HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

School of Information and communications technology

Software Requirement Specification

Version 1.0

Eco Bike Rental Software

Subject: ITSS Software Development

Group 05

Nguyen Thai An – 20176677

Bui Tu Hoang – 20176761

Vu Minh Hoang – 20176765

Nguyen Manh Khang - 20176792

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1 Introduction

1.1 Objective

This document provides the detailed description for Eco Bike Rental software and their functions in application.

This document is mainly focus on related software developers.

1.2 Scope

Eco Bike Rental software's aim, as its name, is to provide a bike renting service to customers.

The software's goal includes creating account. At time of creating account, user is required to add payment method. After logging in, user will be provided with the ability to search for docks and see their information in details. At each dock, user can have knowledge of bikes parked at the dock. Bike renting and returning are key functions of this system.

Interbank acts as a bridge between users and the main system for executing payment transactions. Interbank will take place in the validating, adding money and deducting money processes.

1.3 Glossary

Word	Meaning
deposit	to pay someone an amount of money when you make an agreement with that person to pay for or buy something, that either will be returned to you later, if the agreed arrangement is kept, or that forms part of the total payment
deduct	to take away an amount or part from a total
transaction	an occasion when someone buys or sells something, or when money is exchanged or the activity of buying or selling something

1.4 References

2 Overall Description

2.1 Actors

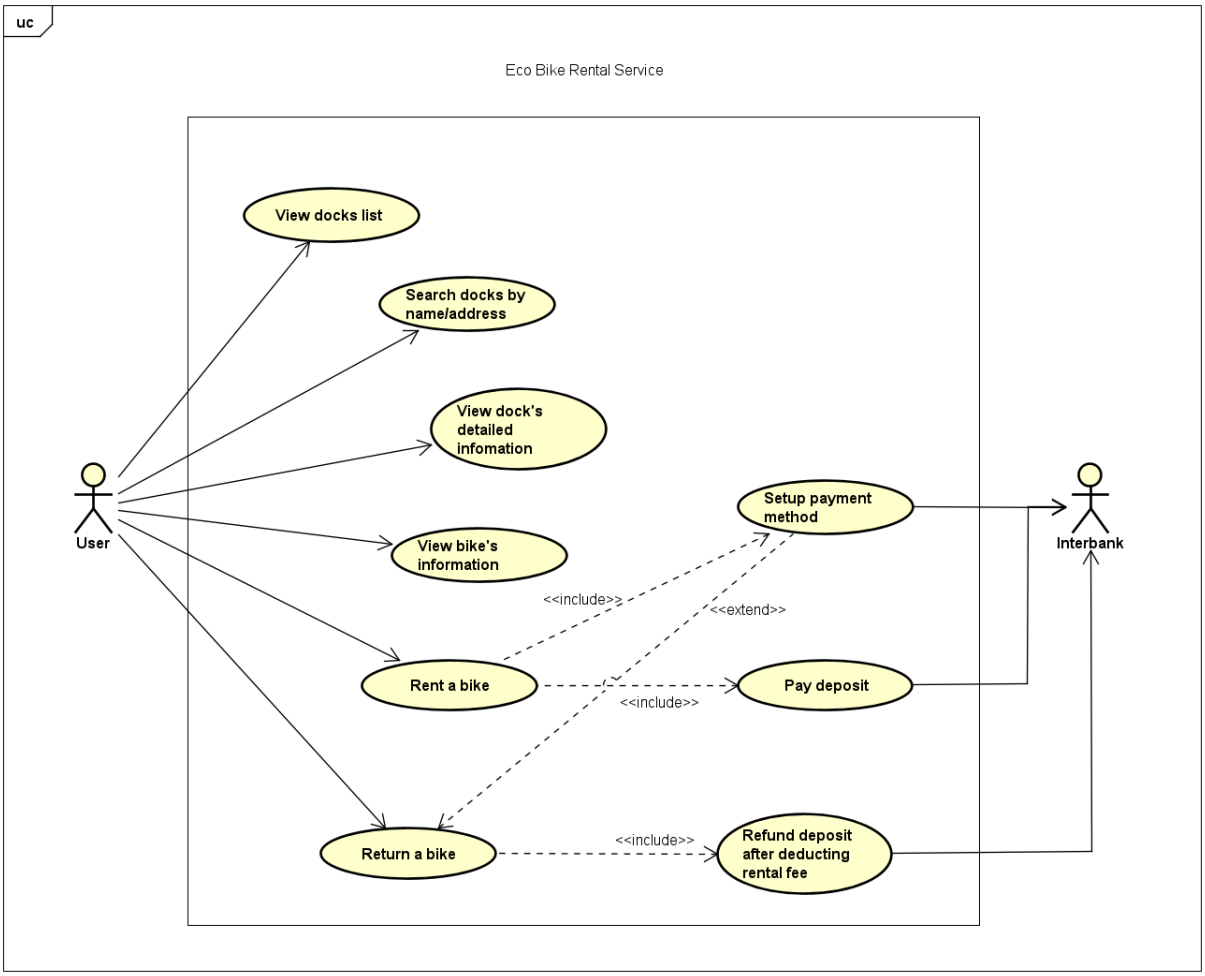
2.1.1 User

Anyone who wants to use the eco bike rental service through this software.

2.1.2 Interbank

The interbank system, used for making transaction when renting and returning a bike within the service.

2.2 Use case diagrams



2.3 Business processes

3 Detailed Requirements

3.1 Use case specification for "Setup payment method"

Use Case "Setup Payment Method"

1. Use case code

UC001

2. Brief Description

This use case describes the interactions between the user, the interbank and the EBR software when the user wishes to setup a new payment method.

3. Actors

3.1.User

4. Preconditions

5. Basic Flow of Events

Step 1. The EBR software displays credit card information form

Step 2. The user enters card info and submits

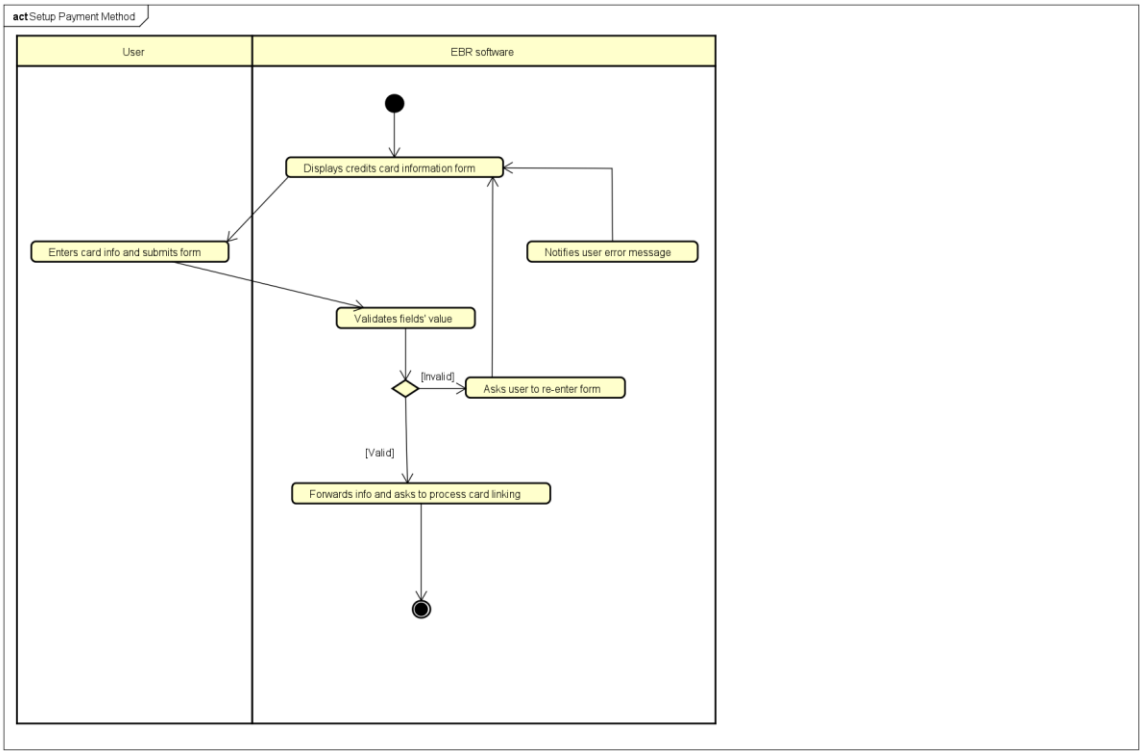
.

6. Alternative flows

Table 1 - Alternative flow of events for UC "Setup Payment Method"

No	Location	Condition	Action	Resume location
1.	At step 2	If has blank mandatory field(s)	_ The EBR software asks the user to refill the form	Resume at step 1
2.	At step 2	If has invalid field formats	_ The EBR software asks user to fix field's values	Resume at step 1

7. Activity diagrams



8. Input data

Table 2 - Input data of credit card information form

No	Data fields	Description	Mandatory	Valid condition	Example
1.	Card Number		Yes	16 digits	1234 4321 2134 3214
2.	Card Type	Choose from a list	Yes		Visa
3.	Expire Date		Yes	Form MM/YY	08/25
4.	Security Code		Yes	Digits only	012

9. Output data

10. Postconditions

3.2 Use case specification for "View dock's detailed information"

Use Case "View Dock's Detailed Information"

1. Use case code

UC002

2. Brief Description

This use case describes the interactions between user and EBR software when user wishes to view the detailed information of chosen dock.

3. Actors

3.1.User

4. Preconditions

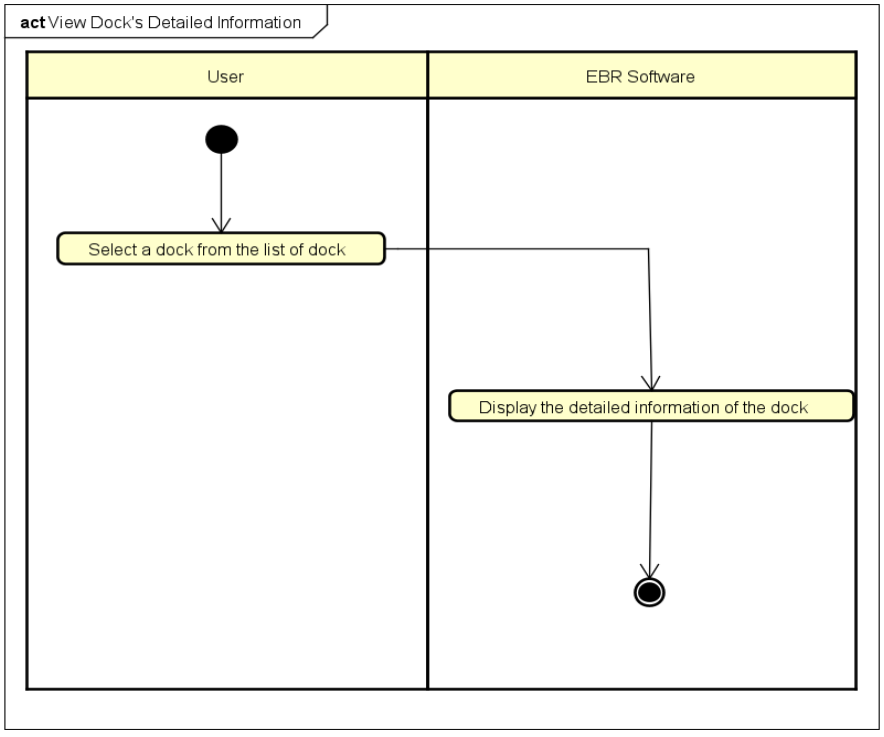
5. Basic Flow of Events

Step 1. The user chooses a dock from the list of docks

Step 2. The software returns the information of the dock

6. Alternative flows

7. Activity diagrams



8. **Input data**
9. **Output data**

Table 2 - Output data of view dock's detailed information

No	Data fields	Description	Display format	Example
1.	Name	Name of the chosen dock		Dock No.01
2.	Address	The address of this dock		12 Inner Road
3.	Dock Area	The area of this dock	• Positive number • Right alignment	60m^2
4.	Number of Available Bikes	Number of available bikes in this dock	• Positive integer • Right alignment	20
5.	Bike	Available bike in this dock		Standard Bike 01
6.	Number of empty slots	The number of empty docking point	• Positive integer • Right alignment	10
7.	Distance	The distance from user's location this dock	• Positive number • Right alignment	100m
8.	Walking Time	The calculated walking time from user's location to this dock	Positive number	2 minutes

10. **Postconditions**

3.3 Use case specification for "View bike's detailed information"

Use Case "View Bike's Detailed Information"

1. Use case code

UC003

2. Brief Description

This use case describes the interactions between user and EBR software when user wishes to view the detailed information of chosen bike.

3. Actors

3.1.User

4. Preconditions

5. Basic Flow of Events

Step 1. The user selects a bike from the list of bikes

Step 2. The software checks the information of the selected bike

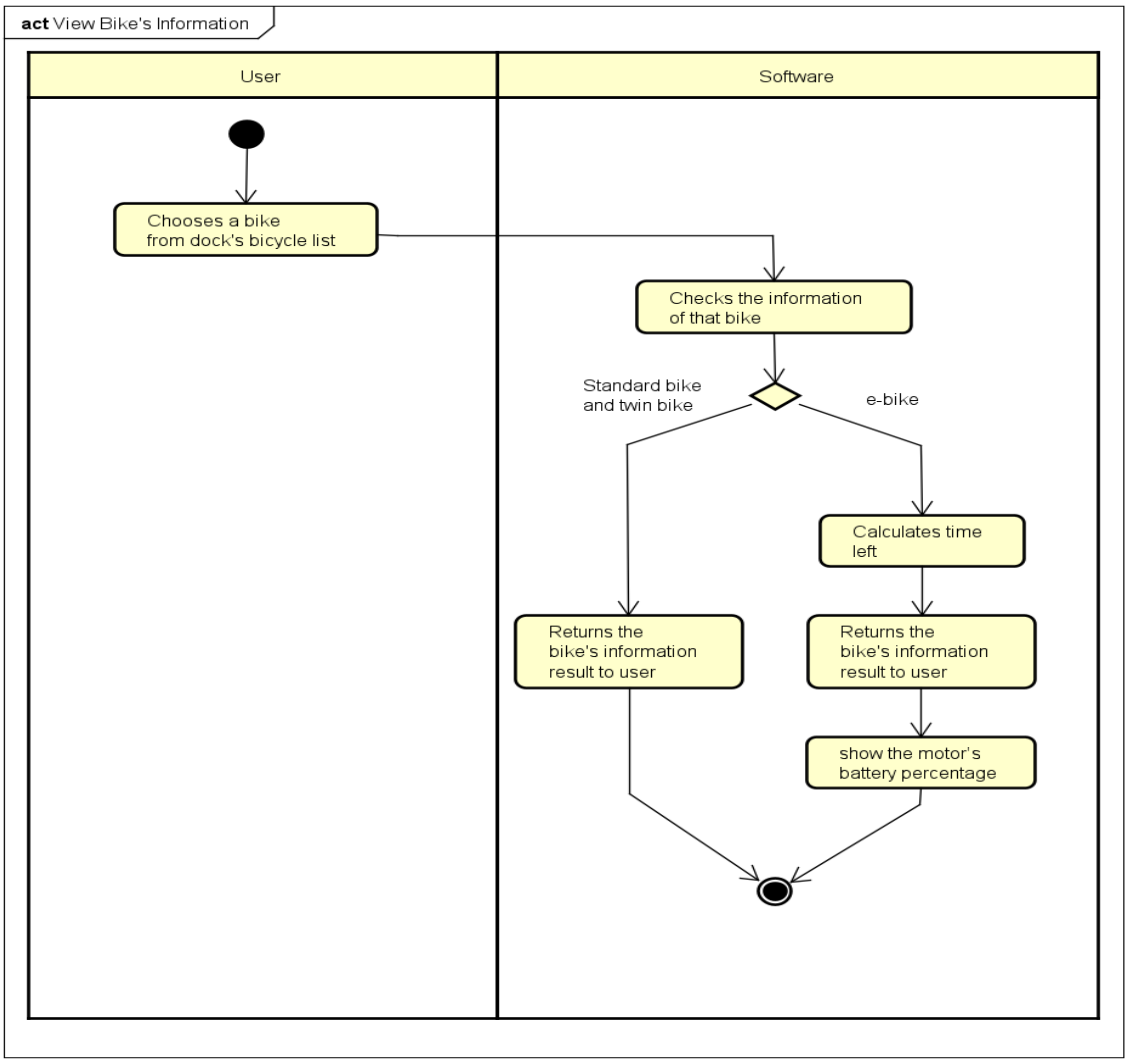
Step 3. The software returns the information of the bike

6. Alternative flows

Table 3 - Alternative flow of events for UC "Name of the Use Case"

No	Location	Condition	Action	Resume location
1	At Step 2	The selected bike is an e-bike	The software returns the percentage of the electric motor's battery and calculate the time left	Resume at Step 3

7. Activity diagrams



8. Input data

9. Output data

Table 4 - Output data of view bike's detailed information

No	Data fields	Description	Display format	Example
1.	Name	Name of the selected bike		E-bike 01
2.	Type	Type of this bicycle		E-bike
3.	Saddle	Number of saddles of this bike	• Positive integer • Right alignment	1

4.	Pedals	Number of pair of pedals	• Positive integer • Right alignment	1
6.	Rear seat	Number of rear seats	• Positive integer • Right alignment	1
7.	Battery	The electric motor's battery percentage	• Positive number with percentage symbol • Right alignment	60%
8.	Time left	How much time is left	In minute	180 minutes

10. Postconditions

3.4 Use case specification for "Rent a bike"

Use Case "Rent A Bike"

1. **Use case code**

   UC004

2. **Brief Description**

   This use case describes the interactions between user and EBR software when user wishes to rent a bike

3. **Actors**

   3.1. User

4. **Preconditions**

5. **Basic Flow of Events**

   Step 1. The user requests to rent a bike

   Step 2. EBR software calls use case "Setup payment method"

   Step 3. EBR software calls use case "Pay deposit"

   Step 4. The EBR Software creates new renting session

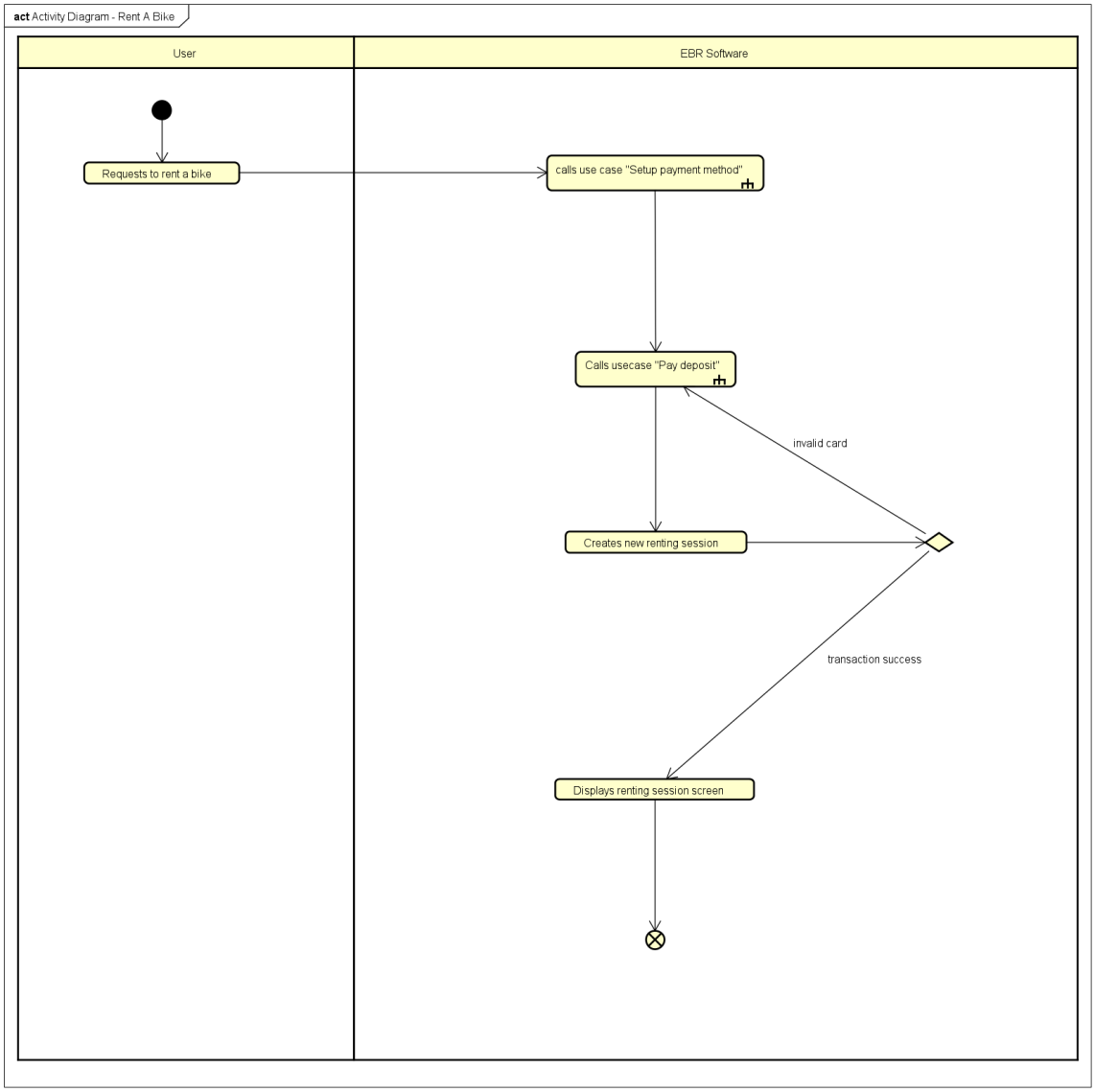
   Step 5. The EBR Software displays renting session screen

6. **Alternative flows**

Table 5 - Alternative flow of events for UC "Rent A Bike"

No	Location	Condition	Action	Resume location
1	At Step 3	Problem with credit card	Let user choose a different card	Step 2

7. **Activity diagrams**



8. Input data

Table 6 - Input data of bike renting

No	Data fields	Description	Mandatory	Valid condition	Example
1	Barcode	Bike's barcode	Yes	String	1231abc212

9. Output data

Table 7 - Output data of bike renting

No	Data fields	Description	Display format	Example
1	Session code		String	Code123123
1	Start time		hh:mm DD/MM/YYYY	16:30 29/09/2020
2	Deposit	Money deposited for the bike	• Comma for thousands separator • Positive integer • Right alignment	123,000

10. Postconditions

3.5 Use case specification for "Pay deposit"

Use Case "Pay Deposit"

1. Use case code

UC005

2. Brief Description

This use case describes the interactions between user and EBR software and Interbank when EBR Software wishes to make transaction with interbank

3. Actors

3.1. User

3.2. Interbank

4. **Preconditions**

5. **Basic Flow of Events**

Step 1. The EBR Software displays the payment confirmation screen

Step 2. The user confirms transaction

Step 3. The EBR Software asks interbank to process transaction

Step 4. The Interbank processes transaction

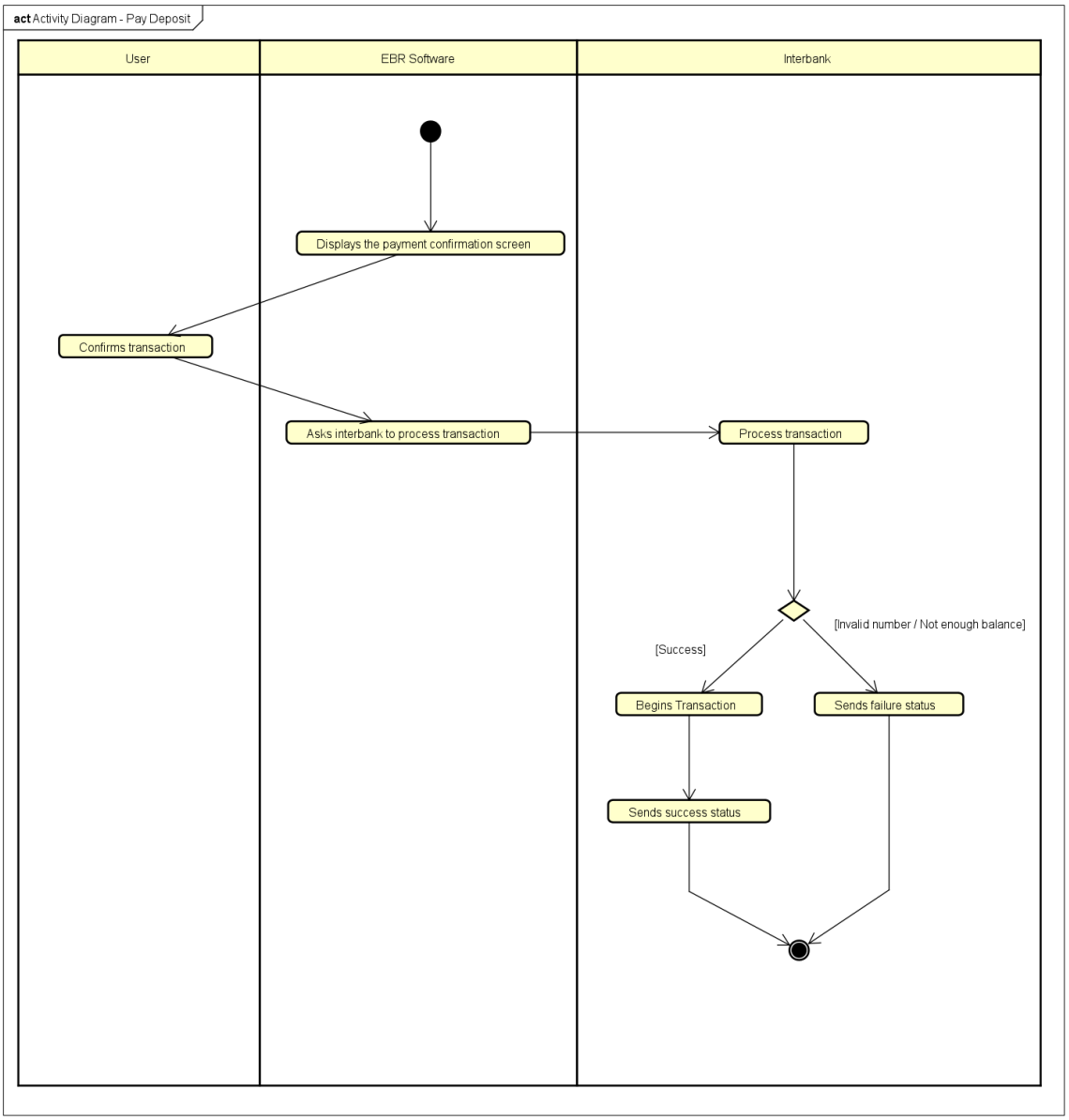
Step 5. The Interbank begins transaction

6. **Alternative flows**

Table 8 - Alternative flow of events for UC "Pay Deposit"

No	Location	Condition	Action	Resume location
1	At Step 5	Invalid card number	Notifies invalid card number	End of use case
2	At Step 5	Not enough balance	Notifies not enough balance	End of use case

7. **Activity diagrams**



8. Input data

9. Output data

Table 9 - Output data of interbank transaction

No	Data fields	Description	Display format	Example
1	Success state		Boolean	True

2	Error message		String	Invalid card number

10. Postconditions

3.6 Use case specification for "Return a bike"

Use Case "Return a bike"

1. Use case code

UC006

2. Brief Description

This use case describes the interactions between User and EBR software when User wishes to return a bike.

3. Actors

3.1. User

4. Preconditions

User rented a bike

5. Basic Flow of Events

Step 1. User requests to return a bike

Step 2. EBR software requests user to choose a dock to return bike

Step 3. EBR software Summarizes session information, calculates rental fee, calculates excess money and notifies to User

Step 4. User confirms information

Step 5. EBR software closes the user's renting session

Step 6. EBR software calls Use case "Refund deposit after deducting rental fee"

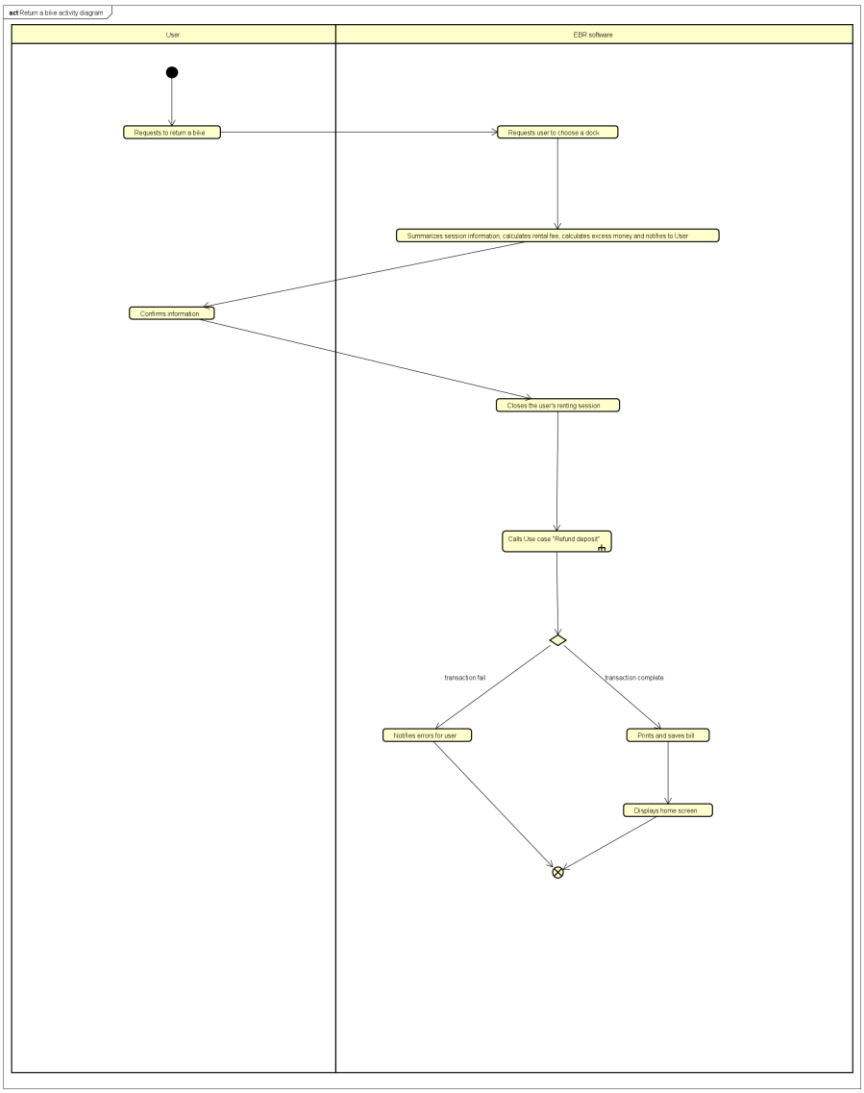
Step 7. EBR software returns home screen

6. Alternative flows

Table 10 - Alternative flow of events for UC "Name of the Use Case"

No	Location	Condition	Action	Resume location
1	At step 6	Transaction fail	Notifies transaction fail	End use case

7. Activity diagrams



8. Input data

Table 11 - Input data of "Return a Bike"

No	Data fields	Description	Mandatory	Valid condition	Example
1	Barcode	Bike's barcode	Yes	String	1231abc212

9. Output data

Table 12 - Output data of "Return a Bike"

No	Data fields	Description	Display format	Example
1	End time	Ending time of the User's renting session	hh : mm DD/MM/YY	12:20 10/10/2020
2	Usage time		. A number of minutes usage	120
3	Renting fee		. Comma for thousands separator . Positive integer . Right alignment	123,000
4	Refund deposit	deposit after deducting rental fee	. Comma for thousands separator . Positive integer . Right alignment	100,000

10. Postconditions

3.7 Use case specification for "Refund deposit"

Use Case "Refund Deposit"

1. Use case code

UC007

2. Brief Description

This use case describes the interactions between EBR software and Interbank when EBR software wishes to refund deposit to User.

3. Actors

3.1. Interbank

4. Preconditions

5. Basic Flow of Events

Step 1. EBR calls use case "Setup payment method"

Step 2. EBR software asks for transaction

Step 3. Interbank validates payment method

Step 4. Proceeds transaction

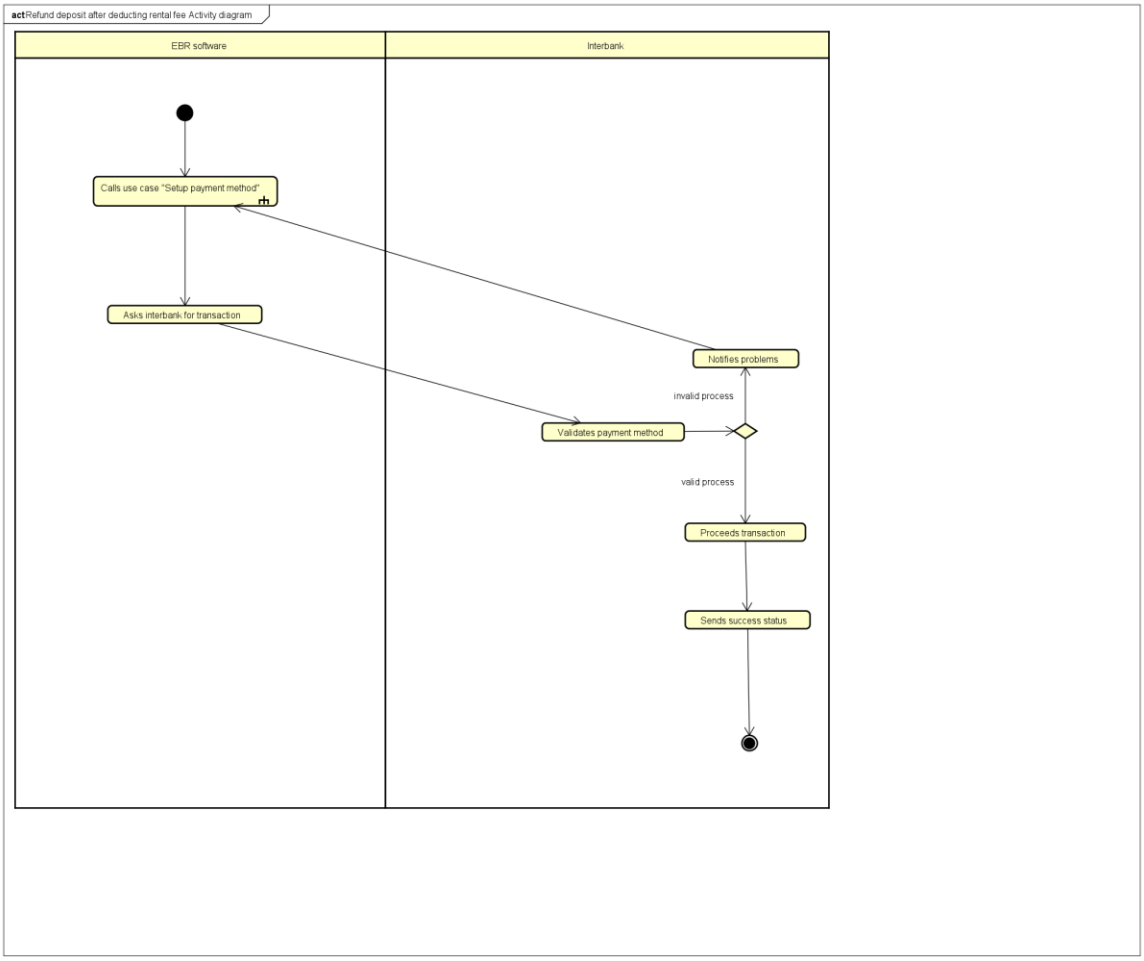
Step 5. Sends success result

6. Alternative flows

Table 13 - Alternative flow of events for UC "Refund Deposit"

No	Location	Condition	Action	Resume location
1	At step 3	Invalid process	Notifies problems	Resume at step 1

7. Activity diagrams



8. Input data

9. Output data

Table 14 - Output data of "Refund Deposit"

No	Data fields	Description	Display format	Example
1	Success status		. Success status as a message	. Your transaction done
2	Incomplete status		. Incomplete status and reason	. Your transaction was failed due to ...

10. Postconditions

4 Supplementary specification

4.1 Functionality

User can cancel almost every current activity by backing to previous activity or to go to the base activity (Docks view)

4.2 Usability

The software must be intuitive which allows novice users without any training to use.

4.3 Reliability

- This system is a 24/7 live service.
- The system must be able to operate in an average of 200 hours without failure.
- Must be repaired within 2 hours after any failure.

4.4 Performance

- The system shall serve 100 concurrent users without noticeable performance lost.
- The system's respond time shall be least than 1 second in average and least than 2 seconds under peak load.

4.5 Supportability

4.6 Other requirements