American International University-Bangladesh

Course: Software Engineering

Section: E

Course Faculty: Dr. S.M. HASAN Mahmud

Group-7

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Project: Padma Bridge Automated Toll Software.

Title: Padma Bridge Automated Toll Software.

Background: Traffic Congestion one of the most disturbing aspect of Bangladesh. Government is trying their best to solve it. Aiming that they have built many bridges, bypass road, high ways , express way and looking forward to get more solutions. But the thing is the huge amount of people and for their traveling here to there they need ample amount of transportation.

This tremendous amount of transportations, vehicle, motor bike all together made road more busy. The Padma Bridge was a dream project to make the travel more comfortable and easy. The tolling system of the Padma bridge is still manual which eventually creates traffic jam.

The Padma Bridge Automated Toll Software offers a comprehensive solution to these problems by providing a minimum time usage without taking any confusion about fare information. In addition, the software offers an easy and convenient way of tolling without wasting any time in the toll center for purchasing tickets, reducing wait times, and improving the overall efficiency.

Problem Scenario:

- The traffic that is made up in front of the toll center is one kind of a hustle .
- To reduce the hustle we need upgrade the tolling system from manual to automated.
- This automatic system will not stop any car in front of the toll center.
- The system will detect the vehicle and the information about the car will be automatically generated.

Objective: The tolling system takes much more time to collect the money and it it difficult to control the huge amount of transports to maintain. Also, managing the money is sometimes gets difficult. A automated software will directly get the information about the car, the car owner and it will directly connected to the owners bank account and the toll money will be deducted from his account.

- To reduce the traffic.
- To minimal the time wastage.
- To conduct direct transactions.
- To make their journeys more efficient and convenient.

Solution: The Padma Bridge Automated Toll Software offers a comprehensive solution to these problems by providing a minimum time usage without taking any confusion about fare information. In addition, the software offers an easy and convenient way of tolling without wasting any time in the toll center for purchasing tickets, reducing wait times, and improving the overall efficiency.

The Software will be developed using Blockchain technology and Cloud storage. The Software will be developed for web application platform ensuring limited accessibility for users. No need to think about the payment method as it is automatically been deducted directly from the account.

This automated toll software will use the number plate information of the vehicle and the owners information. This information will match with the owner's bank account and the toll money will be deducted directly from the account. The process we will use is simply blockchain technology. This block chain technology is already in use of banks so the bank, government and the owner of the vehicle will only be connected . No other user or man power is needed to use here. After deducting the money the owner will get a message from combining the government and the bank .

Target Audience: This software will help all the car, bus , vehicle driver to drive their car on and on. No need to stop at the toll center. The owners need not to bother of the toll money. The bank will manage and easily deduct the toll money. Government will directly get the toll money through transaction.

Main Functionality:

- User don't need to stop the car.
- The censor will detect and save the car number.
- Number will automatically saved and showed in the database.
- Through database the user information will go and match with the bank account.
- Toll money for the vehicle will be deducted from account.
- User will get a massage from the bank consisting the deduction information.
- As we are using the Blockchain technology the transaction will be safe.
- Cloud storage will save every transactional data for every individual vehicle**.**

Blockchain: A blockchain is a distributed database or ledger that is shared among the nodes of a computer network. As a database, a blockchain stores information electronically in digital format. For maintaining a secure and decentralized record of transactions. The innovation with a blockchain is that it guarantees the fidelity and security of a record of data and generates trust without the need for a trusted third party.

Cloud storage: Cloud storage is a cloud computing model that enables storing data and files on the internet through a cloud computing provider that you access either through the public internet or a dedicated private network connection. The provider securely stores, manages, and maintains the storage servers, infrastructure, and network to ensure you have access to the data when you need it at virtually unlimited scale, and with elastic capacity. Cloud storage removes the need to buy and manage your own data storage infrastructure, giving you agility, scalability, and durability, with anytime, anywhere data access.

Project Life Cycle: The waterfall model is a classical model used in system development life cycle to create a system with a linear and sequential approach. It is termed as waterfall because the model develops systematically from one phase to another in downward fashion. The waterfall approach does not define the process to go back to the previous phase to handle changes in requirement. The waterfall approach is the earliest approach that was used for software development.

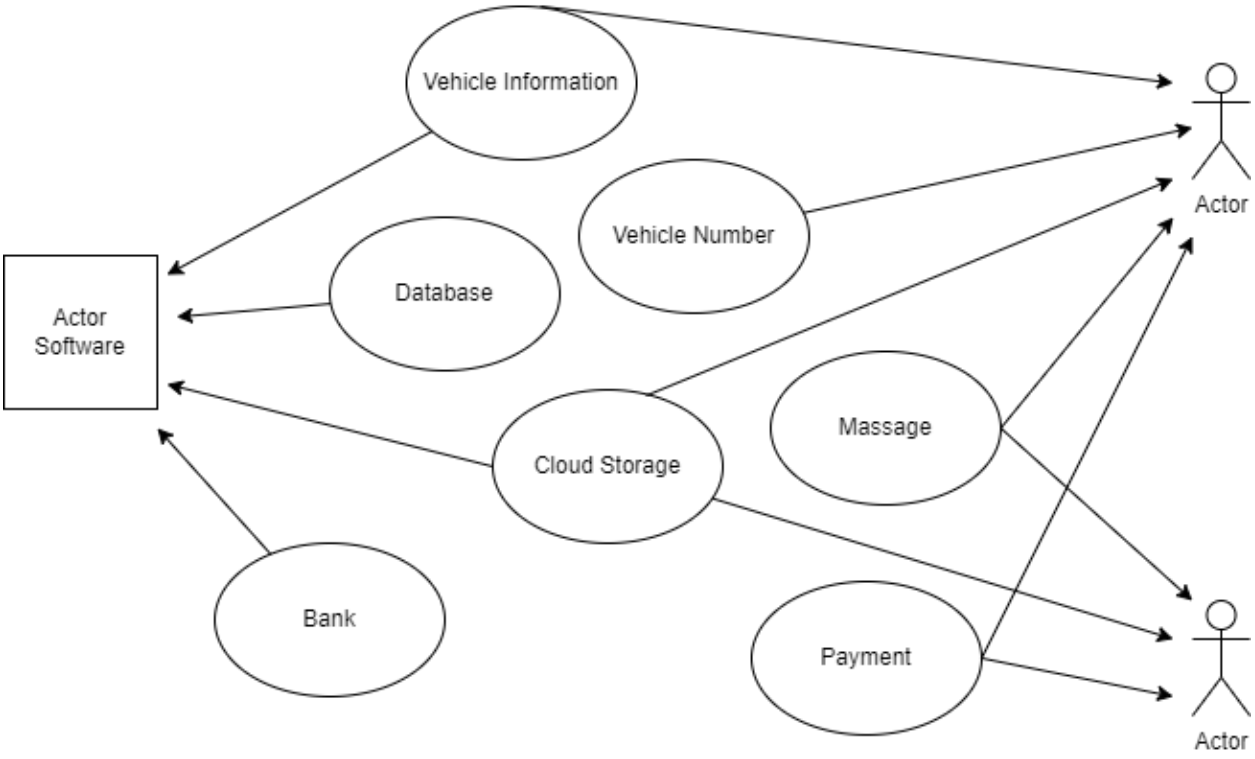


Fig-1 User Class

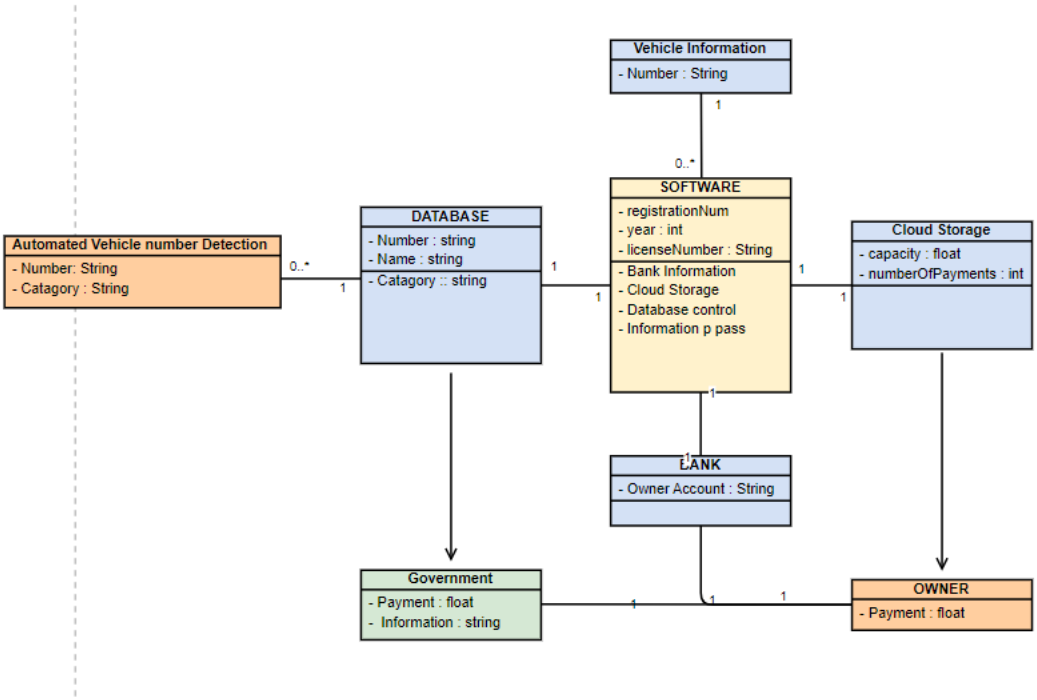


Fig-2 Class Diagram

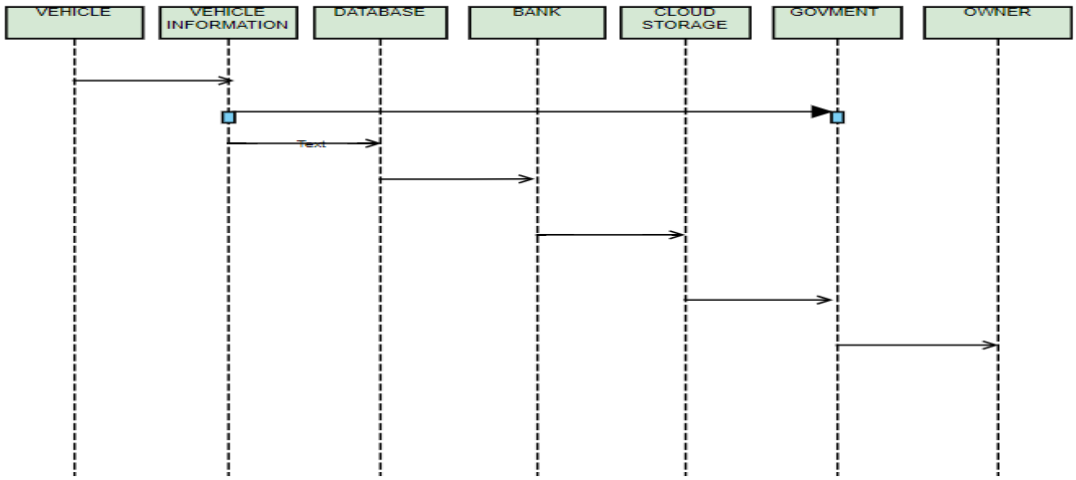


Fig 3- Sequence Diagram

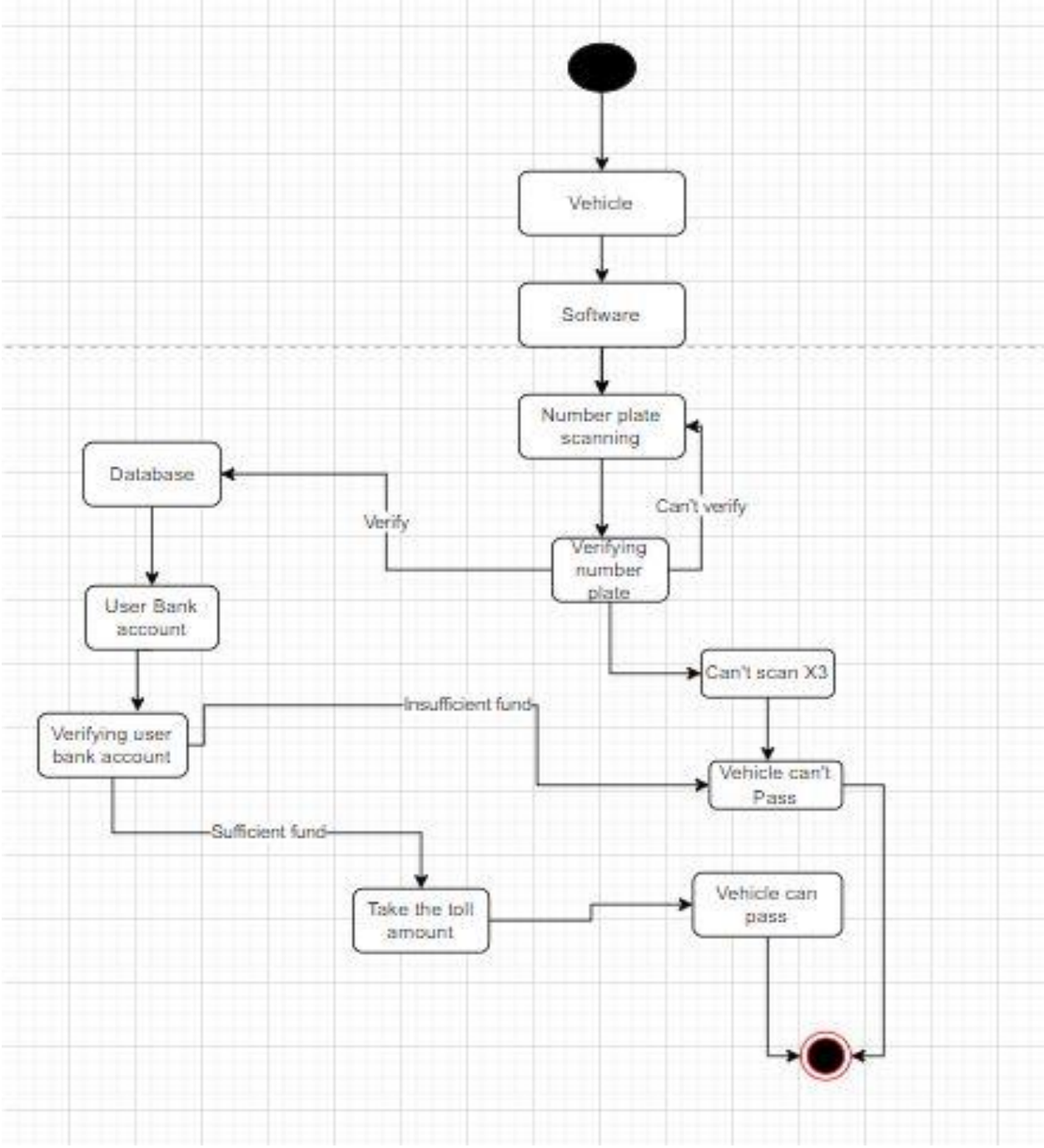


Fig 4 – State chart Diagram

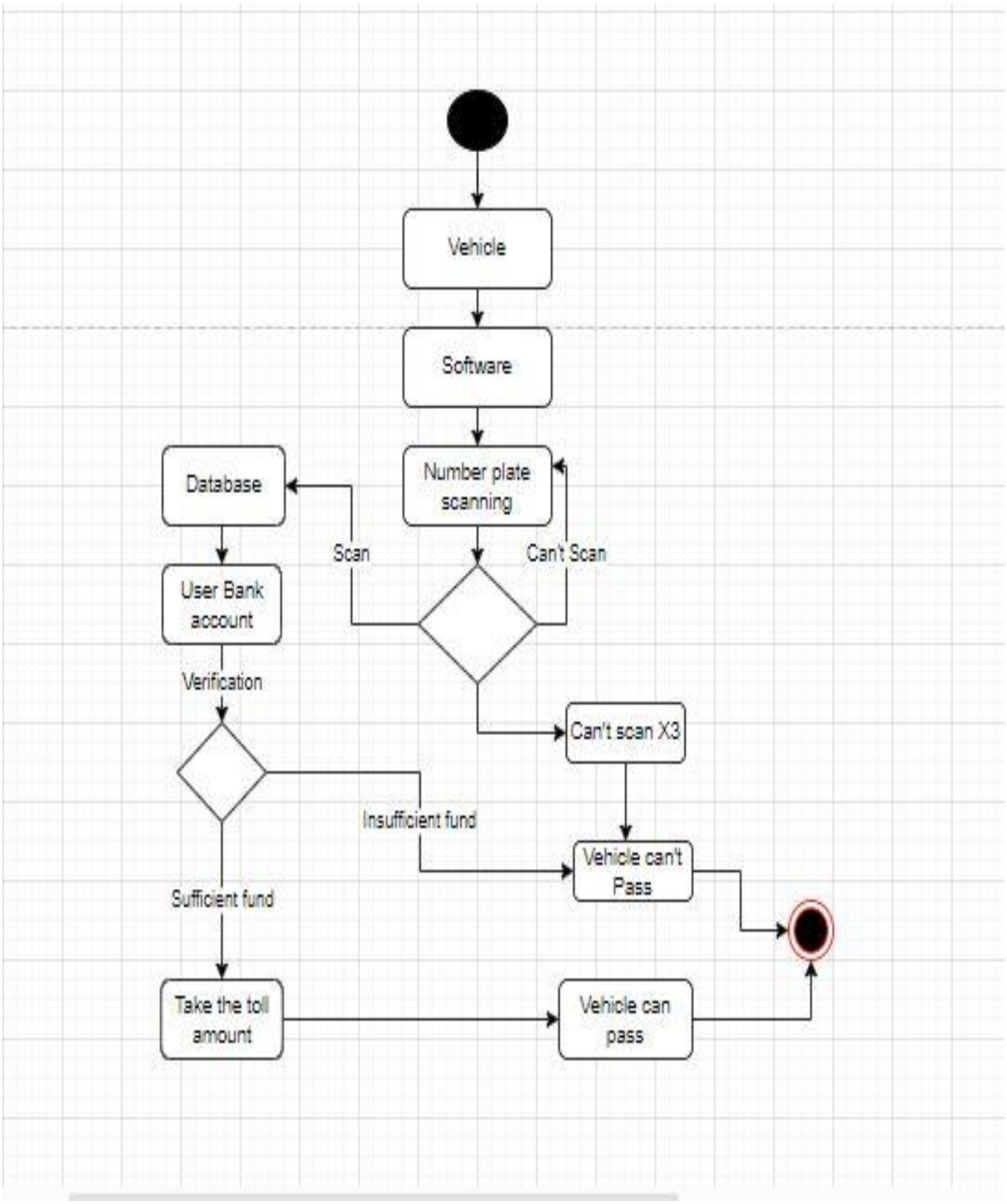


Fig 5- Activity Diagram

Process Model:

The Component-based development model uses object-oriented technologies. In object-oriented technologies, the emphasis is on the creation of components required to build application. components required to build application are the entities that encapsulate data and algorithms. In component-based architecture components required to build application can be uses as reusable components. This model uses various characteristics of spiral model. This model is evolutionary by nature. Hence, software development can be done using iterative approach. The model works in following manner

- First identify all the required candidate components. components required to build application with the help of application data and algorithms.
- If these candidate components are used in previous software projects then they must be present in the library.
- Such preexisting components can be excited from the library and used for further development.
- But if the required component is not present in the library then build or create the component as per requirement.
- Place this newly created component in the library. This makes one iteration of the system.
- Repeat steps 1 to 5 for creating n iterations, where n denotes the number of iterations required to develop the complete application.

Why we Choose Component Based Development Model:

- Save time and money when building large and complex systems: Developing complex software systems with the help of off-the-shelf components helps reduce software development time substantially. Function points or similar techniques can be used to verify the affordability of the existing method.

- Enhance the software quality: The component quality is the key factor behind the enhancement of software quality.

- Detect defects within the systems: The CBD strategy supports fault detection by testing the components; however, finding the source of defects is challenging in CBD.
- Some advantages of CBD include:

  Minimized delivery: Search in component catalogs. Recycling of pre-fabricated components

- Improved efficiency: Developers concentrate on application development

- Improved quality: Component developers can permit additional time to ensure quality. Minimized expenditures

Advantages:

Ease of deployment − As new compatible versions become available, it is easier to replace existing versions with no impact on the other components or the system as a whole.

Reduced cost − The use of third-party components allows you to spread the cost of development and maintenance.

Ease of development − Components implement well-known interfaces to provide defined functionality, allowing development without impacting other parts of the system.

Reusable − The use of reusable components means that they can be used to spread the development and maintenance cost across several applications or systems.

Modification of technical complexity − A component modifies the complexity through the use of a component container and its services.

Reliability − The overall system reliability increases since the reliability of each individual component enhances the reliability of the whole system via reuse.

System maintenance and evolution − Easy to change and update the implementation without affecting the rest of the system.

Independent − Independency and flexible connectivity of components. Independent development of components by different group in parallel. Productivity for the software development and future software development.

Functional Requirements:

1. Login Functional requirements:

1.The software shall allow users to login with their given username and password.

2. The login credentials(username and password) will be verified with database records.

3. If the login successful the home page of the user account will be displayed.

4. If the username and password has been inserted wrong, the random verification code will be generated and sent to the user's email address by the system to retry login.

2. Technology Used:

1. For better and safer transaction we will be using Blockchain technology. Which eventually help the government, owner , bank to deduct, transact and have the correct transaction history.

2. To store the data of every vehicle passing through will be stored in cloud storage. As it will not need a data center to maintain the records and the data will be stored in a cloud way.

3. When a vehicle will be passing through the toll center no car need to stop at the tool center. For new vehicles we will be needed a QR code at the number plate that will be censored will passing through and for the old vehicle they will also use the QR code on their vehicle.

3. Prepare and Deliver Bill:

1. The toll amount will be deducted directly from the bank. The software will make sure the transaction is secure.

2. After deducting the amount one information will go to the cloud storage.

3. The other Information will go to the owner through a massage.

Scanned Number plate

Vehicle Profile

KNOW YOUR RC STATUS

KA[redacted]

Which one is lesser 3 , 4

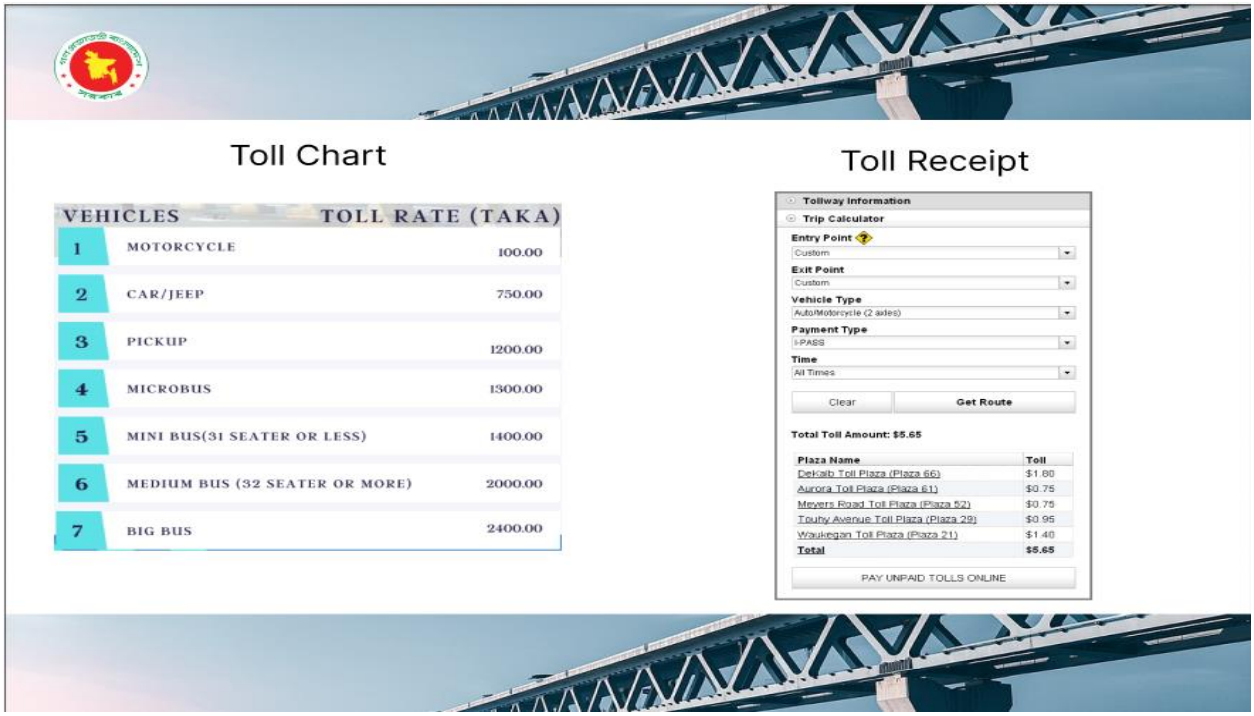
Enter Verification Code

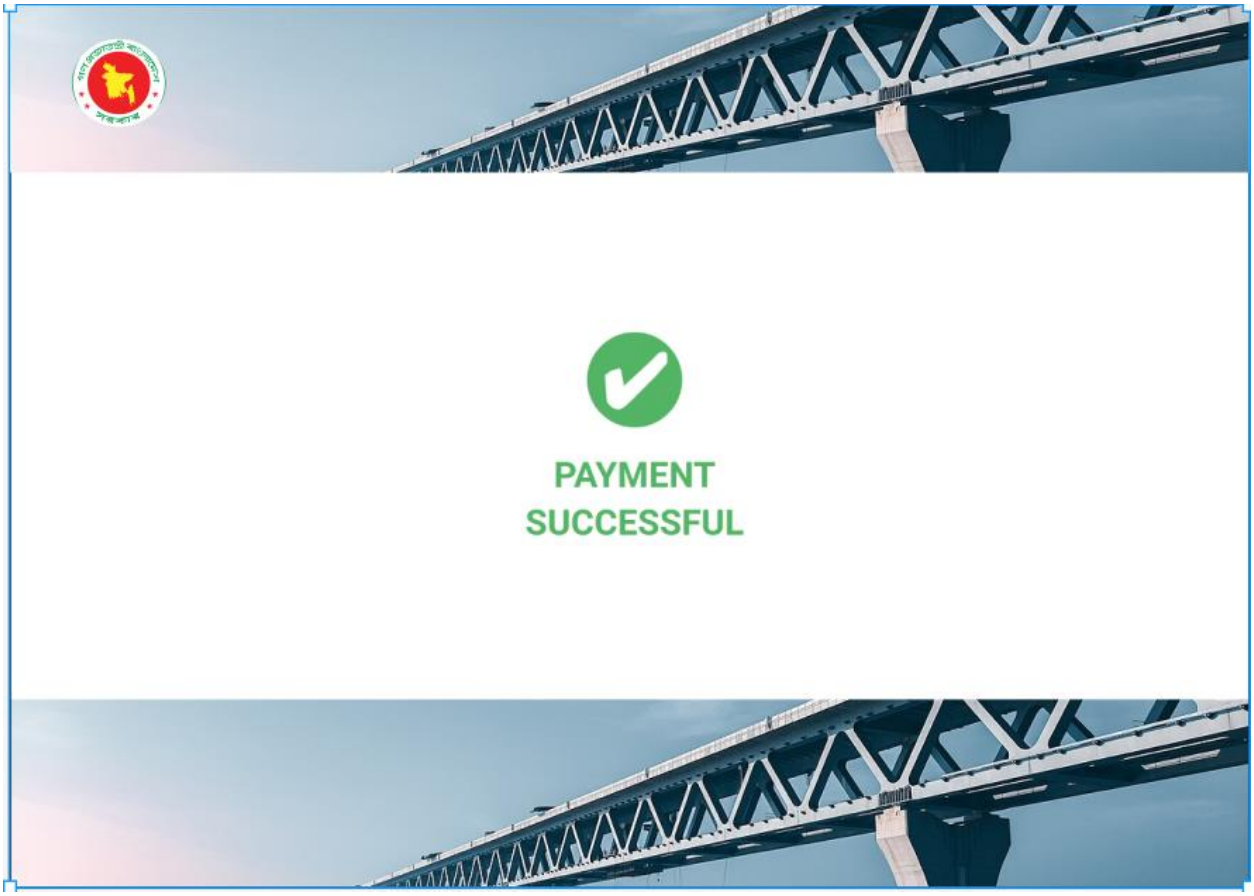
Search Vehicle

Vehicle Details Showing in Registering Authority

1. Registering Authority: BENGALURU SOUTH RTO, Karnataka

Registration No:	KA[redacted]	**Registration Date:**	0[redacted]
Chassis No:	[redacted]	**Engine No:**	J[redacted]
Owner Name:	ALBERT A		
Vehicle Class:	M-Cycle/Scooter(2WN)	**Fuel:**	PETROL
Maker / Model:	HONDA MOTORCYCLE AND SCOOTER INDIA (P) LTD / ACTIVA SCV110E		
Fitness/REGN Upto:	[redacted]	**MV Tax upto:**	LTT
Insurance Upto:	19-Apr-2021	**PUCC Upto:**	NA
Emission norms:	Not Available	**RC Status:**	ACTIVE


Toll Chart
VEHICLES
TOLL RATE (TAKA)
1 MOTORCYCLE 100.00
2 CAR/JEEP 750.00
3 PICKUP 1200.00
4 MICROBUS 1300.00
5 MINI BUS(31 SEATER OR LESS) 1400.00
6 MEDIUM BUS (32 SEATER OR MORE) 2000.00
7 BIG BUS 2400.00
Toll Receipt
Tollway Information
Trip Calculator
Entry Point
Custom
Exit Point
Custom
Vehicle Type
Auto/Motorcycle (2 axles)
Payment Type
I-PASS
Time
All Times
Clear
Get Route
Total Toll Amount: $5.65
Plaza Name
Toll
DeKalb Toll Plaza (Plaza 66) $1.80
Aurora Toll Plaza (Plaza 61) $0.75
Meyers Road Toll Plaza (Plaza 52) $0.75
Touhy Avenue Toll Plaza (Plaza 29) $0.95
Waukegan Toll Plaza (Plaza 21) $1.40
Total $5.65
PAY UNPAID TOLLS ONLINE


PAYMENT
SUCCESSFUL