HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

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Software Requirement Specification

EcoBikeRental (EBR)

Subject: ITSS Software Development

Group 01

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**Table of contents**

Table of contents 1

1 Introduction 2

1.1 Objective 2

1.2 Scope 2

1.3 Glossary 2

1.4 References 2

2 Overall Description 3

2.1 Actors 3

2.2 Use case diagrams

3 Detailed Requirements 4

3.1 Use case specification for UC001 - “View bike info” 9

# Introduction

## Objective

The objective of this document is to present the detailed descriptions for the EcoBikeRental application. It will define and describe the requirements of the application and spell out its functions and constraints. purpose and the features of the system, user group and their usable function at run time. The intended audience of this document includes the stakeholders and the developers of the application.

## Scope

This software will be an EcoBikeRental (EBR) application for customers of Ecopark’s bike renting service. The software’s goal is to facilitate the hourly bike rental service by providing the means to automate the renting and charging process, which helps eliminate the need for human workers. By fully atomizing the key steps in the rental service, the operational cost of the bike rental service is reduced and the chances of human-made errors are minimized.

More precisely, this software is designed to help customers navigate the many docking stations to find a bicycle of choice among them as well as returning a bicycle one to the nearest station when they finish. Additionally, it also tracks the usage time and supports the customer to make online payment accordingly. The customer initiates the renting and returning process by requesting through their application using the identifier of the bike. The application will send control signals to the locker on the bike to lock and unlock it accordingly. The system offers three kinds of bicycles, namely standard bike, twin bike and standard e-bike, which have different rental costs. The payment method supported is credit card by linking to Interbank.

## Glossary

|  |  |
| --- | --- |
| **Term** | **Definition** |
| Barcode | A machine-readable code in the form of numbers and a pattern of parallel lines of varying widths, printed on lock for identifying bikes |
| Customer | Users of the EBR |
| Docking station | Place where customers go to rent bikes and return bikes |
| Locker | A device on each bicycle which contains a barcode to identify that bicycle. It is unlocked upon renting the bicycle and locked again upon returning it. |
| Interbank | A bank to pay for transactions made by the customer |
| Software Requirements 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. |
| Stakeholder | Any person with an interest in the project who is not a developer |
| Standard bike | One of the three kinds of bicycle available for rent, which has 01 saddle, 01 pedal, and 01 rear seat in the back |
| Standard e-bike | One of the three kinds of bicycle available for rent, which is built like a standard bike and has an integrated electric motor for assist propulsion and rental fee costs 1.5 times more expensive than the fee of standard bike |
| Twin bike | One of the three kinds of bicycle available for rent, which has 02 saddles, 02 pedal, and 01 rear seat with no integrated electric motor with rental fee costs 1.5 times more expensive than the fee of standard bike |

## References

## IEEE. ISO/IEC/IEEE 29148:2011 ISO/IEC/IEEE International Standard - Systems and software engineering -- Life cycle processes --Requirements engineering. IEEE Computer Society, 2011.

# Overall Description

# Actors

There are three main actors in the system: Customer, Interbank and Locker. Each contributes in different parts of the system.

* 1. **Use case diagrams**

The project comprises three main use cases: “Check dock”, “Rent bike” and “Return bike”. Within this very section a brief summary of each use case will be present. Note that the above list has been sorted, in chronological order, which the creators of this document have envisioned, for the customer to go through in their pursuit of a ride in the park.

First is the “View dock” use case. The customer can choose a dock from a list of docks shown on the screen instead of a map. They can check the dock’s information, including the name, address, dock area, the number of available bikes, the number of empty docking points, distance, and walking time from the customer’s location to this dock. The detailed information of available bikes in a dock is also viewable, such as battery level, type of bike, top speed, rent rate, deposit rate,…

Next is the “Rent bike” use case. The customer can view the information of any bike (mentioned in the View dock use case) that catches their eyes. Afterward, they enter the barcode of the bike they want to rent into the software. After the customer pays the necessary deposit to rent the bike, the Locker will unlock the bike for a ride within EcoPark. If the customer fails to pay for the depositor, if the Inter-bank cannot process the transaction, the customer won’t be able to use the service.

Finally, we have the “Return bike” use case. At any point during their time, the customer can see the amount of money they would have to pay. When the customer wishes to return the bike, they need to push it into an empty locker and close the lock. the system will automatically return the deposit and deduct the amount of money corresponding to the rental period. If this transaction with the Inter-bank fails to go through, the Customer can try again or link to another bank account. If no transaction is made, or if the Customer doesn’t have enough money in their balance to pay, a notification will be sent to the EcoPark administration to figure out an alternative payment method.

A diagram of a diagram

Description automatically generated

# Detailed Requirements

Details of the use cases given in the following sections are specified below.

## Use case specification for UC001 - “View bike info”

**Use case “View dock info”**

1. **Use case code**

UC001

1. **Brief Description**

This use case describes the interaction between Customer and EBR when Customer wants to see dock info.

1. **Actors**
   1. Customer
2. **Preconditions**

- Customers need to use the app to enter the barcode on the lock, select a dock, or request to view the bike info when renting a bike.

1. **Basic Flow of Events**
2. Software gets the information of the dock.
3. The software displays the information about the dock.
4. **Alternative flows**

None

1. **Input data**

None