Project Report

Only for course Teacher						
		Needs Improvement	Developing	Sufficient	Above Average	Total Mark
Allocate mark & Percentage		25%	50%	75%	100%	25
Problem understanding & Analysis	7					
Implementation	8					
Report writing	10					
Total obtained mark						
Comments						

Semester: Fall 2023

Student Name: Kowshik Mozumder

Batch: 36 Section: A2

Course Code: SE231 Course Name: System Analysis & Design Capstone project

Course Teacher Name: Ms. Tapushe Rabaya Toma

Designation: Assistant Professor, Dept. of SWE

Submission Date:19 /11/2023

Introduction

Padma Bridge Toll Management (Scenario)

The Padma Bridge, a 55km, four-lane highway connecting the capital Dhaka with Bhanga in the southwest through Padma Bridge, has an automatic toll collection system called “Hi Pass” .The Korean Expressway Corporation is responsible for operating and managing the expressway, installing the Hi Pass automatic toll service and intelligent traffic management systems on the N8 Expressway, and conducting toll collection, road and structure maintenance, safety patrol, and disaster management, among others, for five years after opening the systems 1. The Hi Pass touch-and-go service has been installed in the entry points along with the conventional cash methods. The automatic toll collection system is ready for official inauguration, and the Korean Expressway has completed its installation 1. The toll collection system will be conducted through radio frequency identification (RFID) in one lane of both ends of the bridge.

As for the toll management system scenario, let’s assume that the Bangladesh Bridge Authority has proposed to set up a Padma Bridge toll-box at the end of the Dhaka-Mawa highway. To store and manage daily tolls and transactions, they want to install a software system 3. The system will be responsible for collecting tolls, storing transaction data, and generating reports 3. The system will have a user-friendly interface for the toll collectors and the administration to manage the toll collection process 3. The system will also have a dashboard for the administration to monitor the toll collection process and generate reports 3. The system will be integrated with the Hi Pass touch-and-go service to collect tolls automatically 13. The system will also have a backup system to ensure uninterrupted service 3.

User/Stakeholders:

- Admin
- Employee.
- Toll Collector Officer
- Driver

Scope

The scope of a Padma Bridge Toll Management System (PBTMS) encompasses a wide range of functionalities and considerations to ensure efficient and secure toll collection for the Padma Bridge. Here's a comprehensive breakdown of the system's scope:

Toll collection:

Real-time Transaction Processin*g*: Transactions should be processed in real-time, providing instant updates to system records.

System Administration and Monitoring

Centralized Database Management: The system should utilize a centralized database to store vehicle information, transaction records, and system configurations.

Real-time System Monitoring: The admin can monitor the system in real time.

TCO Access Control and Permissions: TCO permission should be given by the admin and can remove the TCO from the system.

Reporting and Analytics: The system should generate comprehensive reports and analytics on toll collection, system performance, and revenue generation. System Maintenance and Upgrades: The system should facilitate regular maintenance, updates, and security patches to ensure optimal performance and address any vulnerabilities.

User Interface and Experience

User-friendly Mobile Application: A user-friendly mobile application should provide users with easy access to account management, transaction history, and toll balance information.

Interactive Toll Booth Displays: Interactive displays at toll booths should provide clear information about toll charges, transaction status, and any relevant instructions or messages.

Feasibility Test

Technical feasibility: The system can be implemented using existing technologies and infrastructure.

Economic feasibility: The system's benefits, such as reduced congestion and increased revenue generation, outweigh its costs.

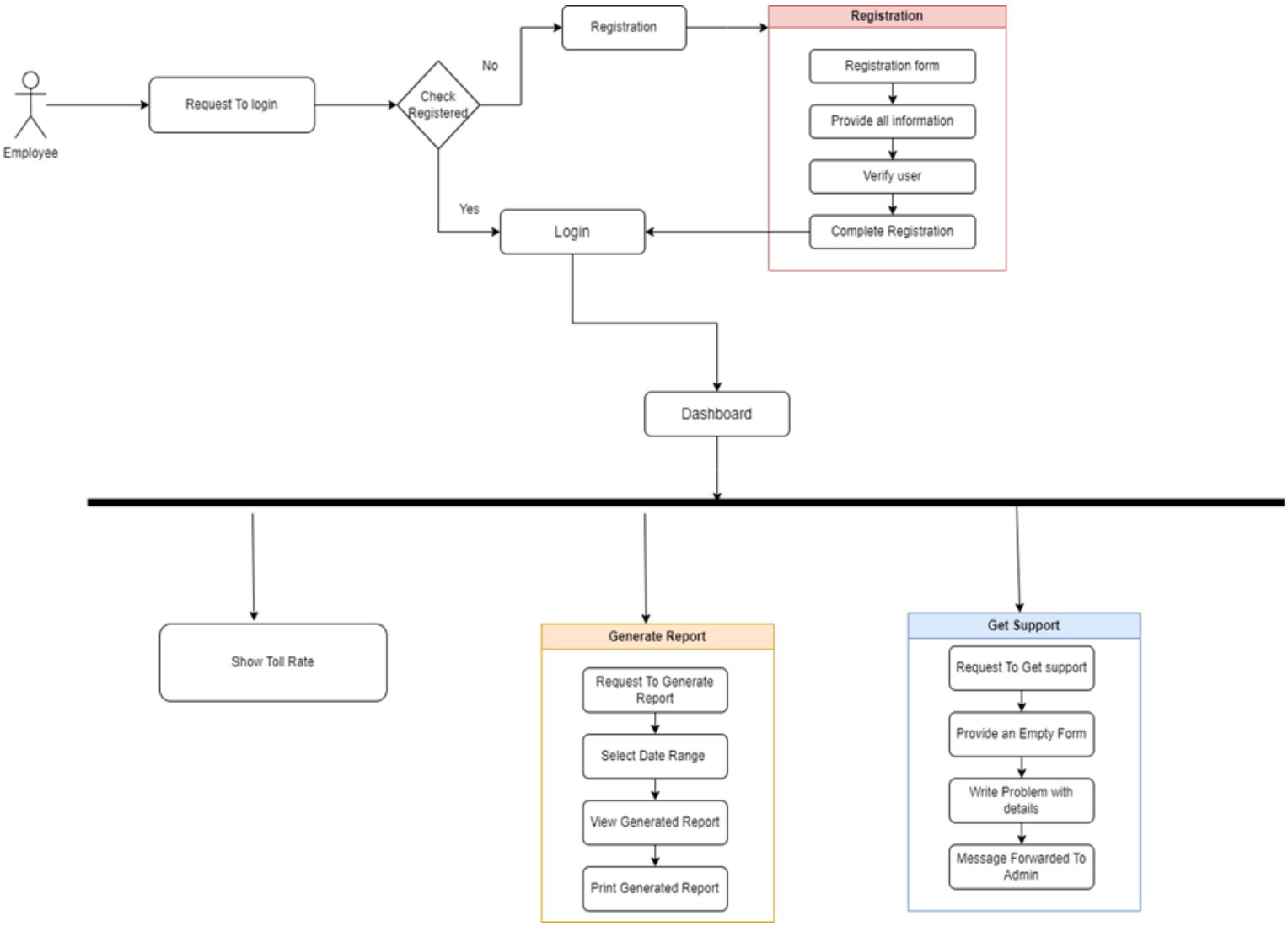
Operational feasibility: The system can be operated and maintained with the available resources and personnel.

Legal and regulatory feasibility: The system complies with all applicable laws and regulations.

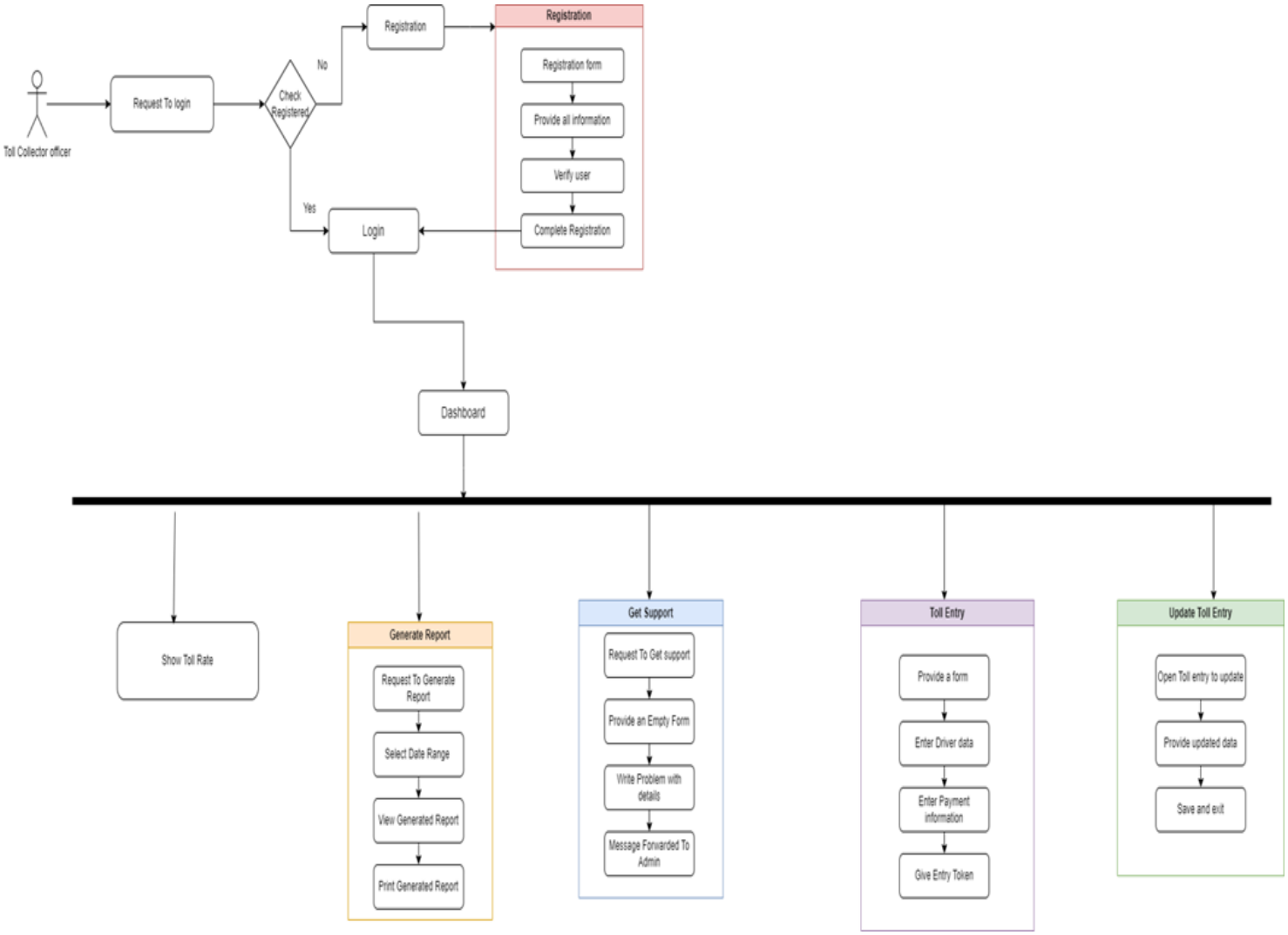
USER PROFILE (Toll Collector Officer)

USER CLASS	NOTE ON CHARACTIERISTICS	REQIUREMENTS IMPLIED
Type Of User	**Toll Collector Officer**	User Interface, Verification.
Age Range	25– 45	Verification.
Frequency Of Use	All most full day.	Performance, Operational, Maintenance, Acceptance.
Mandatory	Yes.	
Computer Experience	Everyone has experience.	User interface.
Education	HSC	
Goals	If someone pays cash toll, then it will be entry by the system.	Performance, Maintainability, User interface, Resource.
Language	English/Bangla	User interface.
Number of User	10-15	Acceptance, Performance.
Training	training required.	
Other System Use	No.	
Way Of Working	Full support.	Performance, Acceptance, Operational, Security.

Block Diagram for Employee

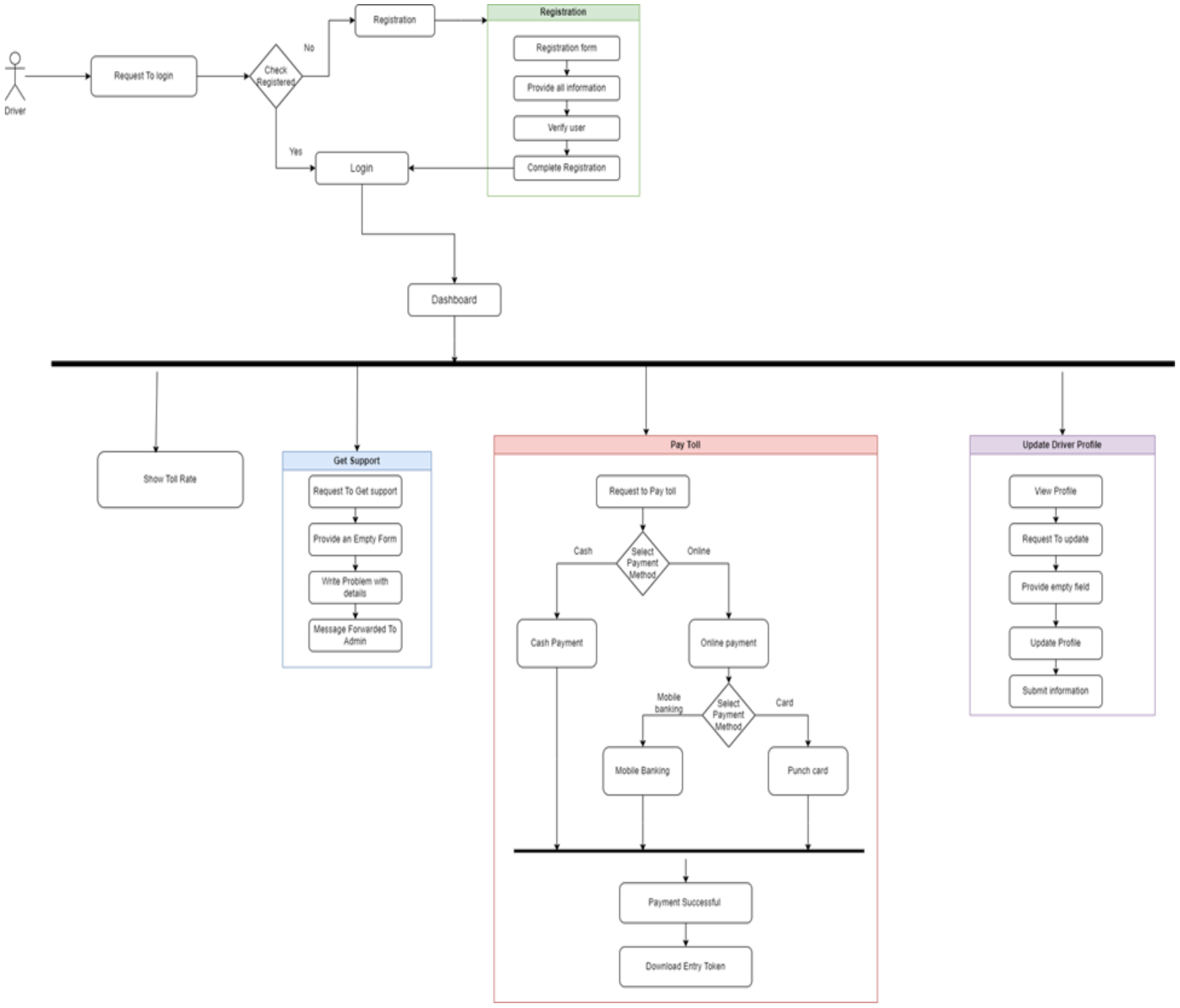


Block Diagram for Toll Collector Officer



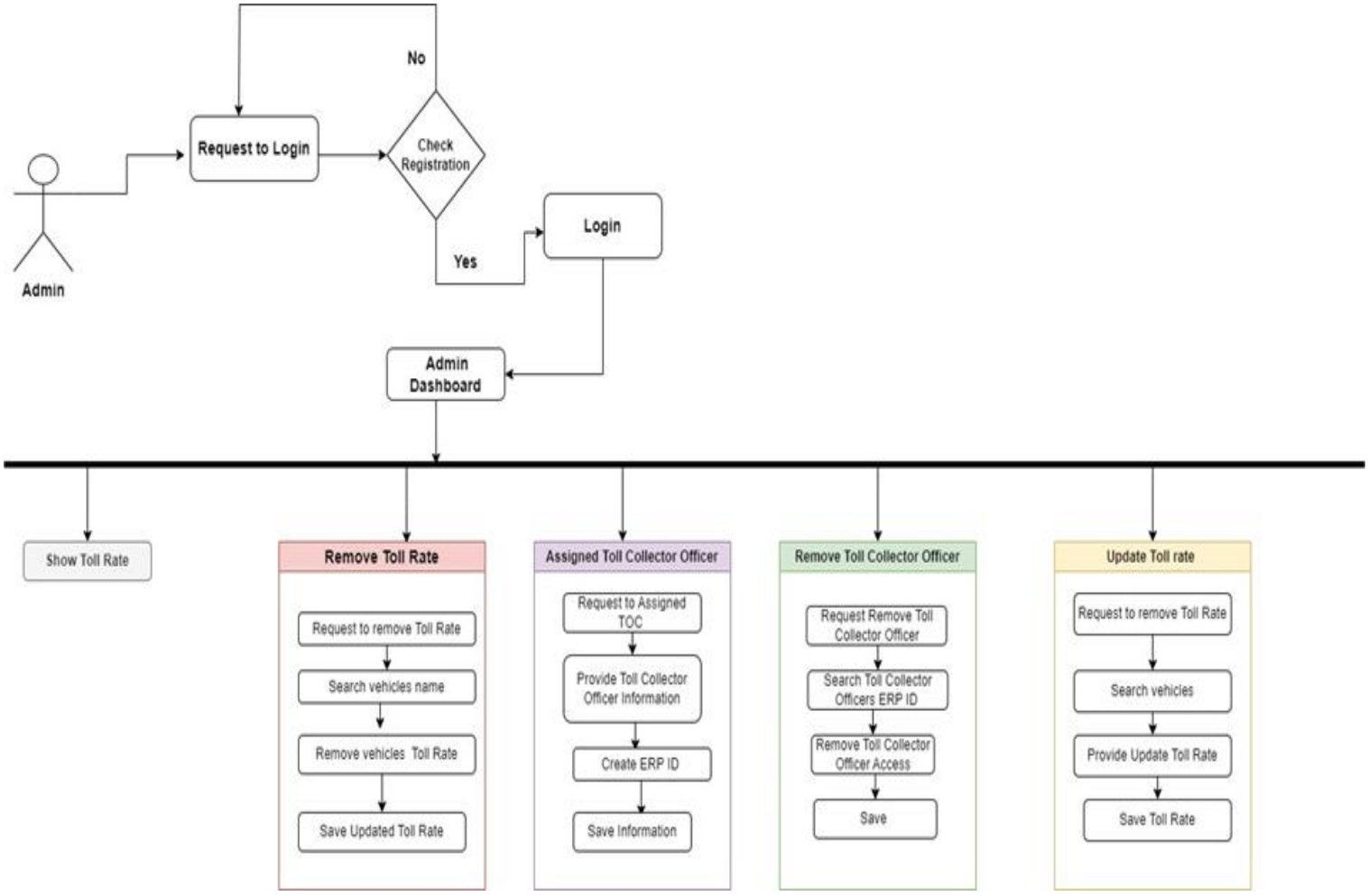
Padma Bridge Toll Management system

Block Diagram for Driver



Padma Bridge Toll Management system

Block Diagram for Admin



Padma Bridge Toll Management system

FR 01	Registration.
Description	Employee, Toll Collector Officer, and driver will provide their user's name, email, user id, password, mobile number, date of birth, gender, and OTP to register into the system.
Stakeholder	Employee, Toll Collector Officer, driver.

FR 02	Log in
Description	Employee, Manager and Admin will provide their user id and password to log in.
Stakeholder	Admin, Employee, Toll Collector Officer, driver.

FR 03	Show Toll Rate.
Description	Admin will add the all items available in the system.
Stakeholder	Admin, Employee, Toll Collector Officer, driver

FR 04	Remove Toll Rate
Description	If ever a troll's rate changes or any vehicles not permitted then, the admin will remove it .
Stakeholder	Admin.

FR 05	Entry Toll
Description	A Toll Collector Officer will collect the toll rates from vehicles and entry the system.
Stakeholder	Toll Collector Officer

FR 06	Update Toll Entry
Description	Toll Collector Officer mistake to toll entry then you can update it.
Stakeholder	Toll Collector Officer

FR 07	Generate Report
Description	Employee can view the day report of all vehicles at the end of the day and keep an account.
Stakeholder	Employee, Toll Collector Officer

FR 08	Assigned Toll Collector Officer.
Description	If a new Toll Collector Officer is Appointed, then he/she needs to be assigned in this system.
Stakeholder	Admin.

FR 09	Remove Toll Collector Officer
Description	To remove on Toll Collector officer off its Access.
Stakeholder	Admin.

FR 10	Pay Toll
Description	When the driver arrives at the bridge, he can pay the toll in advance if he wants.
Stakeholder	Driver.

FR 11	Download Entry Token
Description	After paying the toll, the driver can download a receipt with a QR code.
Stakeholder	Driver

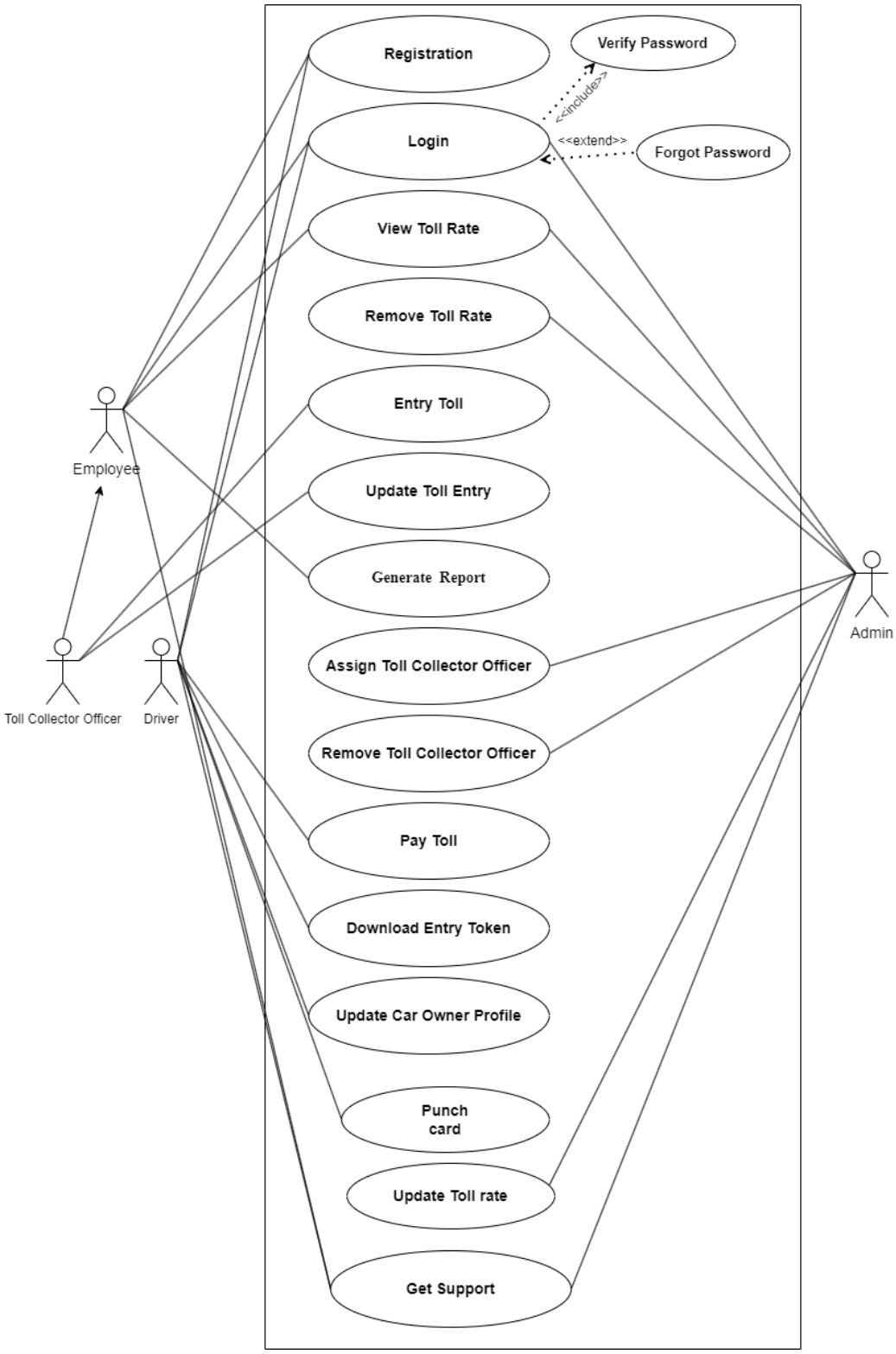
FR 12	Update Car Owner Profile
Description	The driver can update his profile if he wants to.
Stakeholder	Driver

FR 13	Get support.
Description	Everyone can get help if they face any problem from system.
Stakeholder	Admin, Employee, Toll Collector Officer, driver.

FR 14	Punch card.
Description	Driver can take the car with punch card.
Stakeholder	Admin, Employee, Toll Collector Officer, driver.

FR 15	Update Toll rate
Description	If any vehicles toll rate is Changed. Then admin can update it.
Stakeholder	Admin.

Use case Diagram.



Case Description

<table>
<tr><td>Use Case</td><td>Toll Payment</td></tr>
<tr><td>Goal</td><td>Driver will Pay the Toll using the System.</td></tr>
<tr><td>Pre-condition</td><td>Driver has to click the pay toll option.</td></tr>
<tr><td>Success End Condition</td><td>A message “Toll Payment successful” will show</td></tr>
<tr><td>Failed End Condition</td><td>“Something went wrong. Payment unsuccessful” will show.</td></tr>
<tr><td>Primary Actors:

Secondary Actors:</td><td>Driver

Admin</td></tr>
<tr><td>Trigger</td><td>The Driver will press the toll payment option.</td></tr>
<tr><td>Description/ Main Success Scenario</td><td>
<table>
<tr><td>1.</td><td>The User will request to login.</td></tr>
<tr><td>2</td><td>User request to Toll Payment Option</td></tr>
<tr><td>3.</td><td>Show the Toll payment Interface with the payment method.</td></tr>
<tr><td>4.</td><td>Driver selects the Payment Method.</td></tr>
<tr><td>5.</td><td>Driver enters necessary information for payment</td></tr>
<tr><td>6.</td><td>Provide OTP and Password</td></tr>
<tr><td>7.</td><td>Click on payment Confirmation.</td></tr>
<tr><td>8.</td><td>“Toll Payment successful” will show and an entry token will be given.</td></tr>
</table>
</td></tr>
<tr><td>Alternative Flows</td><td>
<table>
<tr><td>1.1</td><td>Server not working.</td></tr>
<tr><td></td><td>1.1.a Login button not working.</td></tr>
<tr><td>3.1.</td><td>Driver didn’t select any payment method.</td></tr>
</table>
</td></tr>
</table>

	<table><tr><td></td><td>.1.a Driver needs to select the payment method</td></tr><tr><td>5.1.</td><td>Driver didn’t enter necessary information.</td></tr><tr><td></td><td>5.1.a Driver needs to enter necessary information</td></tr><tr><td>6.1</td><td>Invalid OTP</td></tr><tr><td>7.1.</td><td>“Toll payment unsuccessfully” will show and no entry token will be given</td></tr><tr><td></td><td>.1.a Driver needs to restart the process</td></tr></table>
Quality Requirements	User will complete the process within 3 min.

Padma Bridge Toll Management system

<table>
<tr><td>Use Case</td><td>Update Toll Entry</td></tr>
<tr><td>Goal</td><td>To change the toll entry if any mistake was made</td></tr>
<tr><td>Pre-condition</td><td>User needs to tap on the update toll entry option</td></tr>
<tr><td>Success End Condition</td><td>Toll entry will be updated</td></tr>
<tr><td>Failed End Condition</td><td>“Something went wrong” will show</td></tr>
<tr><td>Primary Actors:

Secondary Actors:</td><td>Toll Collector Officer

Admin, employee</td></tr>
<tr><td>Trigger</td><td>User will press the Update Toll entry option.</td></tr>
<tr><td>Description/ Main Success Scenario</td><td><table>
<tr><td>1.</td><td>Request to update toll entry.</td></tr>
<tr><td>2.</td><td>Show the Toll entry Interface.</td></tr>
<tr><td>3.</td><td>user select vehicles name and number.</td></tr>
<tr><td>4.</td><td>Click update Option.</td></tr>
<tr><td>5.</td><td>Update the toll entry and hit enter</td></tr>
<tr><td>6.</td><td>“Toll entry update successful” will show</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>1.1</td><td>Sever not found</td></tr>
<tr><td></td><td>1.1.a Try again</td></tr>
<tr><td>2.1</td><td>No interface showed up.</td></tr>
<tr><td></td><td>2.1.a Try Again</td></tr>
<tr><td>3.1</td><td>User didn’t select any name or number</td></tr>
<tr><td></td><td>3.1.a User needs to select the name or number</td></tr>
<tr><td>6.1</td><td>“Toll entry update unsuccessful” will show</td></tr>
<tr><td></td><td>6.1.a Needs to restart the process</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>User will complete the process within 3 min.</td></tr>
</table>

Padma Bridge Toll Management system

<table>
<tr><td>Use Case</td><td>Generate Report</td></tr>
<tr><td>Goal</td><td>To view the report of the toll entry of specific date range</td></tr>
<tr><td>Pre-condition</td><td>User needs to tap on the Generate option</td></tr>
<tr><td>Success End Condition</td><td>An interface with the list of toll entry of specific date</td></tr>
<tr><td>Failed End Condition</td><td>“Something went wrong” will show</td></tr>
<tr><td>Primary Actors:

Secondary Actors:</td><td>Toll Collector Officer, employee

Admin</td></tr>
<tr><td>Trigger</td><td>User will Request to Generate report</td></tr>
<tr><td>Description/ Main Success Scenario</td><td><table>
<tr><td>1.</td><td>The user will press the Generate report Option</td></tr>
<tr><td>2.</td><td>An Interface will show up the ask to select a date range.</td></tr>
<tr><td>3.</td><td>The user selects a date range and press enter.</td></tr>
<tr><td>4.</td><td>A new page will show up with the generated report.</td></tr>
<tr><td>5.</td><td>The user Can now print the report</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>1.1</td><td>Server not found</td></tr>
<tr><td></td><td>1.1.a Try Again</td></tr>
<tr><td>3.1</td><td>The user didn’t Select any date range</td></tr>
<tr><td></td><td>3.1.a Asks to select the date range</td></tr>
<tr><td>4.1</td><td>No new page showed up with the report</td></tr>
<tr><td></td><td>4.1.a Server error</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>User will complete the process within 3 min.</td></tr>
</table>

Padma Bridge Toll Management system

<table>
<tr><td>Use Case</td><td>Toll Entry</td></tr>
<tr><td>Goal</td><td>To update the database with new toll</td></tr>
<tr><td>Pre-condition</td><td>User needs to tap on the Toll Entry option</td></tr>
<tr><td>Success End Condition</td><td>The database will be updated with the new toll entry</td></tr>
<tr><td>Failed End Condition</td><td>The Database Didn’t updated with the new toll entry</td></tr>
<tr><td>Primary Actors:

Secondary Actors:</td><td>Toll Collector Officer</td></tr>
<tr><td>Trigger</td><td>User will Request to toll entry</td></tr>
<tr><td>Description/ Main Success Scenario</td><td><table>
<tr><td>1.</td><td>The Toc will request to Login</td></tr>
<tr><td></td><td>The Toc will request to entry the toll</td></tr>
<tr><td>2.</td><td>An interface will show up to fill necessary information</td></tr>
<tr><td>3.</td><td>The Toc will fill the necessary information and press enter</td></tr>
<tr><td>4.</td><td>Save Successful will show</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>1.1</td><td>Server not found</td></tr>
<tr><td></td><td>1.1.a Try Again</td></tr>
<tr><td>3.1</td><td>The user didn’t fill all the information field</td></tr>
<tr><td></td><td>3.1.a needs to fill all the information field</td></tr>
<tr><td>4.1</td><td>Save unsuccessful will show</td></tr>
<tr><td></td><td>4.1.a user needs to restart the process</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>User will complete the process within 3 min.</td></tr>
</table>

Padma Bridge Toll Management system

<table>
<tr><td>Use Case</td><td>Remove toll collector officer</td></tr>
<tr><td>Goal</td><td>To remove the toll collector officer from the system</td></tr>
<tr><td>Pre-condition</td><td>User needs to be logged in with the admin user</td></tr>
<tr><td>Success End Condition</td><td>The toll collector officer will be removed from the system</td></tr>
<tr><td>Failed End Condition</td><td>The toll collector officer couldn’t be removed from the system</td></tr>
<tr><td>Primary Actors:

Secondary Actors:</td><td>Admin</td></tr>
<tr><td>Trigger</td><td>User will Request to Remove toll collector officer</td></tr>
<tr><td>Description/ Main Success Scenario</td><td>
<table>
<tr><td>1.</td><td>The Admin Request to remove the toll collector officer</td></tr>
<tr><td>2.</td><td>Search the toll collector officer with the id</td></tr>
<tr><td>3.</td><td>The information of the toll collector officer will show up</td></tr>
<tr><td>4.</td><td>The admin will remove the toll collector officer from the system and save</td></tr>
<tr><td>5.</td><td>The system will be updated without the removed toll collector officer</td></tr>
</table>
</td></tr>
<tr><td>Alternative Flows</td><td>
<table>
<tr><td>1.1</td><td>Server not found</td></tr>
<tr><td></td><td>1.1.a Try Again</td></tr>
<tr><td>3.1</td><td>No information of the toll collector officer showed up</td></tr>
<tr><td></td><td>3.1.a Search again</td></tr>
<tr><td>4.1</td><td>Save unsuccessful will show</td></tr>
</table>
</td></tr>
</table>

	<table><tr><td></td><td>4.1.a user needs to start the again from search</td></tr><tr><td>5.1</td><td>The toll collector officer couldn’t be removed from the system</td></tr><tr><td></td><td>5.1.a Server error</td></tr></table>
Quality Requirements	User will complete the process within 3 min.

Use Case	**Get Support.**
Goal	To maintain the system.
Pre-condition	The user needs login with his/her account.
Success End Condition	The problem will be solved.
Failed End Condition	The problem won’t be solved.
Primary Actors: Secondary Actors:	Employee, Manager, Admin, Driver
Trigger	The user will press to get support.

Padma Bridge Toll Management system

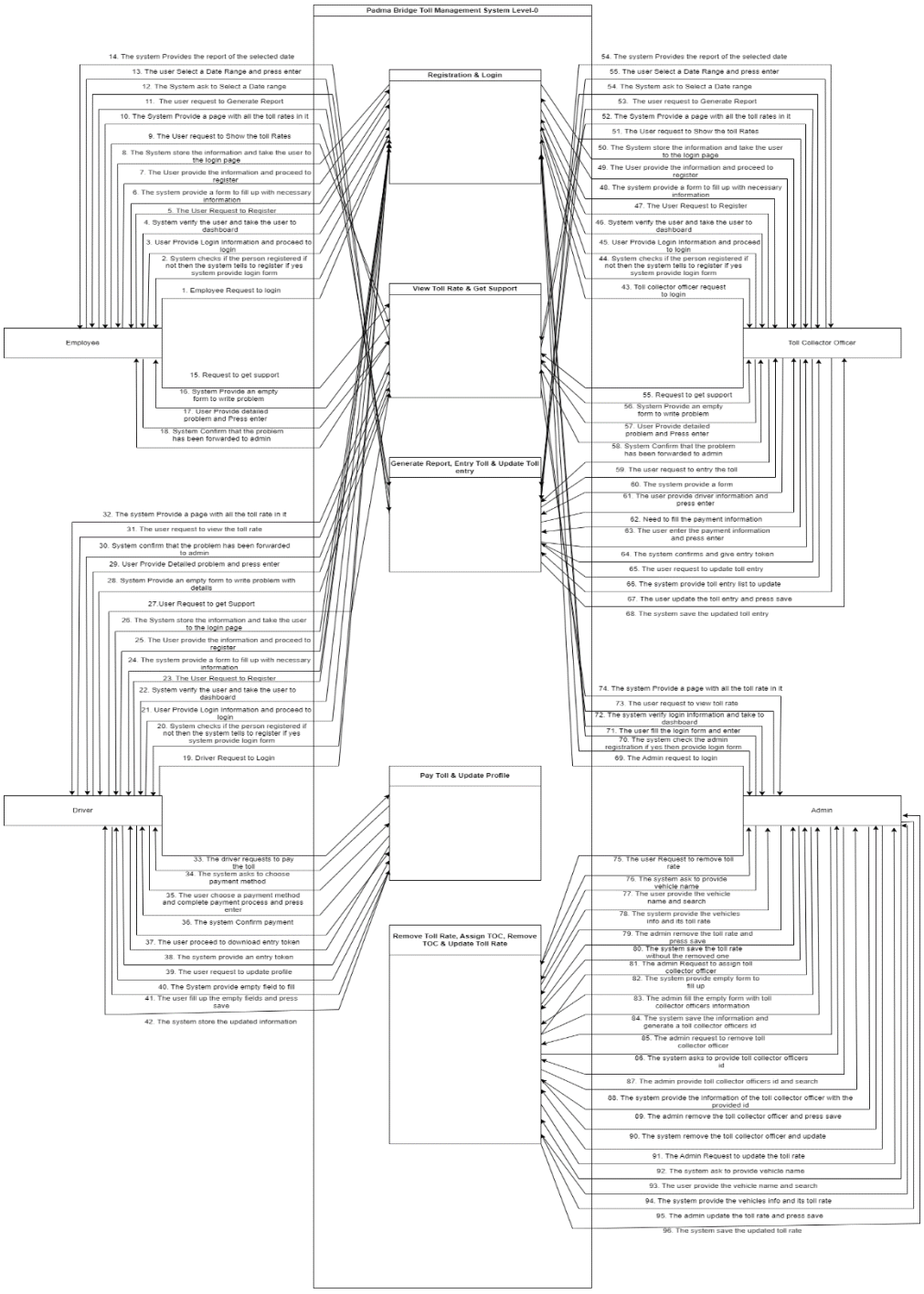
<table>
<tr><td>Description/ Main Success Scenario</td><td><table>
<tr><td>1.</td><td>The employee will Request to get support</td></tr>
<tr><td>2.</td><td>It will take the user to a message box to write the problem.</td></tr>
<tr><td>3.</td><td>The user will write down the problem and press enter.</td></tr>
<tr><td>4.</td><td>The problem will be forwarded to the admin.</td></tr>
<tr><td>5.</td><td>The admin will get a notification of the problem</td></tr>
<tr><td>6.</td><td>The admin will then solve the problem</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>1.1</td><td>Request Not Respond.</td></tr>
<tr><td></td><td>1.1.a Server Not Found</td></tr>
<tr><td>3.1</td><td>The user didn’t write any problem</td></tr>
<tr><td></td><td>3.1.a The user needs to write the problem</td></tr>
<tr><td>5.1.</td><td>The admin didn’t get any notification due to server problem</td></tr>
<tr><td></td><td>5.1.a Show “Server Error”</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>The user will complete the process within 3 min</td></tr>
</table>

Padma Bridge Toll Management system

System Design (Data Flow Diagram (level - 0)

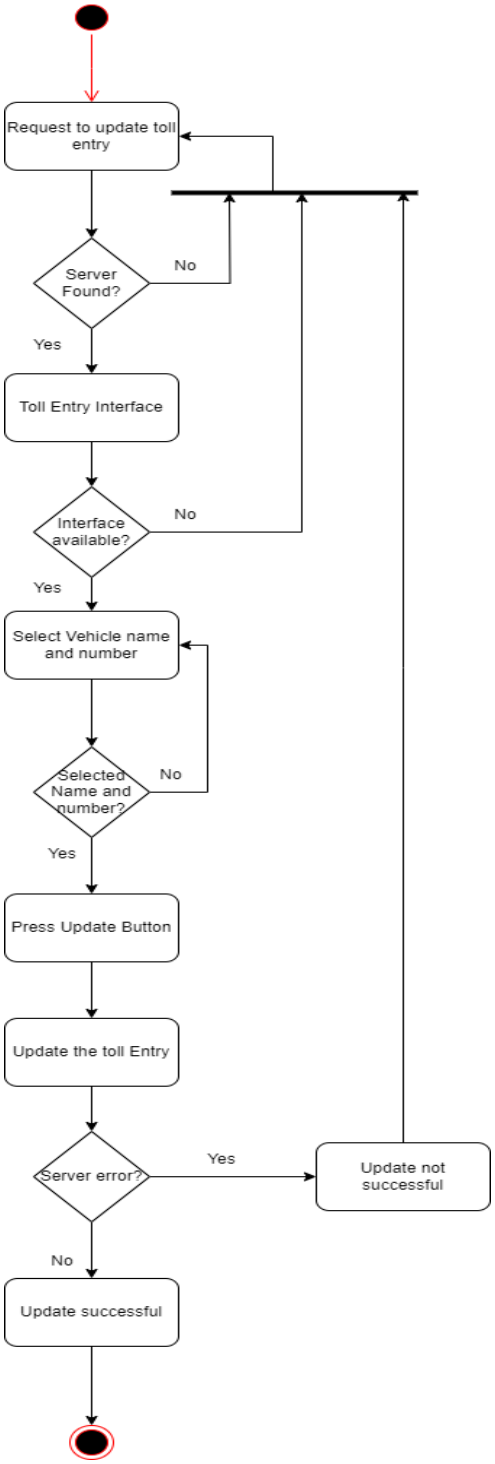
Padma Bridge Toll Management system

Data Flow Diagram (level – 1)



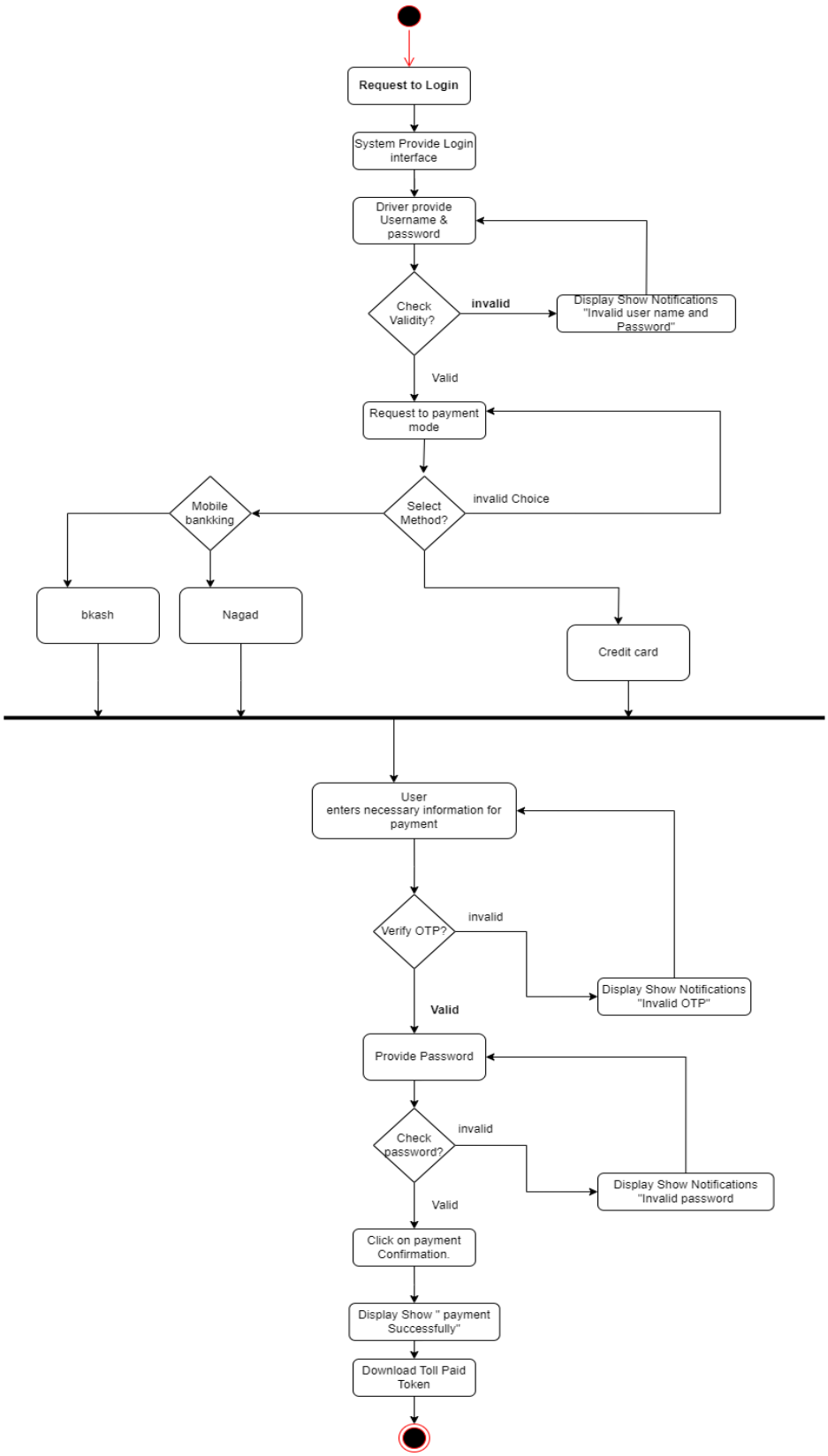
DFD Link - https://drive.google.com/file/d/1tMwEMA6peU6T3jzxOtVWTeoZdZj2ypih/view?usp=sharing

Activity Diagram (Update Toll Entry)

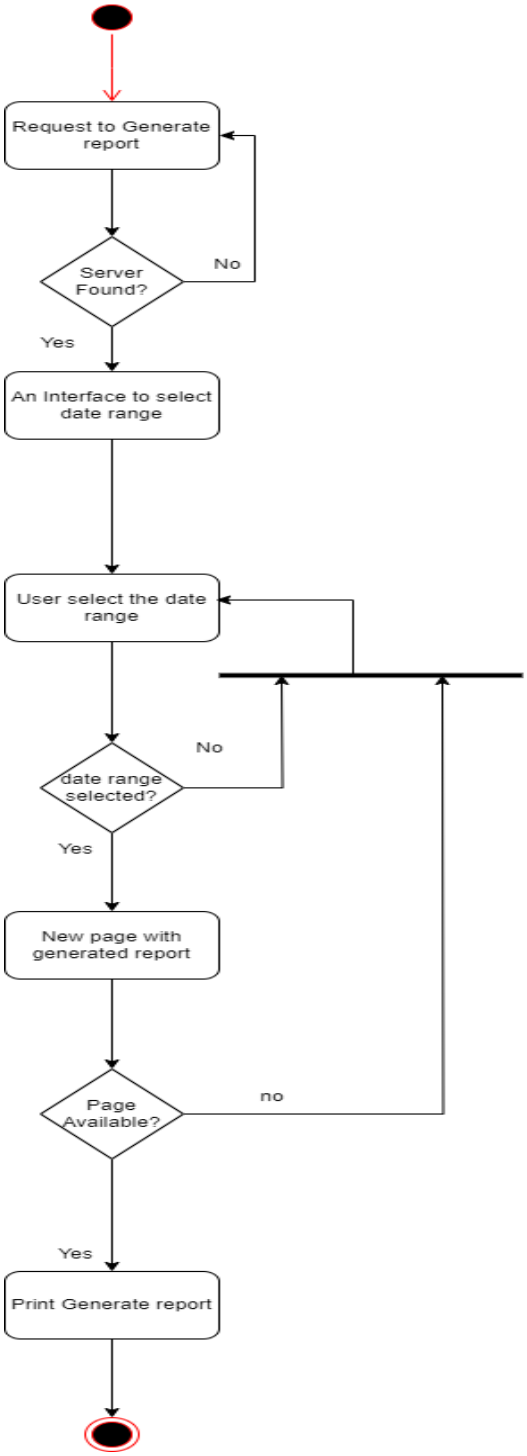


Padma Bridge Toll Management system

Toll Payment

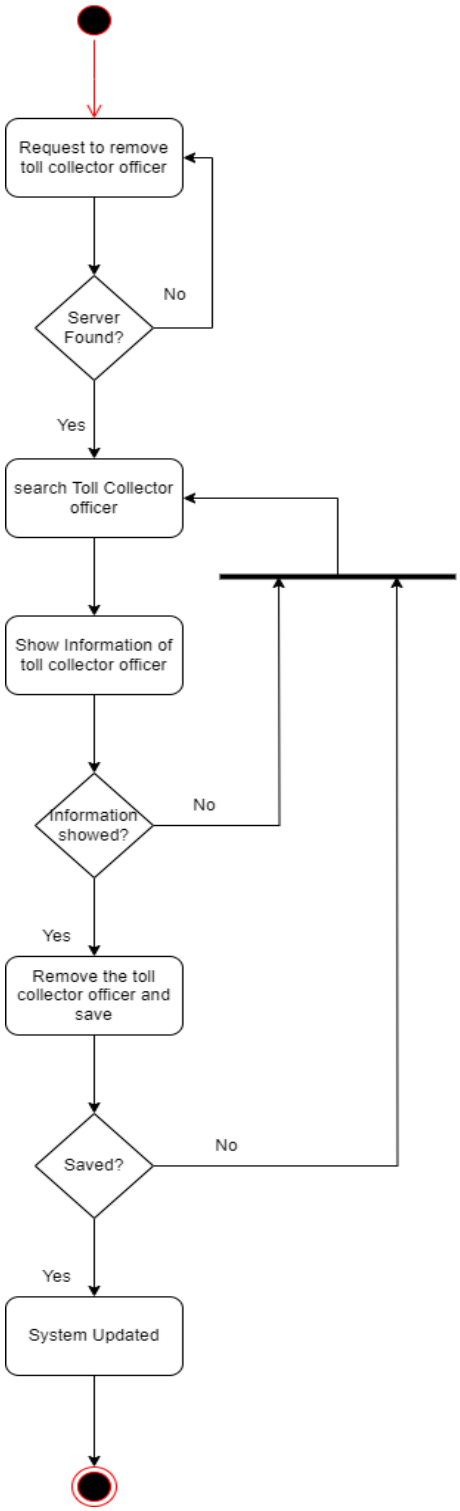


Generate Report



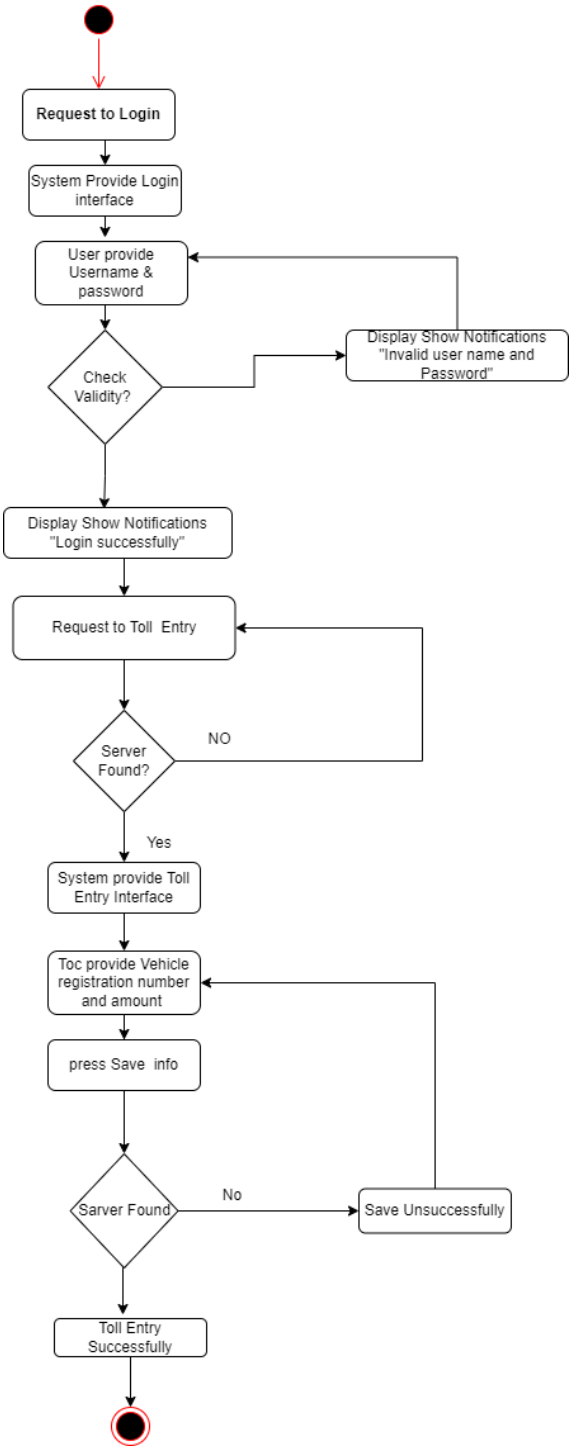
Padma Bridge Toll Management system

Remove toll collector officer

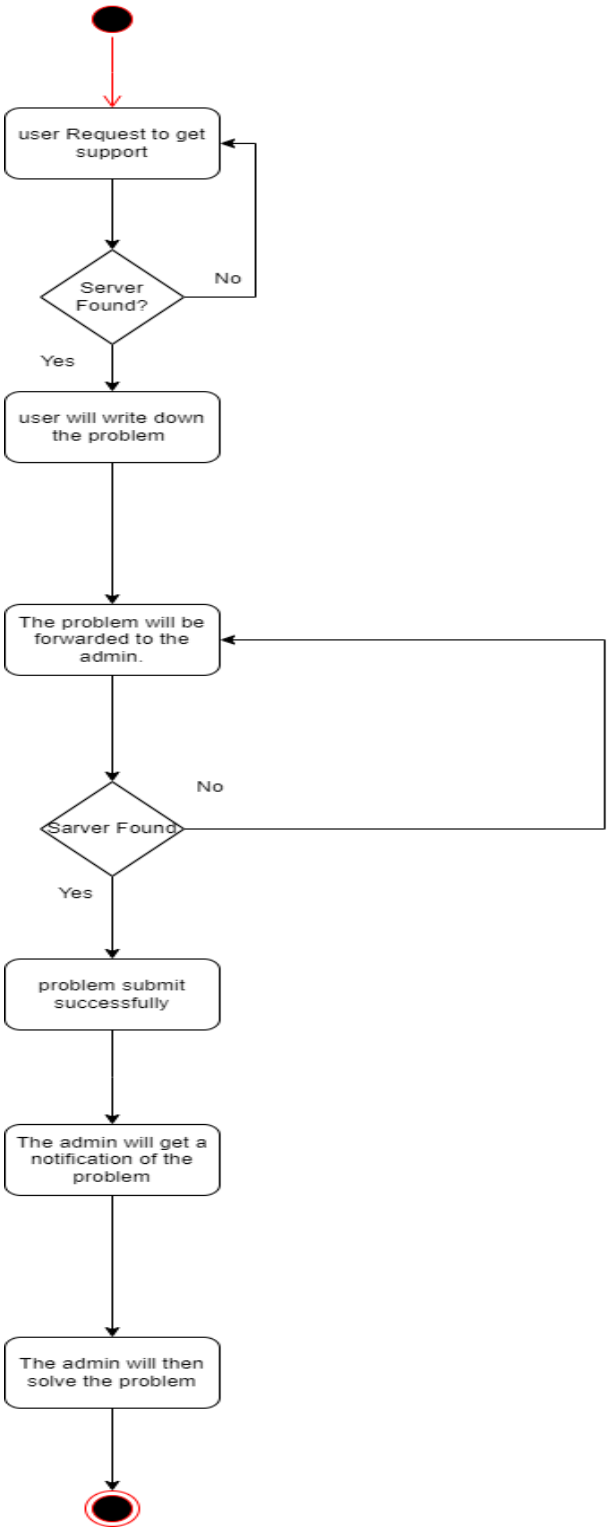


Padma Bridge Toll Management system

Toll Entry:

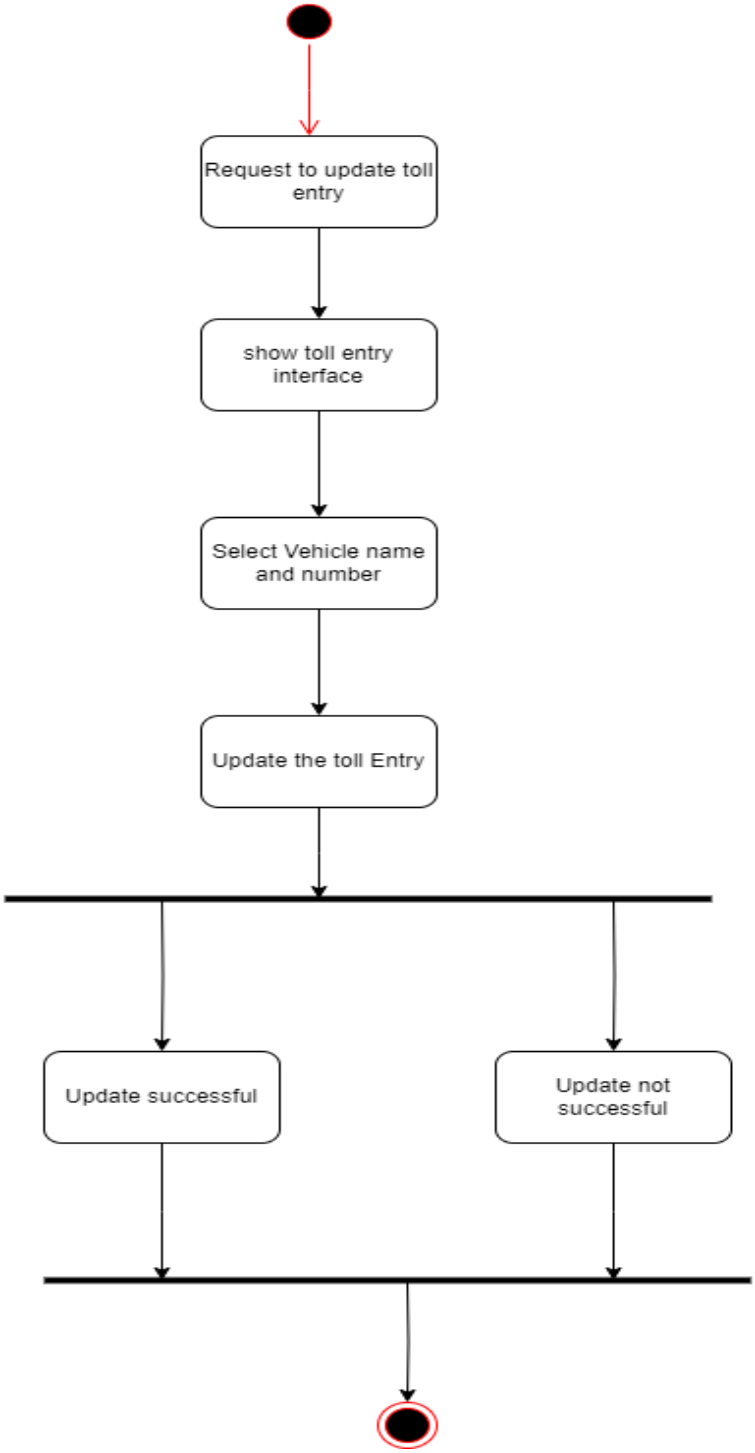


Get Support


user Request to get support
Server Found?
No
Yes
user will write down the problem
The problem will be forwarded to the admin.
Sarver Found
No
Yes
problem submit successfully
The admin will get a notification of the problem
The admin will then solve the problem

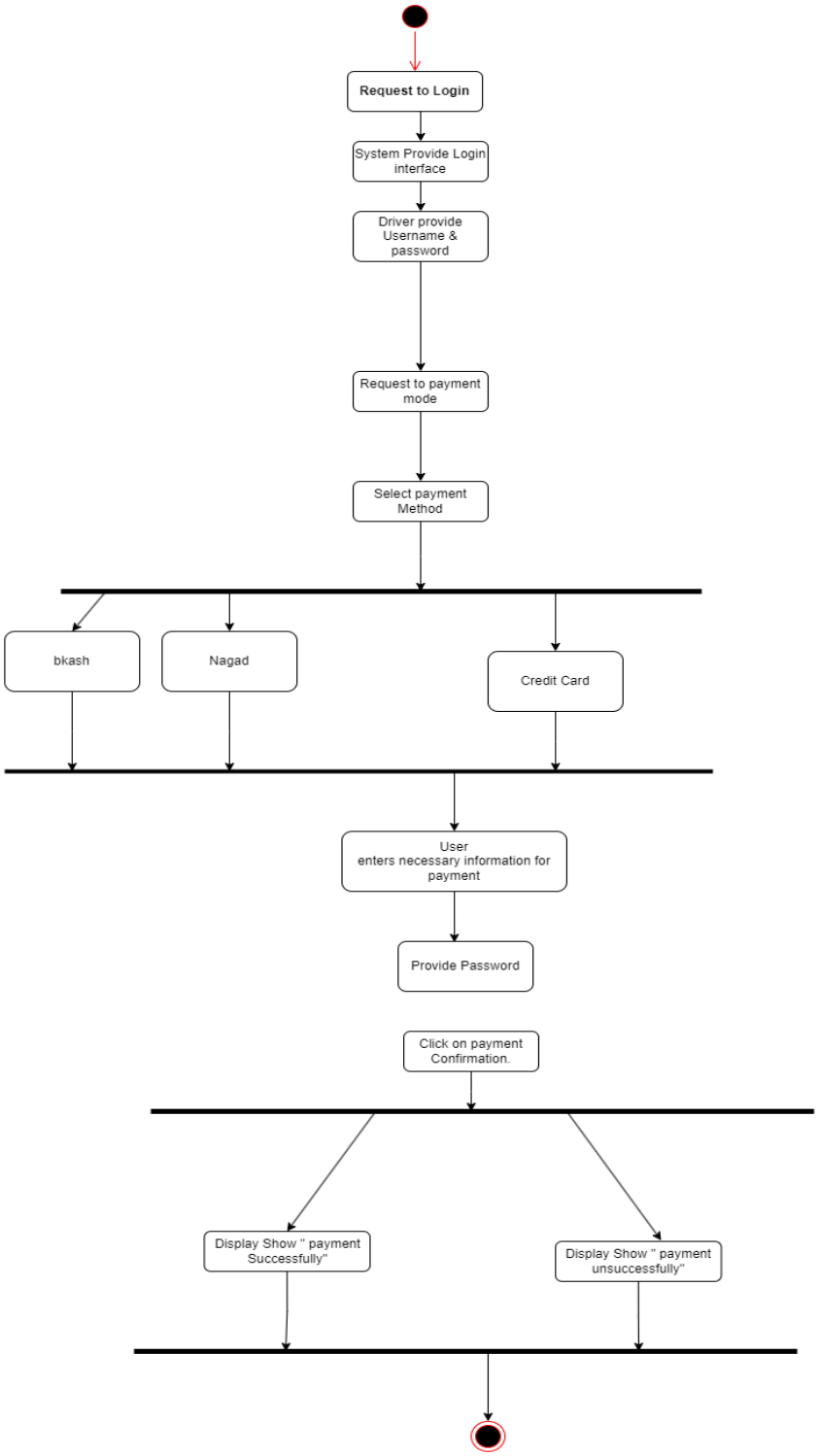
State Diagram

Update Toll Entry

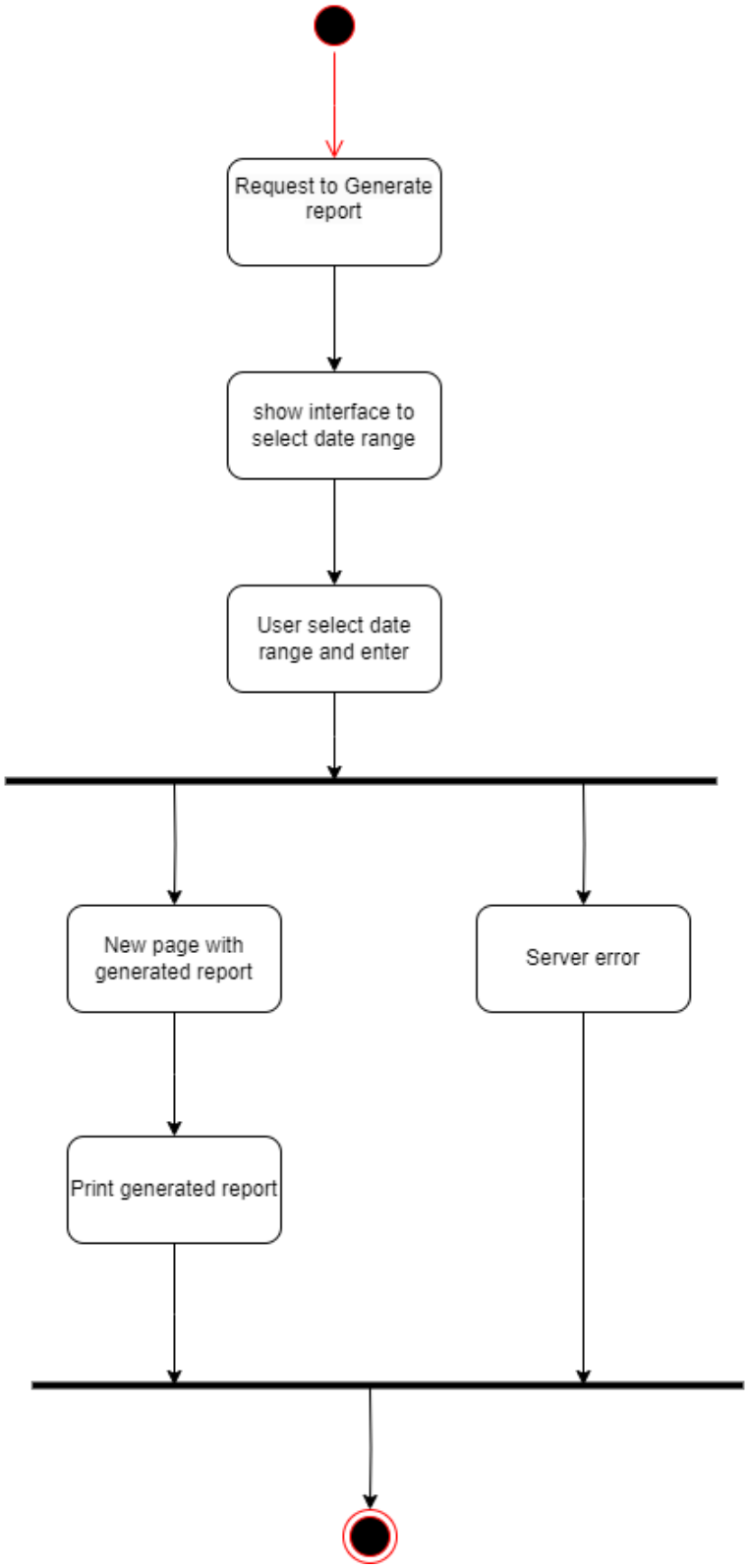


Padma Bridge Toll Management system

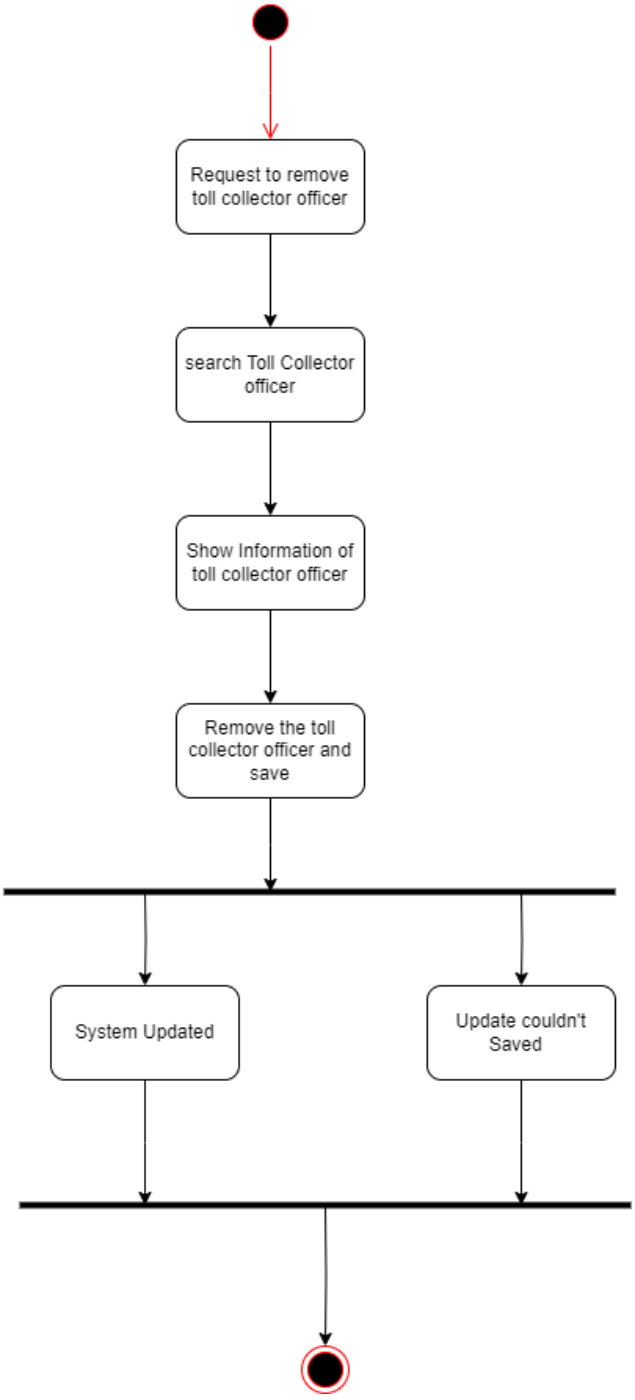
Toll Payment



Generate Report

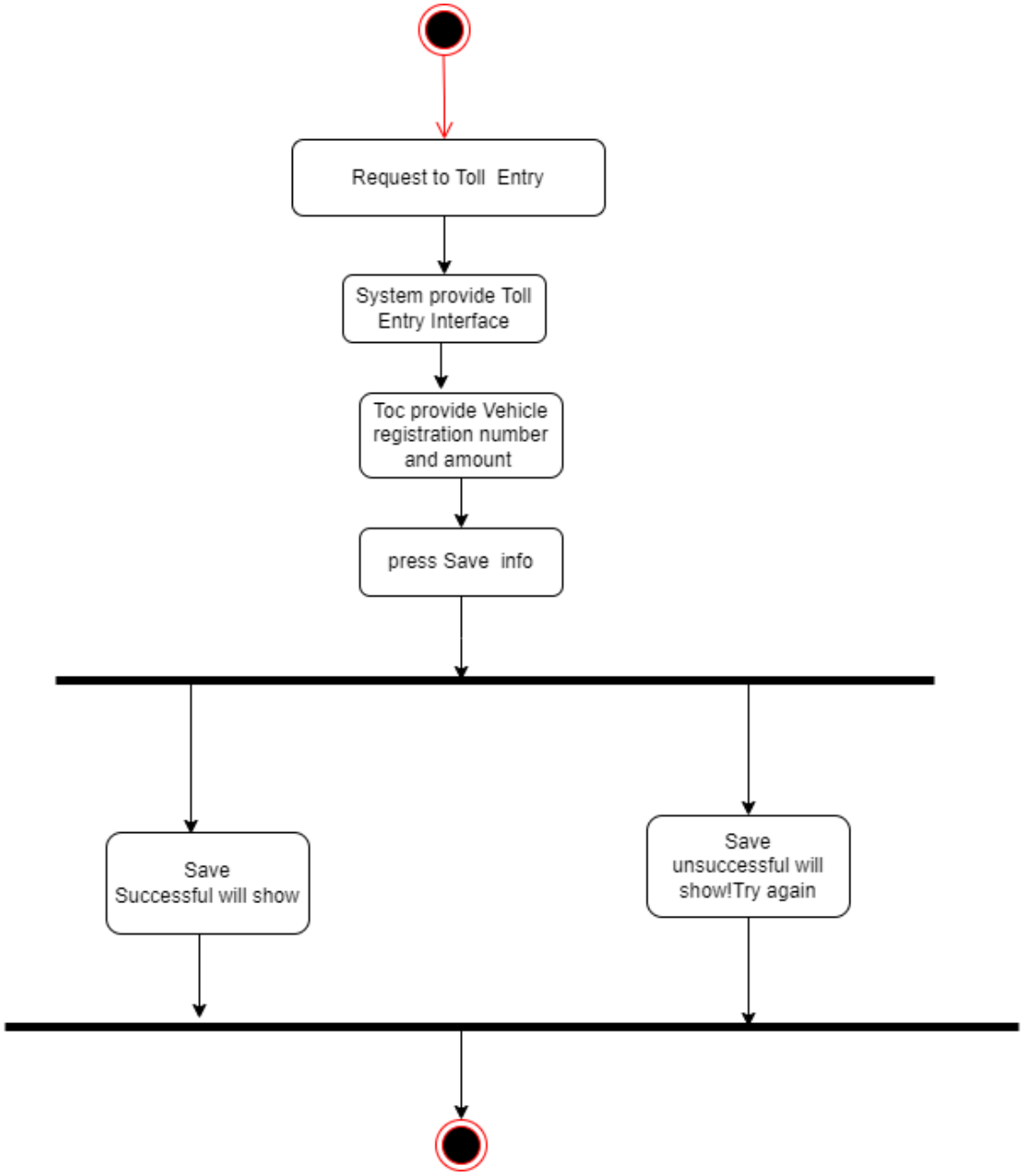


Remove Toll Collector Officer

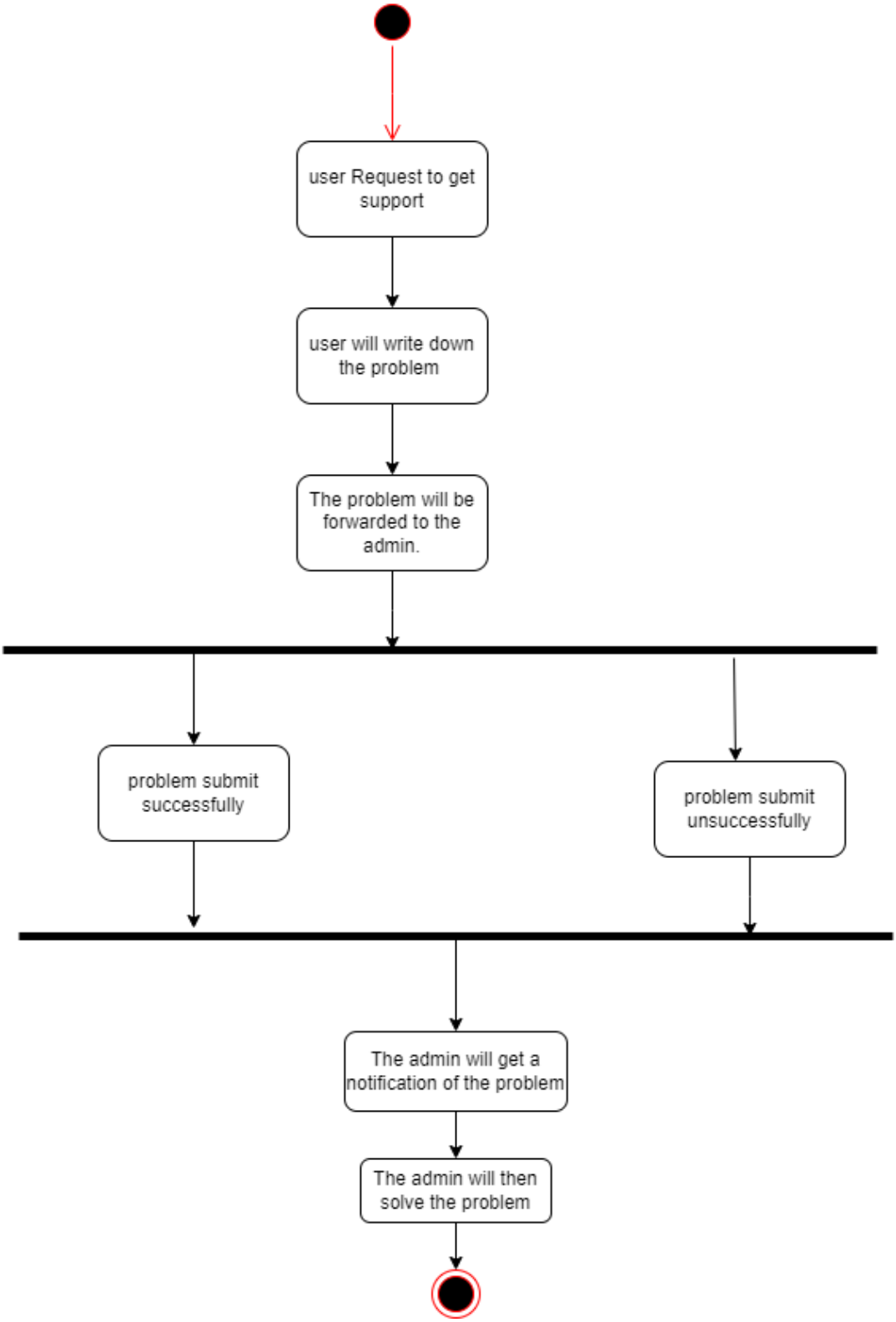


Padma Bridge Toll Management system

Toll Entry

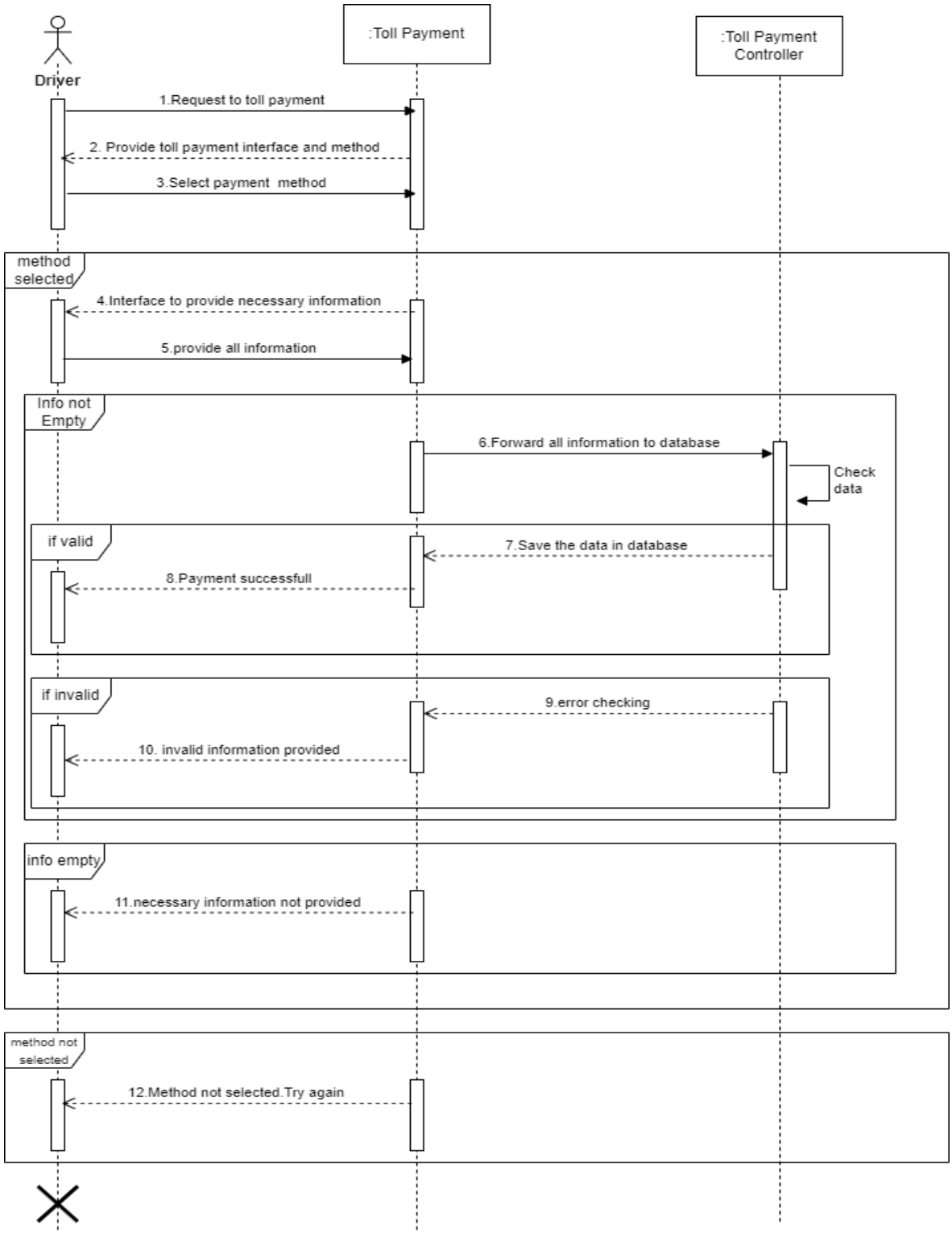


Get Support


user Request to get support
user will write down the problem
The problem will be forwarded to the admin.
problem submit successfully
problem submit unsuccessfully
The admin will get a notification of the problem
The admin will then solve the problem

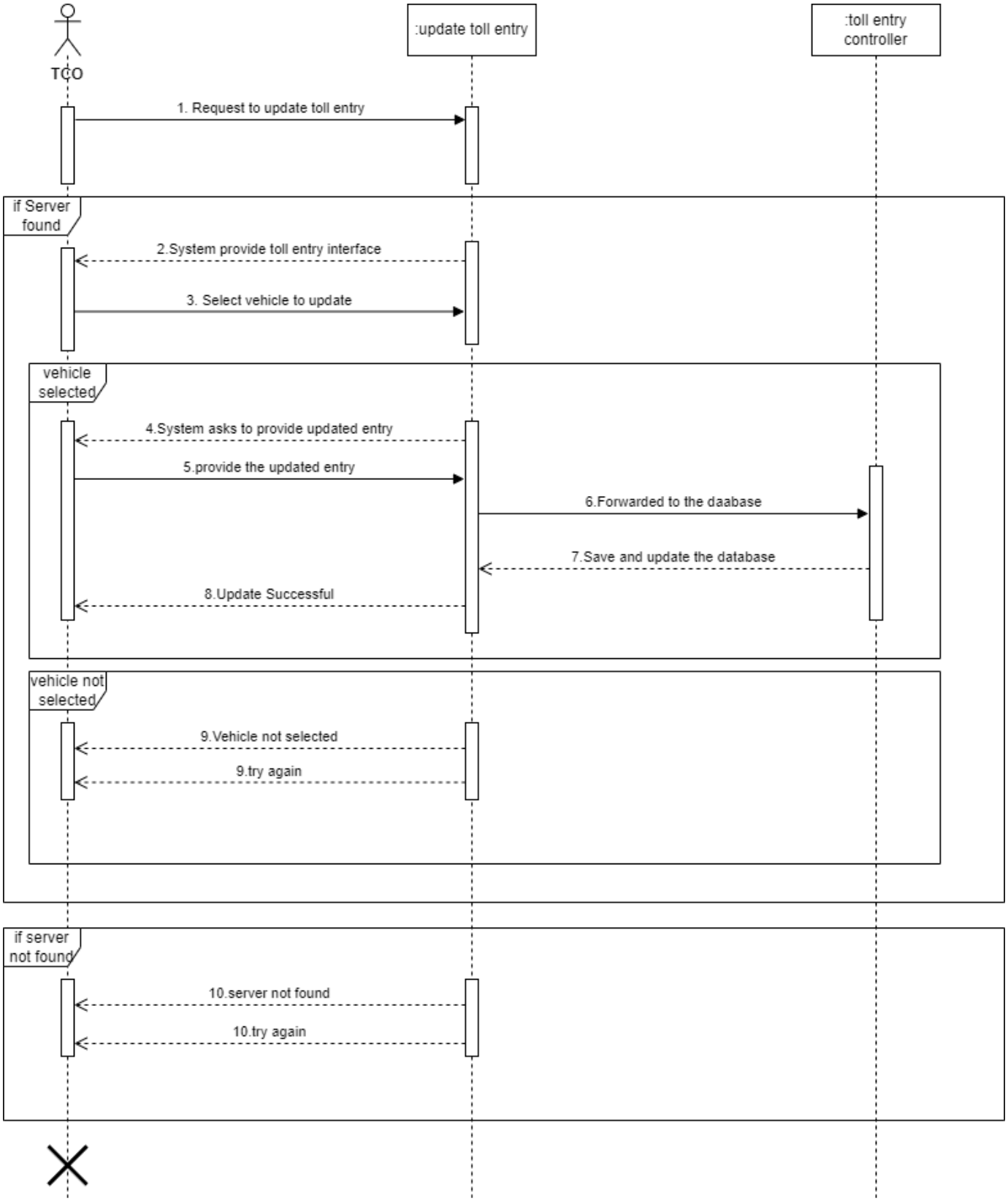
Sequence Diagram

Toll Payment

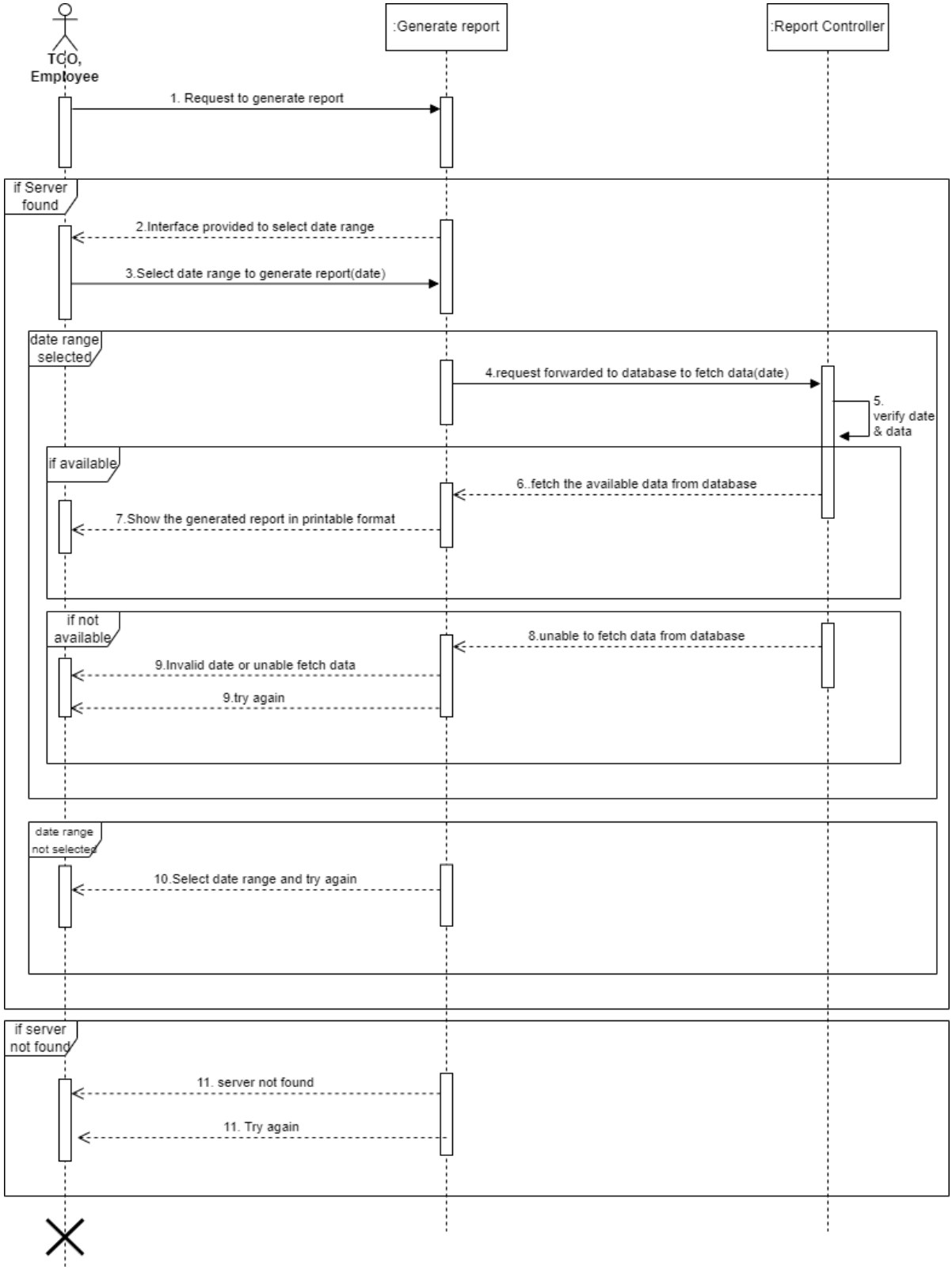


Padma Bridge Toll Management system

Update Toll Entry

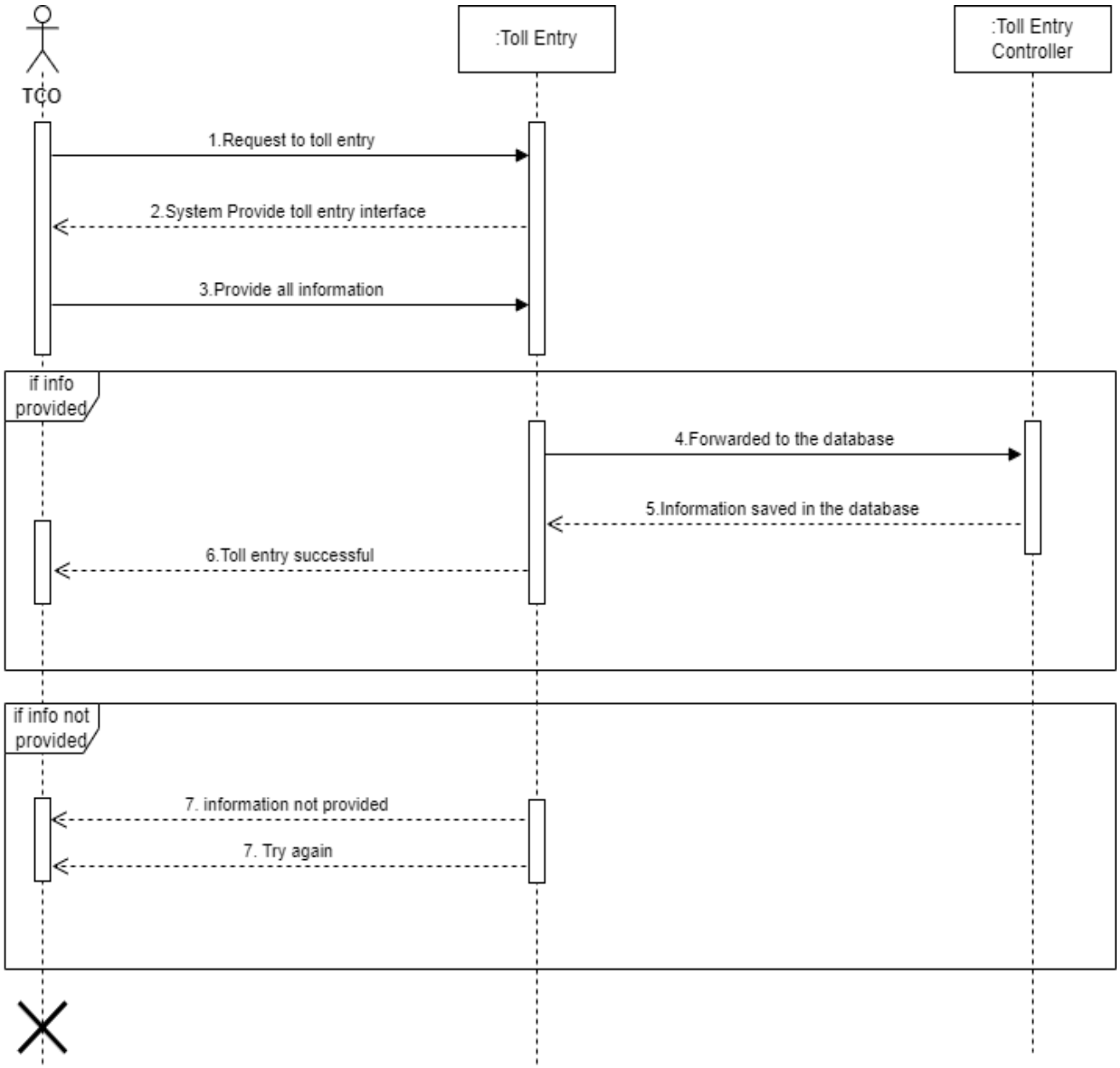


Generate Report



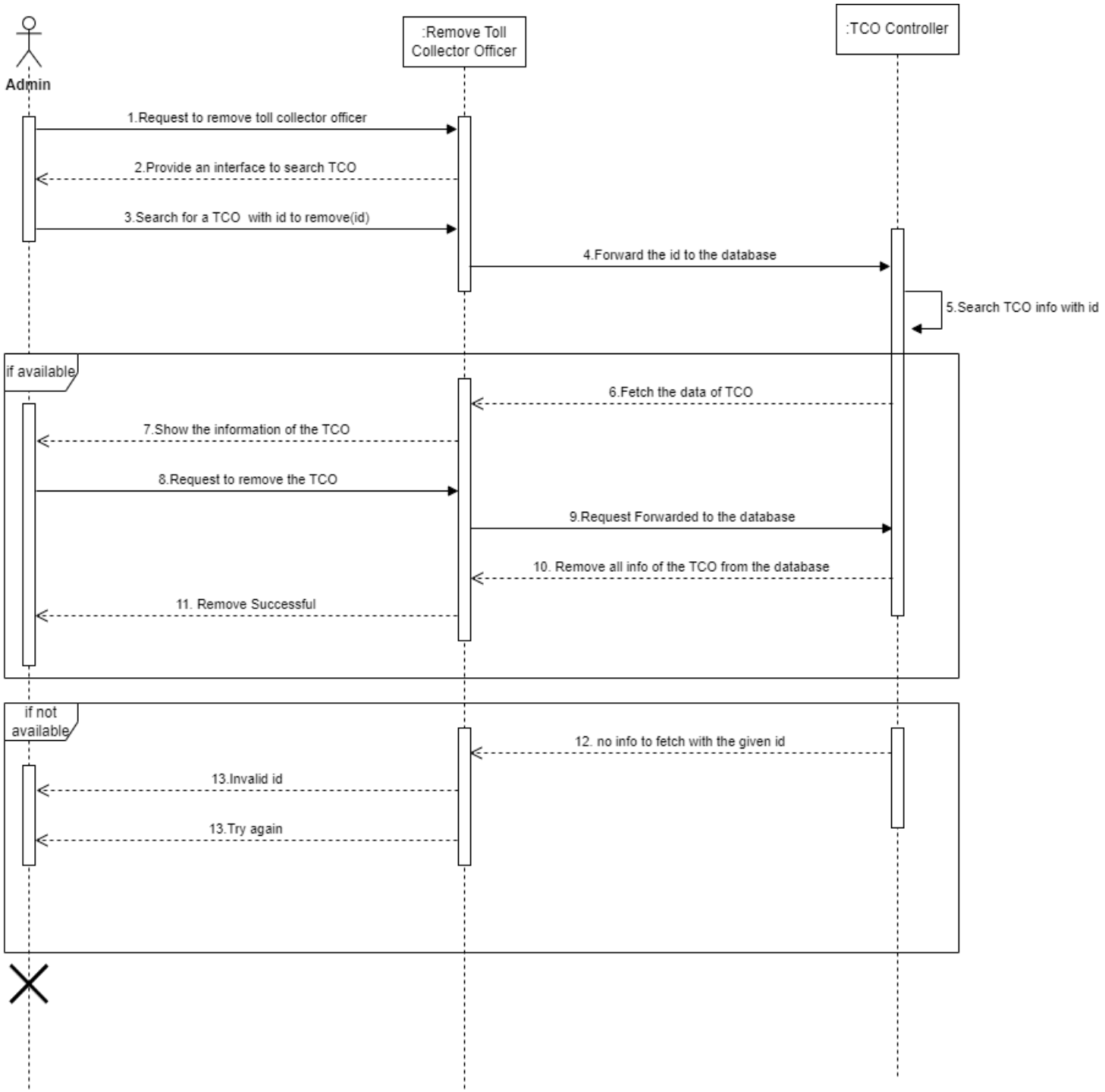
Padma Bridge Toll Management system

Toll Entry



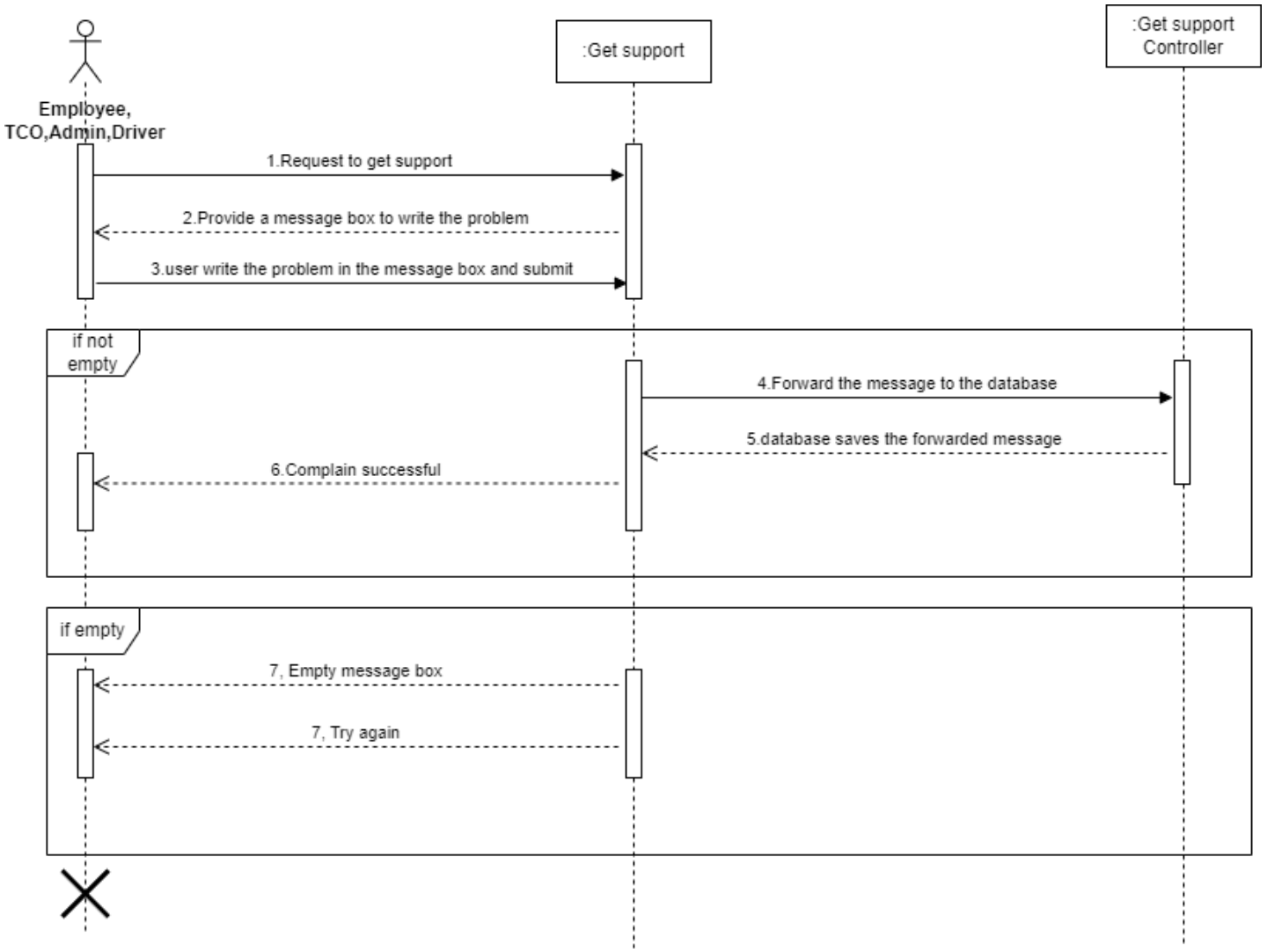
Padma Bridge Toll Management system

Remove Toll Collector Officer



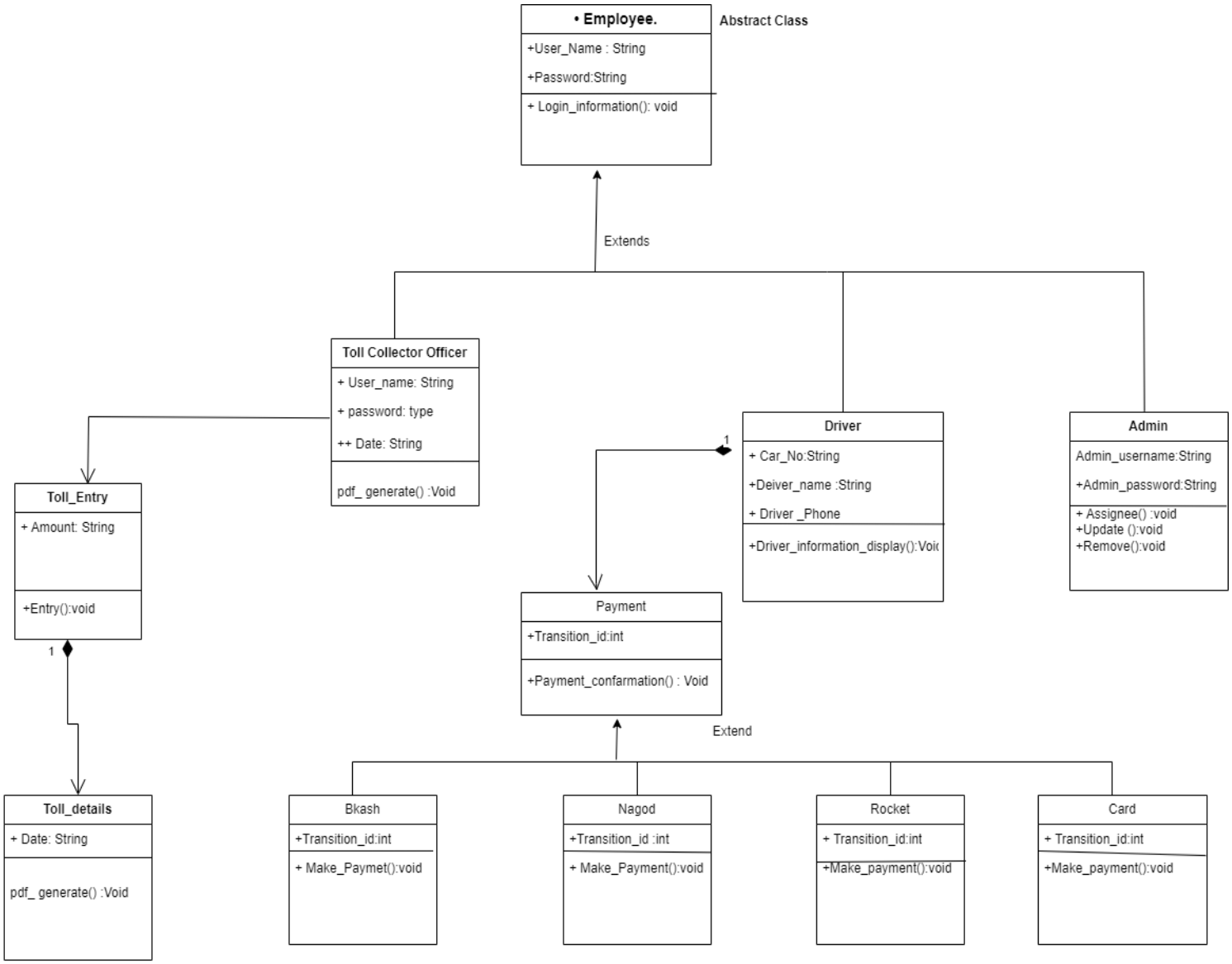
Padma Bridge Toll Management system

Get Support



Padma Bridge Toll Management system

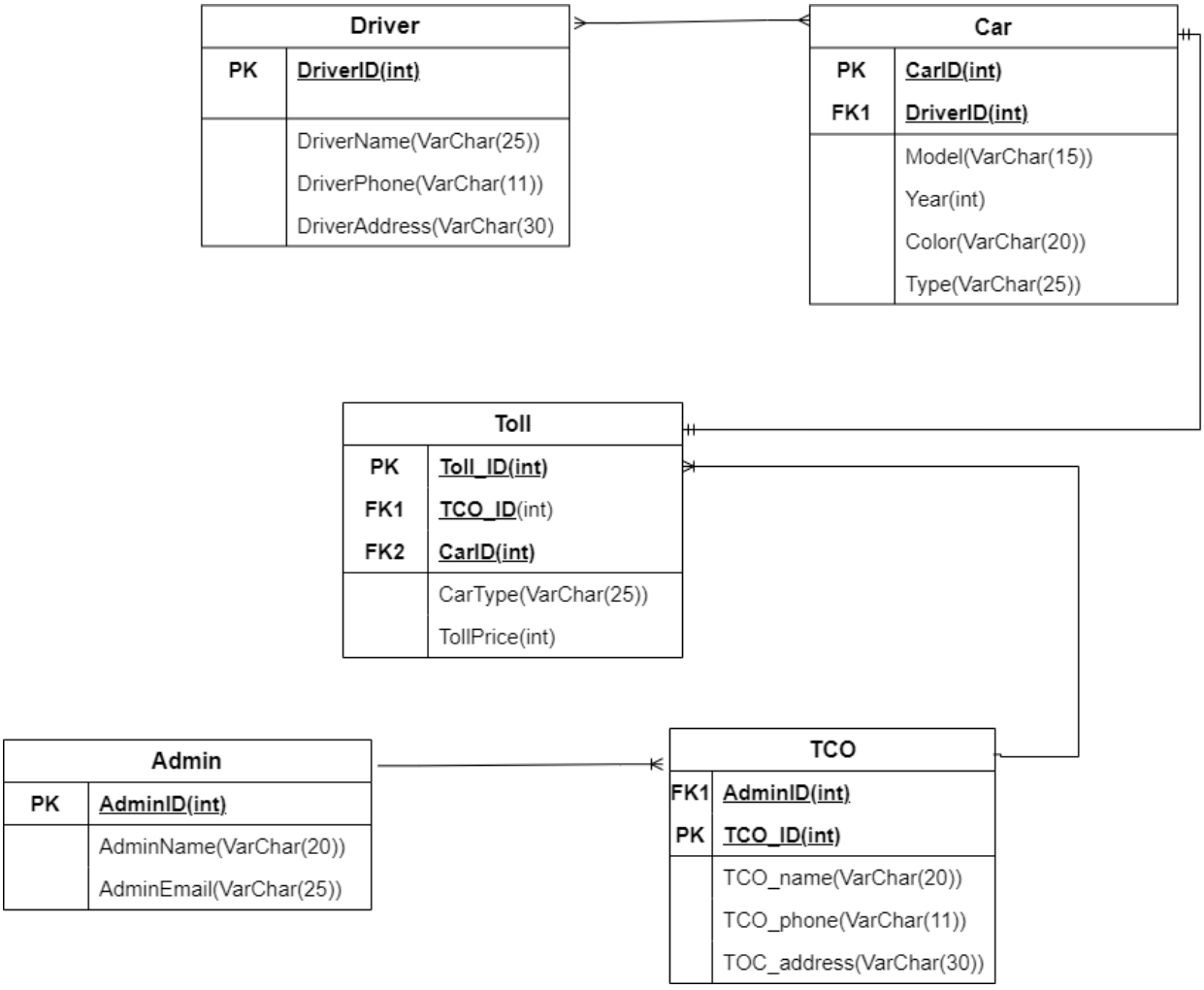
Class Diagram



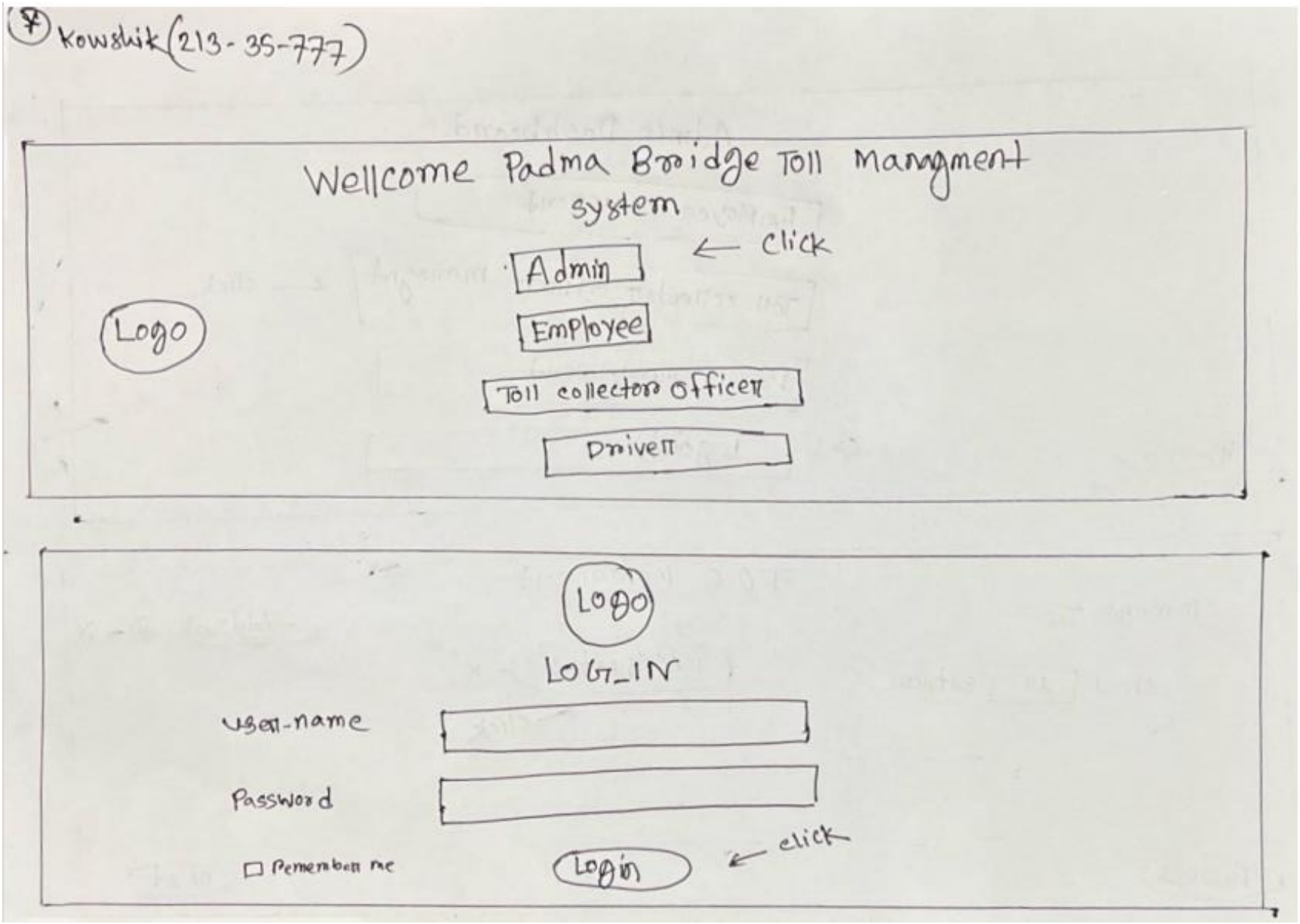
Link - https://drive.google.com/file/d/1DLsHF3jNW2WPl9UwhJr3Wma8s6RcaUmU/view?usp=sharing

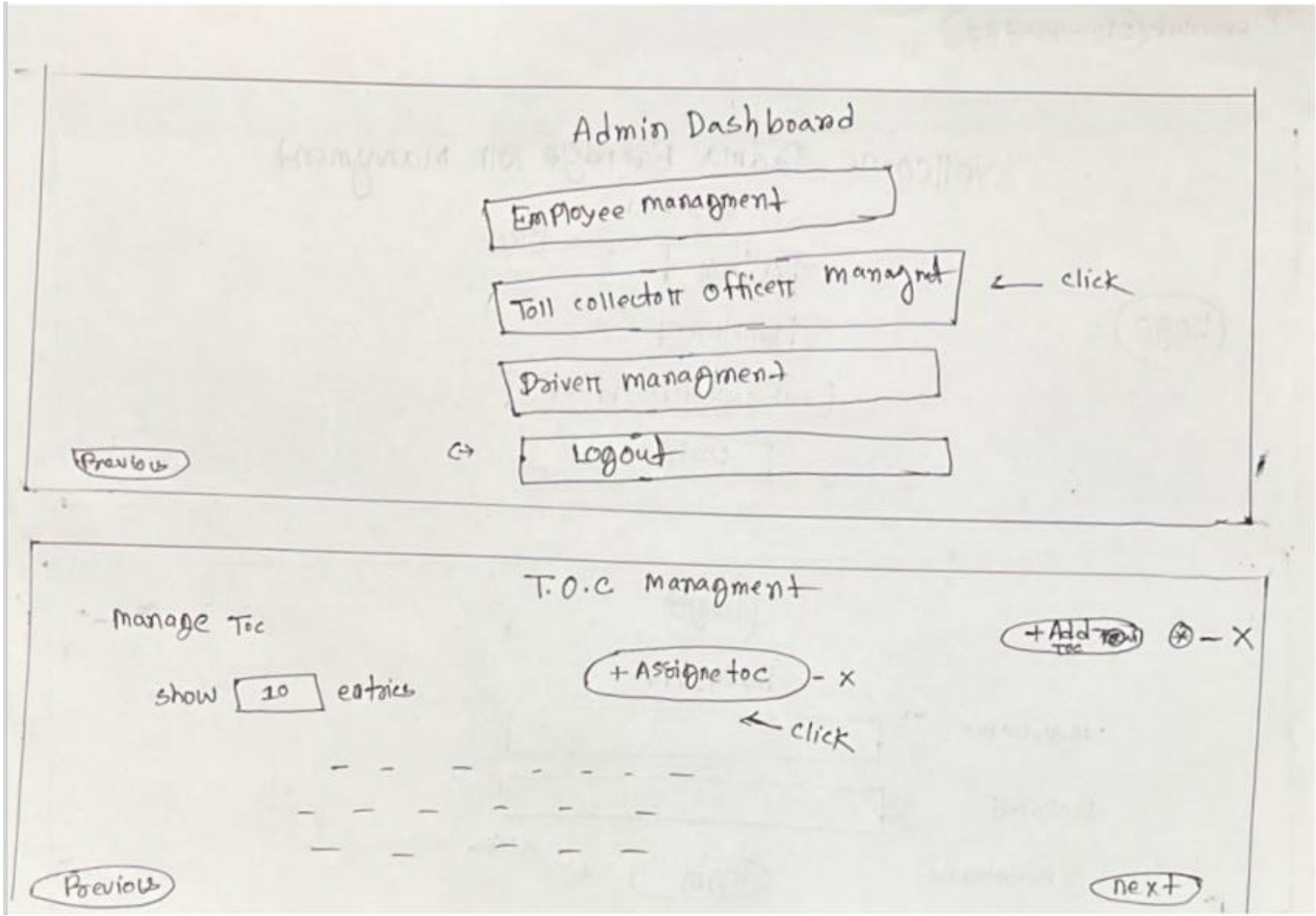
Padma Bridge Toll Management system

Entity Relationship Diagram (ERD)



Link - https://app.diagrams.net/#G16H2rnpczP9PYoYlXQGJjL-Dez2LRPwnT


Kowshik (213-35-777)
Wellcome Padma Bridge Toll Managment system
Admin
click
Logo
Employee
Toll collector officer
Driver
Logo
LOG_IN
User-name
Password
Remember me
Login
click


Admin Dashboard
Employee managment
Toll collector officers managment
click
Driver managment
Logout
Previous
T.O.C managment
manage Toc
+ Add Toc
show 10 entries
+ Assign toc
click
Previous
next

Padma Bridge Toll Management system

-End-