BNA Online Optimization

Process Modeling and Data Modeling /   
System Proposal / Analysis Phase   
(Homework No.3)

Project team: Team 10

Instructor: Dr. Araz Yusubov

Submitted in partial fulfillment of the requirements of the INFT 2303: Systems Analysis and Design course project

|  |  |
| --- | --- |
| GitHub repository | https://github.com/ADA-SITE-INFT2303-2022-Spring/systems-development-project-team-10 |
| Version date | Version information |
| 18.03.2022 | Initial draft |
| 20.02.2022 | Final draft |

|  |  |
| --- | --- |
| Other documents in the package | |
| File name | Brief description of the document |
| Diagrams | This file contains context level and entity Relationship diagrams, crud matrix, level 0 and 1 diagrams. |

|  |  |  |
| --- | --- | --- |
| Team member | Contribution to this homework (NOT the project) | Estimated % |
| Kanan Gafarov | Process Modeling, bonus 2 | 25 % |
| Farhad Khidirli | Bonus 1 | 25 % |
| Kanan Ibrahimli | Data modeling, crud matrix | 25 % |
| Bakhtiyar Guluzade | Bonus 3 | 25 % |

# Table of Contents

[1. Introduction 2](#_Toc101391016)

[Definitions 2](#_Toc101391017)

[2. Process Modeling 2](#_Toc101391018)

[Level 0 diagram 3](#_Toc101391019)

[Level 1 diagrams 6](#_Toc101391020)

[3. Data Modeling 8](#_Toc101391021)

[CRUD matrix 9](#_Toc101391022)

[4. References 10](#_Toc101391023)

# Introduction

This is part of the System Proposal for a hypothetical project **BNA Optimization System** submitted for partial fulfillment of the requirements of the Systems Analysis and Design course in the School of Information Technologies and Engineering at ADA University, Baku, Azerbaijan.

This file generally includes Process and Data modeling which are two key aspects of the analysis phase. In process modeling we have shortly described all processes, data flows, data stores and external entities and drew context level, level 1, and level 0 diagrams. In data modeling, we have shortly listed all entities and attributes of system and drew entity relationship diagram. Then we built a CRUD matrix to balance our system's process and data models.

## Definitions

|  |  |
| --- | --- |
| Term | Definition |
| BakiKart | Baki Kart is a usual card needed for paying public transport fare in Azerbaijan. |

# Process Modeling

Here and in the following sub-sections list all processes, data flows, data stores and external entities with a short textual description. Indicate related use case number and name in the description.

Graphical user interface

Description automatically generated

An account is created after the User inputs his details, after that he is authorized every time, he types them correctly. At the home menu a User will be able your mange his cards by adding and deleting them. And of course, the User can replenish the balance of his cards by indicating sum and payment details.

## Level 0 diagram

Graphical user interface

Description automatically generated

The system consists of 5 main processes. Firstly, a user needs to register by sending his details. After registration the system will ask for account details for authorization. The main purpose of the system is replenishing BakiKart easily. For replenishing the user will need to indicate sum, method of payment and then payment details. If there are no issues with payment the money will immediately land on your BakiKart. To replenish his cards a user must be able to manage them. A user can add a card and bound it to his account by simply writing cards ID located on BakiKart’s back side. Moreover, a user can delete it the same way (pressing delete button).

Diagram

Description automatically generated

## Level 1 diagrams

**Register an account**

Graphical user interface, application

Description automatically generated

User first must input his details into the form so the system can read it. After that the information needs to be processed and checked for errors. There can be several errors, such as incorrect email or phone number or email and number that are already used by other account. If there is no errors new account is created and added to database.

**Log into the System**

Graphical user interface

Description automatically generated

This process is somewhat like Register an Account process. A user inputs hist account details. Those details are checked and if correct a user gains access to his account.

**Add a Card**

Graphical user interface, application

Description automatically generated

The user inputs ID of the card he wants to connect to his account, this card is then checked in Cards Database which is different from User accounts database. In Cards Database none of the cards have an owner when created, so the system bounds the card to the user itself. However, before assigning a card to a user system checks if the cards is free. If the card is taken or ID is incorrect a user will get an error. If the card is free the card is bound to the user.

**Replenish Balance**

Graphical user interface, application, Teams

Description automatically generated

Firstly, a user indicates a sum that he wants to replenish and payment method. After process method is identified the payment is processed and confirmation message is sent to the user. If the details provided by user are incorrect the payment will be cancelled. After confirmation the sum is added to the balance.

**Delete Card**

Graphical user interface, text, application

Description automatically generated

A user indicates card that he wants to delete. The card is then detached from User’s Account, and indication of card’s business is removed from Cards Database.

# Data Modeling

Graphical user interface, application, Teams

Description automatically generated

The first entity is User which consists of ID as identifying attribute, first and last names, email address and phone number for contact and confirmation purposes and password.

The next entity is Card which consists of ID, balance, and attribute “CRD\_connected” which is needed in order to identify if a card is used by someone or not.

The third entity Payment has its own identifier. It also needs User’s and Card’s IDs in order to see which user is trying to replenish which card’s balance.

And last entity “Attached Cards” is needed to identify which users are using which cards.

## CRUD matrix

![Graphical user interface, application, table, Excel

Description automatically generated]()

# References

Actually, we did not use any references for this homework, these are previous references that we used.

<https://blog.ballard.com/4-ways-to-improve-public-transport>

<https://www.masstransitmag.com/management/press-release/21133994/masabi-us-ltd-public-transportation-survey-finds-riders-rank-convenience-as-highest-priority-when-choosing-transit>

<https://thedocs.worldbank.org/en/doc/963521580136216965-0080022020/original/BakuUrbanMobilityPolicyNoteJune2018.pdf>

<https://bna.az/az/video/906>