HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

School of Information and communications technology

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Software Requirement Specification – SRS

Version 1.0

EcoBike Rental

Subject: Software development according to ITSS

ISD.VN.20211-Group2

Vũ Văn Long - 20184146

Trần Xuân Trường - 20184212

Mai Hoàng Minh - 20184151

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1 Introduction

1.1 Objective

The document gives a detailed description of the functionality related to booking, borrowing, and returning cars. Document describing the purpose and features of the system, the interfaces and constraints the system needs to implement in response to external stimuli.

Documentation for stakeholders and software developers.

1.2 Scope

Our application will provide managers with automatic bike rental and return services in dock lots. But in this problem, we will skip the login part and focus on the function related to renting and returning the bike. The goal is to create a fully automated management application that provides customers with the most basic functionalit

A simple way the user after accessing, will see a list of dock lots. After that, users can view information about dock lots and perform bike rental functions through bike codes. After the initial payment process, customers can use the registered bike. Before or during use, customers can also view information about their rented bike such as bike status, battery status. At the end of the usage period, the user will be able to perform the function of returning the bike and making the final payment.

1.3 Glossary

No	Term	Explain	Example	Note
1	**Use case**	Show the interaction between the user and the system, thereby expressing the user's requirements	Rent Bike	Use case performs the bike rental function
2	**Actor**	Only users or external objects interact with the system	Customer, Admin	As a system user
3	**InterBank**	Interbank system, make payments with software.		Is the Actor of the system
4	**Barcode**	an image consisting of a series of parallel black and white lines representing letters, symbols, and numbers	8 712345 670016	used to get bike information

1.4 References

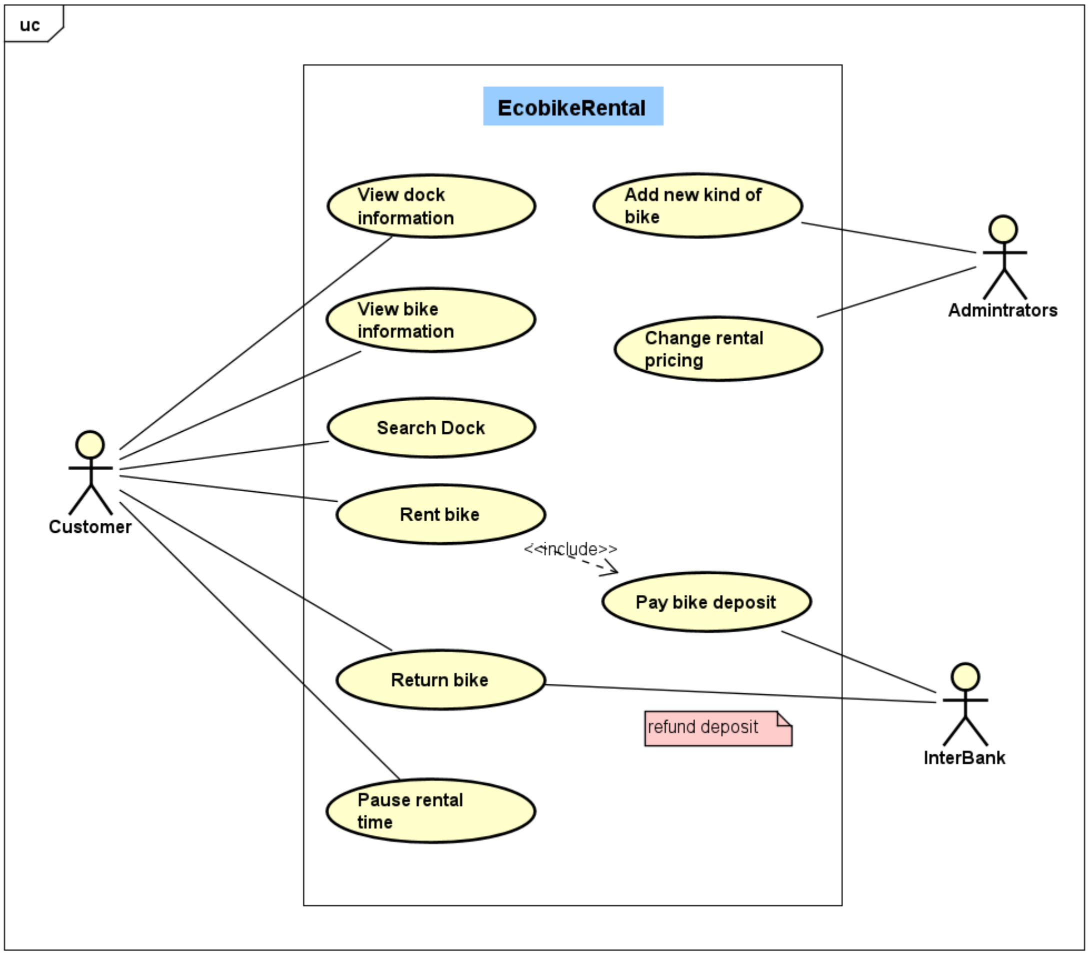
2 Overall Description

2.1 Actors

The software has 3 actors: Customer, Admin and Interbank. Customer will be the main user of the system, interacting with basic functions such as renting and returning bikes. With the Admin actor and related use cases will not be implemented in this document. The Interbank actor will represent the interaction between the system and the bank to perform payment-related work.

2.2 Use case diagrams

Customers when entering the system can see a list of dock lots, to decide to choose which dock lot is appropriate. When booking a bike, customers will choose a bike, view bike information, and finally make a payment (like a deposit when renting a bike). In return bike, the system will simply receive the request, simplify the calculation, and send the goods budget to complete the payment to the customer.



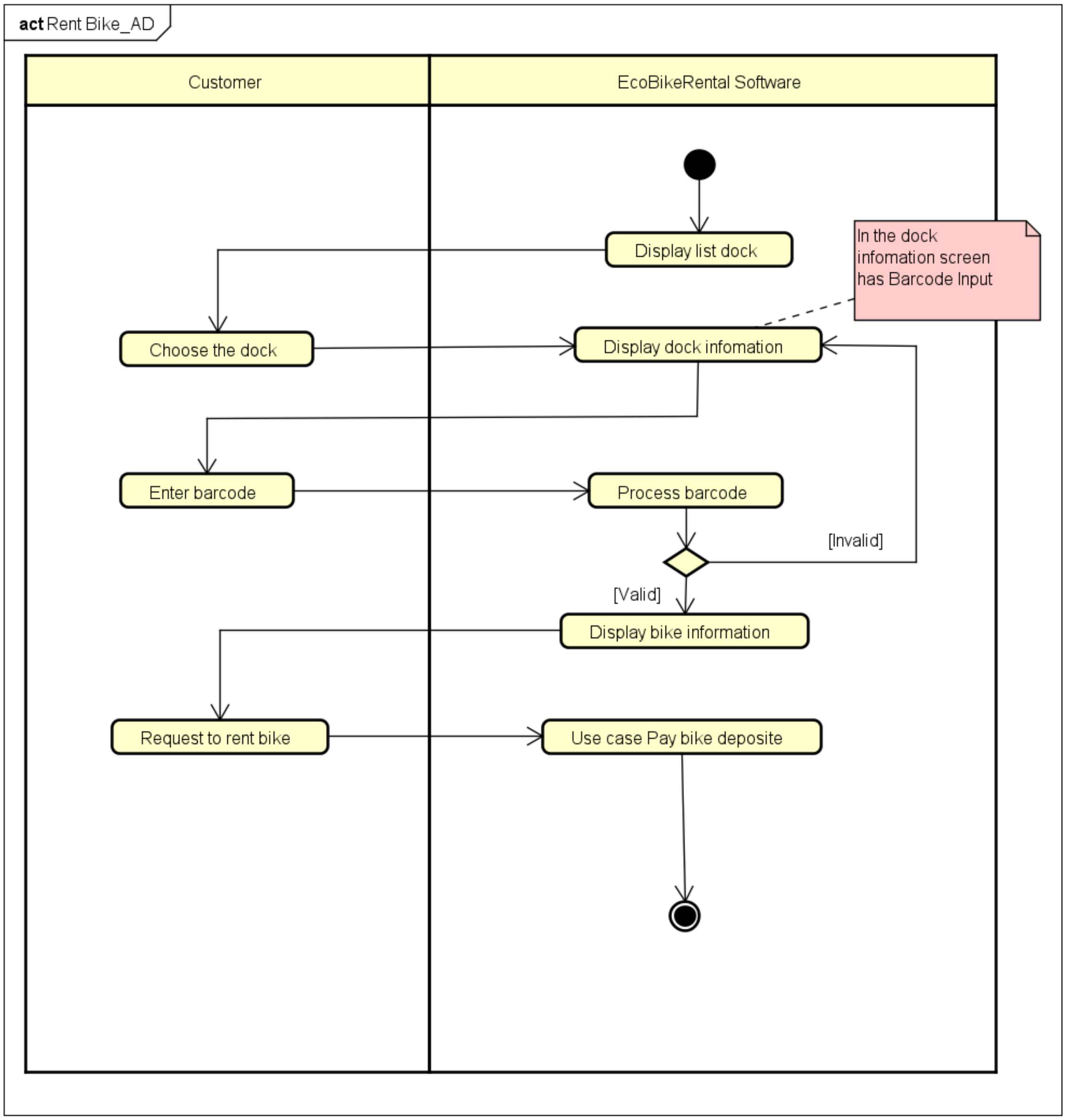
2.3 *Bussiness processes*

In this module, there are 3 main business processes: bike rental process, payment process, bike return process.

Details of the actions in these processes are modeled in the subsections of each process.

2.3.1 Bike rental process

The system will display a form to enter the bike code to rent on the screen. After the customer has finished entering, the system will process the entered information, successful, it will take the customer to the bike information, to continue the payment process.

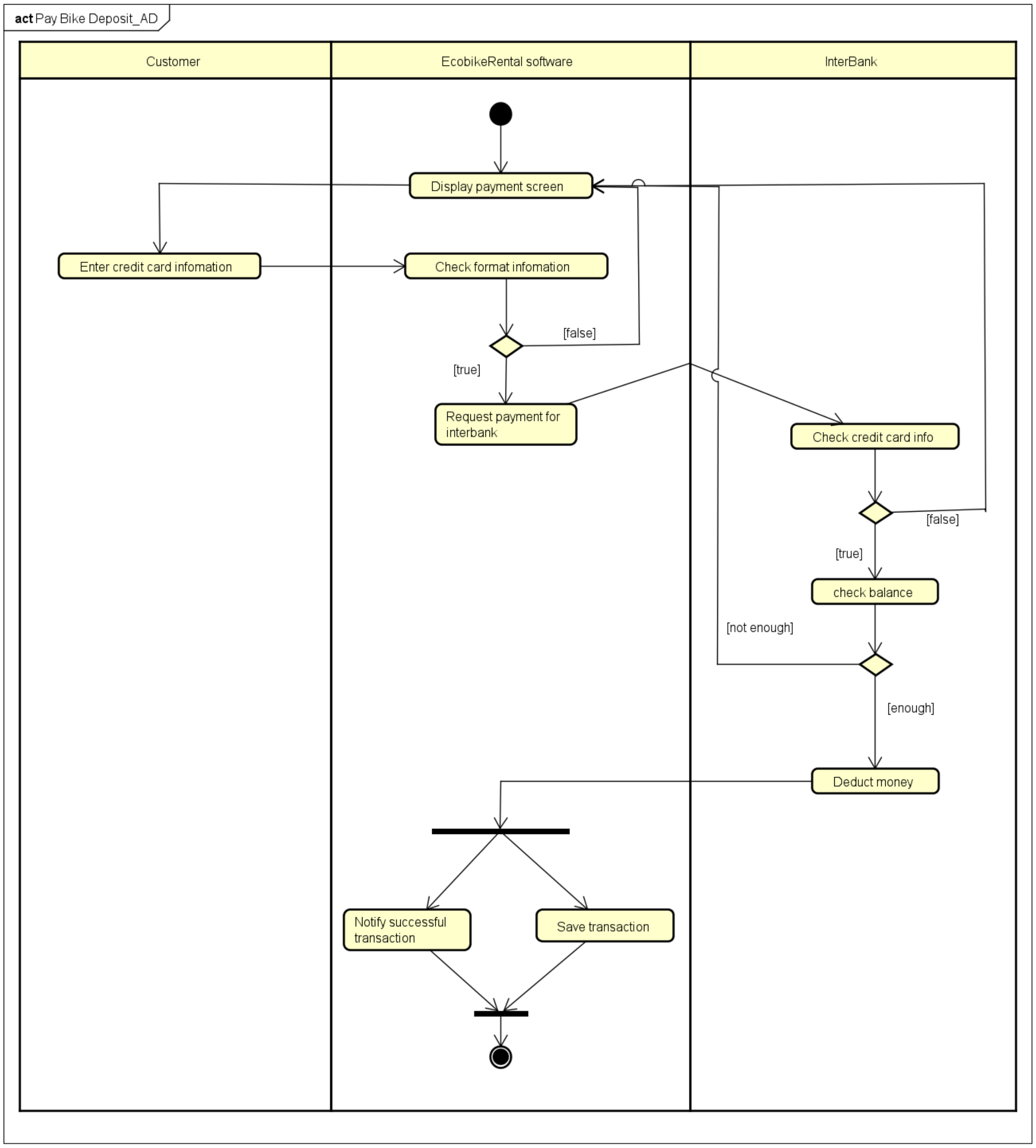


2.3.2 *Payment process*

The payment process includes deposit payment and refund.

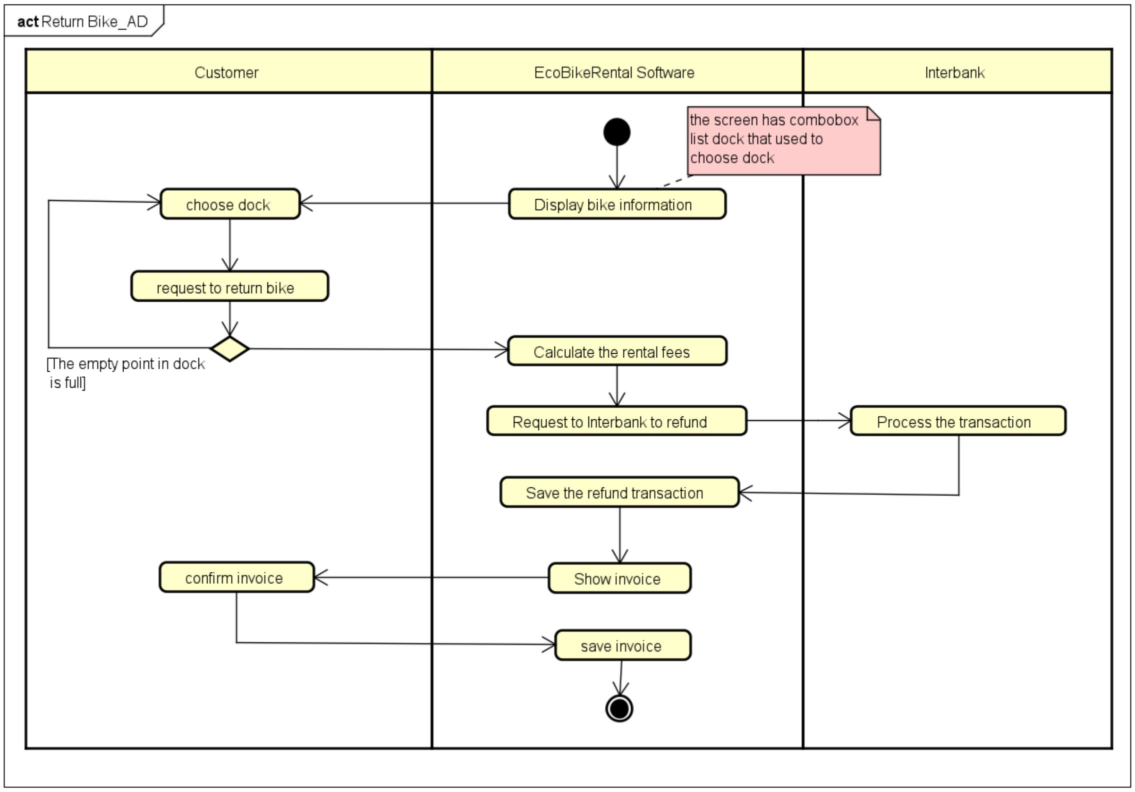
For deposit payments, the system will display the payment screen. Information entered by the customer will be processed and sent to Interbank. Here, Interbank will process the money in the card, return a notification to the customer whether it was successful or not.

For refund, the system will automatically send a request to Interbank to return the deposit minus the rental fee when the customer confirms the return of the bike.



2.3.3 Bike return process

The customer will choose the dock lot to return the bike. The system will calculate the cost, then send it to Interbank for processing for refund. At the end of the process, a message will be displayed to the customer.



3 Detailed Requirements

The details of the use cases given in section 2 are described in the following sections.

3.1 Use case specification for UC001 "Rent Bike"

Use Case "Rent Bike"

1. **Use case code**

   UC001

2. **Brief Description**

   This use case describes the interaction between Customer and EcoBikeRental System when Customer wishes to rent bike.

3. **Actors**

3.1 Customer

4. **Preconditions**

4.1 Customer chooses a dock and requests rent bike.

5. **Basic Flow of Events**

5.1 Software display dock information.

5.2 Customer enters barcode of bike in the dock info screen.

5.3 Software processes barcode.

5.4 Software display bike information.

5.5 Customer requests to rent the bike.

5.6 Software calls to UC Pay bike deposit.

6. **Alternative flows**

Table N-Alternative flows of events for UC Place order

No	Location	Condition	Action	Resume location
1.	At any Step	If customer enters go back	▪ Software goes back previous step.	Resumes at previous step.
2.	At step 5.3	If barcode is invalid	▪ Software notifies wrong info that invalid barcode.	Resumes at 5.1

7. Input data

Table A-Input data - Barcode

No	Data fields	Description	Mandatory	Valid condition	Example
1	Barcode		Yes	Numeric of string, length is 13	1234567890123

8. Output data

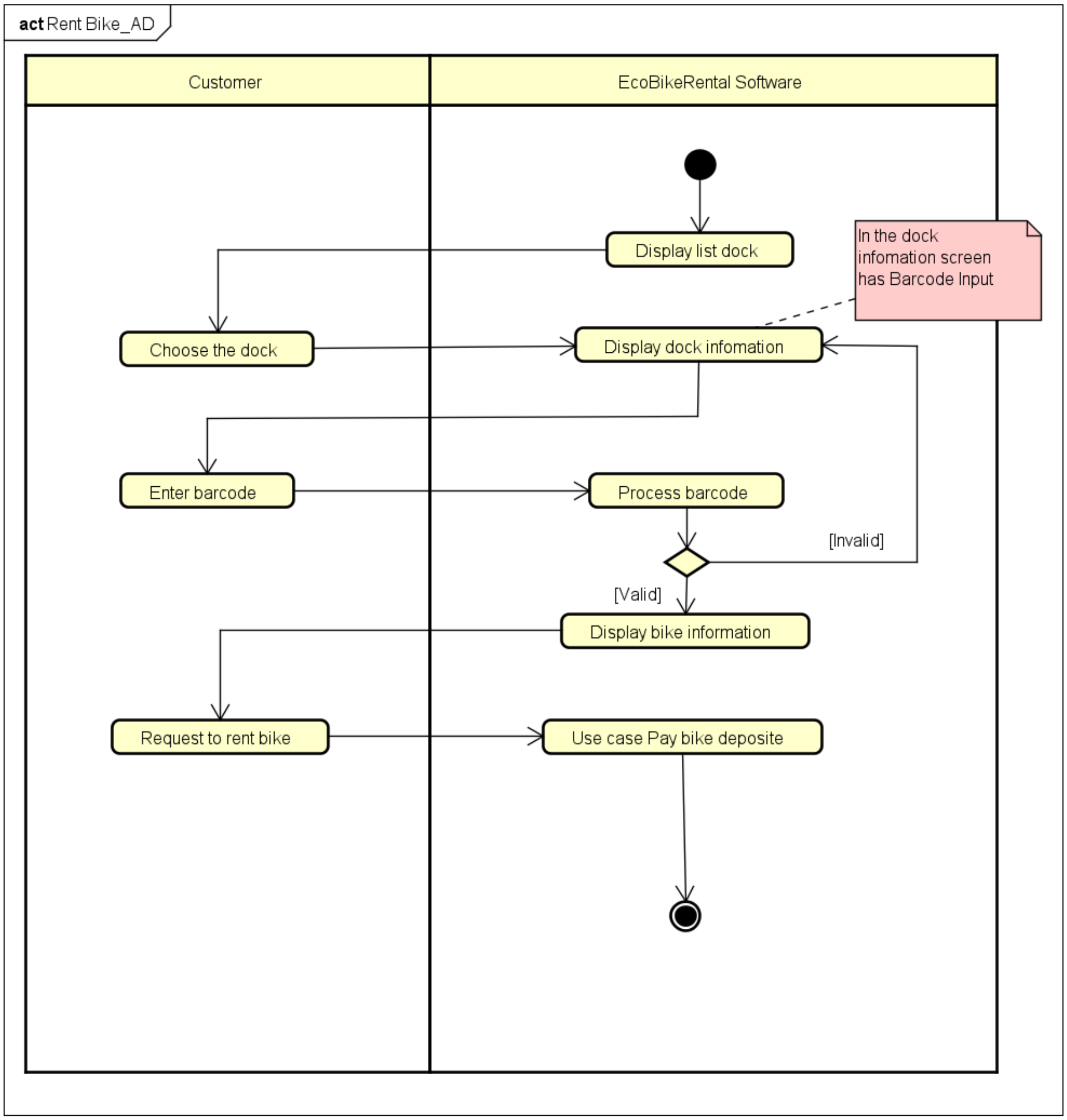
Table B-Output data – dock information

No	Data fields	Description	Display format	Example
1	Dock name			Bách Khoa
2	Address			Đại Cồ Việt – Hai Bà Trưng – Hà Nội
3	Area			500 m^2
4	Quantity			46/50

Table C-Output data – bike information

No	Data fields	Description	Display format	Example
1	Barcode		[0-9]{13}	1234567890123
2	Lisence Plate		[0-9]{2}[A-Z][0-9]-[0-9]{6}	36K6-423405
3	Type			Standard e-Bike
4	Dock			Bách Khoa
5	Pin		[0-100]%	50%

9. Activities diagram



3.2 Use case specification for UC002 “Pay bike deposit”

Use Case “Pay bike deposit”

1. **Use case code**

   UC002

2. **Brief Description**

   This use case describes the interaction between Customer, Interbank and EcoBikeRental System when Customer wishes to pay bike deposit.

3. **Actors**

3.1 Customer

3.2 Interbank

4. **Preconditions**

4.1 Customer requests pay bike deposit.

5. **Basic Flow of Events**

5.1 Software display credit card info inputs.

5.2 Customer enters credit card information. *(Table A)*

5.3 Software check format card information

5.4 Software display card info, amount and request Customer confirm. *(Table B)*

5.5 Customer comfirm information.

5.6 Software request to process deposit transaction to interbank.

5.7 Interbank check credit card information and balance.

5.8 Interbank deduct money in customer card and return payment transaction.

5.9 Software display notify and save payment transaction

6. **Alternative flows**

Table N-Alternative flows of events for UC Place order

No	Location	Condition	Action	Resume location
1.	At 5.3	If input info invalid	Software notifies wrong info	Resumes at 5.1.
2.	At 5.7	If not enough money or card info incorrect	Software notifies wrong info that not enough money or card info incorrect	End use case.

7. Input data

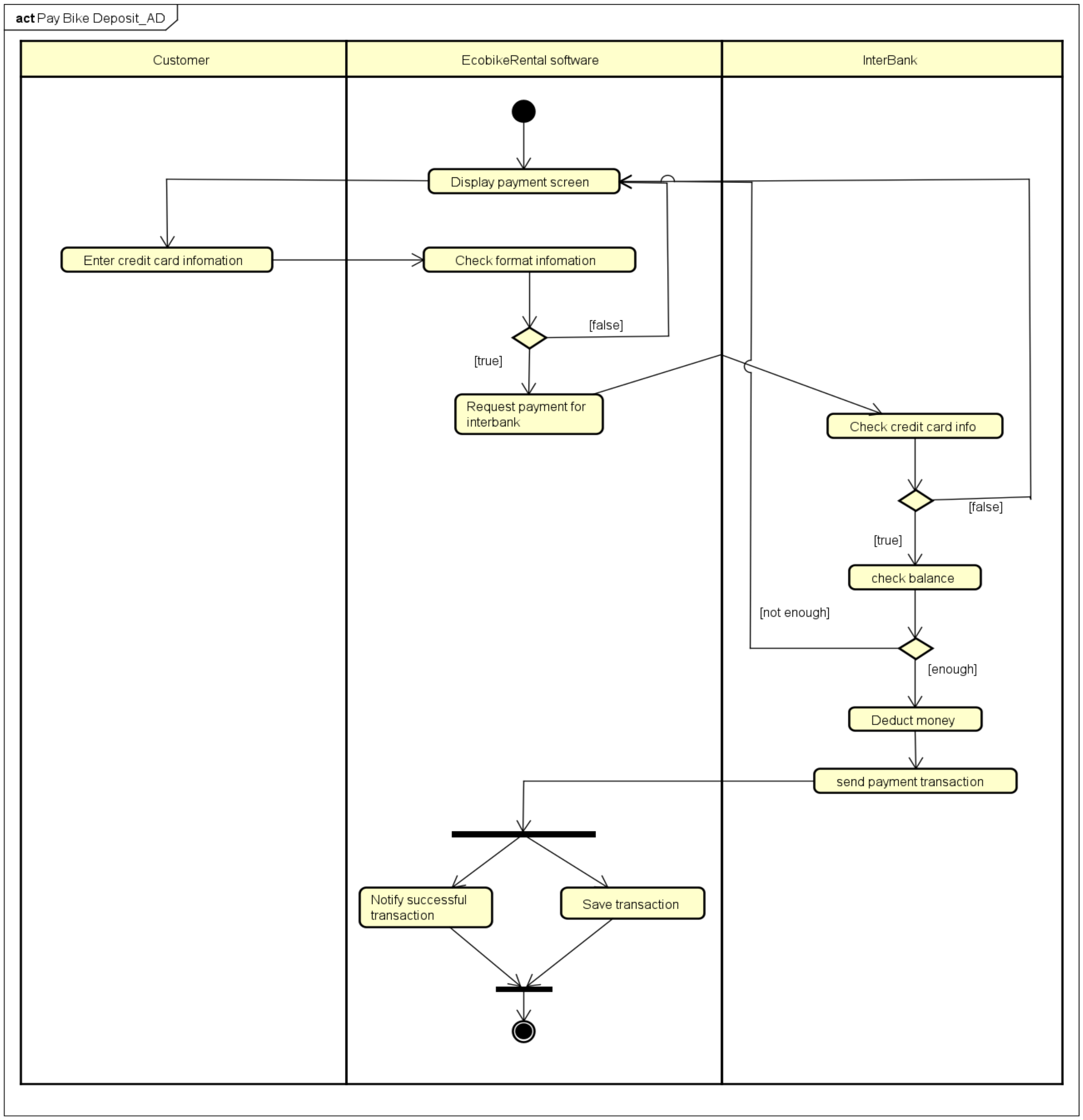
Table A-Input data – Credit card info inputs

No	Data fields	Description	Mandatory	Valid condition	Example
1	Card holdername		Yes		Group 2
2	Card number		Yes		0987654321
3	Issuing Bank		Yes		Vietcombank
4	Expiration Date		Yes	Month/year	05/23
5	Security Code		Yes		123
6	content		Yes		Dat coc xe

8. Output data

No	Data fields	Description	Mandatory	Valid condition	Example
1	Card holdername		Yes		Group 2
2	Card number		Yes		0987654321
3	Issuing Bank		Yes		Vietcombank
4	Expiration Date		Yes		05/23
5	Amount		Yes		3.000.000 VND
6	content		Yes		Dat coc xe

9. Activity diagram



3.3 Use case specification for UC003 “Return bike”

Use Case “Return bike”

1. **Use case code**

UC003

2. **Brief Description**

This use case describes the interaction between customers, Interbank and EcoBikeRental software when the customers wish to return a bike.

3. **Actors**

3.1 Customer

3.2 Interbank

4. **Preconditions**

Customer request to return bike

5. **Basic Flow of Events**

5.1 Software displays bike information.

5.2 Customer chooses a dock and request to return bike. *(Table A)*

5.3 Software calculates the rental fees.

5.4 Software request to the Interbank to refund.

5.5 Interbank processes the transaction.

5.6 Software saves the refund transaction.

5.7 Software show invoice information. *(Table B)*

5.8 Customer confirms invoice.

5.9 Software save invoice.

6. **Alternative flows**

Table N-Alternative flows of events for UC Place order

No	Location	Condition	Alternative flow	Resume location
1	At Step 5.3	If the number of empty docking points is full	- The software notifies the number of empty docking points is full. - The customer selects another dock.	Resumes at Step 5.1

7. Input data

Table A-Input data of List of docks

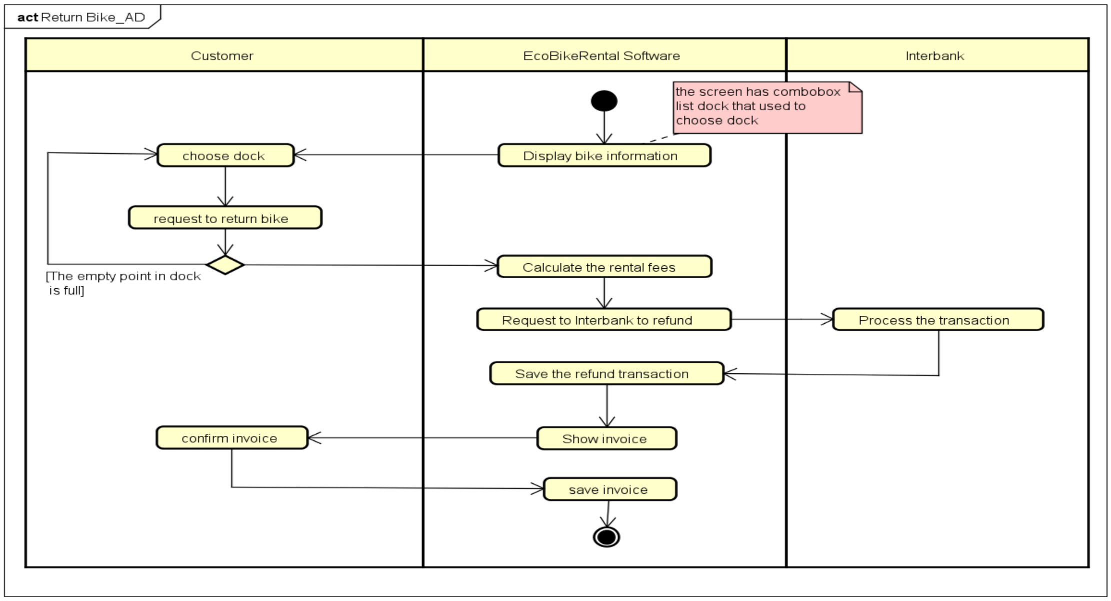
No	Data fields	Description	Mandatory	Valid condition	Example
1	Dock name		Yes		Ho Tay

8. Input data

Table B-Output data of Bike information

No	Data fields	Description	Display format	Example
1	Barcode		[0-9]{13}	1234567890123
2	Lisence Plate		[0-9]{2}K[0-9]-[0-9]{6}	36K6-423405
3	Type			Standard e-Bike
4	Dock			Bách Khoa
5	Pin		[0-100]%	50%
6	Rental time			1h50’
7	Retal Fees			24,000 VND

9. Activity Diagram



3.4 Use case specification for UC004 “View dock info”

Use Case “View Dock Information”

1. Use case code

UC004

2. Brief Description

This use case describes the interaction between Customer and EcoBikeRental System when Customer wishes to view dock information.

3. Actors

3.1 Customer

4. Preconditions

4.1 Customer renting bike.

5. Basic Flow of Events

5.1 Software show list dock.

5.2 Customer chooses dock on list.

5.3 Software show dock information.

6. Output data

Table A-Output data – list dock

No	Data fields	Description	Display format	Example
1.	Ordinal Number			1
2.	Dock name			Back Khoa
3.	Address			Đại Cồ Việt – Hai Bà Trưng – Hà Nội

Table B – Output data – dock information

No	Data fields	Description	Display format	Example
1	Dock name			Bách Khoa
2	Address			Đại Cồ Việt – Hai Bà Trưng – Hà Nội
3	Area			500 m^2
4	Quantity			46/50

4 Supplementary specification

4.1 Functionality

- In the sequence of events of use cases, all steps must manipulate the database, if there is an error during the connection or operation, there should be a corresponding error message to let the agent know that the error is related to the database. not related to customer error
- The use cases in the process of bike rental, payment, and return need to be done sequentially, step by step.
- The general display format is as follows:
    - Number - right
    - Letter - left
    - Font: Segoe ui 18, blue
    - Background: white

4.2 Usability

Functions should be designed to be easy to operate. There should be specific instructions for the customer's error so that the customer knows where the error is located, what the error is, and how to correct it.

4.3 Eficiency

The system must perform 24/7, allowing up to 100 customers at a time without significant changes in performance, and capable of performing 200 hours continuously without errors.

4.4 Reliability

Customer information stored in the system will be absolutely confidential. The bank card information will not be saved in the system to avoid risks when customers use it.

4.5 Maintainability

The system is clearly divided into processing processes, each part will take on a clear function, ensuring the maintenance of the system.

4.6 Portability

Interbank working function is designed as a Subsystem, making sure the change is easy.