If the payment method is invalid the system indicates an error, allows the patron to re-enter it.

7b. If the patron's email address is not well-formed, a sample format is shown and allows them to re-enter it.

7c. If the patron's home address is not a valid geographical location, indicate an error, allow them to re-enter

Special requirements: UI accessible via browsers, physical or virtual keyboard accessible
Technology and Data Variations List:

- SaaP accessible via smartphone apps
- Home address information populated according to the current location of the device

Open issues: Patron has poor network connectivity

Use Case UC2: Login

Primary Actor: Patron
Level: User level
Stakeholders and Interests:

- Patron: Wants to login to the system in order to search for spot availability/reserve a spot/checkout saved spot/modify account details/report an issue.

Precondition: Patron must be registered.
Success Guarantee (Postconditions):

- The Patron is able to update and save personal information.
- The Patron is able to search, browse, register, pay for available spots at the desired location(s) (succeeded by confirmation) and report an issue.

Main success scenario (or basic flow):

1. The Patron visits the SaaP and decides to log in.
2. The Patron identifies themself.
3. The system ensures that the identity is valid.
4. The Patron can use all functionalities offered by the SaaP.
5. The Patron logs out.

Extensions (or alternative flows):

3a. If the username and password do not correspond to the Patron's account, after 3 tries, ask them 2 security questions, to enter at least 1 registered license plate number, the total number of vehicles registered and their email address.

3a.i. If the Patron cannot answer 4/5 questions correctly after 3 tries, disable their account.

Special requirements: UI accessible via browsers, physical or virtual keyboard accessible

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: Patron has poor network connectivity

Use Case UC3: Search

Primary Actor: Patron

Level: User level

Stakeholders and Interests:

- Patron: Wants to search for nearby single-spaced parking meter locations(within 25 km radius) for their vehicle type via the system.
- Enforcement Officers: Want traffic congestions to be minimal

Precondition: Patron must have successfully logged in, the desired search location should be in Toronto, vehicle type must be valid (motorcycle or car).

Success Guarantee (Postconditions):

- The Patron gets access to browse all the nearby(within 25 km radius) single-spaced parking meters, for a particular vehicle type, to the desired location.
- This results in reduced traffic congestion.

Main success scenario (or basic flow):

1. The Patron logs in and decides to search.
2. The Patron enters the Postal Code for their desired search location and the type of vehicle(motorcycle or car) they would like to get a parking spot for.
3. The system ensures the entered Postal Code is in Toronto.

4. The system provides a list of all nearby single-spaced parking meter locations.
5. The Patron can select and view any numbered parking spot from the list, apart from the ones marked ‘X’ (marked as not usable by the enforcement officers).
6. Upon selecting a numbered parking spot the patron can view its complete availability status for that day (till the time it’s usable).

Extensions (or alternative flows):

3a. If the Postal Code is not in Toronto, indicate an error, allow the patron to re-enter.

Special requirements: UI accessible via browsers, physical or virtual keyboard accessible
Technology and Data Variations List:

- SaaP accessible via smartphone apps
- The street address of the desired location can be entered

Open issues: Patron has poor network connectivity, Vehicle type incompatible

Use Case UC4: Reserve

Primary Actor: Patron
Level: User level
Stakeholders and Interests:

- Patron: Wants to reserve single-spaced parking meter locations after browsing.
- Enforcement Officers: Wants to make sure unmarked parking spots aren't being occupied.

Precondition: Patron must have successfully logged in and selected a numbered parking spot.
Success Guarantee (Postconditions):

- The Patron reserves a numbered parking spot for a specific time slot starting now or later such that it does not conflict with a pre-existing reservation.

Main success scenario (or basic flow):

1. The Patron selects a numbered parking spot they wish to reserve after browsing.
2. The Patron chooses between the reserve for now or later options.

   i. The Patron selects between 0.5 hours, 1 hour, 2 hours or 3 hours (max) if they are reserving starting now.
   ii. The Patron enters a start time for later and chooses between 0.5 hours, 1 hour, 2 hours or 3 hours (max) time durations they want to reserve for.
3. The Patron submits once done.
4. The system ensures there are no conflicts between the Patron's preference and pre-existing reservations.
5. The system adds this reservation to the checkout cart.

Extensions (or alternative flows):

4a. If there exists a conflict, indicate an error, indicate the duration of overlap and suggest the use of a different spot, allow Patron to edit preferences

Special requirements: UI accessible via browsers, physical or virtual keyboard accessible

Technology and Data Variations List:

- SaaP accessible via smartphone apps
- Availability can be indicated as A (currently available, with a D if disability parking), R (currently reserved but might become available later, with a D if disability parking), X (not usable)
- Availability can be indicated as Green (currently available, with a D if disability parking), Red (currently reserved but might become available later, with a D if disability parking), Grey (not usable)

Open issues: Patron has poor network connectivity, Vehicle type incompatible, No available numbered spots for that location throughout the day

Use Case UC5: Checkout

Primary Actor: Patron

Level: User level

Stakeholders and Interests:

- Patron: Wants to edit and/or wants to pay for items in the cart.
- Enforcement Officers: Wants to keep track of reserved parking spaces for easier management.
- Toronto Parking Authority: They benefit from patron's paying via the virtual system as it reduces the need for them to physically go collect cash from single space parking meters

Precondition: Patron must have successfully logged in and the cart should not be empty.

Success Guarantee (Postconditions):

- The Patron modifies or pays for items that were present in the cart.

Main success scenario (or basic flow):

1. The Patron goes to the checkout cart to either modify (add or remove items) thereafter they can pay for the items present in the cart or exit.
2. The system calculates the cost of the items present (including tax) after determining whether a discount for disability parking needs to be applied, depending on the parking lot chosen.
3. The system displays the total amount to be paid by the Patron.
4. The Patron can now select a payment option:
    a. Either from the ones saved under their account.
    b. Or add a new payment method.
5. The system handles the payment.
6. The Patron received payment confirmation.
7. The Patron gets a printable version of the parking ticket.

Extensions (or alternative flows):

5a. If an invalid payment method, indicates an error, allow Patron to re-enter.
5b. Payment handled by Payment

Special requirements: UI accessible via browsers, physical or virtual keyboard accessible
Technology and Data Variations List:

- SaaP accessible via smartphone apps
- Availability can be indicated as A (currently available, with a D if disability parking), R (currently reserved but might become available later, with a D if disability parking), X (not usable)
- Availability can be indicated as Green (currently available, with a D if disability parking), Red (currently reserved but might become available later, with a D if disability parking), Grey (not usable)

Open issues: Patron has poor network connectivity, Vehicle type incompatible, No available numbered spots for that location throughout the day, Desired payment method not supported, tax law variations?, disability discount variations?

Checkout includes Payment **Payment extends credit, debit, PayPal**

Use Case UC6: Payment

Primary Actor: System
Level: Subfunction
Stakeholders and Interests:

- Patron: Wants to pay using this payment method.
- Enforcement Officers: Wants to approve a refund to the same payment method.
- Toronto Parking Authority: They benefit from patron's paying via the virtual system as it reduces the need for them to physically go collect cash from single space parking meters

Precondition: Patron must have saved a preferred method to pay with.

Success Guarantee (Postconditions):

- The payment method is successful.

Main success scenario (or basic flow):

1. The patron preferred payment method is saved in the system.
2. The system determines the type of payment method saved.
3. The system sends a payment authorization request to the authentication and authorization approval system.
4. The system receives payment approval and signals approval to Patron.

Extensions (or alternative flows):

3a. Paying by Credit Card: Handle Credit Payment

3b. Paying by debit Card: Handle Debit Payment

3c. Paying by PayPal: Handle Bank Transfer

Special requirements: Ability to interact with external systems

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: Patron has poor network connectivity, Desired payment method not supported, System server down, External System server down

Use Case UC6a: Handle Credit Card Payment

Primary Actor: System

Level: Subfunction

Stakeholders and Interests:

- Patron: Wants to pay using this payment method.
- Enforcement Officers: Wants to approve a refund to the same payment method.
- Toronto Parking Authority: They benefit from patron's paying via the virtual system as it reduces the need for them to physically go collect cash from single space parking meters

Precondition: System has determined that the payment method is of type credit card.

Success Guarantee (Postconditions):

- The payment method is authenticated and authorized.

Main success scenario (or basic flow):

1. The system sends the patron's credit card account details.
2. The system communicates with an External Payment Authorization Service System and requests account authentication.
3. External Payment Authorization Service System conveys authentication to the system.
4. The system requests payment approval, to check if the credit limit is not exceeded on the account, from an External Accounting System.
5. External Accounting System charges the amount to the credit card and signals approval to the system.
6. The system receives payment approval and signals approval to Patron.

Extensions (or alternative flows):

2a. System detects a failure to collaborate with the external system:

- System signals error to Patron.
- A patron enters/selects an alternate payment method.

3a. External Payment Authorization Service System conveys authentication failure, cancel the transaction.

5a. External Accounting System conveys credit limit exceeded, cancel the transaction.

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: Patron has poor network connectivity, System server down, External System server down

Use Case UC6b: Handle Debit Card Payment

Primary Actor: System

Level: Subfunction

Stakeholders and Interests:

- Patron: Wants to pay using this payment method.
- Enforcement Officers: Wants to approve a refund to the same payment method.
- Toronto Parking Authority: They benefit from patron's paying via the virtual system as it reduces the need for them to physically go collect cash from single space parking meters

Precondition: System has determined that the payment method is of type debit card.

Success Guarantee (Postconditions):

- The payment method is authenticated and authorized.

Main success scenario (or basic flow):

1. The system sends the patron's debit card account details.
2. The system communicates with an External Payment Authorization Service System and requests account authentication.
3. External Payment Authorization Service System conveys authentication to the system.
4. The system requests payment approval, to check if the funds in the account are greater than the remittance amount, from an External Accounting System.
5. External Accounting System charges the amount to the account associated with the debit card and signals approval to the system.
6. The system receives payment approval and signals approval to Patron.

Extensions (or alternative flows):

2a. System detects a failure to collaborate with the external system:

- System signals error to Patron.
- A patron enters/selects an alternate payment method.

3a. External Payment Authorization Service System conveys authentication failure, cancel the transaction.

5a. External Accounting System conveys funds insufficient, cancel the transaction.

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: Patron has poor network connectivity, System server down, External System server down

Use Case UC6c: Handle PayPal Payment

Primary Actor: System
Level: Subfunction
Stakeholders and Interests:

- Patron: Wants to pay using this payment method.
- Enforcement Officers: Wants to approve a refund to the same payment method.
- Toronto Parking Authority: They benefit from patron's paying via the virtual system as it reduces the need for them to physically go collect cash from single space parking meters

Precondition: System has determined that the payment method is PayPal.
Success Guarantee (Postconditions):

- The payment method is authenticated and authorized.

Main success scenario (or basic flow):

1. The system sends the PayPal account details.
2. The system communicates with an External Payment Authorization Service System and requests account authentication.
3. External Payment Authorization Service System conveys authentication to the system.
4. The system requests payment approval, to check if the funds in the account are greater than the remittance amount, from an External Accounting System.
5. External Accounting System charges the amount to the account and signals approval to the system.
6. The system receives payment approval and signals approval to Patron.

Extensions (or alternative flows):

2a. System detects a failure to collaborate with the external system:

- System signals error to Patron.
- A patron enters/selects an alternate payment method.

3a. External Payment Authorization Service System conveys authentication failure, cancel the transaction.

5a. External Accounting System conveys funds insufficient, cancel the transaction.

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: Patron has poor network connectivity, System server down, External System server down

Use Case UC7: Report an Issue

Primary Actor: Patron
Level: User level
Stakeholders and Interests:

- Patron: Wants to report an issue due to violation of the parking law or inaccessible parking spot after having reserved it which could result in a refund request.
- Enforcement Officers: Wants to ensure the parking violations don't go unchecked, Patrons are treated fairly.

Precondition: Patron has to be logged in, must have reservation confirmation.
Success Guarantee (Postconditions):

- The request is forwarded to the Enforcement Officer and is being processed.

Main success scenario (or basic flow):

1. The Patron is logged into the system and decides to report an issue.
2. The Patron can file either grievance:
    a. Violation of parking laws (eg. illegal unpaid parking)
    b. Inaccessible parking spot (eg. Snowed in parking spot due to bad weather)
3. The Patron fills out the required complaint fields which include the violator's license plate number, type of vehicle, date, time and location of violation noticed along with a brief description of the incident.
4. The Patron thereafter can request a refund.
5. The system generates an incident report containing a unique ID.
6. The Patron receives a confirmation regarding incident creation, containing its ID.

Extensions (or alternative flows):

3a. If the invalid type of vehicle, indicate an error, allow to re-enter.
3b. If the invalid location (i.e outside Toronto), indicate an error, allow to re-enter.

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: Patron has poor network connectivity.

USE CASES FOR ENFORCEMENT OFFICER:

Use Case UC1: Registration

Primary Actor: Enforcement Officer
Level: User level
Stakeholders and Interests:

- Enforcement Officer: Wants to register to the system in order to get access to the patron's information making it easier for them to manage parking spots and to bill fine tickets.
- Patron: They get access to the information they need to know such as the status of a parking slot, operating hours and parking fees.

Precondition: The Enforcement Officer's badge number should be authorized to access the system.
Success Guarantee (Postconditions):

- An Enforcement Officer is registered to the system and has access to all the functionalities offered.

Main success scenario (or basic flow):

1. The Enforcement Officer visits the SaaP to register.
2. The Enforcement Officer enters their police badge number.
3. The system determines whether the submitted police badge number has been authorized.
4. The Enforcement Officer sets a username and password.
5. The system ensures that the username selected is unique and the chosen password is well constructed (at least 8 characters, at least 1 number, at least 1 special character)
6. The Enforcement Officer fills in the required information for registration, including email address, personal information, unique badge number
7. The Enforcement Officer submits the information once done.
8. The Enforcement Officer gets a confirmation message containing their username.

Extensions (or alternative flows):

3a. If the badge number is not authorized, indicate an error, allow to re-enter

5a. If the username is taken, indicate an error, suggest a unique username and allow them to enter a new one.

5b. If the password is not well constructed, indicate an error, highlight missing fields and allow the patron to re-enter.

6b. If the Enforcement Officer's email address is not well-formed, a sample format is shown, allow re-enter.

Special requirements: UI accessible via browsers, physical or virtual keyboard accessible

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: The Enforcement Officer has poor network connectivity

Use Case UC2: Login

Primary Actor: The Enforcement Officer
Level: User level
Stakeholders and Interests:

- Enforcement Officer: Wants to login to the system in order to modify parking spot usability, fee, hours of operation, free parking hours, parking spot tag to disability parking.

Precondition: Enforcement Officer must be registered.
Success Guarantee (Postconditions):

- The Enforcement Officer is able to update and save personal information.
- The Enforcement Officer has access to all numbered parking spaces.
- The Enforcement Officer is able to search and browse.
- The Enforcement Officer has access to the registered Patron's information.

Main success scenario (or basic flow):

1. The Enforcement Officer visits the SaaP to login.
2. The Enforcement Officer identifies themself.
3. The system ensures that the identity is valid.
4. The Enforcement Officer can use all functionalities offered by the SaaP.
5. The Enforcement Officer logs out.

Extensions (or alternative flows):

3a. If the username and password do not correspond to the Enforcement Officer's account, after limited tries, ask them 2 security question(s), to enter badge number, name of their precinct and their email address.

3a.i. If the Enforcement Officer cannot answer 4/5 questions correctly after 3 tries, disable their account.

Special requirements: UI accessible via browsers, physical or virtual keyboard accessible
Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: Enforcement Officer has poor network connectivity

Use Case UC3: Search

Primary Actor: The Enforcement Officer
Level: User level
Stakeholders and Interests:

- Enforcement Officers: Wants to check how many spots are reserved in a nearby specified location. Wants to modify parking spot usability, fee, hours of operation, free parking hours, parking spot tag to disability parking for spots nearby specified location.

Precondition: The Enforcement Officer must have successfully logged in, the desired search location should be in Toronto.
Success Guarantee (Postconditions):

- The Enforcement Officer gets access to browse and modify all the nearby single-spaced parking meters (available and reserved), to the desired location, allowing them to manage to park efficiently.

Main success scenario (or basic flow):

1. The Enforcement Officer logs in and decides to search.
2. The Enforcement Officer enters the Postal Code of their desired search location.
3. The system ensures the entered Postal Code is in Toronto.
4. The system provides a list of all nearby single-spaced parking meter locations.
5. The Enforcement Officer can select and view the complete availability status of any numbered parking spot from the list for the week.
6. The Enforcement Officer can then choose to edit the various attributes of the parking lot such as parking usability status, fee, hours of operation, free parking hours, parking spot tag to disability parking for spots.
7. The Enforcement Officer can change the usability status when they wish to block off parking spots in an area due to a special event in the city like construction, parades, a criminal investigation, accidents, bad weather conditions, etc.
8. The Enforcement Officer can change the free parking hours (eg. no-fee parking allowed between 6 am-8 am), parking fee, fine and disability discount amounts based on City of Toronto parking bylaws.
9. The Enforcement Officer can change the hours of operation (eg. parking only allowed between 8 am - 10 pm) as dictated by the City of Toronto parking bylaws.
10. The Enforcement Officer can remove/ add disability parking spot tags in accordance with the City of Toronto parking bylaws.
11. The Enforcement Officer can persist the new settings (modification(s)) for that day (only for 1 day), set it to recur for that day (eg. every Saturday) or for all days of that week (eg. unusable due to bad weather conditions for an entire week)

Extensions (or alternative flows):

3a. If the location specified is not in Toronto, indicate an error, allow the Enforcement Officer to re-enter.

Special requirements: UI accessible via browsers, physical or virtual keyboard accessible
Technology and Data Variations List:

- SaaP accessible via smartphone apps
- Street address/Postal Code of the desired location can be entered

Open issues: Enforcement Officer has poor network connectivity.

Use Case UC8: Fine Ticket

Primary Actor: The Enforcement Officer
Level: User level
Stakeholders and Interests:

- Enforcement Officers: Wants to issue a ticket containing an appropriate fine amount based on the violation.

Precondition: The Enforcement Officer must have examined violations in person and be logged into the system.
Success Guarantee (Postconditions):

- The Enforcement Officer will have the fine ticket ready to issue which contains all the relevant information.

Main success scenario (or basic flow):

1. The Enforcement Officer is logged in and notices a parking violation.
2. The Enforcement Officer enters attributes such as the violator's license plate details, time and location of issuing the ticket, officer's badge number and fine amount in accordance with City of Toronto Parking bylaws.
3. The system ensures the entered badge number corresponds to the enforcement officers.
4. The Enforcement officer gets a printable version of the fine ticket.

Extensions (or alternative flows):

3a. If the badge number is incorrect, indicate an error, allow to re-enter.

Special requirements: UI accessible via browsers, physical or virtual keyboard accessible
Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: Enforcement Officer has poor network connectivity, no printing facility available

Use Case UC9: Review an Issue

Primary Actor: Enforcement Officer
Level: User level
Stakeholders and Interests:

- Patron: Wants the reported issue to be reviewed and resolved.

- Enforcement Officers: Wants to ensure the parking violations don't go unchecked, Patrons are treated fairly.

Precondition: Enforcement Officer has to be logged in, there exist claims to be reviewed
Success Guarantee (Postconditions):

- The request is reviewed and resolved.

Main success scenario (or basic flow):

1. The Enforcement Officer is logged into the system and reviews an incident report submitted by a Patron.
2. The Enforcement Officer determines whether the violation reported was valid or not.
3. The Enforcement Officer can then:
    a. Decide to grant a refund if the reported violation is legitimate and can proceed to generate a fine ticket for the violator.
        i. The system processes a refund to the saved payment method.
    b. Add a brief description as to why the refund was not granted.
4. The Enforcement Officer submits once done.
5. The system generates a report resolution summary containing the same ID as the incident report.
6. The Patron receives a notification regarding the decision made.

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: Enforcement Officer has poor network connectivity, no printing facility available

USE CASES FOR SYSTEM:

Use Case UC10: Add/Delete Enforcement Officer

Primary Actor: System
Level: System-level
Stakeholders and Interests:

- Enforcement Officers: Wants to get access to the system and not worry about deleting their account.
- Patron: Is assured that the Enforcement Officers having access to their personal information, issuing fine tickets are authorized personnel.

Precondition: Enforcement Officers must have a unique badge ID and must be authorized to access the system.
Success Guarantee (Postconditions):

- The Enforcement Officer is added/deleted from the system’s records.

Main success scenario (or basic flow):

1. The system receives a registration request from the Enforcement Officer.
2. The system validates that the badge number entered by the Enforcement Officer is authorized.

3. The system approves registration and adds the Enforcement Officer it's recorded.
4. The system sends out a confirmation.
5. The system removes the Enforcement Officer once their authorization is removed.
6. The system updates its record.

Extensions (or alternative flows):

2a. Validation: Validate

4a. Confirmation: Notification

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: System server down, unable to connect to the database, authorization information not provided

Use Case UC11: Add/Delete Patron

Add/Delete includes Notification and extends Validation
Primary Actor: System
Level: System-level
Stakeholders and Interests:

- Patron: Wants to get access to the system and not worry about deleting their account.
- Enforcement Officer: Ensures reduced security risk and can access the Patron's information for efficient management.

Precondition: Patron must have a valid Driver's license.
Success Guarantee (Postconditions):

- The Patron is added/deleted from the system's records.

Main success scenario (or basic flow):

1. The system receives a registration request from the Patron.
2. The system ensures that the Patron has a valid driver's license.
3. The system approves registration and adds the Patron to its record.
4. The system sends out a confirmation.
5. The system removes the Patron once their authorization is removed.
6. The system updates its record.

Extensions (or alternative flows):

2a. Validation: Validate

4a. Confirmation: Notification

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: System server down, unable to connect to the database, authorization information not provided

Use Case UC12: Update

Primary Actor: System
Level: System-level
Stakeholders and Interests:

- Patron: Wants to make sure that their account details and activity details are up-to-date.
- Enforcement Officer: Wants to make sure that their account details and activity details are up-to-date.

Precondition: Patron and Enforcement Officer must be logged in.
Success Guarantee (Postconditions):

- The changes made by the Patron and the Enforcement Officer must be reflected correctly and be up-to-date.

Main success scenario (or basic flow):

1. The system ensures that the addition/deletion of the Enforcement Officer account is up-to-date in its record.
2. The system ensures that the addition/deletion of the Patron account is up-to-date in its record.
3. The system ensures that the account and activity details of the Patron and the Enforcement Officer are up-to-date.(eg. personal information).
4. The system must ensure that the status of the numbered parking spots(eg. reserved, available, not usable) are up-to-date to prevent conflict.
5. The system ensures that changes made by the Enforcement Officer with regards to free parking hours, parking fees and disability discounts are registered up-to-date.
6. The system ensures that the resolved issues are deleted from its record after a reasonable period of time.

Extensions:

4a. Confirmation: Notification

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: System server down, unable to connect to the database, authorization information not provided

Use Case UC13: Validate

Primary Actor: System
Level: System-level
Stakeholders and Interests:

- Patron: Wants to make sure that they can trust the system and that it is authenticated
- The Enforcement Officer: Wants to make sure that they can trust the system and that it is authenticated.

Precondition: Patron and Enforcement Officer must be logged in.
Success Guarantee (Postconditions):

- The changes made by the Patron and the Enforcement Officer must be reflected correctly and be up-to-date.

Main success scenario (or basic flow):

7. The system must check whether the payment method is either Credit, Debit or Paypal
8. The system must check if the email address is well-formed and the password is well-formed(i.e at least 8 characters, at least 1 number, at least 1 special character)
9. The system must check if the entered home address is in a valid geographical location (eg. in Canada).
10. the system must check if the badge number of the Enforcement Officer is authorized and unique.
11. The system must ensure that the Enforcement Officer and the Patron's entered login credentials match with the corresponding registered account.
12. The system must give the Enforcement Officer and Patron 3 tries to answer their security questions if the login credentials are not matching with the registered account.
13. The system must ensure if the entered postal code is in Toronto.
14. The system must ensure the Patron's selected reservation preferences do not conflict with the pre-existing reservations by providing the overlap period and suggesting different available spots.
15. The system must ensure that the type of vehicle chosen is either a car or a motorcycle.
16. The system must ensure that the payment method selected during the checkout is either debit, credit or PayPal.

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: System server down, unable to connect to the database, authorization information not provided

Use Case UC14: Notification

Primary Actor: System
Level: Subfunction
Stakeholders and Interests:

- Enforcement Officers: Wants to get a confirmation from the system, if added
- Patron: Wants to get a confirmation from the system, if added.

Precondition: The Enforcement Officer and the Patron must be added to its record.
Success Guarantee (Postconditions):

- The Enforcement Officer and the Patron must receive communication from the system.

Main success scenario (or basic flow):

1. The system sends an error message to the Patron or the Enforcement Officer if the entered username is not unique and suggests one, password or email address is not well-formed.
2. The system sends account creation confirmation to the Enforcement Officer containing their unique username, once added to its record.
3. The system sends account creation confirmation to the Patron containing their unique username, once added to its record.
4. The system notifies the Patron and the Enforcement Officer with the security questions if the entered login credentials are invalid.
5. The system notifies the Patron and the Enforcement officer if the Postal Code entered is outside the City of Toronto limits.
6. The system notifies the Patron if the entered payment method or information is invalid.
7. The System notifies the Patron with a payment approval on receiving a valid authorization from the external accounting system.
8. The system notifies the Patron of a payment error if it receives an invalid authentication or authorization signal from the external authorization or accounting system.
9. The system must notify the Patron with an error message if it cannot communicate with the external systems.
10. The system notifies the Patron regarding incident report generation containing a unique ID, once the report an issue request is added to its records.
11. The system must notify the Enforcement Officer of the creation of a summary report containing the unique ID corresponding to that complaint, for resolved issues.
12. The system must notify the Patron of the decision made in regards to the complaint(s) filed which are associated with a unique ID.

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: System server down, unable to connect to the database, authorization information not provided

Use Case UC15: Parking Fee

Primary Actor: System
Level: System-level
Stakeholders and Interests:

- Enforcement Officers: Wants to be assured that parking fee is charged according to the City of Toronto parking bylaws which will also reduce the number of complaints by Patrons.

- Patron: Wants to be assured that they are paying parking fees as stated by the City of Toronto Parking bylaws which will ensure they are not cited for violation for no fault of their own.

Precondition: The Patron must have initiated the checkout process after reserving a parking spot(s).

Success Guarantee (Postconditions):

- The total amount payable by Patron is calculated in accordance with the city of Toronto Parking bylaws.

Main success scenario (or basic flow):

1. The Patron initiates the checkout process.
2. The system will retrieve up-to-date free parking hours, parking fees and disability discount information.
3. The system will determine which conditions (eg. duration, discounts etc.) apply before calculating the final amount for reserving a parking spot for the desired time slot.
4. The system then calculates the final amount and adds applicable taxes in accordance with Taxation laws.
5. The system returns this amount to the Patron.
6. The system reflects the amount paid by the Patron after payment confirmation is received on the printable parking ticket version.

Extensions (or alternative flows):

4a. Confirmation: Notification

Technology and Data Variations List:

- SaaP accessible via smartphone apps

Open issues: System server down, unable to connect to the database, authorization information not provided

USE CASE DIAGRAMS

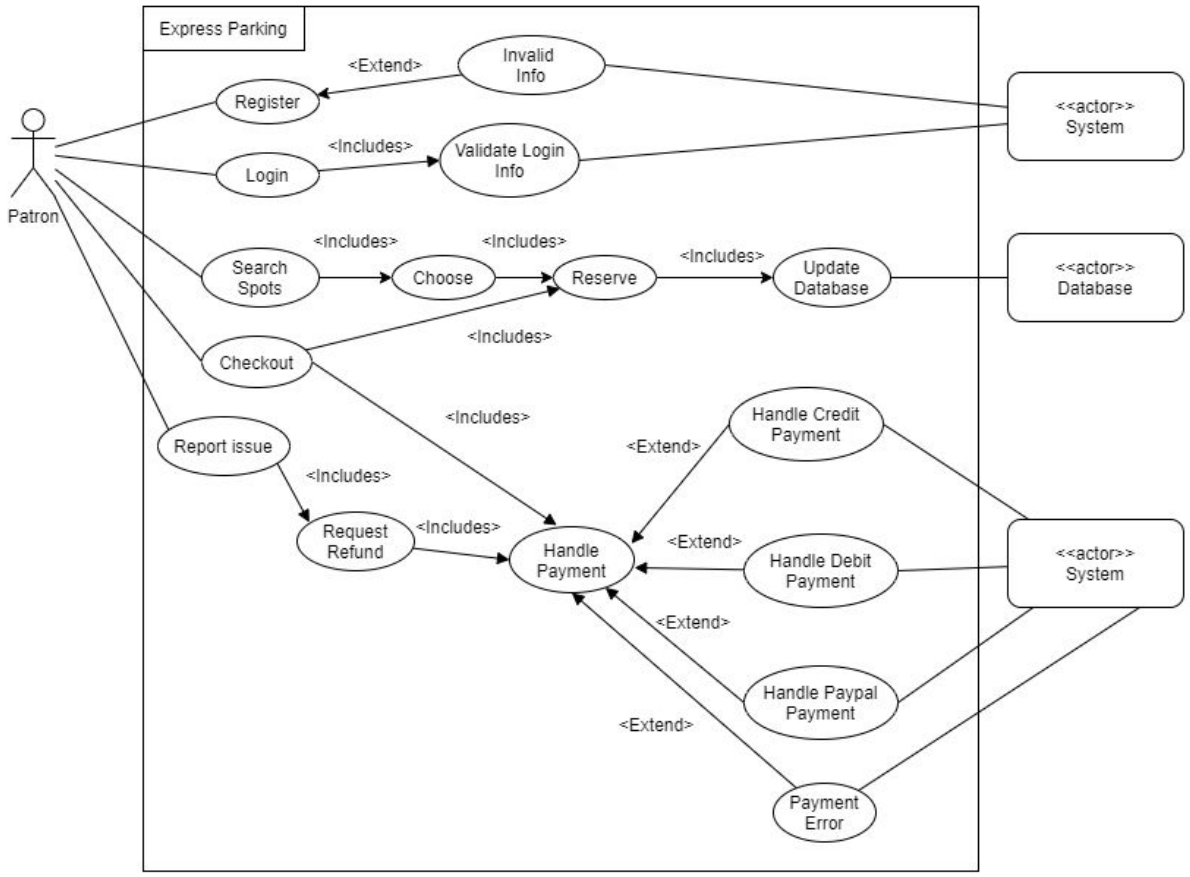

Figure 1 shows use cases for Patron

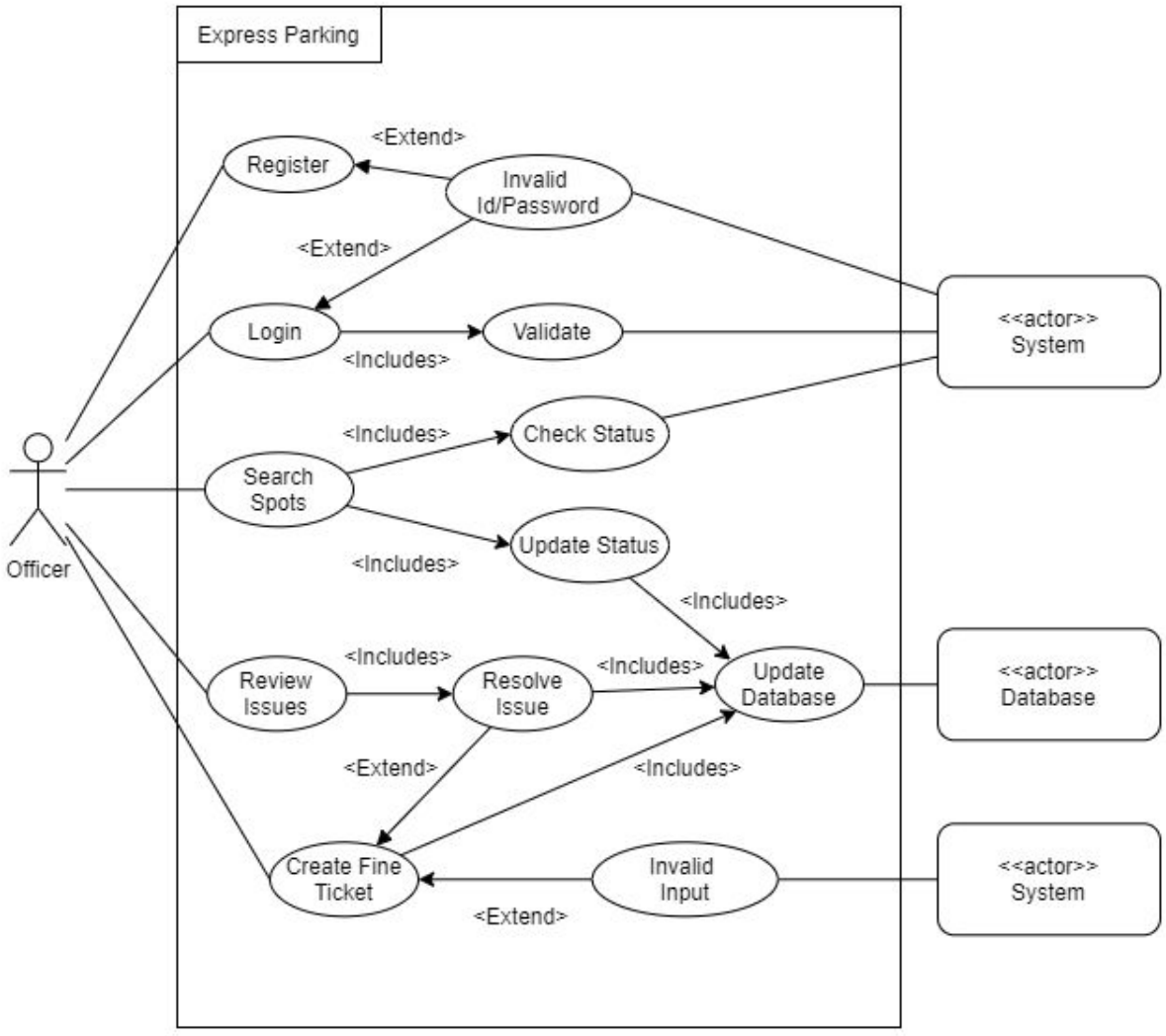

Figure 2 shows use cases for Enforcement Officer

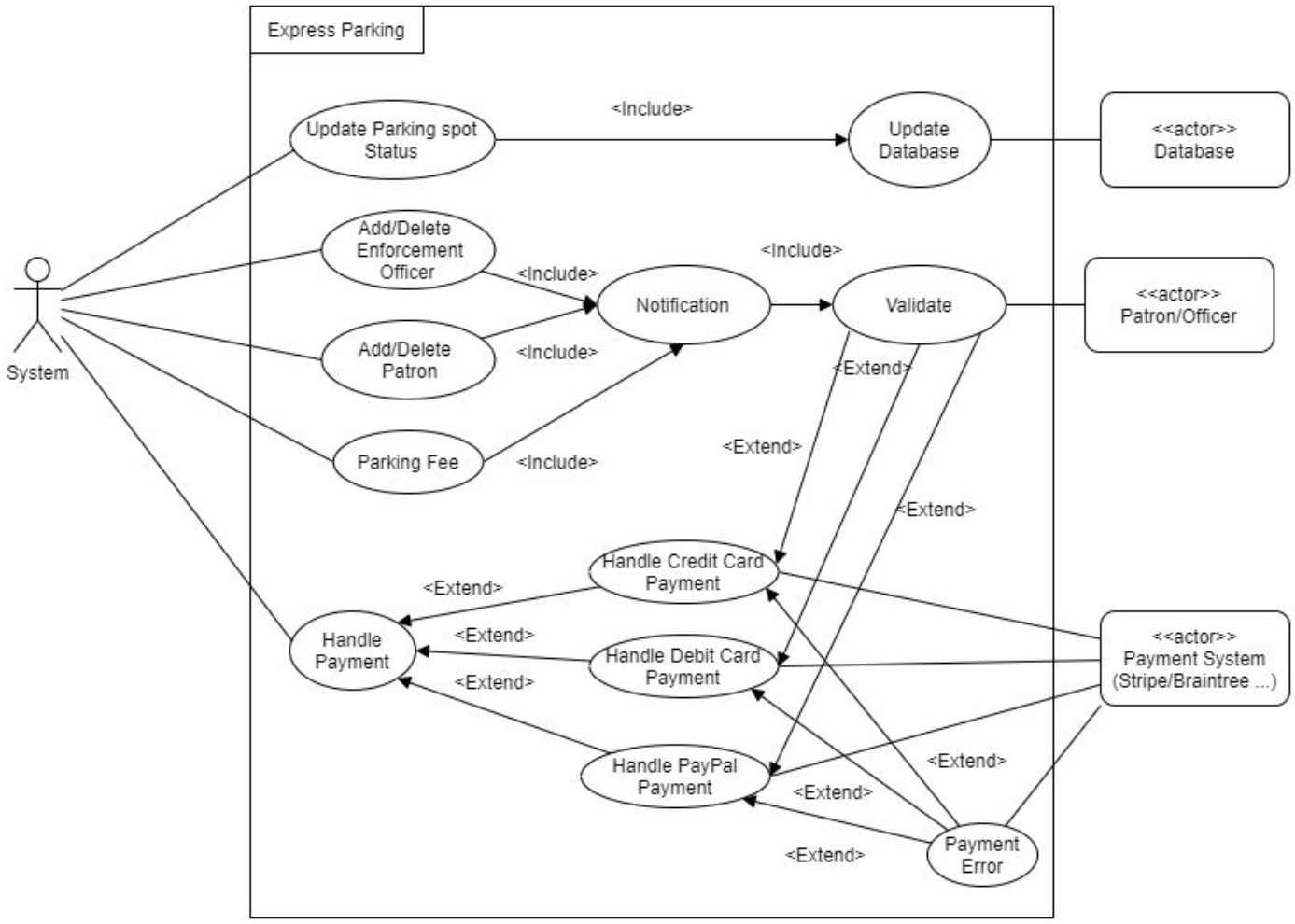

Figure 3 shows Use Cases for System