MrPenn

SINGLE SOFTWARE DESIGN DESCRIPTION DOCUMENT

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# Introduction

## Purpose

The purpose of the MrPenn system is to allow its users to store their money transactions, then they will have access to their personal balance and some personal statistics or graphs based on this data. All the data is personal and confidential, thus is not shared between users.

## Overview

### Goals

* G1: The system allows users to privately store their transactions.
* G2: Each user can see, update and delete each of his transactions.
* G3: The user can request statistics based on his transactions.
  + Transaction that have not been returned.
  + Total balances for each entity.
  + Partial monthly balances for each entity and category.

### Requirements

* R1: The user is prompted to login if necessary
* R2: The user can sign up to the system
* R3: The user can add a new transaction with:
  + Id
  + Positive amount
  + Origin and destination entities
  + Date
  + Optionally one or more categories
  + Optional notes
  + Whether must be returned
  + Optional returning id
* R4: The backend check that the new transaction is correct and stores it
* R5: For each transaction, the value is subtracted to the source entity
* R6: For each transaction, the value is added to the destination entity
* R7: For each transaction, the value is added to its categories
* R8: The data is only accessible by the user that created it
* R9: The user can see, update and delete each of his transactions
* R10: The user can specify preferred entities
* R11: The user can specify preferred categories
* R12: The user can add some of the preferred entities to a “total”, that is their sum
* R13: The “total” is shown with other entities in the statistics, but cannot exist in transactions
* R14: When an entity is set as preferred, the user is asked for its initial balance
* R15: Each category allows to specify if its value is positive or negative
* R16: The user can request the monthly partial balances for each entity
* R17: The user can request the monthly partial balances for each category
* R18: The user can request the up-to-this-month balances for each entity
* R19: The user can request the up-to-this-month balances for each category
* R20: The user can request the total balances for each entity
* R21: The user can see some statistics:
  + Transaction that have not been returned
  + Graph with preferred entities balances by month
  + Partial monthly balances for the current and previous month, for preferred entities
  + Partial monthly balances for the current and previous month, for preferred categories
  + Total balance for the preferred entities
  + Graph with the monthly spending for each category

### Assumptions

* D1: The system relies on the abstraction it is built on for the security of the connection.
* D2: The user has a device and the MrPenn app.
* D3: The user is connected to the internet most of the time.
* D4: The external services behave correctly.

### Other relevant data from RSD

* U1: User sign up.
* U2: User login.
* U2: New transaction.
* U3: Request transactions.
* U4: Request statistic data.
* UI1: The UI adheres for the most part to the Material guidelines, especially for usability.
* UI2: A transaction that must be returned allows to open a precompiled form to insert the returning transaction.
* UI3: When adding a transaction, the user can specify which transaction is returning.
* O1: The data must be portable.
* O2: The back end is always backward-compatible (from the viewpoint of the front end).
* O3: The system will adhere to the principal GDPR guidelines.

## Definitions

* System: the software to be.
* User: an individual that uses the app.
* Transaction: an exchange of money from a certain origin to a certain destination.
* (Personal) balance: the sum of all the transactions for an entity or category.
* Entity: the source or destination of the money in a transaction.
* Category: labels for the transactions.
* To return: a sum of money is to be returned if it must be given back eventually.
* Initial balance: for an entity, the initial sum of money, used to produce statistics.
* Total: a special entity that is the sum (in the context) of other selected entities.
* Positive or negative category: whether the transactions in this category are incomes or outgoings.

## Acronyms and abbreviations

* Gn: goal number n.
* Rn: requirement number n.
* Dn: domain assumption number n.
* Un: use case number n.
* UIn: user interface requirement number n.
* On: other requirement number n.

## Revision history

* Version 1: first version.

# References

The structure of this document is inspired on those proposed in IEEE 1016.

Material Design by Google.

GDPR regulations.

# Context

This design document focuses on the front end, leaving the backend to a SaaS, which will mainly implement three function: authorization, data storage and security checks.

Some actions are not considered here since they are not basic functions, for example password reset, closing the account, updating a transaction and similar.

## Use case

Figure 1 represents the use cases of the front end and their relationship with the backend functions.



Figure 1 – UML use case diagram for the front end.

Here follows a specification for each of the use case, the actors are not specified since there is only the user.

#### U1: User sign up

Precondition: the user has a device and wants to use the app.

Execution: the user inserts the required data and sends it.

Postcondition: if the operation was successful, the user is signed in; otherwise he receives an error message.

Exceptions: the operation can fail if the user is not connected to the internet or the sever is not reachable.

Notes: the completion of the sign-up process is left to the server, that stores the data and can send a confirmation email.

#### U2: User login

Precondition: the user has a device with the app and has already signed up.

Execution: the user inserts the data and sends it.

Postcondition: if the operation was successful, the user is signed in; otherwise he receives an error message.

Exceptions: the operation can fail if the user is not connected to the internet or the sever is not reachable.

#### U2: New transaction

Precondition: the user has signed in.

Execution: the user inserts the data and sends it.

Postcondition: the data is checked by the server and if correct it is stored. If not, the client receives an error message.

Exceptions: the operation can fail if the user is not connected to the internet or the sever is not reachable.

Notes: the server can perform additional operations when it receives the transaction.

#### U3: Request transactions

Precondition: the user has signed in.

Execution: the user requests a list of the transaction he has inserted. The server sends it and the client displays it.

Postcondition: The user can see the requested transaction in detail and modify them.

Exceptions: the operation can fail if the user is not connected to the internet or the sever is not reachable.

Notes: when the user modifies or deletes a transaction, the server could do some operations on the stored data.

#### U4: Request statistic data

Precondition: the user has signed in.

Execution: the app requests some data to the server or uses the data previously cached to create the required statistics or graph.

Postcondition: the user can see the statistics or graph.

Exceptions: the operation can fail if the user is not connected to the internet or the sever is not reachable.

# Composition

Composition and modular assembly of systems in terms of subsystems and (pluggable) components, buy vs. build, reuse of components. Package and component diagram. Deployment diagram.

## Functional decomposition

## Run time decomposition

Also, deployment

# Logical

Static structure (classes, interfaces, and their relationships) Reuse of types and implementations (classes, data types). Class, object diagrams.

Persistent information

# Patterns

Reuse of patterns and available Framework template. UML composite structure diagram.

# Interactions

Object communication, messaging. Sequence, communication diagram.

# State dynamics

Dynamic state transformation. State diagram.

# Algorithm

Procedural logic

# Resources

Resource utilization. UML OCL.

# User Interface

User flow diagrams.