**Hanoi University of Science and Technology  
School of Information and Communication Technology**

**Software Requirement Specifications**

**Version 1.0**

**EcoBike Application**

***Subject: ITSS Software Development***

**Supervisor: Asst. Prof. Nguyen Thi Thu Trang**

**Group number: 6**

**Group participants**

|  |  |
| --- | --- |
| **Name** | **Student ID** |
| **Nguyen Thi Minh Chau** | **20184238** |
| **Tran Le Hai Duong** | **20184248** |
| **Nguyen Thanh Long** | **20184287** |

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## **1. Introduction**

### **1.1 Objective**

The purpose of this document is to present a detailed description of the EcoBike system. It will explain the purpose and features of the system, the interfaces of the system, what the system will do, the constraints under which it must operate and how the system will react to external stimuli. This document is intended for both the stakeholders and the developers of the system.

### **1.2 Scope**

This EcoBike system is designed for EcoPark, which has an hourly bike rental service with docking stations for customers to rent or return bikes automatically. This system provides convenience for customers to finding a dock of bike, signing up for renting a bike, paying renting fees and returning a bike. EcoBike also assists administrators in monitoring bikes in the system, which includes adding, viewing, updating and removing bike to/from the system.

In details, when the customer starts EcoBike, the application displays the map of the region around the current location of him. The customers can then select or search for a bike station to view its information, including the distance and estimated walking time to the selected dock. At the same time, EcoBike provides a list of available bikes at the dock at the meantime. Customer can also select a bike in order to get its information and current states before deciding to rent it.

To rent a bike, customer uses the application to scan the barcode on the lock and open the bike. Details about the selected bike is shown, and if he wants to rent it, the application calculates the deposit, and transactions is performed by using credit cards connected to an interbank. When being in rent, the state of the bike is always updated so that customers can have a better look on his current renting bike.

To return a bike, customer firmly pushes the bike to an empty dock point and closes the lock. EcoBike then calculates the total charges corresponding to renting time. At the same time, the system saves the rental transaction and sends an email of transactions to customers.

The interbank, which will be in connection with EcoBike system, will receive payment request from EcoBike after the customer has confirmed the rental. It will help the customer to pay deposit before renting a bike, and finish the fees after he is done with renting the bike. Also, if the customer rents a bike for less than a predefined time period, he will have his deposit returned. This return will also be issued by EcoBike and be performed by the interbank.

For the administrator side, he can manipulate the list of bikes in system for rental at any time. To add a new bike, he provides information for the application so that EcoBike can validates it and create a new bike profile for tracking its states. Administrator can choose to view lists of bikes, as well as detail information of these bike. Also, while being in the monitor screen, he can choose to update bike information or delete it from the list if it is not being used in the future anymore.

### **1.3 Glossary**

***Table 1:*** Terms used in the document

|  |  |
| --- | --- |
| **Term** | **Definition** |
| Administrator | The person who uses EcoBike application system for the purposes of monitoring list of bicycles in the system |
| Admin | as “administrator” |
| Bicycle | The transportation mean to be rent in this application system |
| Bike | as “bicycle” |
| Card number | The ID number of the credit card, printed on the credit card |
| Cardholder name | The name of the owner of the credit card, printed on the credit card |
| Credit card | A card connected to the interbank, used for performing transaction |
| Customer | The person who uses EcoBike application system for the purposes of renting bike |
| Database | Collection of all information monitored by this system |
| Deposit | An amount of money customer has to pay at first in order to rent a bike |
| Dock | A place where bicycles are put |
| Interbank | The organization in charges of performing payment and return deposit transactions in the system |
| Payment | An amount of money customer has to pay to rent a bike, including deposit and rental fee |
| Rent a bike | The action of using a bike in a period of time, with paying deposit and rental fee |
| Rental fee | An amount of money customer has to pay, outside of the deposit, which depends on the rental time |
| Rental time | The time period when the bike is being rented |
| Return a bike | The action of stopping using a bike after having rented |
| Software Requirement Specification | A document that completely describes all of the functions of a proposed system and the constraints under which it must operate. For example, this document. |
| Station | as “dock” |
| Transaction | The action of paying for bike deposit, bike rental or returning deposit |
| User | Customer or Administrator |

## **2. Overall description**

### **2.1 Actors**

*2.1.1 Customer*

The customer is the actor who interacts with the system for the purpose of renting a bike. The activities of the customers with EcoBike system includes checking and selecting dock, viewing bike information, renting and returning bike, performing payment.

*2.1.2 Administrator*

The administrator is the actor who interacts with the system for the purpose of monitoring bicycles in the EcoBike system. The activites of the customers with the application are adding, viewing and updating bike information, and deleting bike from the system.

*2.1.3 Interbank*

The interbank is the actor who interacts with the system for the purpose of performing transactions issued by the customers. The activities includes paying deposit, rental fees and returning deposit

### **2.2 Usecase diagram**

The below diagrams illustrate the overall usecase of the actors on the EcoBike system

Diagram

Description automatically generated

Figure 1: Usecase diagram of EcoBike system

### **2.3 Business processes**

The bellow diagram shows the business process for the EcoBike system

Diagram

Description automatically generated

Figure 2: Business process diagram for EcoBike system

## **3. Detailed requirement**

### **3.1 Usecase specifications for “CRUD bike”**

### **3.2 Usecase specifications for “Check bike information”**

### **3.3 Usecase specifications for “Rent a bike”**

### **3.4 Usecase specifications for “Return a bike”**

## **4. Supplementary specification**

### **4.1 Functionality**

None

### **4.2 Usability**

- The system allows novice users to use without any training

- The system must be able to use 24/7, serves 100 users at the same time without noticeable loss of performance

### **4.3 Reliability**

The system must be able to operates in an average of 200 hours per week without failure. It also must be repaired within 02 hours after any typical failure

### **4.4 Performance**

- The response time for the system is 01 second at normal time and 02 seconds during a peak load

- The response time for performing any transaction must not exceed 01 second

### **4.5 Supportability**

None

### **4.6 Database design**

Diagram

Description automatically generated

Figure: ER-Diagram for EcoBike system’s database

Diagram, schematic

Description automatically generated

Figure: Implementation of EcoBike system’s database

### **4.7 Other requirements**

- The system is platform-independent

- All information about user’s credit card must be secured