

­­***Capstone Project Document***

*Personal Finance Management*

|  |  |
| --- | --- |
| **PFM Team** | |
| **Group Members** | Lại Lê Lệ Linh – LinhLLL01355  Nguyễn Đức Lộc – LocND01006  Lê Thị Minh Khánh – KhanhLTM01262  Nguyễn Thị Gấm – GamNT01326  Nguyễn Anh Tuấn – TuanNA01030 |
| **Supervisor** | Teacher Nguyễn Văn Hiển |
| **Ext Supervisor** |  |
| **Capstone Project code** | PFM |

HaNoi, 25thNov, 2012

**Record of changes:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Change Item** | **Description** | **By** | **Version** |
| 25/11/2012 | All | Create the document | GamNT01326 | 0.1 |
| 12/10/2012 | Add IV and V |  |  | 0.2 |
|  |  |  |  | 0.3 |
|  |  |  |  | 1.0 |

# Introduction

## Project Overview

### Project Information

* Project Name: **Personal Finance Management**
* Project Code: **PFM**
* Project Type: **Mobile Application**
* Duration: **Sep 2012 to Dec 2012**

### Group Information

* Supervisor:
* Name: **Mr. Nguyen Van Hien**
* E-Mail: [**HienNV@fpt.edu.vn**](mailto:HienNV@fpt.edu.vn)
* Phone: **0977.999.707**
* Role: **Lecture**
* Team members

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No | **Full name** | **Student code** | **Phone** | **E-mail** | **Role** |
| 01 | Lai Le Le Linh | 01355 | 01689908772 | LinhLLL01355@fpt.edu.vn | Leader |
| 02 | Le Thi Minh Khanh | 01262 | 01665291990 | KhanhLTM01262@fpt.edu.vn | Member |
| 03 | Nguyen Thi Gam | 01326 | 01685201603 | GamNT01326@fpt.edu.vn | Member |
| 04 | Nguyen Duc Loc | 01006 | 01234351990 | LocND01006@fpt.edu.vn | Member |
| 05 | Nguyen Anh Tuan | 01030 | 01229249209 | TuanNA01030@fpt.edu.vn | Member |

## Initial idea

The idea of our product comes from actual problems, that how to help people manage their personal finance in the way of the most quickly and usefully. Normally, you have to save your receipts, record all your purchases, add up your expenses, and calculate how much you have left to spend or save. Maybe that final result sends you into unimaginable even complete shock, and you wonder why your money goes so quickly. You must spend lots of time for recalling accounts payable, expense and income. Sometime, you forgot and you cannot remember all of them.

And now we’d like to introduce our product which will bring to you a place to easily manage your finance, without waste of time to remember and don't afraid forget any account. It will do all of work for you: automatically calculating your expenses and purchases; analyzing your spending with reports and pie charts; alerting you of upcoming bills; planning your future spending; and more.

Not only manages finance, our system but also helps storage data by synchronization data. With this when you change or lost mobile, all your data will not be lost and you can use this function to get back data and continue use application but don’t need input again.

With the rapidly expansion of mobile with Android OS, we hope that our product will become most popular application, to help more people managing personal finance.

## Overview of existing systems

There are some existing system and our analysis about them.

### Application in Vietnam

#### Money Lover

* **Features:**

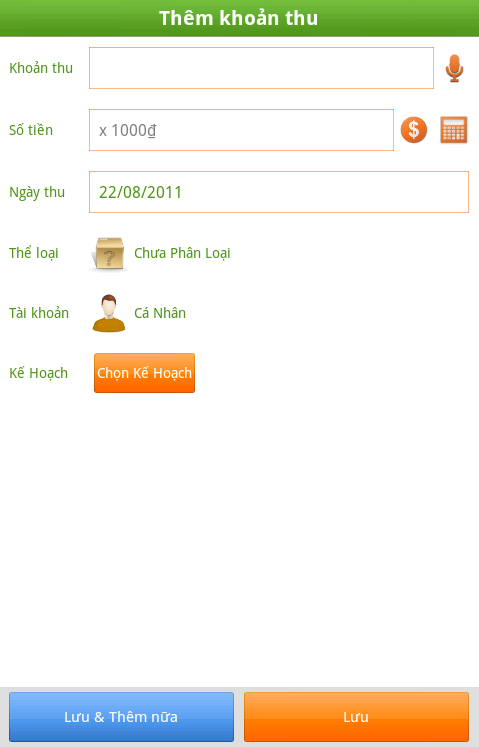
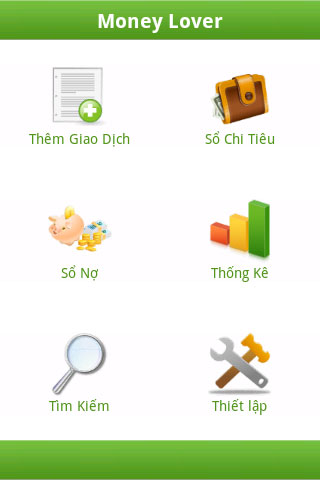
This application was developed by Vietnamese. Money Lover is a financial budget management app that can be used for simple tasks such as tracking income and expenses on up to smarter advanced tools such as debt management and budget reports. The application supports more than 30 languages.  
After successful installation, the main interface of the program, including six function buttons will appear.

* Add Transaction: button will help you record the transaction revenues, expenditures, loans, investment...
* Cash Book: is a list of income and expenditures
* Debt Management: helps you manage the lending and borrowing easier.
* Statistics: give you charts and compare the income and expenditures.
* Budget plan: where to plan, estimate your expenses.
* Tools, gives you four basic tools: Currency Exchange, Bank Finder, ATM Finder and Interest Rate.

The app supports multiple profiles (in Premium), for example, you can set up one profile for personal and one for your office. It also can protect your data when you go to the settings to enable “Pattern Lock”. More importantly, have a look at the Auto Backup feature. From there you can set up scheduled backups of your financial data.

When you have an income or expenditure, you add them to "Cash Book" by selecting "Add transaction" and choose types (income, expense, Receivable or Payable). Then input name, select a category ... Finally, choose "Save" button, your income and expenditures are recorded and managed very easily. To view, you touch "Cash Book".

* **Advantages:**
* Loaded with features both simple and comprehensive for personal finance management.
* Support for pattern lock to open app and automatic schedule of data backup.
* Produce charts and stats from data
* Supports multiple profiles (in Premium version)
* Support many functions and languages
* **Disadvantages:**
* Does not have a synchronize function
* Have too many unnecessary functions such as “Currency exchange”, “Tip calculator”, “ATM finder”, “Bank finder”.
* Have to buy the full version of the application to use some functions like “Account manager”…
* Some functions have not completed yet and need to be updated in the next version. It is also uncomfortable to bring user to home screen, because user must go back to many screens



*Figure 1: Money Lover Interface*

### Foreign applications

#### CWMoney

* **Features:**

This application helps user to keep track of all their expenses and incomes in an easy way.

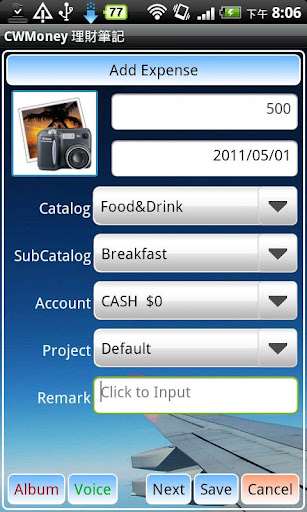
First of all, you need to select your language and then restart the application in order to make it work properly. Then, you can start use apps by adding some expenses or incomes.

The main interface of program including four functions:

* Expense: you can make a record, set a default picture, and include a category and subcategory (Food and Breakfast for instance), the type of the account used (Cash, Credit Card…) and even the project (Holiday, Wedding, Travel…). You can also take notes about any particular thing you want to add.
* Income: same Expense function
* Data Manager: keep track of the money spent in a great variety of ways. A report is also provided (in a Pie or a Bar Chart) to help you visualize everything better.

Bottom of the screen shows total expense, income follow daily, weekly and monthly.

* **Advantages:**
* The system is simple and easy to understand for users
* Support UI Theme
* Support multiple accounts and currency
* Support GPS, Camera, Album, Voice
* Data Export (Excel XML, CSV).
* Backup Send to Dropbox, Gmail, FTP...
* **Disadvantages:**
* Have less function, lack schedule function, borrowing and lending function
* Must purchase to synchronize data.
* Have some items are unnecessary for users



*Figure 2: CWMoney Interface*

#### Easy Money

* **Features:**

This application helps you track your expenses and stick to your budget quickly and easily using a simple yet powerful user interface.

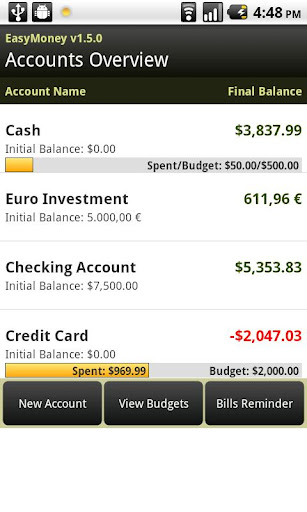
The main interface of program including three accounts default (Cash, Credit Card and Bank Account) and three buttons:

* New account: User can create new account with Account Name, Currency, Description, Starting Balance…
* View Budget: User can view all accounts that they created. In each account user can Add Transaction (Income or expense). In this function user can create new Budget. User also can use Bills Reminder in this function.
* Bills Reminder: Add new Reminder and Receive notifications of upcoming and overdue bills - for both one-time payments as well as recurring bills.

Interactive Reports & Graphs let you analyses income, expenses, cash flow and balance over various customizable date ranges.

Set monthly budgets on specific accounts and/or categories and monitor them via color-coded budget health bars charts.

* **Advantages:**
* Track income and expenses for multiple accounts in multiple currencies.
* Support transfers between accounts.
* Lock application using a 4-digit security passcode.
* Backup data onto SD card.
* Import & Export transaction data to .CSV & .QIF files.
* **Disadvantages:**
* Don’t have borrowing and lending function.
* To use this application, you must buy it.



*Figure 3: Easy Money Interface*

## Expected system

From above statistic about existing system, we have a table of comparison with functions that we have as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Application Name** | **Money Lover** | **CWMoney** | **Easy Money** | **\*Money Tracker** |
| **Expense/Income** | Yes | Yes | Yes | Yes |
| **Schedule** | Yes | No | Yes | Yes |
| **Borrowing/Lending** | Yes | No | No | Yes |
| **Report/Chart** | Yes | Yes | Yes | Yes |
| **Warning** | Yes | Yes | Yes | Yes |
| **Synchronize Data** | No | Yes | Yes | Yes |
| **Input by NFC** | No | No | No | Yes |
| **Input by Q code** | No | No | No | Yes |
| **Export/Import** | No | Yes | Yes | Yes |
| **Score** | 5/9 | 5/9 | 6/9 | 9/9 |

**Table 1: Comparative Matrix between the Existing System and the Money Tracker**

Not only try to solve their some disadvantages, but also we will learn from their good points. We expect that our system will bring to user all benefits and can be different with others.

There are some main features of our product:

* **Interface:** Our system will bring to user most friendly interface, easy to understand for user.
* **Functions:** Our system also provides all function necessary to manage finance such as input expense, income, schedule, report, chart, and warning and synchronize data. Furthermore, our system also helps user to input data faster by using NFC.
* Schedule: User can create schedule follow week or month. In this function, user can input monthly budget or input total money for each category.
* Borrowing and lending: In this function, user can input interest to calculator the debts and loans.
* Incomes and Expenses management: helps user manage income and expense every month. In this function, user can input data faster by using NFC and Q code. System will compare expense/income with schedule, if it over budget, system will show warning message for user.
* Warning: reminder user when expense exceed plan or the maturity of borrowing or lending.
* Statistics: helps user has an overview of the expenses in a month, compare with plan or other month.
* Synchronize: help storage data, when user change or lost mobile, all their data will not be lost and user can use this function to get back data and continue use application but don’t need input again.
* Export/ Import: all user’s data will be export to excel file which user can see without application access. Import function will help user access to their data.

# Software Project Management Plan

## Problem Definition

### Name of this Capstone Project

As introduction in Report 1, name of this project is **Personal Finance Management**. Abbreviation **PFM**

### Problem Abstract

Our product helps people manage their personal finance in the way of the most quickly and usefully, without waste of time to remember and don't afraid forget any account.

### Project Overview

#### The current System

It will be a new system, developed by ourselves. There is no current system.

#### The Proposed System

There are some main functions of our product (when completed):

* Schedule: use to plan your future spending
* Income and expense management: to record all transaction which user want to watch for.
* Borrowing and lending management: help user to easily manage borrowing and lending.
* Statistics: analyze user spending with reports and pie charts; help user has an overview of the expenses in a month or week, compare with schedule or other month or week.
* Warning: alert user of upcoming bills or when expense exceed budget.
* Synchronize: help storage data
* Export/ Import: help user work with their data

#### Boundaries of the System

* Final product is an application on Android
* Application for Vietnamese
* The system will have to work Android 2.3 or higher

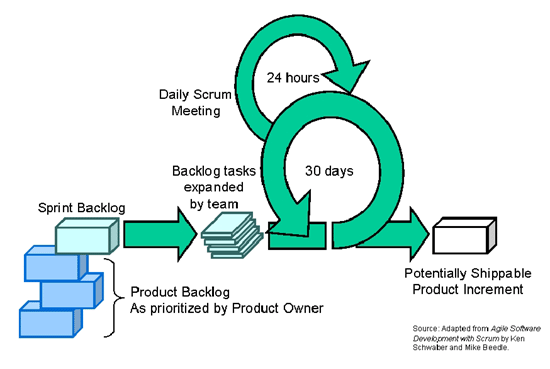
#### Development Environment

* OS: Windows 7.
* Developing language: Java, .net/ C#.
* IDE: Eclipse Juno 4.0, Visual studio.
* Database: SQL server 2010, SQLite.

## Problem Organization

### Software Process Model

We apply new process model named: Scrum. All phases of project will follow this model.



### Roles and Responsibilities

|  |  |  |  |
| --- | --- | --- | --- |
| STT | Full Name | Role in Group | Responsibilities |
| 1 | Lai Le Le Linh | Team Leader  Designer  Tester | - Create project plan, take meeting, check status, and monitor activities...of team members.  - Promote the project implementation and evaluate steps of project.  - Write meeting minutes  - GUI design  - Testing  - Create use-case diagram |
| 2 | Nguyen Duc Loc | Technical Leader  Developer | - Support other members about technical issues.  - Build framework and guide for developers.  - Coding  - Unit testing  - Create System Design |
| 3 | Nguyen Anh Tuan | Developer | - Create Database Design  - Coding  - Unit testing |
| 4 | Le Thi Minh Khanh | Tester  Designer | - Create test case  - Testing  - Design GUI  - Write meeting minutes |
| 5 | Nguyen Thi Gam | Tester | - Create SRS  - Testing  - Create documents, reports  - Write meeting minutes |

### Tools and Techniques

* + 1. Tools:
* Eclipse Juno 4.0, Visual studio
* SQL server 2010, SQLite
* Photoshop CS5
* Microsoft word 2010, 2013
  + 1. Techniques:
* NFC (Near field communication)
* QR code (Quick response code)
* SOAP (Simple Object Access Protocol)
* JExcelAPI

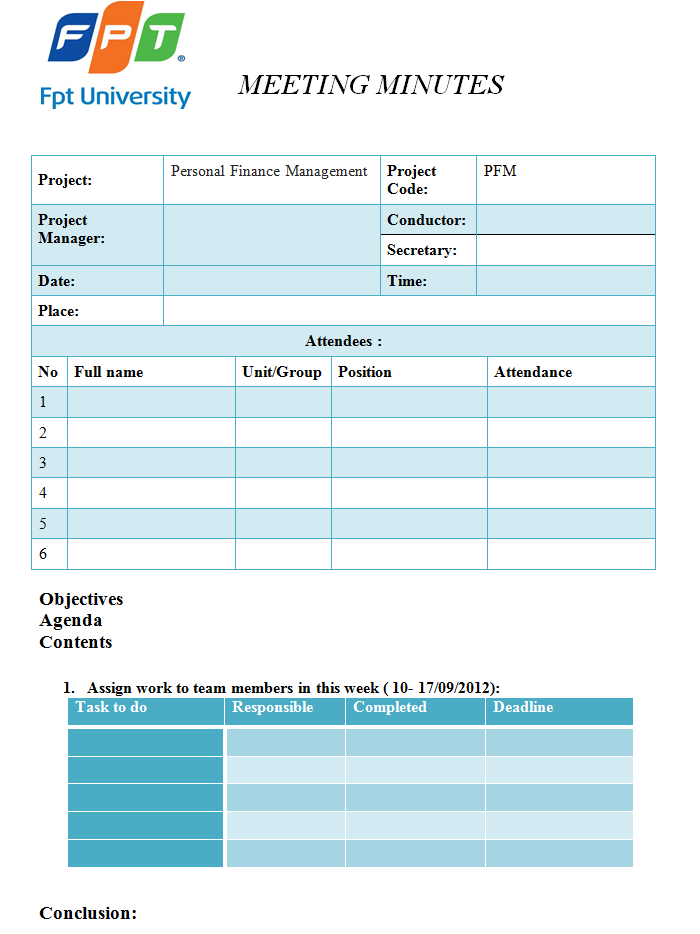
## Project Management Plan

### Task Sheet: Assignments and Timetable

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task Name** | **Duration** | **Start** | **Finish** | **Predecessors** | **Resource Names** |
| **PFM Project** | **100 days** | **Wed 8/5/12** | **Thu 12/7/12** |  |  |
| **1. Initiation** | **7 days** | **Wed 8/1/12** | **Wed 8/8/12** |  |  |
| 1.1 Research information | 3 days | Wed 8/1/12 | Fri 8/3/12 |  | PFM Team |
| 1.2 Identify Project | 2 days | Fri 8/3/12 | Sun 8/5/12 |  | PFM Team |
| 1.3 Approve Project | 2 days | Mon 8/6/12 | Tue 8/7/12 |  | PFM Team |
| 1.4 Register Capstone Project | 1 day | Tue 8/7/12 | Wed 8/8/12 |  | TuanNA |
| 1.5 Kick off meetings | 1 day | Tue 8/7/12 | Wed 8/8/12 |  | PFM Team |
| **2. Plan** | **23 days** | **Thu 8/9/12** | **Sat 9/1/12** |  |  |
| 2.1 Research project requirement | 5 days | Thu 8/9/12 | Mon 8/13/12 |  | PFM Team |
| 2.2 Create application main function | 7 days | Mon 8/13/12 | Mon 8/20/12 |  | PFM Team |
| 2.3 Define project scope | 3 days | Mon 8/20/12 | Thu 8/23/12 |  | PFM Team |
| 2.4 Study technic | 5 days | Thu 8/23/12 | Tue 8/28/12 |  | PFM Team |
| 2.5 Set up work environment | 3 days | Tue 8/28/12 | Sat 9/1/12 |  | LocND, TuanNA |
| **3. Executing** |  |  |  |  |  |
| **3.1 Sprint 0** | **15 days** | **Sat 9/1/12** | **Sat 9/15/12** |  |  |
| 3.1.1 Create report 3 (SRS document) | 10 days | Sat 9/1/12 | Mon 9/10/12 |  | GamNT, LinhLLL |
| 3.1.2 Research Technic | 10 days | Mon 9/1/12 | Mon 9/10/12 |  |  |
| 3.1.2.1 Research SQLite | 5 days | Mon 9/1/12 | Wed 9/5/12 |  | TuanNA |
| 3.1.2.2 Create SQLite sample | 5 days | Wed 9/5/12 | Mon 9/10/12 |  | TuanNA |
| 3.1.2.3 Research Chart | 5 days | Mon 9/1/12 | Wed 9/5/12 |  | LocND |
| 3.1.2.4 Create Chart sample | 5 days | Wed 9/5/12 | Mon 9/10/12 |  | LocND |
| 3.1.3 Create simple GUI | 5 days | Mon 9/10/12 | Sat 9/15/12 |  | KhanhLTM, LinhLLL, GamNT |
| 3.1.4 Update SRS | 5 days | Mon 9/10/12 | Sat 9/15/12 |  | GamNT, LinhLLL |
| 3.1.5 Create Report 1(Introduction) | 5 days | Mon 9/10/12 | Sat 9/15/12 |  |  |
| **3.2 Sprint 1( Schedule & Borrowing & Lending function)** | **23 days** | **Sat 9/15/12** | **Mon 10/8/12** |  |  |
| 3.2.1 Update Use case | 8 days | Sat 9/15/12 | Sun 9/23/12 |  | LinhLLL |
| 3.2.2 Update Report 1 | 8 days | Sat 9/15/12 | Sun 9/23/12 |  | GamNT |
| 3.2.3 Summit and Review simple GUI | 0 day | Mon 9/16/12 | Mon 9/16/12 |  | Mr. HienNV, PFM Team |
| 3.2.3.1 Simple GUI | 0 day | Mon 9/16/12 | Mon 9/16/12 |  | Mr. HienNV, PFM Team |
| 3.2.3.2 Chart sample | 0 day | Mon 9/16/12 | Mon 9/16/12 |  | Mr. HienNV, PFM Team |
| 3.2.3.3 SQLite sample | 0 day | Mon 9/16/12 | Mon 9/16/12 |  | Mr. HienNV, PFM Team |
| 3.2.3.4 Report 1 | 0 day | Mon 9/16/12 | Mon 9/16/12 |  | Mr. HienNV, PFM Team |
| 3.2.4 Create final GUI (ver 0.1) | 9 days | Sat 9/15/12 | Sun 9/23/12 |  | LinhLLL, KhanhLTM |
| 3.2.4.1 Schedule | 9 days | Sat 9/15/12 | Sun 9/23/12 |  | LinhLLL, KhanhLTM |
| 3.2.4.1.1 New schedule screen | 3 days | Sat 9/15/12 | Tue 9/18/12 |  | LinhLLL, KhanhLTM |
| 3.2.4.1.2 View schedule screen | 3 days | Tue 9/18/12 | Thu 9/20/12 |  | LinhLLL, KhanhLTM |
| 3.2.4.1.3 Schedule screen | 3 days | Thu 9/20/12 | Sun 9/23/12 |  | LinhLLL, KhanhLTM |
| 3.2.4.2 Borrowing and Lending | 9 days | Sat 9/15/12 | Sun 9/23/12 |  | LinhLLL, KhanhLTM |
| 3.2.4.2.1 New borrowing screen | 3 days | Sat 9/15/12 | Tue 9/18/12 |  | LinhLLL, KhanhLTM |
| 3.2.4.2.2 View borrowing screen | 3 days | Tue 9/18/12 | Thu 9/20/12 |  | LinhLLL, KhanhLTM |
| 3.2.4.1.3 Borrowing screen | 3 days | Thu 9/20/12 | Sun 9/23/12 |  | LinhLLL, KhanhLTM |
| 3.2.5 Create Report 4 (System design) | 7 days | Mon 9/17/12 | Sun 9/23/12 |  | TuanNA, LocND |
| 3.2.5.1 Create Database design | 7 days | Mon 9/17/12 | Sun 9/23/12 |  | TuanNA |
| 3.2.5.2 Create System design | 7 days | Mon 9/17/12 | Sun 9/23/12 |  | LocND |
| 3.2.6 Coding | 15 days | Thu 9/20/12 | Thu 10/4/12 |  | LocND, TuanNA |
| 3.2.6.1 Schedule | 15 days | Thu 9/20/12 | Thu 10/4/12 |  | LocND |
| 3.2.6.1.1 Input screen | 3 days | Thu 9/20/12 | Sun 9/23/12 |  | LocND |
| 3.3.6.1.2 Main screen and add new screen | 5 days | Sun 9/23/12 | Fri 9/28/12 |  | LocND |
| 3.3.6.1.3 View screen | 3 days | Fri 9/28/12 | Sun 9/30/12 |  | LocND |
| 3.3.6.1.4 Edit screen | 4 days | Sun 9/30/12 | Thu 10/4/12 |  | LocND |
| 3.2.6.2 Borrowing and Lending | 15 days | Thu 9/20/12 | Thu 10/4/12 |  | LocND |
| 3.2.6.2.1 Input screen | 3 days | Thu 9/20/12 | Sun 9/23/12 |  | TuanNA |
| 3.3.6.2.2 Add new screen | 5 days | Sun 9/23/12 | Fri 9/28/12 |  | TuanNA |
| 3.3.6.2.3 View detail screen | 3 days | Fri 9/28/12 | Sun 9/30/12 |  | TuanNA |
| 3.3.6.2.4 Edit screen | 4 days | Sun 9/30/12 | Thu 10/4/12 |  | TuanNA |
| 3.3.6.2.5 Intergrate Schedule and Borrowing & Lending function | 1 day | Thu 10/4/12 | Thu 10/4/12 |  | LocND, TuanNA |
| 3.2.7 Summit and Review | 0 day | Mon 9/24/12 | Mon 9/24/12 |  |  |
| 3.2.7.1 Use case diagram | 0 day | Mon 9/24/12 | Mon 9/24/12 |  | Mr. HienNV, PFM Team |
| 3.2.7.2 Report 1 (ver 0.1) | 0 day | Mon 9/24/12 | Mon 9/24/12 |  | Mr. HienNV, PFM Team |
| 3.2.7.3 System design | 0 day | Mon 9/24/12 | Mon 9/24/12 |  | Mr. HienNV, PFM Team |
| 3.2.7.4 Database design | 0 day | Mon 9/24/12 | Mon 9/24/12 |  | Mr. HienNV, PFM Team |
| 3.2.7.4 Final GUI(ver 0.1) | 0 day | Mon 9/24/12 | Mon 9/24/12 |  | Mr. HienNV, PFM Team |
| 3.2.7.5 Schedule funtion ( Input screen) | 0 day | Mon 9/24/12 | Mon 9/24/12 |  | Mr. HienNV, PFM Team |
| 3.2.7.6 Borrowing and Lending function (Input screen) | 0 day | Mon 9/24/12 | Mon 9/24/12 |  | Mr. HienNV, PFM Team |
| 3.2.8 Update Report 1 | 7 days | Mon 9/24/12 | Mon 10/1/12 |  | GamNT |
| 3.2.9 Update SRS | 7 days | Mon 9/24/12 | Mon 10/1/12 |  | GamNT, LinhLLL |
| 3.2.10 Update Final GUI ( release) | 7 days | Mon 9/24/12 | Mon 10/1/12 |  | LinhLLL |
| 3.2.11 Update System design | 7 days | Mon 9/24/12 | Mon 10/1/12 |  | LocND, TuanNA |
| 3.2.11.1 Update Database design | 7 days | Mon 9/24/12 | Mon 10/1/12 |  | TuanNA |
| 3.2.11.2 Update System design | 7 days | Mon 9/24/12 | Mon 10/1/12 |  | LocND |
| 3.2.11.3 Create detail database design | 7 days | Mon 9/24/12 | Mon 10/1/12 |  | TuanNA |
| 3.2.11.4 Create detail system design | 7 days | Mon 9/24/12 | Mon 10/1/12 |  | LocND |
| 3.2.12 Prepare slide for the project assessment | 1 day | Tue 9/25/12 | Tue 9/25/12 |  | LinhLLL, TuanNA |
| 3.2.13 Create testcase for Schedule, Borrowing and Lending function | 2 days | Thu 9/27/12 | Sat 9/29/12 |  | KhanhLTM |
| 3.2.14 Research | 2 days | Wed 9/26/12 | Thu 9/27/12 |  | LocND |
| 3.2.14.1 QR code | 1 day | Wed 9/26/12 | Wed 9/26/12 |  | LocND |
| 3.2.14.2 NFC code | 1 day | Thu 9/27/12 | Thu 9/27/12 |  | LocND |
| 3.2.15 Create research report | 2 days | Wed 9/26/12 | Thu 9/27/12 |  | LocND |
| 3.2.16 Create detail function information document | 1 day | Thu 9/27/12 | Thu 9/27/12 |  | GamNT |
| 3.2.17 Release Schedule, Borrowing and Lending function | 0 day | Wed 10/3/12 | Wed 10/3/12 |  | LocND,TuanNA |
| 3.2.18 Execute test | 1 days | Wed 10/3/12 | Thu 10/4/12 |  | KhanhLTM, LinhLLL, GamNT |
| 3.2.19 Complete test round 1 | 0 day | Thu 10/4/12 | Thu 10/4/12 |  | KhanhLTM, LinhLLL, GamNT |
| 3.2.20 Fix bugs of Schedule, Borrowing and Lending function | 3 day | Thu 10/4/12 | Sat 10/6/12 |  | TuanNA, LocND |
| 3.2.21 Execute test round 2 | 1 day | Sat 10/6/12 | Sun 10/7/12 |  | KhanhLTM, LinhLLL, GamNT |
| 3.2.22 Create report 2 (Plan) | 5 days | Mon 10/1/12 | Fri 10/5/12 |  | GamNT |
| 3.2.23 Review Schedule, Borrowing and Lending function | 0 day | Mon 10/8/12 | Mon 10/8/12 |  | Mr HienNV, PFM Team |
| 3.2.23.1 Schedule function (all screen) | 0 day | Mon 10/8/12 | Mon 10/8/12 |  | Mr HienNV, PFM Team |
| 3.2.23.2 Borrowing and Lending function (all screen) | 0 day | Mon 10/8/12 | Mon 10/8/12 |  | Mr HienNV, PFM Team |
| 3.2.23.3 Intergrate Schedule and Borrowing & Lending function | 0 day | Mon 10/8/12 | Mon 10/8/12 |  | Mr HienNV, PFM Team |
| 3.2.23.4 GUI | 0 day | Mon 10/8/12 | Mon 10/8/12 |  | Mr HienNV, PFM Team |
| 3.2.23.3 Report 2 | 0 day | Mon 10/8/12 | Mon 10/8/12 |  | Mr HienNV, PFM Team |
| 3.2.24 Meeting for complete sprint 1 | 0 day | Mon 10/8/12 | Mon 10/8/12 |  | Mr HienNV, PFM Team |
| **3.3 Sprint 2 ( Income and Expense management, Warning function)** | **12 days** | **Mon 10/8/12** | **Sat 10/20/12** |  |  |
| 3.3.1 Update Use case | 2 days | Mon 10/8/12 | Wed 10/10/12 |  | LinhLLL |
| 3.3.2 Create GUI for Sprint 2 (ver 0.1) | 4 days | Mon 10/8/12 | Fri 10/12/12 |  | LinhLLL |
| 3.3.2.1 Income and Expense management | 3 days | Mon 10/8/12 | Thu 10/11/12 |  | LinhLLL |
| 3.3.2.1 Main screen | 1 day | Mon 10/8/12 | Tue 10/9/12 |  | LinhLLL |
| 3.3.2.2 View detail income and expense screen | 1 day | Tue 10/9/12 | Wed 10/10/12 |  | LinhLLL |
| 3.3.2.3 Input income or expense screen | 1 day | Wed 10/10/12 | Thu 10/11/12 |  | LinhLLL |
| 3.3.2.4 Edit income or expense screen | 1 day | Thu 10/11/12 | Fri 10/12/12 |  | LinhLLL |
| 3.3.2.2 Warning, Report | 3 days | Tue 10/9/12 | Fri 10/12/12 |  | LinhLLL |
| 3.3.2.2.1 Set up warning screen | 1 day | Tue 10/9/12 | Wed 10/10/12 |  | LinhLLL |
| 3.3.2.2.2 Report screen | 2 days | Wed 10/10/12 | Fri 10/12/12 |  | LinhLLL |
| 3.3.3 Update System design | 5 days | Mon 10/8/12 | Thu 10/13/12 |  | LocND, TuanNA |
| 3.3.4 Update report 2 ( Plan) | 7 days | Mon 10/8/12 | Mon 10/15/12 |  | PFM Team |
| 3.3.5 Coding | 7 days | Mon 10/8/12 | Mon 10/15/12 |  | LocND |
| 3.3.5.1 Income and Expense management | 7 days | Mon 10/8/12 | Mon 10/15/12 |  | LocND |
| 3.3.5.2 Warning | 7 days | Mon 10/8/12 | Mon 10/15/12 |  | LocND |
| 3.3.6 Create test case for sprint 2 | 3 days | Wed 10/11/12 | Sun 10/14/12 |  | KhanhLTM |
| 3.3.7 Research chart engine for report function | 10 days | Mon 10/8/12 | Thu 10/18/12 |  | TuanNA |
| 3.3.7 Summit and Review | 0 day | Mon 10/15/12 | Mon 10/15/12 |  | Mr. HienNV, PFM Team |
| 3.3.7.1 Report 2 | 0 day | Mon 10/15/12 | Mon 10/15/12 |  | Mr. HienNV, PFM Team |
| 3.3.7.2 Coding ( All functions) | 0 day | Mon 10/15/12 | Mon 10/15/12 |  | Mr. HienNV, PFM Team |
| 3.3.7.3 GUI | 0 day | Mon 10/15/12 | Mon 10/15/12 |  | Mr. HienNV, PFM Team |
| 3.3.7.4 System design | 0 day | Mon 10/15/12 | Mon 10/15/12 |  | Mr. HienNV, PFM Team |
| 3.3.8 Update GUI (final) | 1 day | Mon 10/15/12 | Tue 10/16/12 |  | LinhLLL |
| 3.3.9 Execute test round 1 | 1 day | Mon 10/15/12 | Tue 10/16/12 |  | KhanhLTM, LinhLLL, GamNT |
| 3.3.10 Fix bugs | 2 days | Tue 10/16/12 | Thu 10/18/12 |  | LocND |
| 3.3.11 Execute test round 2 | 1 day | Thu 10/18/12 | Fri 10/19/12 |  | KhanhLTM, LinhLLL, GamNT |
| 3.3.12 Release final build version | 1 day | Fri 10/19/12 | Sat 10/20/12 |  | LocND |
| 3.3.12 Review Income and Expense management, Warning functions | 0 day | Sat 10/20/12 | Sat 10/20/12 |  | Mr. HienNV, PFM Team |
| 3.3.13 Meeting for complete sprint 2 | 0 day | Sat 10/20/12 | Sat 10/20/12 |  | Mr. HienNV, PFM Team |
| **3.4 Sprint 3 ( NFC and QR Code)** | **12 days** | **Sat 10/20/12** | **Thu 11/1/12** |  |  |
| 3.3.1 Update Use case | 1 day | Sat 10/20/12 | Sun 10/21/12 |  | LinhLLL |
| 3.3.2 Create GUI (ver 0.1) | 2 days | Sat 10/20/12 | Mon 10/22/12 |  | LinhLLL |
| 3.3.2.1 NFC | 2 days | Sat 10/20/12 | Mon 10/22/12 |  | LinhLLL |
| 3.3.2.2 QR code | 2 days | Sat 10/20/12 | Mon 10/22/12 |  | LinhLLL |
| 3.3.3 Update System design | 2 days | Sat 10/20/12 | Mon 10/22/12 |  | LocND, TuanNA |
| 3.3.4 Update report 2 ( Plan) | 2 days | Sat 10/20/12 | Mon 10/22/12 |  | LinhLLL, GamNT |
| 3.3.5 Coding | 16 days | Sat 10/20/12 | Mon 11/5/12 |  | LocND, TuanNA |
| 3.3.5.1 Use QR code to input expense | 16 days | Sat 10/20/12 | Mon 11/5/12 |  | TuanNA |
| 3.3.5.2 Use NFC to input expense | 16 days | Sat 10/20/12 | Mon 11/5/12 |  | LocND |
| 3.3.6 Create test case for sprint 3 | 3 days | Sat 10/20/12 | Tue 10/23/12 |  | KhanhLTM |
| 3.3.7 Summit and Review | 0 day | Mon 11/5/12 | Mon 11/5/13 |  | Mr. HienNV, PFM Team |
| 3.3.7.1 Report 2 (final) | 0 day | Mon 11/5/12 | Mon 11/5/12 |  | Mr. HienNV, PFM Team |
| 3.3.7.2 Coding | 0 day | Mon 11/5/12 | Mon 11/5/12 |  | Mr. HienNV, PFM Team |
| 3.3.7.3 GUI | 0 day | Mon 11/5/12 | Mon 11/5/12 |  | Mr. HienNV, PFM Team |
| 3.3.7.4 Test case | 0 day | Mon 11/5/12 | Mon 11/5/12 |  | Mr. HienNV, PFM Team |
| 3.3.8 Execute test round 1 | 1 day | Mon 11/5/12 | Tue 11/6/12 |  | KhanhLTM, LinhLLL, GamNT |
| 3.3.9 Fix bugs | 1 days | Tue 11/6/12 | Tue 11/6/12 |  | LocND, TuanNA |
| 3.3.10 Execute test round 2 | 1 day | Tue 11/6/12 | Tue 11/6/12 |  | KhanhLTM, LinhLLL, GamNT |
| 3.3.11 Summit and review | 0 day | Thu 11/8/12 | Thu 11/8/12 |  | Mr. HienNV, PFM Team |
| 3.3.11.1 Review NFC and QR code | 0 day | Thu 11/8/12 | Thu 11/8/12 |  | Mr. HienNV, PFM Team |
| 3.3.12 Meeting for complete sprint 3 | 0 day | Thu 11/8/12 | Thu 11/8/12 |  | Mr. HienNV, PFM Team |
| **3.4 Sprint 4 ( Synchronize function & Report function)** | **10 days** | **Thu 11/8/12** | **Sun 11/18/12** |  |  |
| 3.4.1 Update Use case | 2 days | Thu 11/8/12 | Sat 11/10/12 |  | LinhLLL |
| 3.4.2 Create GUI of Synchronize function (ver 0.1) | 1 day | Thu 11/8/12 | Fri 11/9/12 |  | LinhLLL |
| 3.4.3 Update System design | 3 days | Thu 11/8/12 | Sun 11/11/12 |  | LocND, TuanNA |
| 3.4.4 Update SRS(ver 0.2) | 3 days | Thu 11/8/12 | Sun 11/11/12 |  | GamNT, LinhLLL |
| 3.4.5 Coding | 7 days | Thu 11/8/12 | Thu 11/15/12 |  | LocND, TuanNA |
| 3.4.5.1 Synchronize function | 7 days | Thu 11/8/12 | Thu 11/15/12 |  | LocND |
| 3.4.5.2 Report function | 7 days | Thu 11/8/12 | Thu 11/15/12 |  | TuanNA |
| 3.4.6 Create test case for sprint 4 | 3 days | Thu 11/8/12 | Sun 11/11/12 |  | KhanhLTM |
| 3.4.7 Summit and Review | 0 day | Mon 11/12/12 | Mon 11/12/12 |  | Mr. HienNV, PFM Team |
| 3.4.7.1 Report 3 (ver 0.1) | 0 day | Mon 11/12/12 | Mon 11/12/12 |  | Mr. HienNV, PFM Team |
| 3.4.7.2 Coding | 0 day | Mon 11/12/12 | Mon 11/12/12 |  | Mr. HienNV, PFM Team |
| 3.4.7.3 GUI | 0 day | Mon 11/12/12 | Mon 11/12/12 |  | Mr. HienNV, PFM Team |
| 3.4.7.4 Test case | 0 day | Mon 11/12/12 | Mon 11/12/12 |  | Mr. HienNV, PFM Team |
| 3.4.8 Execute test round 1 | 1 day | Thu 11/15/12 | Fri 11/16/12 |  | KhanhLTM, LinhLLL, GamNT |
| 3.4.9 Fix bugs | 1 day | Fri 11/16/12 | Sat 11/17/12 |  | LocND, TuanNA |
| 3.4.10 Execute test round 2 | 1 day | Sat 11/17/12 | Sun 11/18/12 |  | KhanhLTM, LinhLLL, GamNT |
| 3.4.11 Summit and review | 0 day | Sun 11/18/12 | Sun 11/18/12 |  | Mr. HienNV, PFM Team |
| 3.4.11.1 Synchronize function | 0 day | Sun 11/18/12 | Sun 11/18/12 |  | Mr. HienNV, PFM Team |
| 3.4.12 Meeting for complete sprint 4 | 0 day | Sun 11/18/12 | Sun 11/18/12 |  | Mr. HienNV, PFM Team |
| **4. Sprint 5 (Import & export fuction)** | 11 days | Sun 11/18/12 | Thu 11/29/12 |  |  |
| 4.1 Create final GUI of application | 5 days | Sun 11/18/12 | Fri 11/23/12 |  | LinhLLL |
| 4.2 Update report 3 (ver 0.1) | 3 days | Sun 11/18/12 | Tue 11/20/12 |  | GamNT |
| 4.3 Coding | 10 days | Sun 11/18/12 | Wed 11/28/12 |  | LocND, TuanNA |
| 4.3.1 Update code of report function | 10 days | Sun 11/18/12 | Wed 11/28/12 |  | TuanNA |
| 4.3.2 Import and export function | 5 days | Sun 11/18/12 | Fri 11/23/12 |  | LocND |
| 4.4 Create test case for sprint 5 | 6 days | Sun 11/18/12 | Sat 11/24/12 |  | KhanhLTM |
| 4.5 Execute test round 1 | 1 day | Sat 11/24/12 | Sun 11/25/12 |  | KhanhLTM, LinhLLL, GamNT |
| 4.6 Fix bugs | 2 day | Sun 11/25/12 | Tue 11/27/12 |  | LocND, TuanNA |
| 4.7 Execute test round 2 | 1 day | Tue 11/27/12 | Wed 11/28/12 |  | KhanhLTM, LinhLLL, GamNT |
| 4.8 Summit and review | 0 day | Thu 11/29/12 | Thu 11/29/12 |  | Mr. HienNV, PFM Team |
| 4.8.1 Final GUI | 0 day | Thu 11/29/12 | Thu 11/29/12 |  | Mr. HienNV, PFM Team |
| 4.8.2 Import and export function | 0 day | Thu 11/29/12 | Thu 11/29/12 |  | Mr. HienNV, PFM Team |
| **5. System implement** | 5 days | Thu 11/29/12 | Tue 12/4/12 |  |  |
| 4.1 Intergrate 4 main functions | 5 days | Thu 11/29/12 | Tue 12/4/12 |  | LocND, TuanNA |
| 4.2 Update code of report function | 5 days | Thu 11/29/12 | Tue 12/4/12 |  | TuanNA |
| 4.3 Update report 3 (ver 0.2) | 3 days | Thu 11/29/12 | Sun 12/2/12 |  | GamNT, LinhLLL |
| 4.4 Create report 5 | 5 days | Thu 11/29/12 | Tue 12/4/12 |  | KhanhLTM |
| 4.5 Create report 4 (ver 0.1) | 5 days | Thu 11/29/12 | Tue 12/4/12 |  | LocND, TuanNA |
| 4.6 Update final GUI (ver 0.1) | 5 days | Thu 11/29/12 | Tue 12/4/12 |  | LinhLLL, KhanhLTM |
| 4.7 Summit and review | 0 day | Tue 12/4/12 | Tue 12/4/12 |  | Mr. HienNV, PFM Team |
| 4.7.1 Coding | 0 day | Tue 12/4/12 | Tue 12/4/12 |  | Mr. HienNV, PFM Team |
| 4.7.2 Report 3 | 0 day | Tue 12/4/12 | Tue 12/4/12 |  | Mr. HienNV, PFM Team |
| 4.7.3 Report 4 | 0 day | Tue 12/4/12 | Tue 12/4/12 |  | Mr. HienNV, PFM Team |
| **5. System test** | 7 days | Tue 12/4/12 | Tue 12/11/12 |  |  |
| 5.1 Update final GUI (ver 0.2) | 5 days | Tue 12/4/12 | Sun 12/9/12 |  | LinhLLL |
| 5.2 Update report 4 (ver 0.2) | 3 days | Tue 12/4/12 | Fri 11/7/12 |  | LocND, TuanNA |
| 5.3 Prepare document for closing project | 7 days | Tue 12/4/12 | Tue12/11/12 |  | PFM Team |
| 5.3.1 Update report 5 (ver 0.1) | 2 days | Tue 12/4/12 | Thu 12/6/12 |  | KhanhLTM |
| 5.3.2 Update report 4 (final) | 5 days | Tue 12/4/12 | Sun 12/9/12 |  | LocND, TuanNA |
| 5.3.3 Create final report | 5 days | Tue 12/4/12 | Sun 12/9/12 |  | PFM Team |
| 5.3.4 Create User Manual Document | 6 days | Tue 12/4/12 | Mon 12/10/12 |  | PFM Team |
| 5.4 Summit and review | 0 day | Tue 12/11/12 | Tue 12/11/12 |  | Mr. HienNV, PFM Team |
| 5.4.1 Report 4 | 0 day | Tue 12/11/12 | Tue 12/11/12 |  | Mr. HienNV, PFM Team |
| 5.4.2 Report 5 | 0 day | Tue 12/11/12 | Tue 12/11/12 |  | Mr. HienNV, PFM Team |
| 5.4.3 Final report | 0 day | Tue 12/11/12 | Tue 12/11/12 |  | Mr. HienNV, PFM Team |
| 5.4.4 User manual | 0 day | Tue 12/11/12 | Tue 12/11/12 |  | Mr. HienNV, PFM Team |
| 5.4.5 Final GUI | 0 day | Tue 12/11/12 | Tue 12/11/12 |  | Mr. HienNV, PFM Team |
| **6. Closing** | 10 days | Tue 12/11/12 | Fri 12/21/12 |  |  |
| 6.1 Prepare project presentation | 7 days | Tue 12/11/12 | Tue 12/18/12 |  | PFM Team |
| 6.2 Complete final report | 7 days | Tue 12/11/12 | Tue 12/18/12 |  | GamNT |
| 6.3 Complete project presentation | 2 days | Tue 12/11/12 | Thu 12/20/12 |  | LinhLLL |
| 6.4 Release final report & project code | 0 day | Tue 12/11/12 | Tue 12/18/12 |  | PFM Team |
| 6.5 Meeting for closing project | 0 day | Tue 12/11/12 | Tue 12/11/12 |  | Mr. HienNV, PFM Team |

### All Meeting Minutes

Here is a template for meeting minute within the project’s life cycle



## Coding Convention

We follow standard Java coding conventions. We add a few rules:

### Java Language Rules

#### Don’t Ignore Exceptions

Sometimes it is tempting to write code that completely ignores an exception like this:

|  |
| --- |
| private void setServerPort(String value) {  try {  serverPort = Integer.parseInt(value);  } catch (NumberFormatException e) { }  } |

You must never do this. While you may think that your code will never encounter this error condition or that it is not important to handle it, ignoring exceptions like above creates mines in your code for someone else to trip over some day. You must handle every Exception in your code in some principled way. The specific handling varies depending on the case.

Acceptable alternatives (in order of preference) are:

* Throw the exception up to the caller of your method.

|  |
| --- |
| private void setServerPort(String value) throws NumberFormatException {  serverPort = Integer.parseInt(value);  } |

* Throw a new exception that's appropriate to your level of abstraction.

|  |
| --- |
| private void setServerPort(String value) throws ConfigurationException {  try {  serverPort = Integer.parseInt(value);  } catch (NumberFormatException e) {  throw new ConfigurationException("Port " + value + " is not valid.");  }  } |

* Handle the error gracefully and substitute an appropriate value in the catch {} block.

|  |
| --- |
| /\*\* Set port. If value is not a valid number, 80 is substituted. \*/  private void setServerPort(String value) {  try {  serverPort = Integer.parseInt(value);  } catch (NumberFormatException e) {  serverPort = 80; // default port for server  }  } |

* Catch the Exception and throw a new RuntimeException. This is dangerous: only do it if you are positive that if this error occurs, the appropriate thing to do is crash.

|  |
| --- |
| /\*\* Set port. If value is not a valid number, die. \*/  private void setServerPort(String value) {  try {  serverPort = Integer.parseInt(value);  } catch (NumberFormatException e) {  throw new RuntimeException("port " + value + " is invalid, ", e);  }  } |

Note that the original exception is passed to the constructor for RuntimeException. If your code must compile under Java 1.3, you will need to omit the exception that is the cause.

* Last resort: if you are confident that actually ignoring the exception is appropriate then you may ignore it, but you must also comment why with a good reason:

|  |
| --- |
| /\*\* If value is not a valid number, original port number is used. \*/  private void setServerPort(String value) {  try {  serverPort = Integer.parseInt(value);  } catch (NumberFormatException e) {  // Method is documented to just ignore invalid user input.  // serverPort will just be unchanged.  }  } |

#### Fully Qualify Imports

When you want to use class Bar from package foo, there are two possible ways to import it:

|  |
| --- |
| import foo.\*; |

Pros: Potentially reduces the number of import statements

|  |
| --- |
| import foo.Bar; |

Pros: Makes it obvious what classes are actually used. Makes code more readable for maintainers.

Decision: Use the latter for importing all Android code. An explicit exception is made for java standard libraries (java.util.\*, java.io.\*, etc.) and unit test code (junit.framework.\*)

### Java Style Rules

#### Use Javadoc Standard Comments

Every file should have a copyright statement at the top. Then a package statement and import statements should follow, each block separated by a blank line. And then there is the class or interface declaration. In the Javadoc comments, describe what the class or interface does.

|  |
| --- |
| */\**  *\* Copyright (C) 2010 The Android Open Source Project*  *\**  *\* Licensed under the Apache License, Version 2.0 (the "License");*  *\* you may not use this file except in compliance with the License.*  *\* You may obtain a copy of the License at*  *\**  *\* http://www.apache.org/licenses/LICENSE-2.0*  *\**  *\* Unless required by applicable law or agreed to in writing, software*  *\* distributed under the License is distributed on an "AS IS" BASIS,*  *\* WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.*  *\* See the License for the specific language governing permissions and*  *\* Limitations under the License.*  *\*/*  *package com.android.internal.foo;*  *import android.os.Blah;*  *import android.view.Yada;*  *import java.sql.ResultSet;*  *import java.sql.SQLException;*  */\*\**  *\* Does X and Y and provides an abstraction for Z.*  *\*/*  *public class Foo {*  *...*  *}* |

Every class and nontrivial public method you write must contain a Javadoc comment with at least one sentence describing what the class or method does. This sentence should start with a 3rd person descriptive verb.

Examples:

|  |
| --- |
| */\*\* Returns the correctly rounded positive square root of a double value. \*/*  *private static double sqrt(double a) {*  *...*  *}* |

Or

|  |
| --- |
| */\*\**  *\* Constructs a new String by converting the specified array of*  *\* bytes using the platform's default character encoding.*  *\*/*  *public String(byte[] bytes) {*  *...*  *}* |

#### Limit Variable Scope

The scope of local variables should be kept to a minimum (Effective Java Item 29). By doing so, you increase the readability and maintainability of your code and reduce the likelihood of error. Each variable should be declared in the innermost block that encloses all uses of the variable.

Local variables should be declared at the point they are first used. Nearly every local variable declaration should contain an initializer. If you don't yet have enough information to initialize a variable sensibly, you should postpone the declaration until you do.

One exception to this rule concerns try-catch statements. If a variable is initialized with the return value of a method that throws a checked exception, it must be initialized inside a try block. If the value must be used outside of the try block, then it must be declared before the try block, where it cannot yet be sensibly initialized:

|  |
| --- |
| *// Instantiate class cl, which represents some sort of Set*  *Set s = null;*  *try {*  *s = (Set) cl.newInstance();*  *} catch(IllegalAccessException e) {*  *throw new IllegalArgumentException(cl + " not accessible");*  *} catch(InstantiationException e) {*  *throw new IllegalArgumentException(cl + " not instantiable");*  *}*  *// Exercise the set*  *s.addAll(Arrays.asList(args));* |

But even this case can be avoided by encapsulating the try-catch block in a method:

|  |
| --- |
| *private Set createSet(Class cl) {*  *// Instantiate class cl, which represents some sort of Set*  *try {*  *return (Set) cl.newInstance();*  *} catch(IllegalAccessException e) {*  *throw new IllegalArgumentException(cl + " not accessible");*  *} catch(InstantiationException e) {*  *throw new IllegalArgumentException(cl + " not instantiable");*  *}*  *}*  *...*  *// Exercise the set*  *Set s = createSet(cl);*  *s.addAll(Arrays.asList(args));* |

Loop variables should be declared in the for statement itself unless there is a compelling reason to do otherwise:

|  |
| --- |
| for (int i = 0; i n; i++) {  doSomething(i);  } |

And

|  |
| --- |
| for (Iterator i = c.iterator(); i.hasNext(); ) {  doSomethingElse(i.next());  } |

#### Follow Field Naming Conventions

* Non-public, non-static field names start with m.
* Static field names start with s.
* Other fields start with a lower case letter.
* Public static final fields (constants) are ALL\_CAPS\_WITH\_UNDERSCORES.

For example:

|  |
| --- |
| public class MyClass {  public static final int SOME\_CONSTANT = 42;  public int publicField;  private static MyClass sSingleton;  int mPackagePrivate;  private int mPrivate;  protected int mProtected;  } |

#### Use Standard Java Annotations

Annotations should precede other modifiers for the same language element. Simple marker annotations (e.g. @Override) can be listed on the same line with the language element. If there are multiple annotations, or parameterized annotations, they should each be listed one-per-line in alphabetical order.

Android standard practices for the three predefined annotations in Java are:

* @Deprecated: The @Deprecated annotation must be used whenever the use of the annotated element is discouraged. If you use the @Deprecated annotation, you must also have a @deprecated Javadoc tag and it should name an alternate implementation. In addition, remember that a @Deprecated method is still supposed to work.

If you see old code that has a @deprecated Javadoc tag, please add the @Deprecated annotation.

* @Override: The @Override annotation must be used whenever a method overrides the declaration or implementation from a super-class.

For example, if you use the @inheritdocs Javadoc tag, and derive from a class (not an interface), you must also annotate that the method @Overrides the parent class's method.

* @SuppressWarnings: The @SuppressWarnings annotation should only be used under circumstances where it is impossible to eliminate a warning. If a warning passes this "impossible to eliminate" test, the @SuppressWarnings annotation must be used, so as to ensure that all warnings reflect actual problems in the code.

When a @SuppressWarnings annotation is necessary, it must be prefixed with a TODO comment that explains the "impossible to eliminate" condition. This will normally identify an offending class that has an awkward interface. For example:

|  |
| --- |
| *// TODO: The third-party class com.third.useful.Utility.rotate() needs generics*  *@SuppressWarnings("generic-cast")*  *List<String> blix = Utility.rotate(blax);* |

When a @SuppressWarnings annotation is required, the code should be refactored to isolate the software elements where the annotation applies.

#### Treat Acronyms as Words

Treat acronyms and abbreviations as words in naming variables, methods, and classes. The names are much more readable:

|  |  |
| --- | --- |
| **Good** | **Bad** |
| XmlHttpRequest | XMLHTTPRequest |
| getCustomerId | getCustomerID |
| class Html | class HTML |
| String url | String URL |
| long id | long ID |

Both the JDK and the Android code bases are very inconsistent with regards to acronyms, therefore, it is virtually impossible to be consistent with the code around you. Bite the bullet, and treat acronyms as words.

# Software Requirements Specifications

## Introduction

The introduction of the **Software Requirements Specification (SRS)** provides an overview of the entire **SRS**. It includes the purpose, scope, definitions, acronyms, abbreviations, references, and overview of the **SRS.**

### Purpose

This SRS document describes functional and nonfunctional requirements for the Money Tracker, helps user manage personal finance. This document is intended to be used by the members of the project team that will implement and verify the correct functioning of the system.

### Scope

The product that will be developed is a Money Tracker. This product uses both hardware, software, and many technologies to support the task at hand.

It is application for Android and using NFC technology.

### Definitions, Acronyms, and Abbreviations

| Abbreviations | Description | Note |
| --- | --- | --- |
| PFM | Personal Finance Management |  |
| PM | Project Manager |  |
| NFC | Near Field Communication |  |
| TP | Test Plan |  |
| TC | Test Case |  |
| TR | Test Report |  |
| UT | Unit test |  |
| SRS | Software Requirements Specification |  |
| MSG | Message |  |

### References

### Overview

This document contains the complete description of the behavior of Personal Finance Management application and includes a set of use cases that describe interactions the users will have with the software. In addition it also contains non-functional requirements. Non-functional requirements impose constraints on the design or implementation (such as performance engineering requirements, quality standards, or design constraints).

## Specific Requirements

This section of the SRS contains all software requirements to a level of detail sufficient to enable designers to design a system to satisfy those requirements, and testers to test that the system satisfies those requirements. When using use-case modeling, these requirements are captured in the Use Cases and the applicable supplementary specifications. If use-case modeling is not used, the outline for supplementary specifications may be inserted directly into this section, as shown below.

### External Interface Requirements

#### User Interface

* Application’s interfaces need to be clear and easy to use.
* Show message to confirm user in necessary cases.
* Display alert if user makes an error.
* Charts are clear and easy to understand.

#### Hardware Interfaces

* Google devices that support Android OS.
* NFC tags.
* Server.

#### Software Interfaces

* Java Development Kit (required for Android deployment).
* Android SDK (required for Android deployment).
* Eclipse (required for development environment).
* SQLite.
* Windows server.

### Functional Requirements

This section describes specific features of the software project. If desired, some requirements may be specified in the use-case format and listed in the Use Cases Section.

#### Incomes and Expense management

This is the main and most important function of the system. It helps user manage revenue and expenditure every month. This function allows the user to input the income / expenses in every day and then save the data.

* Input expenses:
* The program will provide a default list of expenditures for user selected to input data (“Ăn uống”, “Điện”, “Nước”, “Sinh nhật”, “Tiệc ”, “Nhà”…)
* If expenses are not included in the list, the user can create a new account by selecting the "Khác". When select this option, immediately below will appear second textbox allows the user to manually enter other expenses. Then the program will automatically update the list to user do not have to re-enter when need enter a similar cost.
* After user saves one new expense in the day, at the bottom of the screen will display information:
* The total cost was used
* The remaining amount
* Use the QR code to input data
* Use NFC to input data
* Input revenue: Users can manipulate the same with expenses.

#### Schedule

This function helps user plan expenditure every month/week.

* The system will default time to start is the current date, in addition  
  the user also can manually enter start date.
* Next is total money user will expense in month/week (include total budget and detail budget)
* The user can enter a total budget, or just enter detailed budget.
* When the user does not enter a total budget, just enter the details budget,  
  system will automatically update the total budget.
* With detailed budget system will support a list of expenditures   
  (“Ăn uống”, “Điện”, “Nước”, “Sinh nhật”, “Tiệc tùng”, “Nhà”…) to user select. With one expenses not included in the list, the user can  
  select the "Khác" and create one new detail budget. And then system will save  
  and update it on the list available.
* If a user enters the detailed budget and total budget, when total of details budget greater total budget, the system will alert by displaying message with two options:
* Automatically update the total budget to match the detailed budget.
* Allow user update total budget or edit detail budget to accord.

#### Borrowing and lending management

This function allows the user to easily manage borrowing and lending.

With account payables or account receivables, the user will enter the necessary information such as:

* Total money (borrowing, lending or saving)
* Name (the lender, the borrower or where saving)
* Phone numbers and addresses.
* Term (borrowing, lending, saving).
* This type of interest rate.
* Interest (only support a fixed rate).
* In the case “Name” has in the contacts of mobile, the system will retrieve the information such as phone number and address of this person and user will not have to manually enter.
* User can view details borrowing, lending or saving, and interest received each day.

When view, the system will sort accounts follow maturity closest

#### Statistics

This function helps user has an overview of the expenses in a month or week, compare with plan or other month or week.

Beside detail report income and expense in the form of small reports, system also has some charts such as pie chart, bar charts to help user analyses and understand about their income and expense of the week, months and between the weeks and months.

#### Warning

This function uses to reminder users about expenditures, borrowing, lending and saving.

* When expenditures exceed plan.
* When the maturity of borrowing or lending.

#### Synchronize

This function will ensure the safety data for user, and support the users use multiple devices.  
Data created by user will be stored in the device, when a network connection, data will be synchronized with the server. And in other devices, if a network connection, this data  
will also be updated from the server.

#### Export/Import

### Use Cases

#### Use Case 1: Schedule

* Use case Diagram

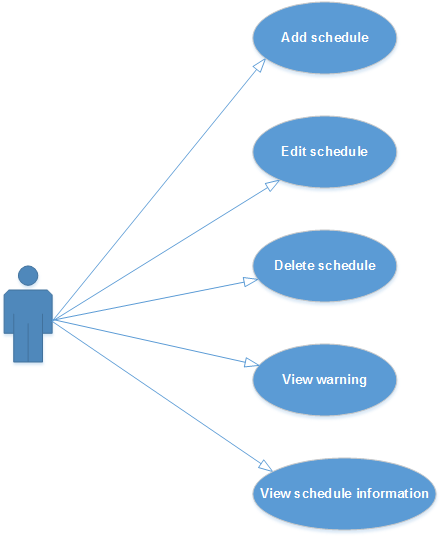


Figure 1: Schedule use-case diagram

* Use case Specification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- Create Schedule SPECIFICATION** | | | | |
| **Use-case No.** | UC SC.1 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Create Schedule** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/09/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can create budget, detail expense for current week or month.  **Goal:**  Allow user create budget and plan schedule.  **Triggers**  Touch schedule icon, second icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen | | **2** | Touch create icon at the top- right concern of screen | Display create screen | | **3** | Touch “Tháng” toggle | Change toggle “Tháng” to “Tuần” | | **4** | Enter data into “Tổng ngân sách” field | Display entered data | | **5** | Touch save icon at the top- right concern of screen | * Return “Tháng” screen * Show message “Đã lưu” * Display saved data |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen | | **2** | Touch create icon at the top- right concern of screen | Display create screen | | **3** | Enter data into all fields | Display all entered data | | **4** | Touch cancel icon beside save icon | * Return “Tháng” screen |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen | | **2** | Touch create icon at the top- right concern of screen | Display create screen | | **3** | Enter data into “Ăn uống” field on screen | Display entered data | | **4** | Touch plus icon beside “Ăn uống” field | Display:   * Default value of combobox is: “Ăn uống” * One field | | **5** | Touch combobox “Ăn uống” | Display list options:   * Điện * Nước * Nhà * Sinh nhật * Khác | | **6** | Choose “Điện” option | Display combobox value is “Điện” | | **7** | Enter data into new field | Display entered data | | **8** | Touch save icon at the top- right concern of screen | * Return “Tháng” screen * Show message “Đã lưu” * Display saved data |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen | | **2** | Touch create icon at the top- right concern of screen | Display create screen | | **3** | Touch first date field | Choose desired time | | **4** | Enter data into “Tổng ngân sách” field | Display entered data | | **5** | Touch save icon | * Return “Tháng” screen * Show message “Đã lưu” * Display saved data |   **Exceptions:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen | | **2** | Touch create icon at the top- right concern of screen | Display create screen | | **3** | Touch first date field | Choose desired time | | **4** | Enter data into “Tổng ngân sách” field | Display entered data | | **5** | Enter data into “Ăn uống” field on screen | Display entered data | | **6** | Touch plus icon beside “Ăn uống” field | Display:   * Default value of combobox is: “Ăn uống” * One field | | **7** | Enter data into new field | Display entered data | | **5** | Touch save icon | If total of detail budget greater than “Tổng ngân sách” display:   * Message: “Đã vượt quá ngân sách, tăng thêm ngân sách?” * 2 buttons: “Có” and “Không” |     **Relationships:**  UC SC.2, UC SC.3, UC SC.4  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to create new schedule, user must accessed application | | **2** | In order to save schedule, user must enter data into mandatory field |   **Screen:**  **E:\PFM2012\documents\SPEC\Final design\create_schedule_big_screen.png** | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- Edit Schedule SPECIFICATION** | | | | |
| **Use-case No.** | UC SC.2 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Edit Schedule** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/09/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can edit monthly or weekly budget, detail expense for user’s schedule which they created.  **Goal:**  Allow user edit budget and plan schedule.  **Triggers**  Touch “Kế hoạch” tab.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Kế hoạch” screen | | **2** | Choose one schedule in list schedule on screen | Display detail information of schedule | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **4** | Edit data in all fields | All data is changed | | **5** | Touch save icon at the top- right of screen | * Return “Tháng” screen * Show message “Đã lưu” * Display saved data |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Kế hoạch” screen | | **2** | Choose one schedule in list schedule on screen | Display detail information of schedule | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **4** | Edit data in all fields | All data is changed | | **5** | Touch cancel icon beside save icon | * Return “Tháng” screen * No data is edited |   **Exceptions:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Kế hoạch” screen | | **2** | Choose one schedule in list schedule on screen | Display detail information of schedule | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **4** | Edit data in all fields | All data is changed | | **5** | Touch save icon at the top- right of screen | If total of detail budget greater than “Tổng ngân sách” display:   * Message: “Đã vượt quá ngân sách, tăng thêm ngân sách?” * 2 buttons: “Có” and “Không” |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen | | **2** | Touch create icon at the top- right concern of screen | Display create screen | | **3** | Touch first date field | * Choose desired time * If desired time coincides with available time, show:   + Message: “Đã có kế hoạch trong thời gian này! Xin vui lòng chọn lại!” |   **Relationships:**  UC SC.1, UC SC.4  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to edit schedule, user must accessed application | | **2** | In order to edit schedule, “Kế hoạch” screen must have at least one schedule | | **3** | In order to save schedule, user must enter data into at least one field | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- Delete Schedule SPECIFICATION** | | | | |
| **Use-case No.** | UC SC.3 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Delete Schedule** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/09/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can delete schedule.  **Goal:**  Allow user delete schedule.  **Triggers**  Touch “Kế hoạch” icon, second icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen | | **2** | Long click on one schedule in list schedule | Display menu includes:   * “Sửa” * “Xóa” | | **3** | Touch “Xóa” | Show pop-up confirm includes:   * Message: “Xóa?” * 2 buttons: “Có” and “Không” | | **4** | Touch “Có” button | * Clear schedule * Show message: “Đã xóa” |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Kế hoạch” icon, second icon at the bottom of screen | Display “Tháng” screen | | **2** | Long click on one schedule | Display menu includes:   * Sửa * Xóa | | **3** | Touch “Xóa” | Show pop-up confirm includes:   * Message: “Xóa?” * 2 buttons: “Có” and “Không” | | **4** | Touch “Không” button | * Return “Tháng” screen |   **Relationships:**  UC SC.1, UC SC.2, UC SC.4  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to delete schedule, user must accessed application | | **2** | In order to delete schedule, “Schedule” screen must have at least one schedule | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- View Schedule SPECIFICATION** | | | | |
| **Use-case No.** | UC SC.4 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **View Schedule** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/09/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can view list of schedule or schedule detail.  **Goal:**  Allow user view schedule.  **Triggers**  Touch “Kế hoạch” icon, second icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen include list of monthly schedule   * Each schedule includes information below:   + Total budget  + Time  + Chart descripts this schedule | | **2** | Touch “Tuần” tab | Display “Tuần” screen include list of monthly schedule   * Each schedule includes information below:   + Total budget  + Time  + Chart descripts this schedule |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Kế hoạch” icon, second icon at the bottom of screen | Display “Tháng” screen | | **2** | Touch one schedule in list of schedule | Display “Chi tiết kế hoạch” screen includes all information below:   * Schedule time * List items of living cost * Amount of money is used for each item * Simple report |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen with content “Không có dữ liệu” | | **2** | Touch “Tuần” tab | Display “Tháng” screen with content “Không có dữ liệu” |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen with content “Không có dữ liệu” | | **2** | Touch “Tuần” tab | Display “Tuần” screen include list of monthly schedule   * Each schedule includes information below:   + Total budget  + Time  + Chart descripts this schedule |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch second icon at the bottom of screen | Display “Tháng” screen include list of monthly schedule   * Each schedule includes information below:   + Total budget  + Time  + Chart descripts this schedule | | **2** | Touch “Tuần” tab | Display “Tuần” screen with content “Không có dữ liệu” |   **Relationships:**  UC SC.1, UC SC.2, UC SC.3  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to delete schedule, user must accessed application | | **2** | In order to delete schedule, “Kế hoạch” screen must have at least one schedule |   **Screen:**  E:\PFM2012\documents\SPEC\Final design\view_schedule_big_screen.png | | | | |

#### Use Case 2: Incomes and Expenses management

* Use case Diagram

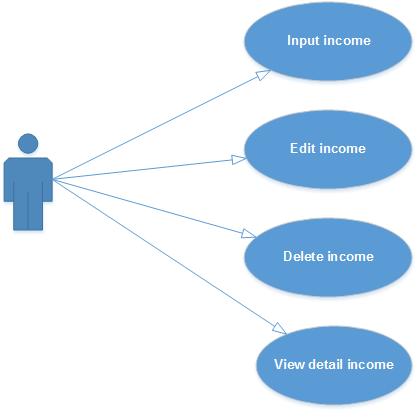


Figure 2: Income management use-case diagram

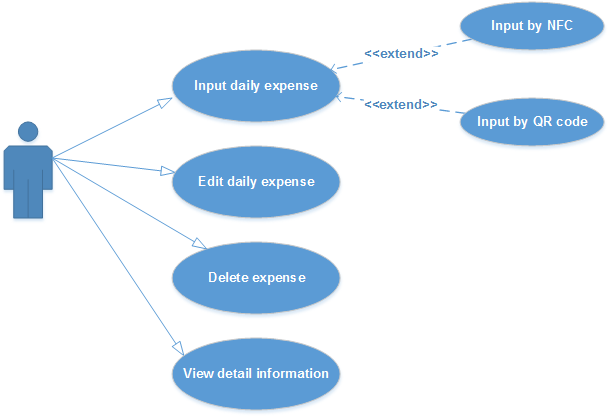


Figure 3: Expense management use-case diagram

* Use case Specification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- VIEW EXPENSE SPECIFICATION** | | | | |
| **Use-case No.** | UC MNG.1 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **View Expense** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 03/10/2012 | **Priority** | **High** | |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Actor:**  User  **Summary:**  User can view monthly expense or daily expense.  **Goal:**  Allow user view detail expense.  **Triggers**  Touch management icon, first icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen includes:   * List of expense * Add new expense icon at the top-right of screen | | **2** | Touch one item of list | Display sub- item of selected item | | **3** | Touch one sub-item | Display “Chi phí ngày” screen |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen includes:   * List of expense * Add new expense icon at the top-right of screen | | **2** | Touch “Thu nhập” tab | Display “Thu nhập” screen |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen with content “Không có dữ liệu” | | **2** | Touch “Thu nhập” tab | Display “Thu nhập” screen with content “Không có dữ liệu” |   **Relationships:**  UC MNG.2, UC MNG.3, UC MNG.4  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to view expense, user must accessed application | | **2** | In order to view detail, user must touch one item of list expense |   **Screen:**  **E:\PFM2012\documents\SPEC\Final design\management_big_screen.pngE:\PFM2012\documents\SPEC\Final design\view_management_big_screen.png** | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- ADD DAILY EXPENSE OR INCOME SPECIFICATION** | | | | |
| **Use-case No.** | UC MNG.2 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Add Daily Expense or Income** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 03/10/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can input daily expense.  **Goal:**  Allow user input detail expense.  **Triggers**  Touch management icon, first icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen | | **2** | Touch add new icon at the top- right concern of screen | Display “Thêm chi phí” screen | | **3** | Enter data into all fields | Display all entered data | | **4** | Touch save icon at the top- right concern of screen | * Return “Chi phí” screen * Show message “Đã lưu” * Display saved data |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen | | **2** | Touch add new icon at the top- right concern of screen | Display “Thêm chi phí” screen | | **3** | Enter data into all fields | Display all entered data | | **4** | Touch cancel icon besides save icon | * Return “Chi phí” screen * Nothing is saved |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen | | **2** | Touch add new icon at the top- right concern of screen | Display “Thêm chi phí” screen | | **3** | Touch “Chi phí” toggle | Change “Chi phí” to “Thu nhập” | | **4** | Enter data into all fields | Display all entered data | | **5** | Touch save icon at the top- right concern of screen | * Return “Chi phí” screen * Show message “Đã lưu” * Display saved data |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen | | **2** | Touch add new icon at the top- right concern of screen | Display “Thêm chi phí” screen | | **3** | Touch first date field | Choose desired time | | **4** | Enter data into all remaining field | Display entered data | | **5** | Touch save icon | * Return “Chi phí” screen * Show message “Đã lưu” * Display saved data |   **Exceptions:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen | | **2** | Touch create icon at the top- right concern of screen | Display “Thêm chi phí ” screen | | **3** | Touch first date field | Choose desired time | | **4** | Enter data into all field | Display entered data   * If amount of money make total expense greater than budget:   + show message: “Chi phí đã vượt quá ngân sách.” | | **5** | Touch save icon | * Return “Chi phí” screen * Show message “Đã lưu” * Display saved data |     **Relationships:**  UC MNG.1, UC MNG.3, UC MNG.4  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to add new daily expense, user must accessed application | | **2** | In order to save expense, user must enter data into mandatory field |   **Screen:**  **E:\PFM2012\documents\SPEC\Final design\create_management_big_screen.png** | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- EDIT EXPENSE OR INCOME SPECIFICATION** | | | | |
| **Use-case No.** | UC MNG.3 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Edit expense or income** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 03/10/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can edit detail expense which they added.  **Goal:**  Allow user edit expense.  **Triggers**  Touch first icon at the bottom of screen  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen includes list of expense | | **2** | Choose one item of list expense on screen | Display view detail screen | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **4** | Edit data in all fields | All data is changed | | **5** | Touch save icon at the top- right of screen | * Return view detail screen * Show message “Đã lưu” * Display saved data |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen | | **2** | Choose one item of list expense on screen | Display view detail screen | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **4** | Edit data in all fields | All data is changed | | **5** | Touch cancel icon beside save icon | * Return view detail screen * No data is edited |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen includes list of expense | | **2** | Choose one item of list expense on screen | Display view detail screen includes detail information of expense | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **4** | * Touch “Chi phí” toggle * Edit data in all fields | * Change “Chi phí” to “Thu nhập” toggle * All data is changed | | **5** | Touch save icon at the top- right of screen | * Return view detail screen * Show message “Đã lưu” * Display saved data |   **Relationships:**  UC MNG.1,UC MNG.2, UC MNG.4  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to edit expense/income, user must accessed application | | **2** | In order to edit expense/income, “Chi phí”/ “Thu nhập” screen must have at least one schedule | | **3** | In order to save what user edited, user must enter data into mandatory field |   **Screen:**  **E:\PFM2012\documents\SPEC\Final design\edit_management_big_screen.png** | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- DELETE EXPENSE OR INCOME SPECIFICATION** | | | | |
| **Use-case No.** | UC MNG.4 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Delete expense or income** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 03/10/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can delete expense or income.  **Goal:**  Allow user delete expense or income.  **Triggers**  Touch first icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen | | **2** | Long click on one item in list expense | Display menu includes:   * “Sửa” * “Xóa” | | **3** | Touch “Xóa” | Show pop-up confirm includes:   * Message: “Xóa?” * 2 buttons: “Có” and “Không” | | **4** | Touch “Có” button | * Clear expense * Show message: “Đã xóa” |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Schedule” tab | Display “Chi phí” screen | | **2** | Long click on one schedule | Display menu includes:   * Sửa * Xóa | | **3** | Touch “Xóa” | Show pop-up confirm includes:   * Message: “Xóa?” * 2 buttons: “Có” and “Không” | | **4** | Touch “Không” button | * Return “Chi phí” screen |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch first icon at the bottom of screen | Display “Chi phí” screen | | **2** | Touch “Thu nhập” tab | Display “Thu nhập” screen | | **3** | Long click on one item in list income | Display menu includes:   * “Sửa” * “Xóa” | | **4** | Touch “Xóa” | Show pop-up confirm includes:   * Message: “Xóa?” * 2 buttons: “Có” and “Không” | | **5** | Touch “Có” button | * Clear income * Show message: “Đã xóa” |   **Relationships:**  UC MNG.1, UC MNG.2, UC MNG.3  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to delete income/ expense, user must accessed application | | **2** | In order to delete income/expense, “Chi phí”/”Thu nhập” screen must have at least one schedule | | | | | |

#### Use Case 3: Borrowing and lending management

* Use case Diagram

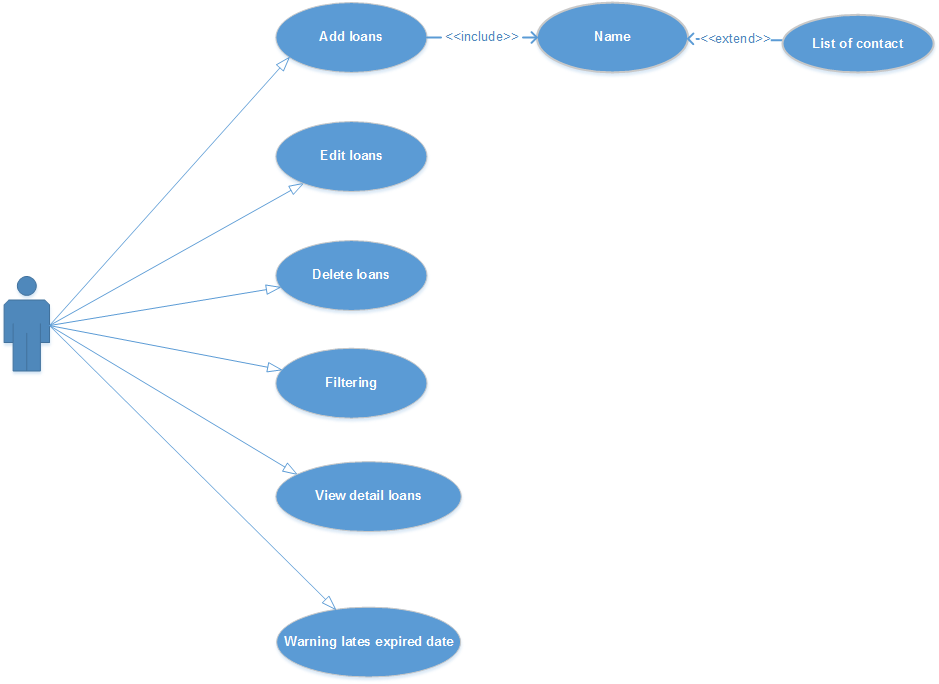


Figure 3: Borrowing and Lending money management use-case diagram

* Use case Specification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- Add New Loans SPECIFICATION** | | | | |
| **Use-case No.** | UC BL.1 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Add New Loans** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/09/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can add new loan.  **Goal:**  Allow user input detail information of loan.  **Triggers**  Touch “Vay nợ” icon, thirst icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Touch create icon at the top- right of screen | Display create screen | | **3** | Enter data into mandatory fields | Display all entered data   * If entered name is not available in mobile contact, display pop-up to add new contact | | **4** | Touch save icon at the top- right of screen | * Return “Vay” screen * Show message: “Đã lưu” * Display all saved data |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Touch create icon at the top- right of screen | Display create screen | | **3** | Enter data into mandatory fields | Display all entered data | | **4** | Touch cancel icon besides save icon | * Return “Vay” screen * Nothing is added |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Touch create icon at the top- right of screen | Display create screen | | **3** | Touch “Vay” toggle | Change “Vay” to “Cho vay” | | **4** | Enter data into all fields | Display all entered data   * If entered name is available in mobile contact, system can be automatic display phone number and address | | **5** | Touch save icon at the top- right of screen | * Return “Vay” screen * Show message: “Đã lưu” * Display all saved data |   **Exceptions:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Touch create icon at the top- right of screen | Display create screen | | **3** | Touch “Vay” toggle | Change “Vay” to “Cho vay” | | **4** | Enter data into all fields except “Ngày đáo hạn” field | Display all entered data   * If entered name is available in mobile contact, system can be automatic display phone number and address | | **5** | Touch save icon at the top- right of screen | * Show message: “Bạn phải nhập ngày đáo hạn!” * Return create screen |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Touch create icon at the top- right of screen | Display create screen | | **3** | Touch “Vay” toggle | Change “Vay” to “Cho vay” | | **4** | Enter data into all fields except “Lãi suất” và “Ngày đáo hạn” field | Display all entered data   * If entered name is available in mobile contact, system can be automatic display phone number and address | | **5** | Touch save icon at the top- right of screen | * Return “Vay” screen * Show message: “Đã lưu” * Display all saved data |   **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to add borrowing money, user must accessed application | | **2** | In order to save data, user must enter data into mandatory field |   **Screen:**  ***E:\PFM2012\documents\SPEC\Final design\create_borrow_big_screen.png*** | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- Edit Loans SPECIFICATION** | | | | |
| **Use-case No.** | UC BL.2 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Edit Loans** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/09/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can edit information of loan.  **Goal:**  Allow user edit detail information of loan.  **Triggers**  Touch “Vay nợ” icon, thirst icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Choose one borrowing money in list of borrowing money | Display detail information screen | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **4** | Change all of data in fields | Display all data is changed | | **5** | Touch save icon at the top- right of screen | * Return “Vay” screen * Show message: “Đã lưu” * Display all saved data |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Choose one borrowing money in list of borrowing money | Display detail information screen | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **4** | Change all of data in fields | Display all data is changed | | **5** | Touch cancel icon besides save icon | * Return “Vay” screen * Nothing is changed |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Choose one borrowing money in list of borrowing money | Display detail information screen | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **4** | Touch “Vay” toggle | Change “Vay” to “Cho vay” | | **5** | Change data in all fields | Display all changed data | | **6** | Touch save icon at the top- right of screen | * Return “Vay” screen * Show message: “Đã lưu” * Display all saved data |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Choose one borrowing money in list of borrowing money | Display detail information screen | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **4** | Clear data in “Lãi suất” field | “Lãi suất” is empty field | | **5** | Clear data in “Ngày đáo hạn” | “Ngày đáo hạn” is empty field | | **6** | Touch save icon at the top- right of screen | * Return “Vay” screen * Show message: “Đã lưu” * Display all saved data |   **Exceptions:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Touch create icon at the top- right of screen | Display create screen | | **3** | Touch “Vay” toggle | Change “Vay” to “Cho vay” | | **4** | Clear data in one of field below:   * “Tên” * “Tổng số tiền” * “Ngày bắt đầu” * “Ngày đáo hạn” | Display all empty field | | **5** | Touch save icon at the top- right of screen | * Display message: “Xin hãy nhập Tên và Tổng số tiền! Xin cảm ơn!” |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Choose one borrowing money in list of borrowing money | Display detail information screen | | **3** | Touch edit icon at the top- right of screen | Display edit screen | | **5** | Clear data in “Ngày đáo hạn” | “Ngày đáo hạn” is empty field | | **6** | Touch save icon at the top- right of screen | * Show message: “Hãy nhập ngày đáo hạn!” |   **Relationships:**  UC BL.1, UC BL.4  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to add borrowing money, user must accessed application | | **2** | In order to save data, user must enter data into mandatory field | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- Delete Loans SPECIFICATION** | | | | |
| **Use-case No.** | UC BL.2 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Delete Loans** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/09/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can delete loan.  **Goal:**  Allow user delete loan.  **Triggers**  Touch “Vay nợ” icon, thirst icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Long click on one borrowing in list borrowing | Display menu includes:   * “Sửa” * “Xóa” | | **3** | Touch “Xóa” | Show pop-up confirm includes:   * Message: “Xóa?” * 2 buttons: “Có” and “Không” | | **4** | Touch “Có” button | * Clear borrowing * Show message: “Đã xóa” |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch “Vay nợ” icon, thirst icon at the bottom of screen | Display “Vay” tab includes list of borrowing money | | **2** | Long click on one borrowing in list borrowing | Display menu includes:   * “Sửa” * “Xóa” | | **3** | Touch “Xóa” | Show pop-up confirm includes:   * Message: “Xóa?” * 2 buttons: “Có” and “Không” | | **4** | Touch “Không” button | * Return “Vay” screen |   **Relationships:**  UC BL.1, UC BL.2  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to add borrowing money, user must accessed application | | **2** | In order to save data, user must enter data into mandatory field | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- View and Warning loans SPECIFICATION** | | | | |
| **Use-case No.** | UC BL.4 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **View and Warning loans** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/09/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can view list of loans or loan detail.  **Goal:**  Allow user view loan.  **Triggers**  Touch “Vay” icon, thirst icon at bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch thirst icon at bottom of screen | Display “Vay” screen includes list of information below:   * Each borrowing includes information below:   + “Tên”  + “Điện thoại”  + “Địa chỉ”  + “Kiểu lãi”  + “Lãi suất”  + “Ngày bắt đầu”  + “Ngày đáo hạn” | | **2** | Touch “Cho vay” tab | * Display “Cho vay” screen includes list of lending * Each lending includes information below:   + “Tên”  + “Điện thoại”  + “Địa chỉ”  + “Kiểu lãi”  + “Lãi suất”  + “Ngày bắt đầu”  + “Ngày đáo hạn” |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch thirst icon at bottom of screen | Display “Vay” screen includes list of information below:   * Each borrowing includes information below:   + “Tên”  + “Điện thoại”  + “Địa chỉ”  + “Kiểu lãi”  + “Lãi suất”  + “Ngày bắt đầu”  + “Ngày đáo hạn” | | **2** | Touch “Cho vay” tab | * Display “Cho vay” screen with content “Không có dữ liệu” |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch thirst icon at bottom of screen | Display “Vay” screen with content “Không có dữ liệu” | | **2** | Touch “Cho vay” tab | Display “Cho vay” screen includes list of information below:   * Each lending includes information below:   + “Tên”  + “Điện thoại”  + “Địa chỉ”  + “Kiểu lãi”  + “Lãi suất”  + “Ngày bắt đầu”   * + “Ngày đáo hạn” |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch thirst icon at bottom of screen | Display “Vay” screen with content “No data” | | **2** | Touch “Cho vay” tab | * Display “Cho vay” screen with content “Không có dữ liệu” |   **Relationships:**  UC BL.1, UC BL.2, UC BL.3  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to delete schedule, user must accessed application | | **2** | In order to delete schedule, “Schedule” screen must have at least one schedule | | | | | |

#### Use Case 4: Statistics

* Use case Diagram

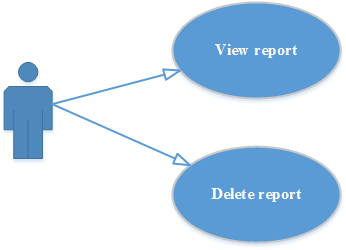


Figure 4: Report use-case diagram

* Use case Specification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- VIEW REPORT SPECIFICATION** | | | | |
| **Use-case No.** | UC RE.1 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **View report** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/10/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can view general weekly or monthly report. Besides, users can view detail report or chart which can compare income or expense between months.  **Goal:**  Allow user view report and compare income or expense between weeks/ months.  **Triggers**  Touch report icon, fourth icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch fourth icon at the bottom of screen | Display “Báo cáo” screen default focus “Tháng” screen includes list of month which have information | | **2** | Touch one item of list | Default display “Chi tiết” screen of this item includes detail information | | **3** | Touch “Đồ thị” tab | Display “Đồ thị” screen includes pie chart which descripts income/expense of this item | | **4** | Touch compare icon on screen | Display list of months which have income or expense information | | **5** | Touch some items  Touch “Đồng ý” button | Display trend chart to compared between chosen months |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch fourth icon at the bottom of screen | Display “Báo cáo” screen default focus “Tháng” screen includes list of months which have information | | **2** | Touch “Tuần” tab | Display “Tuần” screen includes list of weeks which have information | | **3** | Touch one item of list | Default display “Chi tiết” screen of this item includes detail information | | **4** | Touch “Đồ thị” tab | Display “Đồ thị” screen includes pie chart which descripts income/expense of this item | | **5** | Touch compare icon on screen | Display list of weeks which have income or expense information | | **6** | Touch some items  Touch “Đồng ý” button | Display trend chart to compared between chosen weeks |   **Relationships:** UC MNG.2, UC MNG.3, UC MNG.4  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to view report, user must have information of income or expense | | **2** | In order to compare between months/ weeks, user must have at least two months/ weeks |   **Screen:**  **E:\PFM2012\documents\SPEC\Final design\report_big_screen.pngE:\PFM2012\documents\SPEC\Final design\report_big_screen_bar_chart.png** | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- DELETE REPORT SPECIFICATION** | | | | |
| **Use-case No.** | UC RE.2 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Delete Report** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/10/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can delete weekly or monthly report.  **Goal:**  Allow user delete report.  **Triggers**  Touch report icon, fourth icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch fourth icon at the bottom of screen | Display “Báo cáo” screen default focus “Tháng” screen includes list of month which have information | | **2** | Long click one item of list | Display dialog includes:   * Message: “Xóa?” * 2 buttons: “Có” và “Không” | | **3** | Touch “Có” button | * Clear this item * Show message: “Đã xóa!” | | **4** | Touch “Tuần” tab | Display list of weeks which have income or expense information | | **5** | Long click one item of list | Display dialog includes:   * Message: “Xóa?” * 2 buttons: “Có” và “Không” | | **6** | Touch “Có” button | * Clear this item * Show message: “Đã xóa!” |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch fourth icon at the bottom of screen | Display “Báo cáo” screen default focus “Tháng” screen includes list of month which have information | | **2** | Long click one item of list | Display dialog includes:   * Message: “Xóa?” * 2 buttons: “Có” và “Không” | | **3** | Touch “Không” button | * Return “Tháng” screen | | **4** | Touch “Tuần” tab | Display list of weeks which have income or expense information | | **5** | Long click one item of list | Display dialog includes:   * Message: “Xóa?” * 2 buttons: “Có” và “Không” | | **6** | Touch “Không” button | * Return “Tuần” screen |   **Relationships:** UC MNG.2, UC MNG.3, UC MNG.4  **Business Rules:**   |  |  | | --- | --- | | **No** | **Rule Description** | | **1** | In order to delete report, user must have information of income or expense | | | | | |

#### Use Case 5: Warning

* Use case Diagram

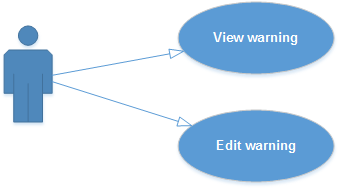


Figure 5: Warning use-case diagram

* Use case Specification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- WARNING SPECIFICATION** | | | | |
| **Use-case No.** | UC WAR | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Warning** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/10/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can change system warning for “Kế hoạch” and “ Vay và cho vay” functions  **Goal:**  Allow user change time, ring… of system warning  **Triggers**  Touch setting icon, fifth icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch fifth icon at the bottom of screen. | Display “Thiết lập” screen includes list of item which user can change | | **2** | Change all item on screen | Display all changed data | | **3** | Touch “Đồng ý” button | Save all system change |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch fifth icon at the bottom of screen. | Display “Thiết lập” screen includes list of item which user can change | | **2** | Touch first combobox on screen | Display list of choices for” Cảnh báo khi đến” label:   * 25% * 50% * 70% * 100% * Other | | **3** | Touch at least one item of list | Display chosen item | | **4** | Touch second combobox on screen | Display list of choices for ”Nhạc Chuông” label:   * Không có * Mặc định * Thư mục | | **5** | Touch “Thư mục” item | Display all song on user mobile phone | | **6** | Choose at least one song of list | Display chosen song title on second combobox | | **7** | Touch third combobox on screen | Display list of choices for “Nhắc lại” label:   * Không bao giờ * 10 phút * 30 phút * 1 tiếng * Other | | **8** | Choose at least on item of list | Display chosen item | | **9** | Touch “Đồng ý” button | Save all change of “Kế hoạch” warning functions |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch fifth icon at the bottom of screen. | Display “Thiết lập” screen includes list of item which user can change | | **2** | Touch fourth combobox on screen | Display list of choices for” Cảnh báo trước khi đáo hạn” label:   * 1 tiếng * 10 tiếng * 1 ngày * 1 tuần * Other | | **3** | Touch at least one item of list | Display chosen item | | **4** | Touch fifth combobox on screen | Display list of choices for ”Nhạc Chuông” label:   * Không có * Mặc định * Thư mục | | **5** | Touch “Thư mục” item | Display all song on user mobile phone | | **6** | Choose at least one song of list | Display chosen song title on second combobox | | **7** | Touch sixth combobox on screen | Display list of choices for “Nhắc lại” label:   * Không bao giờ * 10 phút * 30 phút * 1 tiếng * Other | | **8** | Choose at least one item of list | Display chosen item | | **9** | Touch “Đồng ý” button | Save all change of “Vay và cho vay” warning functions |   **Screen:** | | | | |

#### Use Case 6: Synchronize

* Use case Diagram

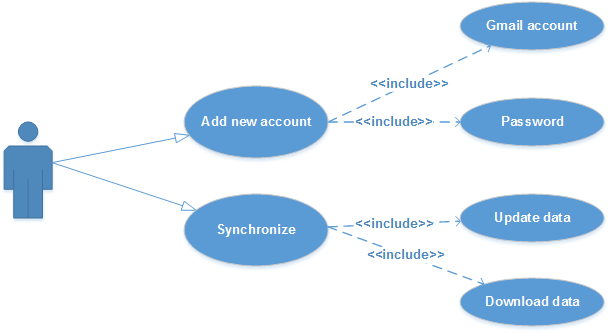


Figure 6: Synchronize use-case diagram

* Use case Specification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **USE CASE- SYNCHRONIZATION SPECIFICATION** | | | | |
| **Use-case No.** | UC SYN.1 | **Use-case Version** | | **1.0** |
| **Use-case Name** | **Synchronization** | | | |
| **Author** | **LinhLLL** | | | |
| **Date** | 08/10/2012 | **Priority** | **High** | |
| **Actor:**  User  **Summary:**  User can add new synchronize account.  **Goal:**  Allow user add new account for synchronize.  **Triggers**  Touch setting icon, last icon at the bottom of screen.  **Preconditions:**  Accessed to application  **Main Success Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch last icon at the bottom of screen | Display “Thiết lập” screen includes list of choices below:   * “Cảnh báo” * “Đồng bộ” | | **2** | Touch “Đồng bộ” | Display “Đồng bộ” screen includes “Thêm tài khoản” button | | **3** | Touch “Thêm tài khoản” button | Display gmail sign-in screen | | **4** | Enter data into all fields on screen | Display all entered data | | **5** | Touch sign-in button | * Return “Đồng bộ” screen * Display account on screen | | **6** | Touch automatic synchronize checkbox in “Thiết lập sơ bộ” section | * Display checked checkbox * Started the synchronization |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch last icon at the bottom of screen | Display “Thiết lập” screen includes list of choices below:   * “Cảnh báo” * “Đồng bộ” | | **2** | Touch “Đồng bộ” | Display “Đồng bộ” screen includes:   * Gmail account ( if any) * “Thêm tài khoản” button | | **3** | Touch automatic synchronize checkbox in “Thiết lập sơ bộ” section | * Display checked checkbox * Started the synchronization |   **Alternative Scenario:**   |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch last icon at the bottom of screen | Display “Thiết lập” screen includes list of choices below:   * “Cảnh báo” * “Đồng bộ” | | **2** | Touch “Đồng bộ” | Display “Đồng bộ” screen includes “Thêm tài khoản” button | | **3** | Touch “Thêm tài khoản” button | Display gmail sign-in screen | | **4** | Register new gmail acount |  | | **5** | Sign-in with new account | * Return “Đồng bộ” screen * Display account * Started the synchronization |  |  |  |  | | --- | --- | --- | | **Step** | **Actor action** | **System response** | | **1** | Touch last icon at the bottom of screen | Display “Thiết lập” screen includes list of choices below:   * “Cảnh báo” * “Đồng bộ” | | **2** | Touch “Đồng bộ” | Display “Đồng bộ” screen includes:   * “Thiết lập sơ bộ” section   + Automatic synchronization checkbox   * “Tài khoản” section:   + All added account  + Default checked radio button beside latest synchronization account | | **3** | Touch radio button beside other account | Display checked radio button | | **4** | Touch automatic synchronize checkbox in “Thiết lập sơ bộ” section | Started the synchronization by checked account |   **Screen:** | | | | |

### Non-Functional Requirements

Non-functional requirements may exist for the following attributes. Often these requirements must be achieved at a system-wide level rather than at a unit level.

#### Performance

The main criteria for grading the performance of the system are:

* The verification process should be efficient and take less than 1 - 3 seconds to complete.
* System cans deployment at version different of Android
* Content will display and done after less than 3 seconds.

#### Reliability

* System is capable to deal with unusually situation.
* The database has continuous back up and can be recovering if necessary.
* Not conflict with other software.

#### Availability

* Systems have to run 24/7
* System is capable to deal with unusually situation.
* The database has continuous back up and can be recovering if necessary

#### Security

To transfer data safely between client and server, encryption is used. The system shall authenticate all users with username and password. Users not authorized should not obtain access to the system

#### Maintainability

The system shall have a documented source code to ease maintenance when this is needed. The system is designed based on separated modules, so it is easy to maintain or implement new version with many new functions.

#### Portability

The system will have to work Android 2.3 or higher.

### Logical Database Requirements

### Other Requirements

## Entity Relationship Diagram

# Software Design Description

## Design Overview

This document has been developed by PFM Group for Personal Finance Management Project.

This document describes the technical and UI design of the Personal Finance Management system. It includes the architectural design and the detailed design of common functions and business functions. It also includes the design of database model, and overall design of user interface.

The architectural design describes the overall architecture of the system, and the architecture of each main component and subsystem. It will describe the patterns being used, the role of each component and the role of the system in the working environment.

The detailed design describes static and dynamic structure for each component and function. It includes class diagrams, class explanations, and sequence diagrams of the main use cases.

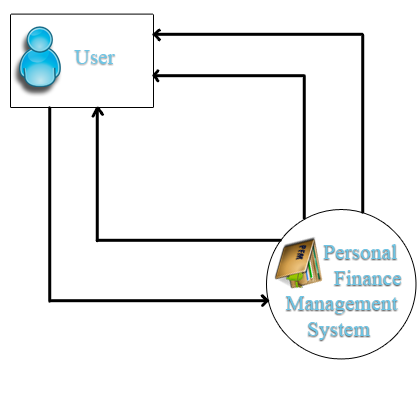
The database design describes the relationship between entities, and details of each entity. It uses notations of SQL Server 2010 as it is the database server for developing the system.

The user interface design describes the layout of the system, and some design for the screens.

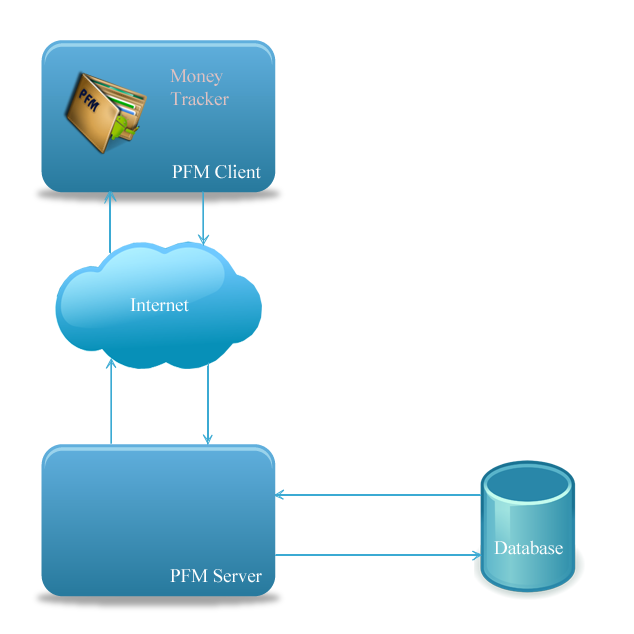
## System Architecture Design

### Choice of System Architecture

#### System Context



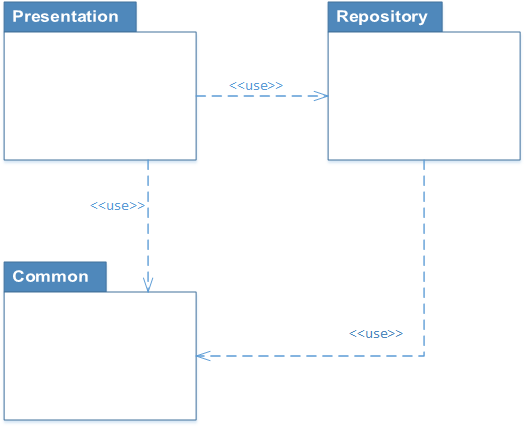
#### Overall System Architecture



### Discussion of Alternative Design

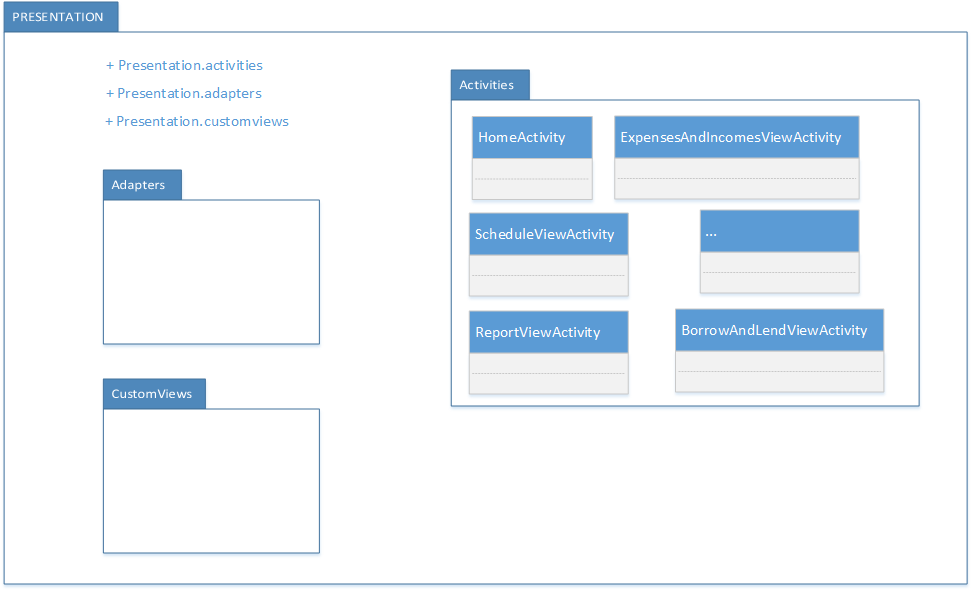
### Description of System Interface

## Package Diagram

This diagram depicts the dependencies between the packages that make up a model. The Personal Finance Management System includes 3 packages: Presentation, Repository and Common. The relationship between packages is described as below diagram:

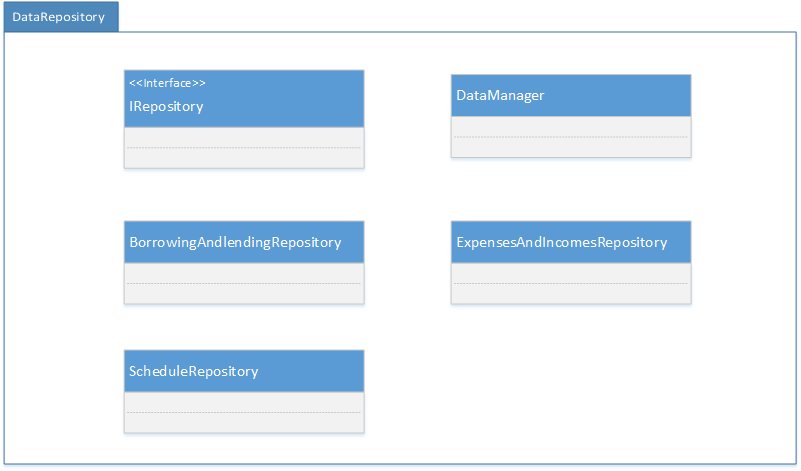
### Presentation Package

This package contains classes that will be used to help user can interact with Personal Finance Management System. This package includes the activities, custom views, adapters…



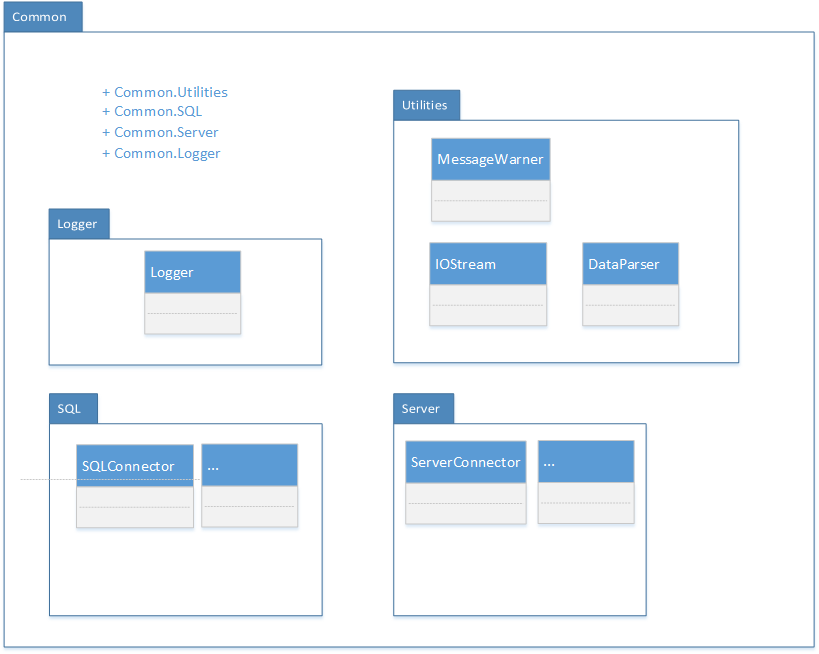
### Data Repository Package

This package will get data and transfer them to Presentation package. It includes: DataManager, IRepository, ScheduleRepository, and BorrowingAndLendingRepository…



### Common Package

This contains common functions which can be used by all packages in the application. It contains functions which are used throughout the application like function for getting the response from server for a request, logging etc.



## Detail Description of Components

### CRC Cards (Class-Responsibility-Collaborators)

#### SqlHelper Class

|  |  |
| --- | --- |
| **Class name:** SqlHelper | **Super class:** Object |
| **Subclasses:** <None> | |
| **Responsibilities:** create, select, insert, update and delete a table in SQLite database. | |
| **Collaborations:** SqlConnector, AccountProvider, ScheduleDetailViewActivity, ScheduleEditActivity, TabViewActivity, SyncSettingActivity, ScheduleRepository, EntryDetailViewActivity, EntryEditActivity, ReportChartActivity… | |

#### SynchroizeTask Class

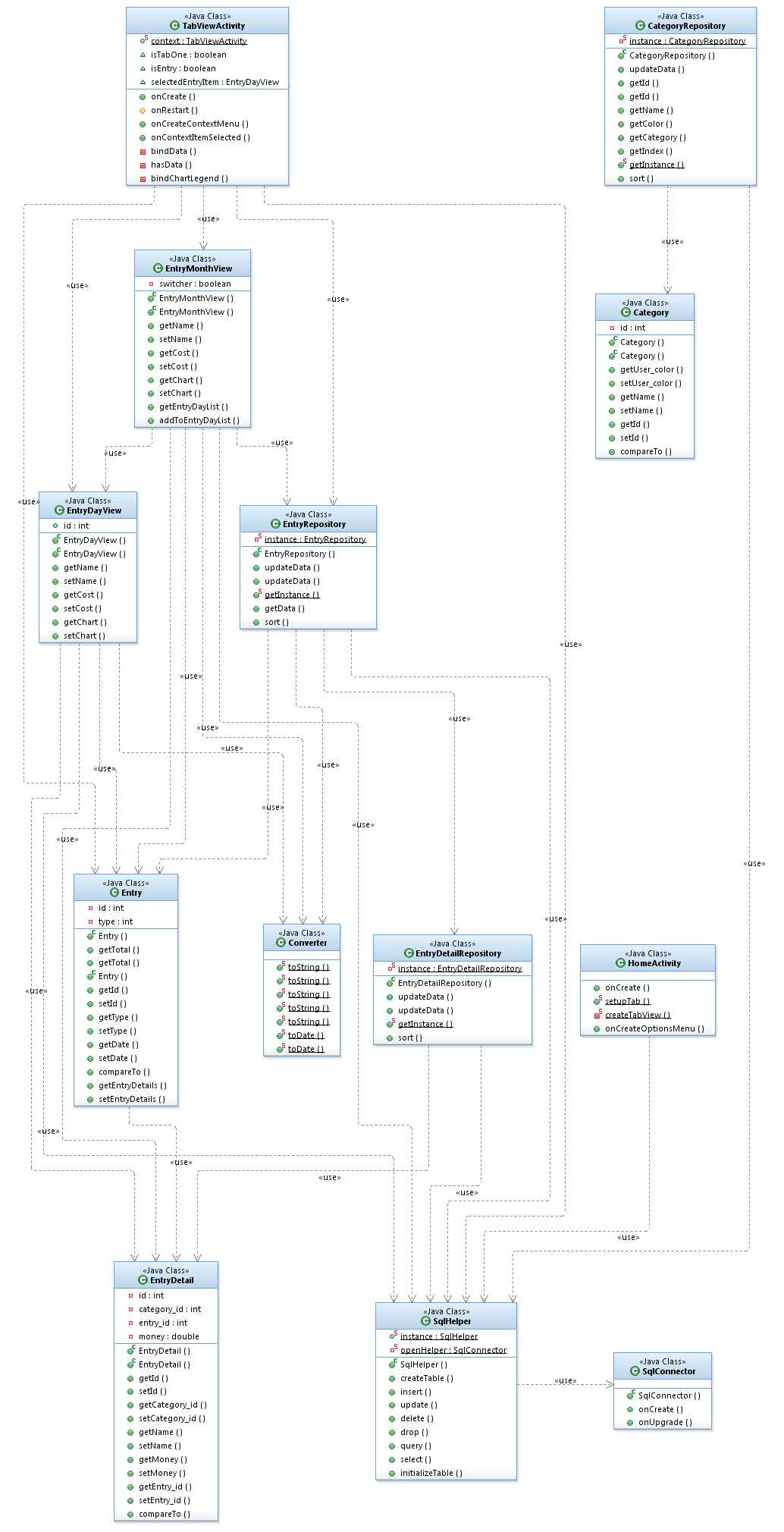
|  |  |
| --- | --- |
| **Class name:** SynchronizeTask | **Super class:** AsyncTask<Void, Void, Void> |
| **Subclasses:** <None> | |
| **Responsibilities:** Create another thread for data synchronization. | |
| **Collaborations:** PfmApplication, EmailAccountCustomView, BorrowLendInsertActivity, ScheduleEditActivity, SyncSettingActivity, EntryEditActivity. | |

### Class Diagram

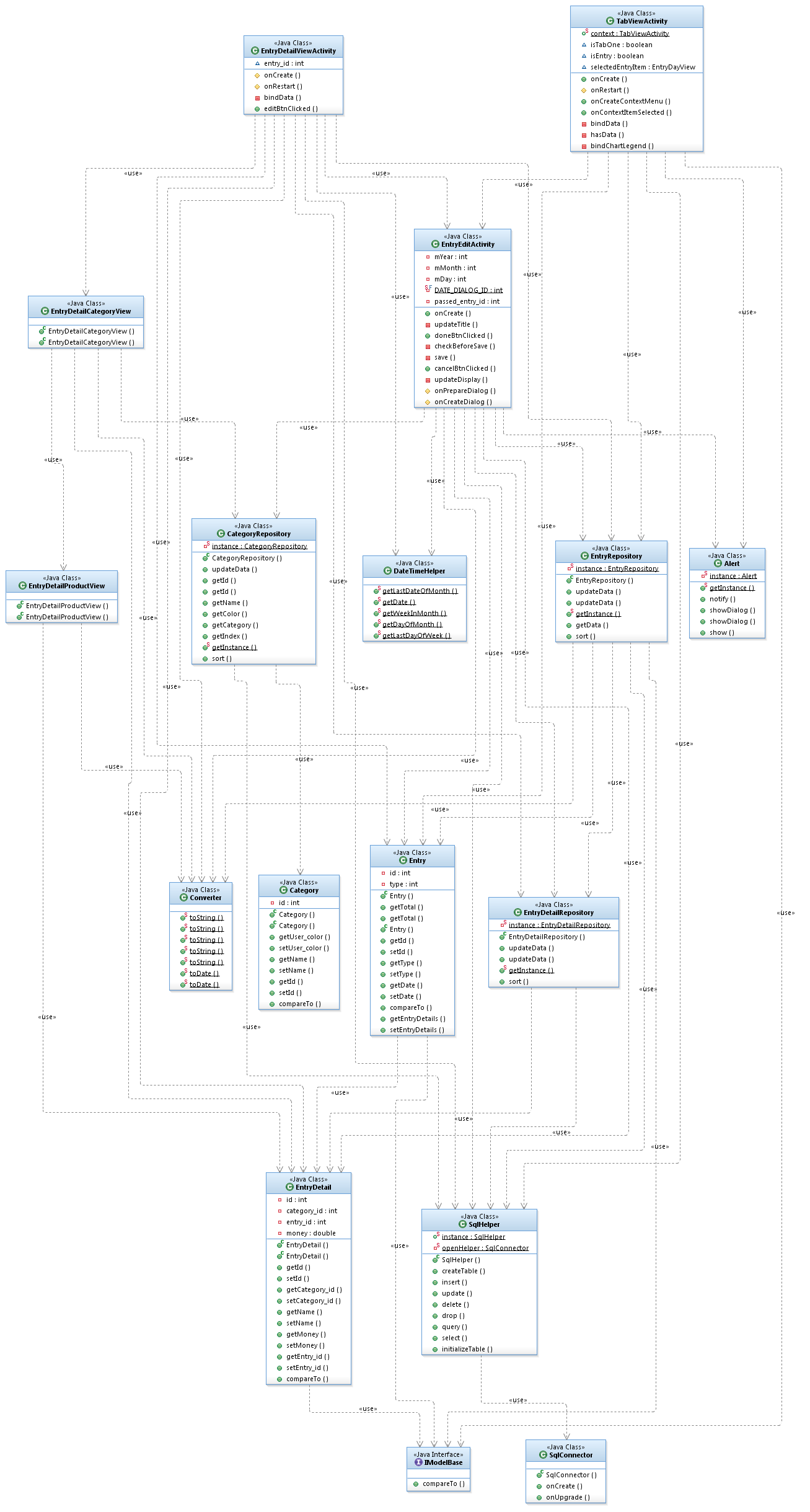
#### Incomes and Expenses management

##### Incomes and Expenses management View

##### Incomes and Expenses management Edit or Delete

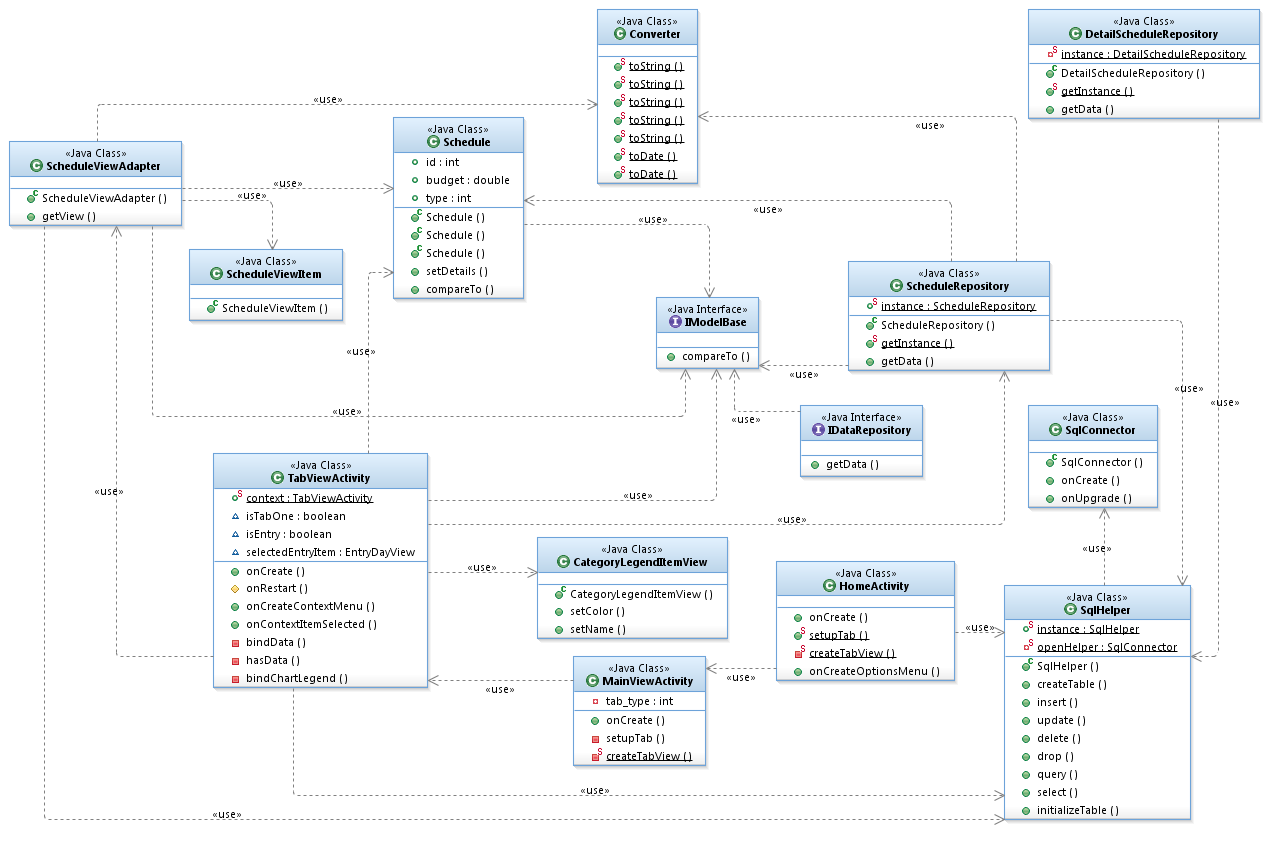
******

##### Detailed Incomes and Expenses management View

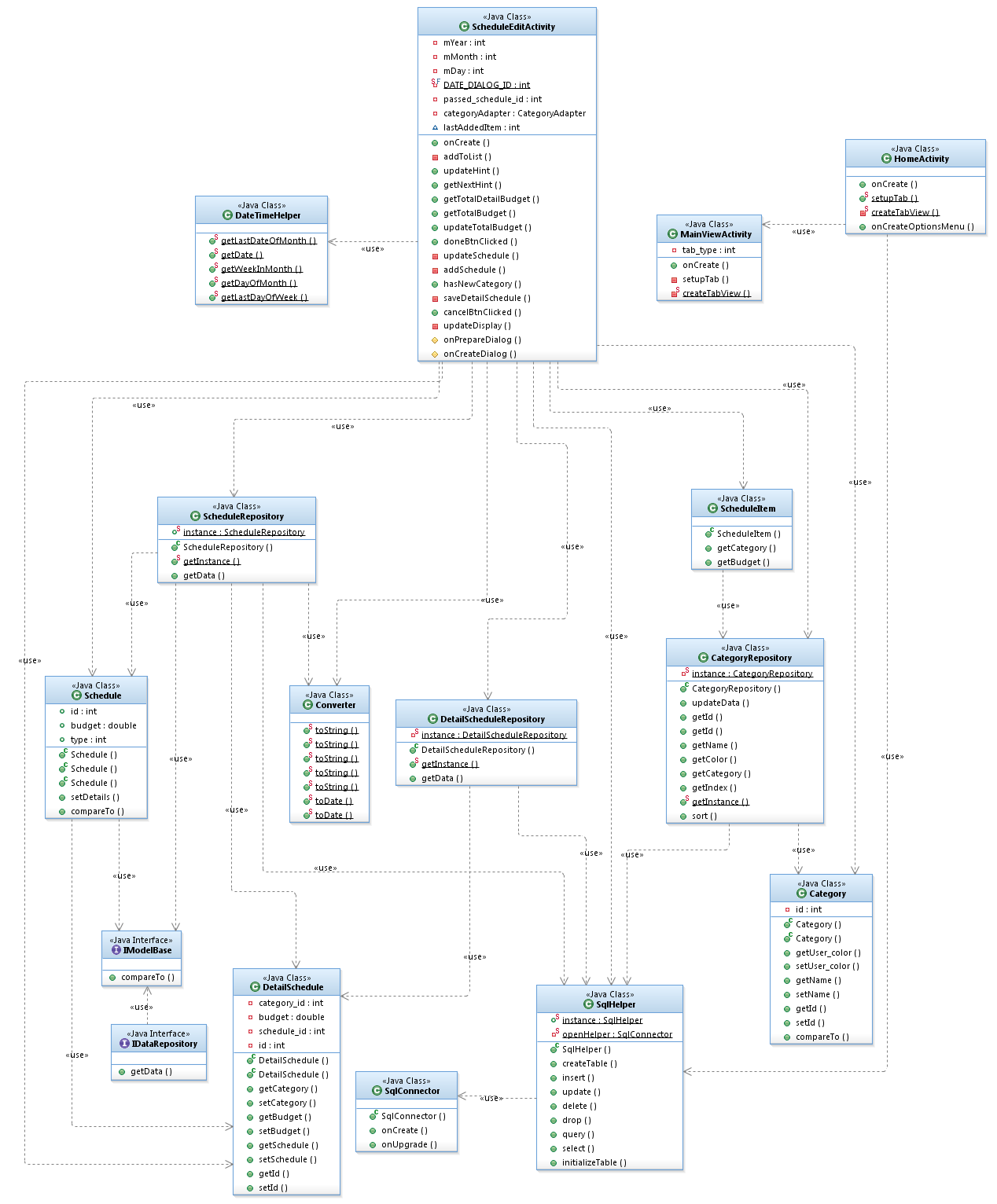
******

#### Schedule

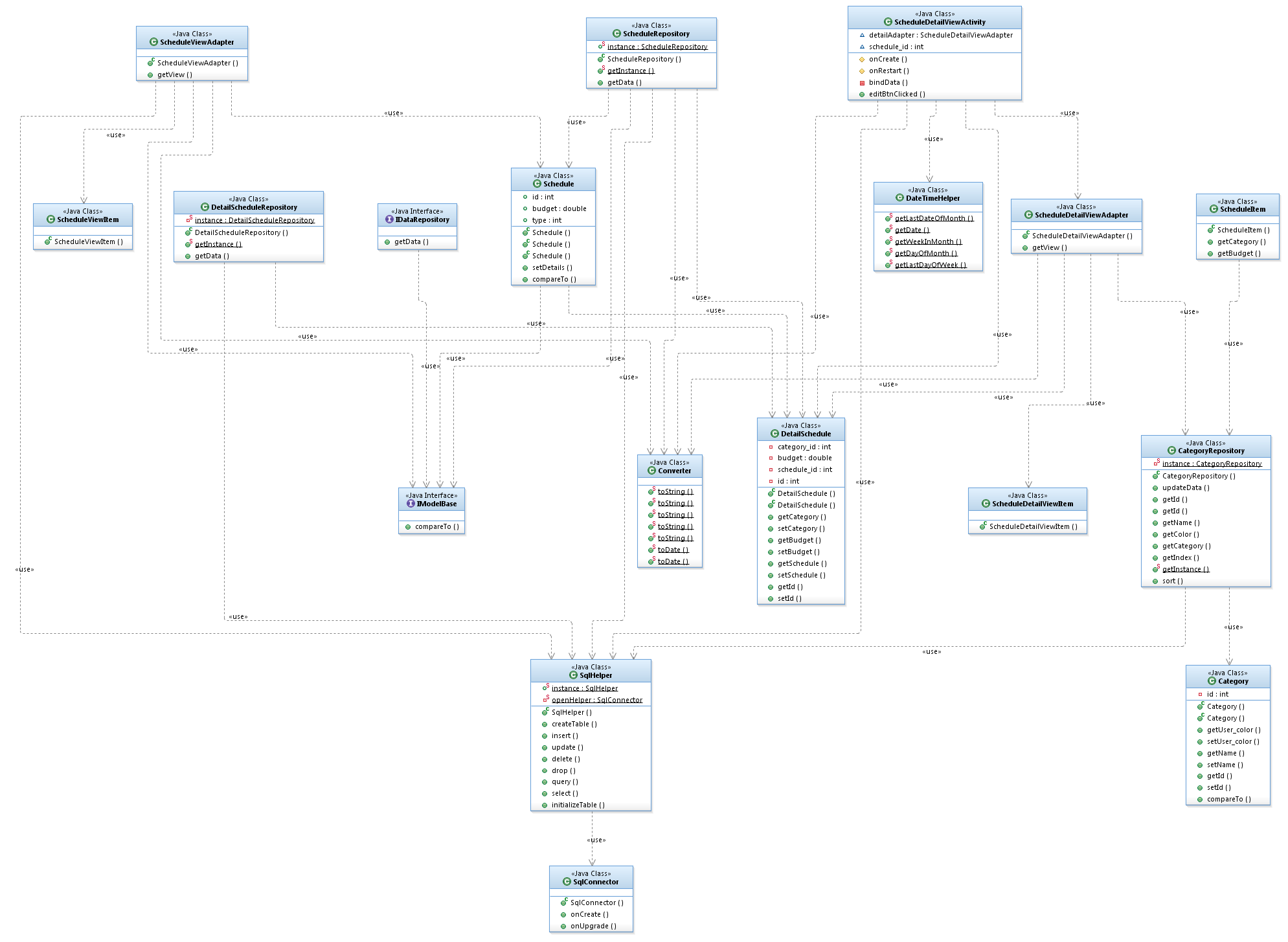
##### Schedule View function



##### Schedule Edit or Delete function

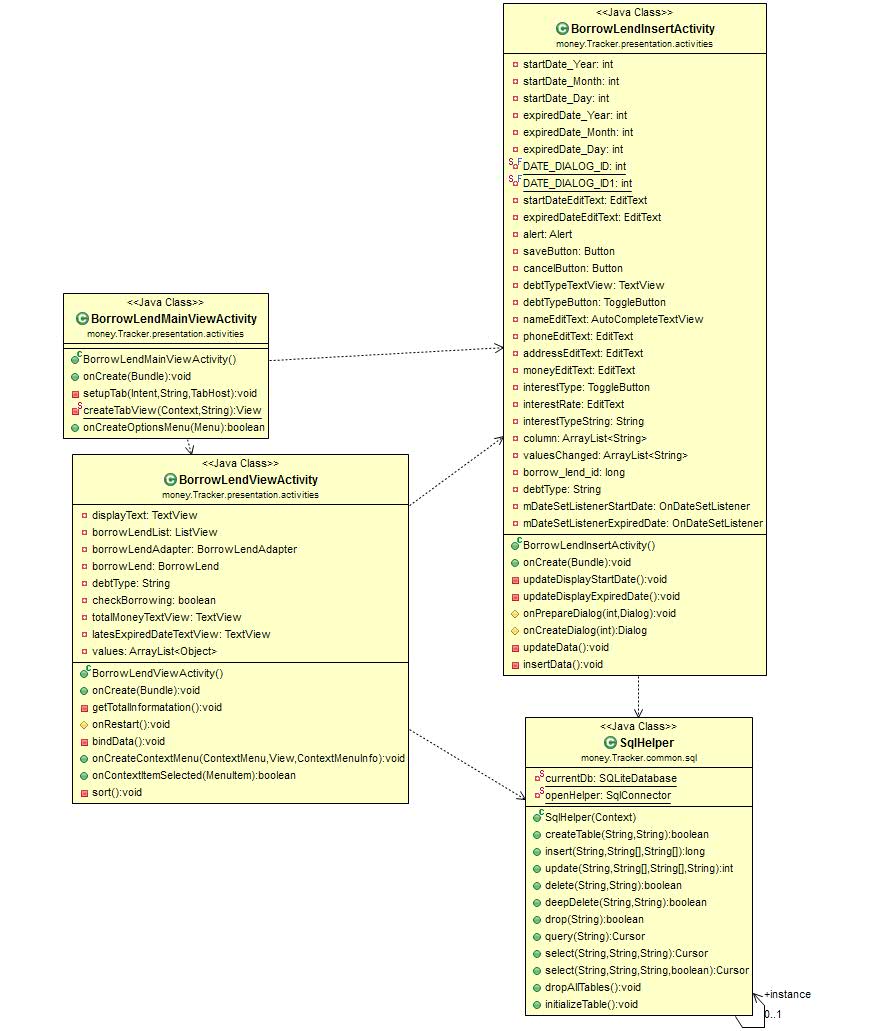
******

##### Class Diagram for Detailed Schedule function

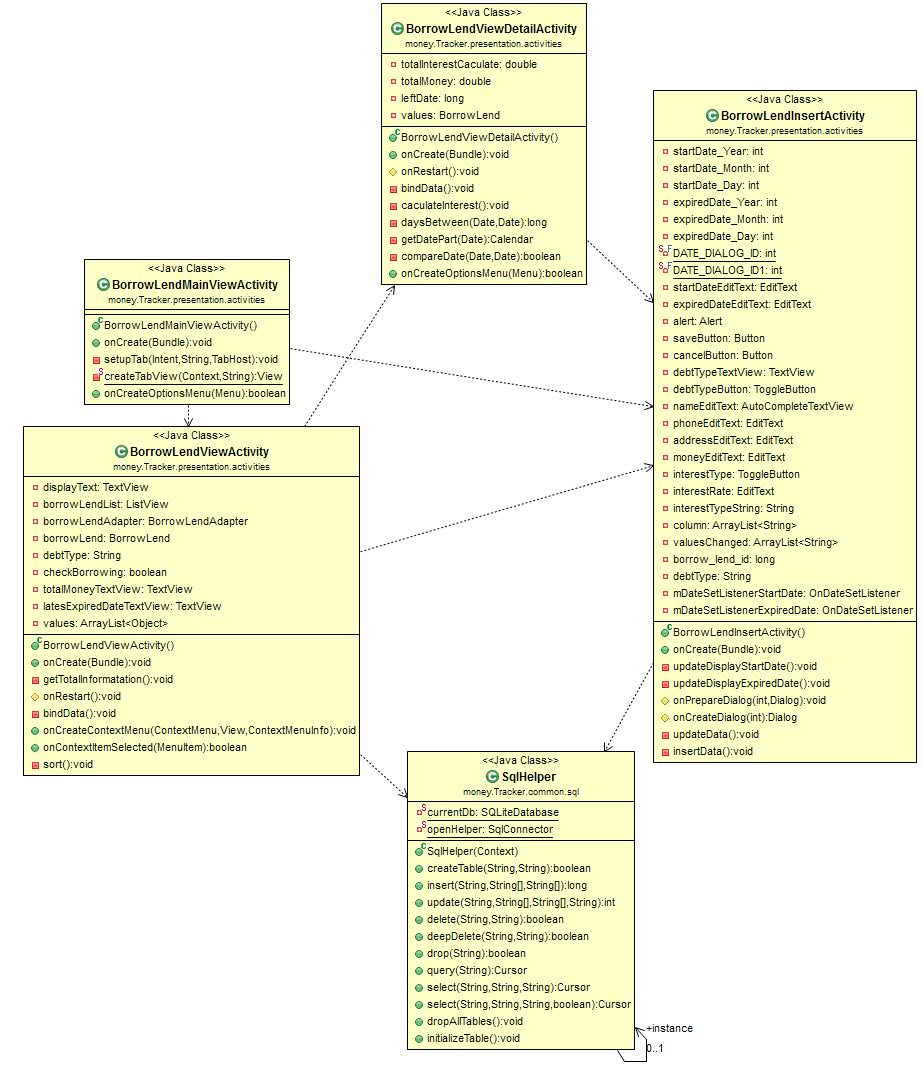
******

#### Borrowing and lending management

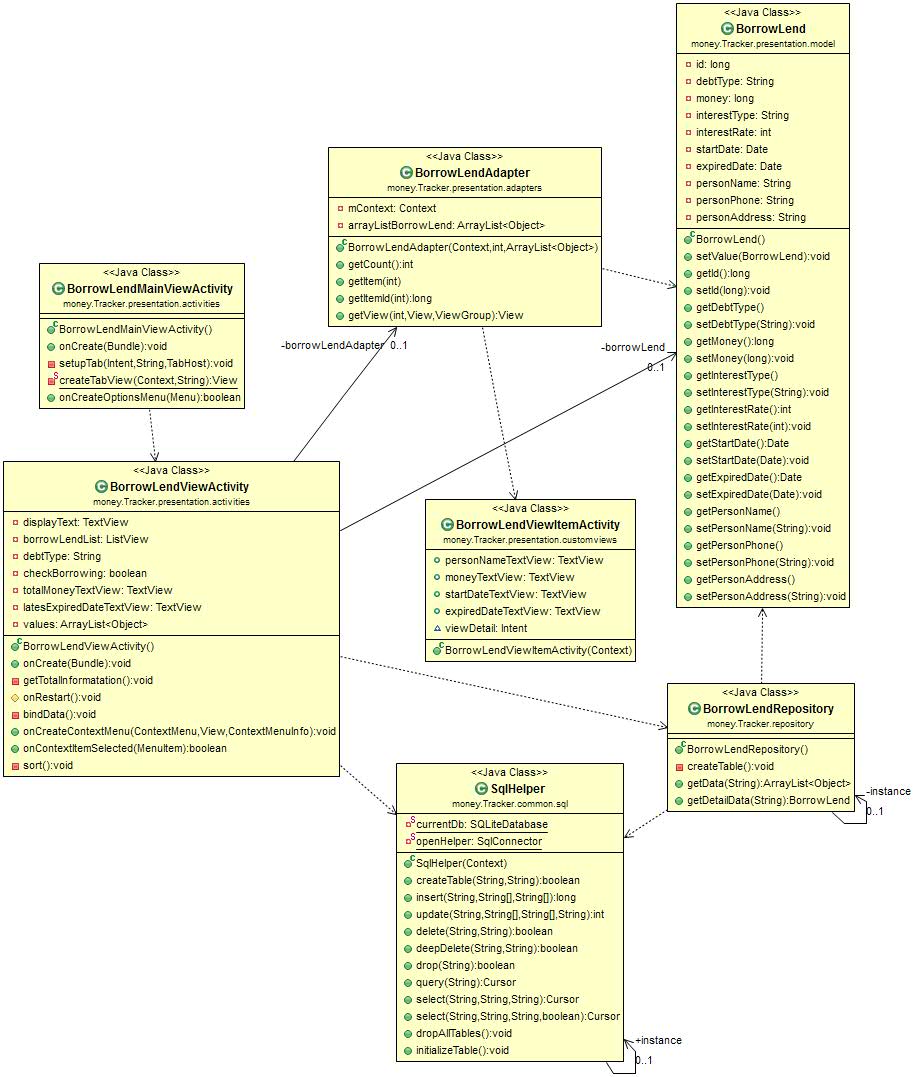
##### Borrowing and lending Add



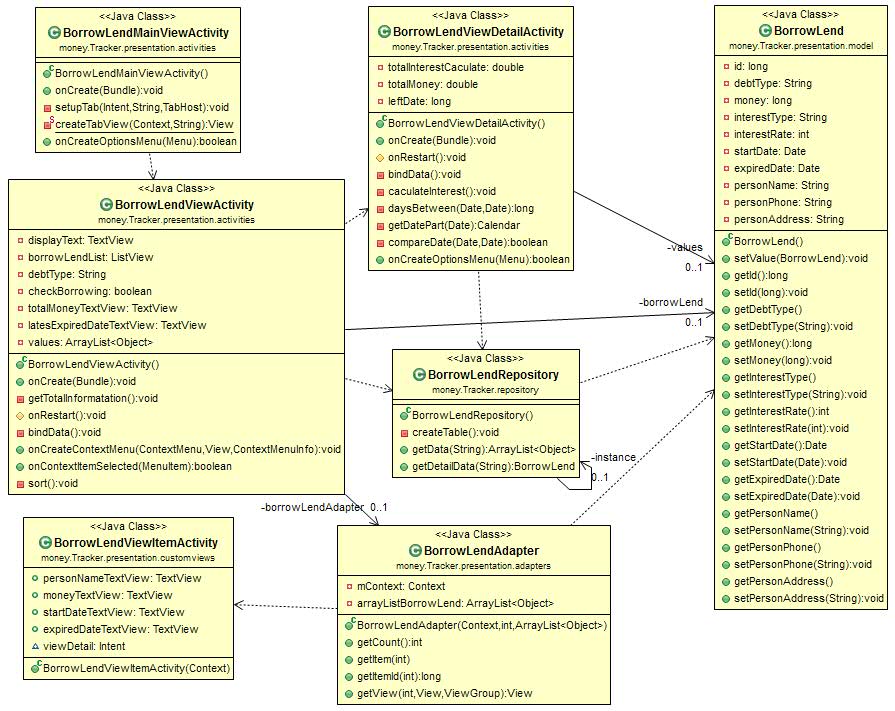
##### Borrowing and lending Update



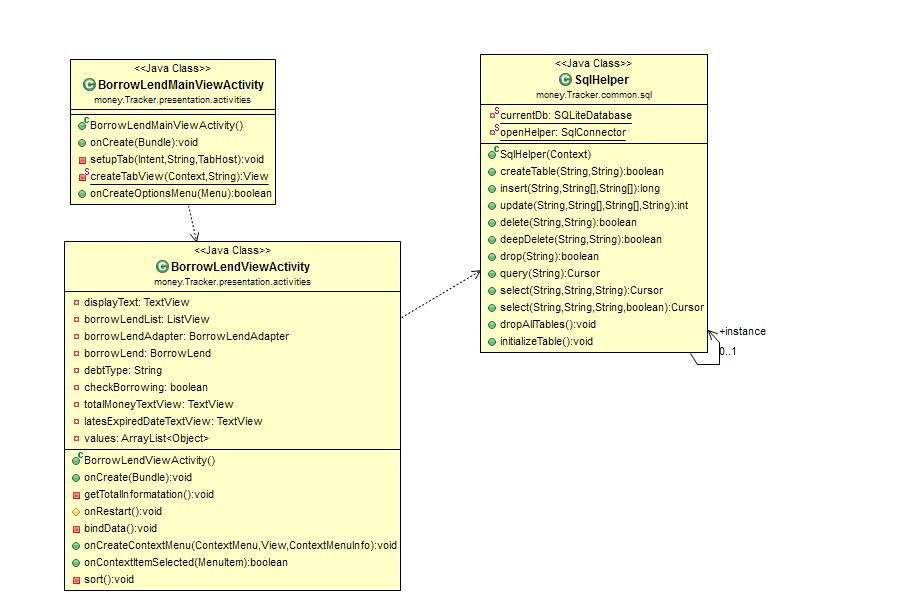
##### Borrowing and lending View



##### Borrowing and lending View Detail

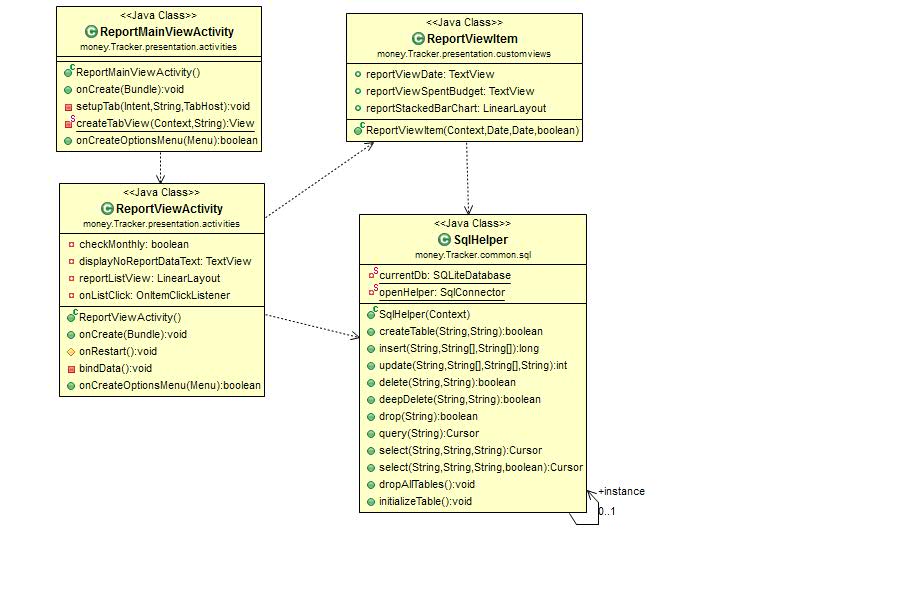


##### Borrowing and lending Delete

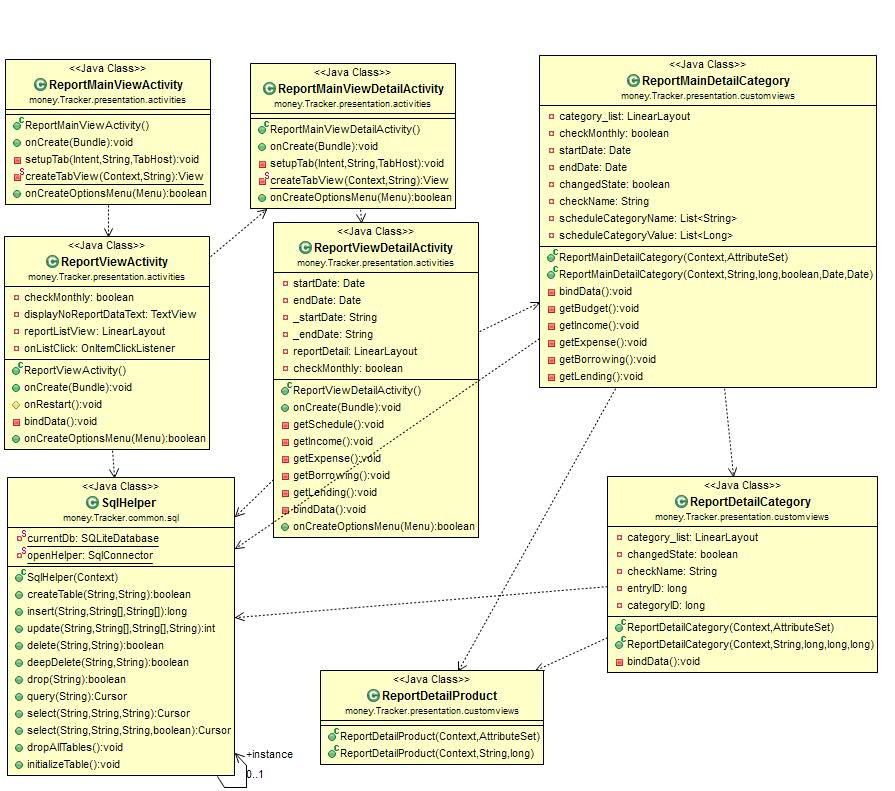


#### Statistics

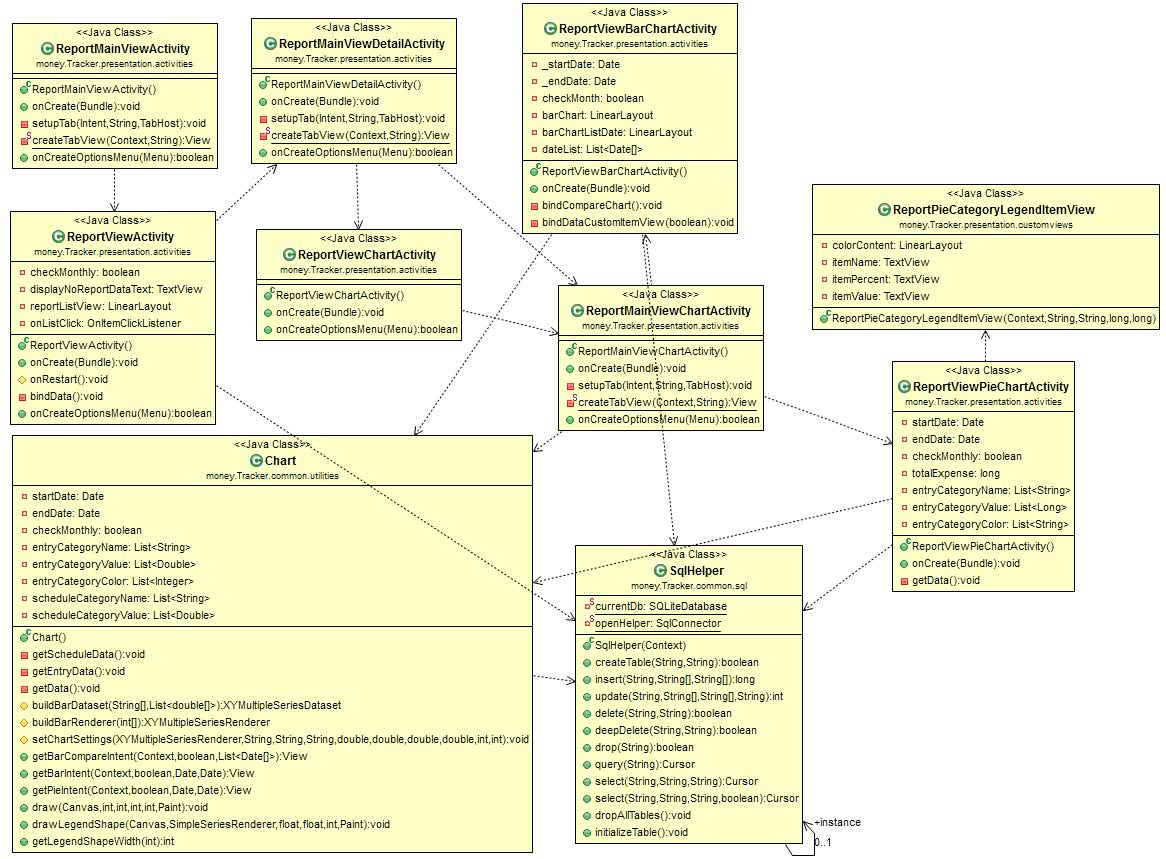
##### Statistics View



##### Statistics View Detail



##### Statistics View Chart



#### W

#### S

### Explanation

#### SqlHeper Class

##### Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Type | Accessibility | Description |
| instance | SqlHelper | public | A static field that helps using SqlHelper class without initializing an instance of SqlHelper many times. |
|  |  |  |  |

##### Operations

|  |  |  |
| --- | --- | --- |
| **public** **boolean** createTable(String tableName, String columnsInfo) | | |
| This method is used to create a table with specified name and column information if this table doesn’t exist. | | |
| Parameter | Type | Description |
| tableName | String | Name of table will be created |
| columnsInfo | String | Information of columns includes: column name, type of column, Primary Key |
| return | Boolean | True if creation is successful. If the name of table is existing in local database or have some errors in creation progress, then this operation should return false |

#### BorrowLendInsert Class

##### Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Type | Accessibility | Description |
| startDate\_Year | Int | Private |  |
| startDate\_Month | Int | Private |  |
| startDate\_Day | Int | Private |  |
| expiredDate\_Year | Int | Private |  |
| expiredDate\_Month | Int | Private |  |
| expiredDate\_Day | Int | Private |  |
| startDateEditText | EditText | Private |  |
| expiredDateEditText | EditText | Private |  |
| alert | Alert | Private | A static field that helps using alert user when they input mistake |
| debtTypeTextView | TextView | Private |  |
| debtTypeButton | ToogleButton | Private |  |
| nameEditText | AutoCompleteTextView | Private |  |
| phoneEditText | EditText | Private |  |
| addressEditText | EditText | Private |  |
| moneyEditText | EditText | Private |  |
| interestType | ToogleButton | Private |  |
| interestRate | EditText | Private |  |
| interestTypeString | String | Private |  |
| column | ArrayList<String> | Private | A static field that helps using record changed columns |
| valuesChanged | ArrayList<String> | Private | A static field that helps using record values of changed columns |

##### Operations

|  |  |  |
| --- | --- | --- |
| **public** **void** onCreate(Bundle savedInstanceState) | | |
| This method is used to prepare view | | |
| Parameter | Type | Description |
| saveInstanceState | Bundle |  |

|  |  |  |
| --- | --- | --- |
| **public** **void** updateData() | | |
| This method is used to update data to database after the user change information of a record | | |
| Parameter | Type | Description |

|  |  |  |
| --- | --- | --- |
| **public** **void** insertData() | | |
| This method is used to insert new data to database | | |
| Parameter | Type | Description |

#### BorrowLendViewActivity

##### Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Type | Accessibility | Description |
| displayText | TextView | Private |  |
| borrowLendList | ListView | Private |  |
| borrowLendAdapter | BorrowLendAdapter | Private |  |
| borrowLend | BorrowLend | Private |  |
| checkBorrowing | Boolean | Private |  |
| totalMoneyTextView | TextView | Private |  |
| latesExpiredDateTextView | TextView | Private |  |
| values | ArrayList<Object> | Private |  |

##### Operations

|  |  |  |
| --- | --- | --- |
| 1. **public** **void** onCreate(Bundle savedInstanceState) | | |
| This method is used to prepare view | | |
| Parameter | Type | Description |
| saveInstanceState | Bundle |  |

|  |  |  |
| --- | --- | --- |
| **public** **void** bindData() | | |
| This method is used to get data from database and display them to view | | |
| Parameter | Type | Description |

|  |  |  |
| --- | --- | --- |
| **public** **void** sort() | | |
| This method is used to sort data following date time | | |
| Parameter | Type | Description |

#### BorrowLendRepository Class

##### Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Type | Accessibility | Description |

##### Operations

|  |  |  |
| --- | --- | --- |
| **public** **void** ArrayList<Object> getData(String condition) | | |
| This method is used to get all data from database | | |
| Parameter | Type | Description |
| condition | String |  |
| Return | ArrayList<Objects> | Return list of BorrowLend model |

|  |  |  |
| --- | --- | --- |
| **public** **void** BorrowLend getDetailData(String condition) | | |
| This method is used to get detail data of a record from database | | |
| Parameter | Type | Description |
| Condition | String |  |
| Return | BorrowLend | Return BorrowLend model |

#### BorrowLendViewDetail Class

##### Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Type | Accessibility | Description |
| totalInterestCaculate | double | Private |  |
| totalMoney | double | Private |  |
| leftDate | long | Private |  |

##### Operations

|  |  |  |
| --- | --- | --- |
| **public** **void** bindData() | | |
| This method is used to get data from database and display them to view | | |
| Parameter | Type | Description |

|  |  |  |
| --- | --- | --- |
| **public** **void** caculateInterest() | | |
| This method is used to calculate interest of a record | | |
| Parameter | Type | Description |

#### StatisticsViewDetail Class

##### Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Type | Accessibility | Description |
| startDate | Date | Private |  |
| endDate | Date | Private |  |
| reportDetail | LinearLayout | Private |  |
| checkMonthly | Boolean | Private |  |

##### Operations

|  |  |  |
| --- | --- | --- |
| **public** **void** getSchedule() | | |
| This method is used to get data about Schedule from database to show them on the view | | |
| Parameter | Type | Description |

|  |  |  |
| --- | --- | --- |
| **public** **void** getIncome() | | |
| This method is used to get data about Income from database to show them on the view | | |
| Parameter | Type | Description |

|  |  |  |
| --- | --- | --- |
| **public** **void** getExpense() | | |
| This method is used to get data about Expense from database to show them on the view | | |
| Parameter | Type | Description |

|  |  |  |
| --- | --- | --- |
| **public** **void** getBorrowing() | | |
| This method is used to get data about Borrowing from database to show them on the view | | |
| Parameter | Type | Description |

|  |  |  |
| --- | --- | --- |
| **public** **void** getSchedule() | | |
| This method is used to get data about Lending from database to show them on the view | | |
| Parameter | Type | Description |

#### Chart Class

##### Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute | Type | Accessibility | Description |
| startDate | Date | Private |  |
| endDate | Date | Private |  |
| checkMonthly | boolean | Private |  |
| entryCategoryName | List<String> | Private |  |
| entryCategoryValue | List<Double> | Private |  |
| entryCategoryColor | List<String> | Private |  |
| scheduleCategoryName | List<String> | Private |  |
| scheduleCategoryValue | List<Double> | Private |  |

##### Operations

|  |  |  |
| --- | --- | --- |
| 1. **public** **void** getScheduleDate() | | |
| This method is used to get data about Schedule from database | | |
| Parameter | Type | Description |

|  |  |  |
| --- | --- | --- |
| **public** **void** getEntryData() | | |
| This method is used to get data about Expense from database | | |
| Parameter | Type | Description |

|  |  |  |
| --- | --- | --- |
| **public** **View** getBarChartCompareIntent(Context context, boolean checkMonthly, List<Date[]> dateList) | | |
| This method is used to make bar chart to compare data between month or week | | |
| Parameter | Type | Description |
| context | Context |  |
| checkMonthLy | boolean |  |
| dateList | List<Date[]> |  |
| Return | View |  |

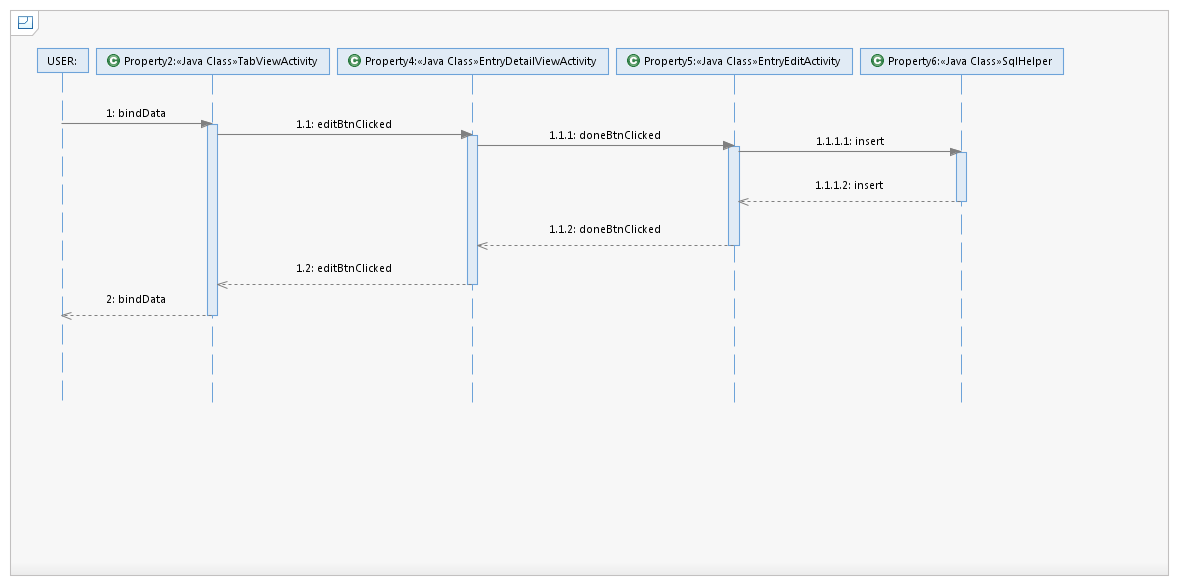
|  |  |  |
| --- | --- | --- |
| **public** **View** getBarChartIntent(Context context, boolean checkMonthly, Date startDate, Date endDate) | | |
| This method is used to make bar chart to compare category in a month or week | | |
| Parameter | Type | Description |
| context | Context |  |
| checkMonthly | Boolean |  |
| startDate | Date | The begun date of a month or a week |
| endDate | Date | The finished date of a month or a week |

|  |  |  |
| --- | --- | --- |
| **public** **View** getPieChartIntent(Context context, boolean checkMonthly, Date startDate, Date endDate) | | |
| This method is used to make pie chart to compare category in a month or week | | |
| Parameter | Type | Description |
| context | Context |  |
| checkMonthly | boolean |  |
| startDate | Date | The begun date of a month or a week |
| endDate | Date | The finished date of a month or a week |

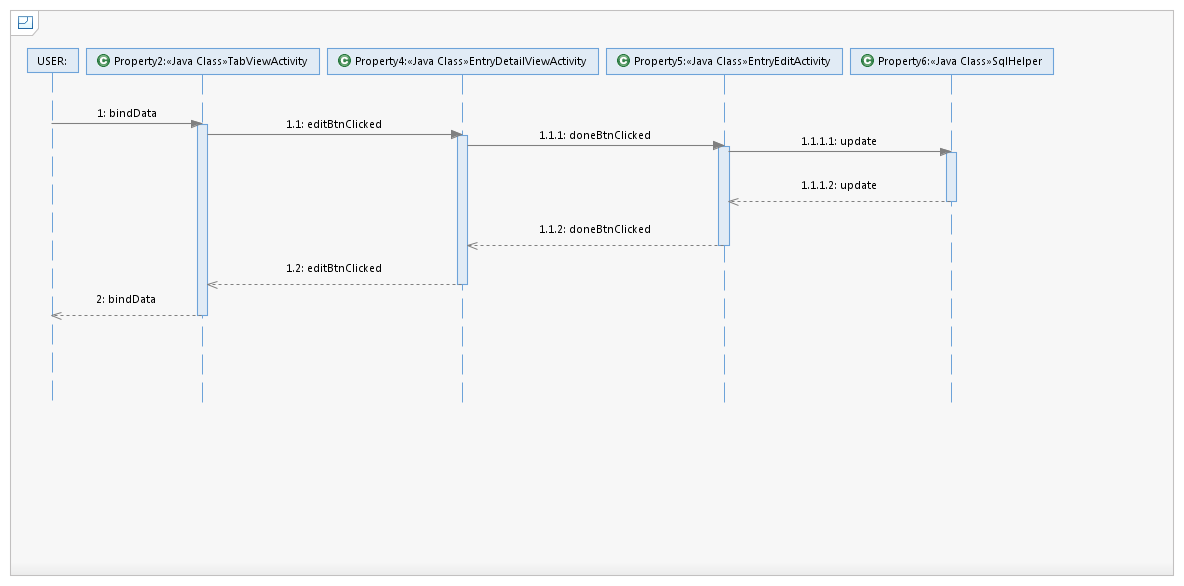
## Sequence Diagram

### Incomes and Expenses management function

#### Add a record

****

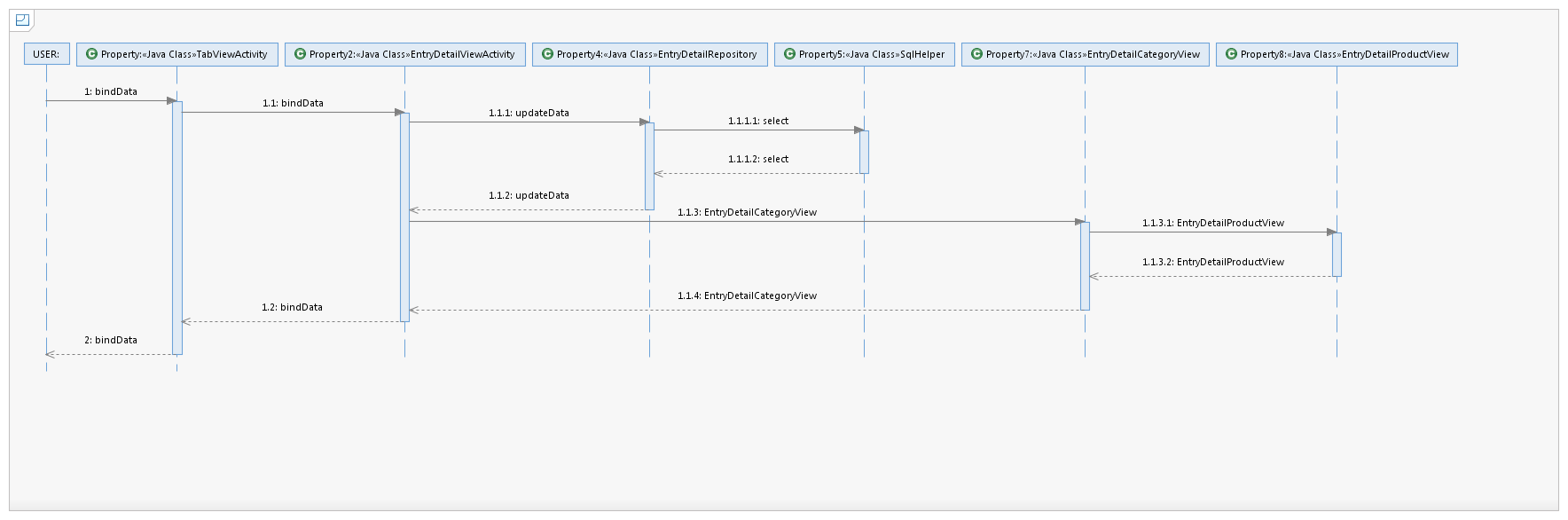
#### Edit a record

****

#### View a record



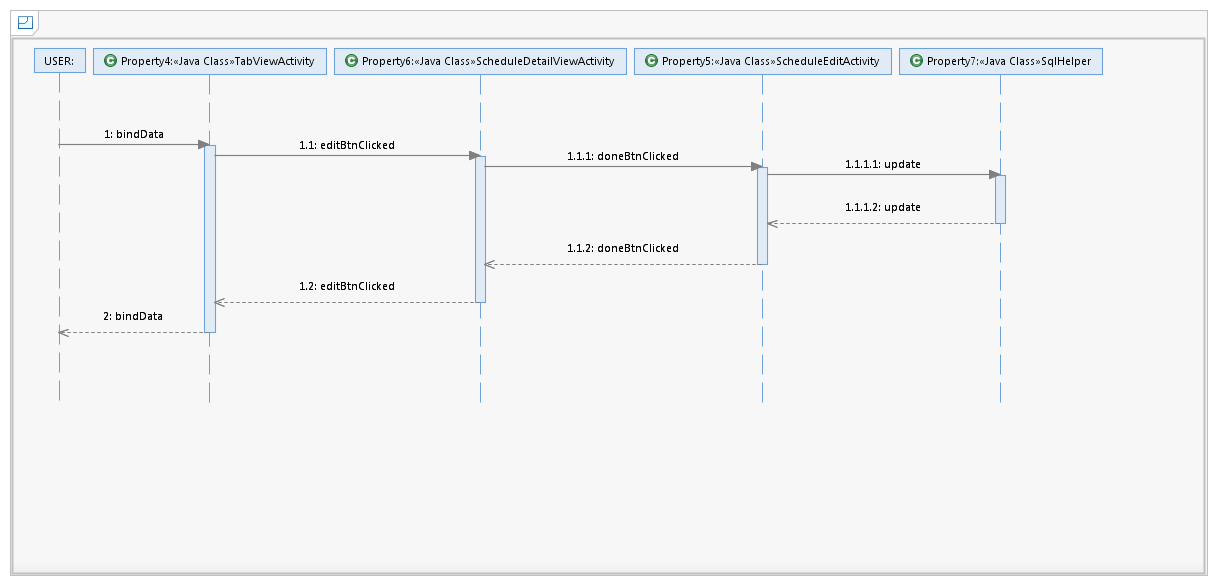
#### View a detail record



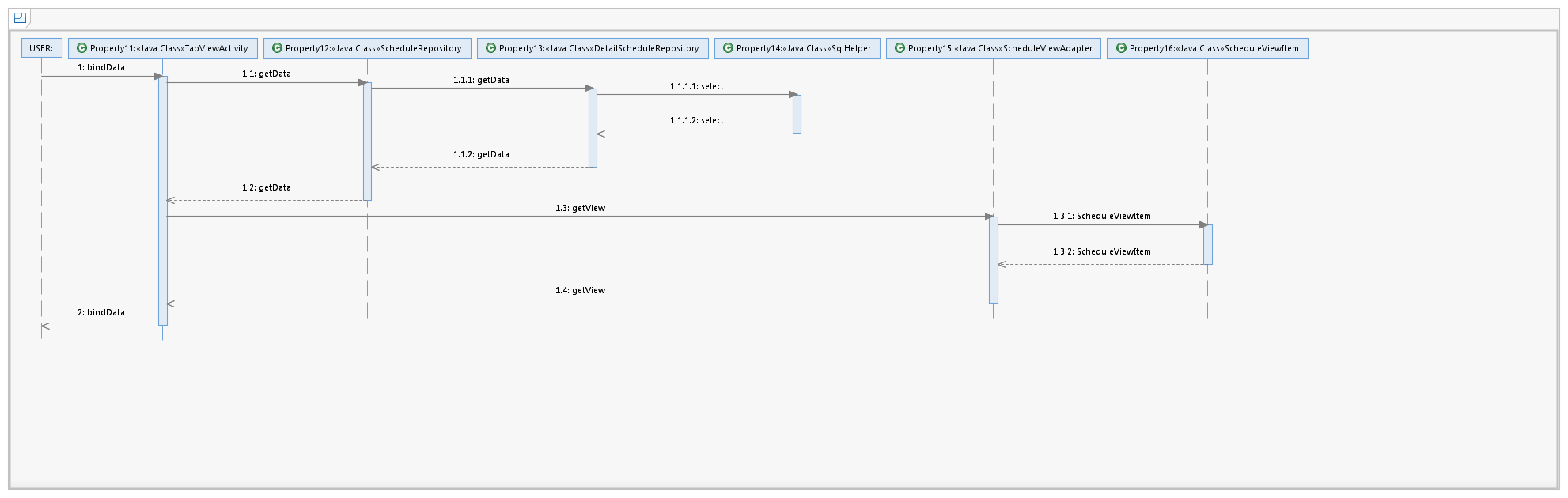
### Schedule function

#### Add a record

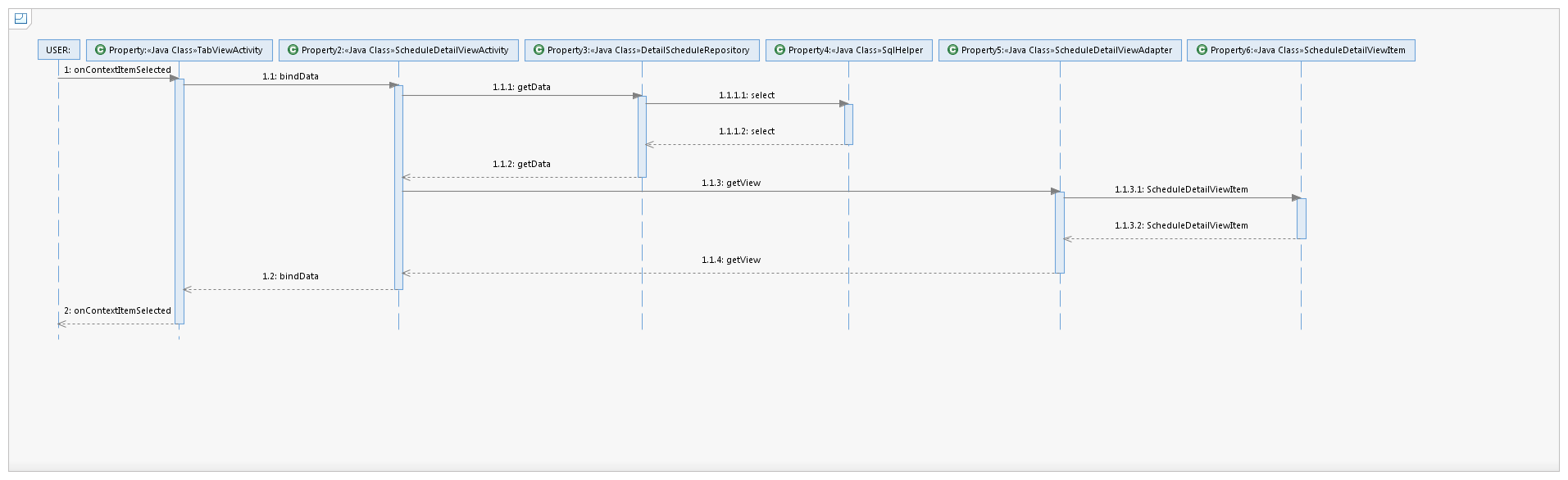
#### Edit a record



#### View a record

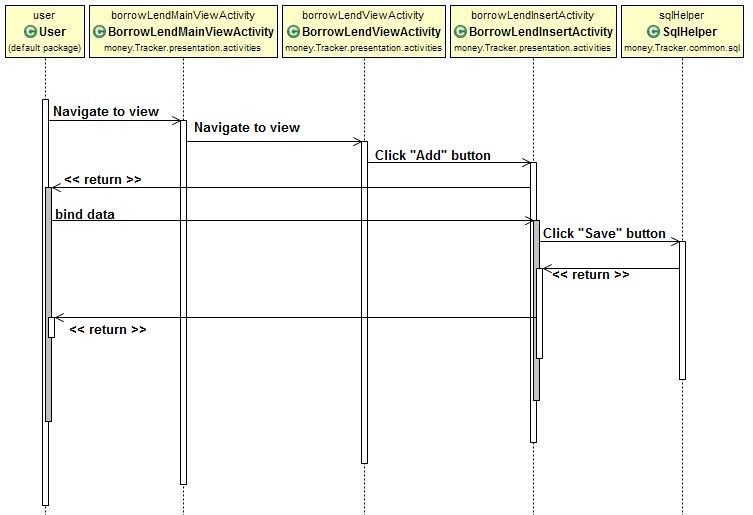
****

#### View a detail record



### Borrowing and lending management function

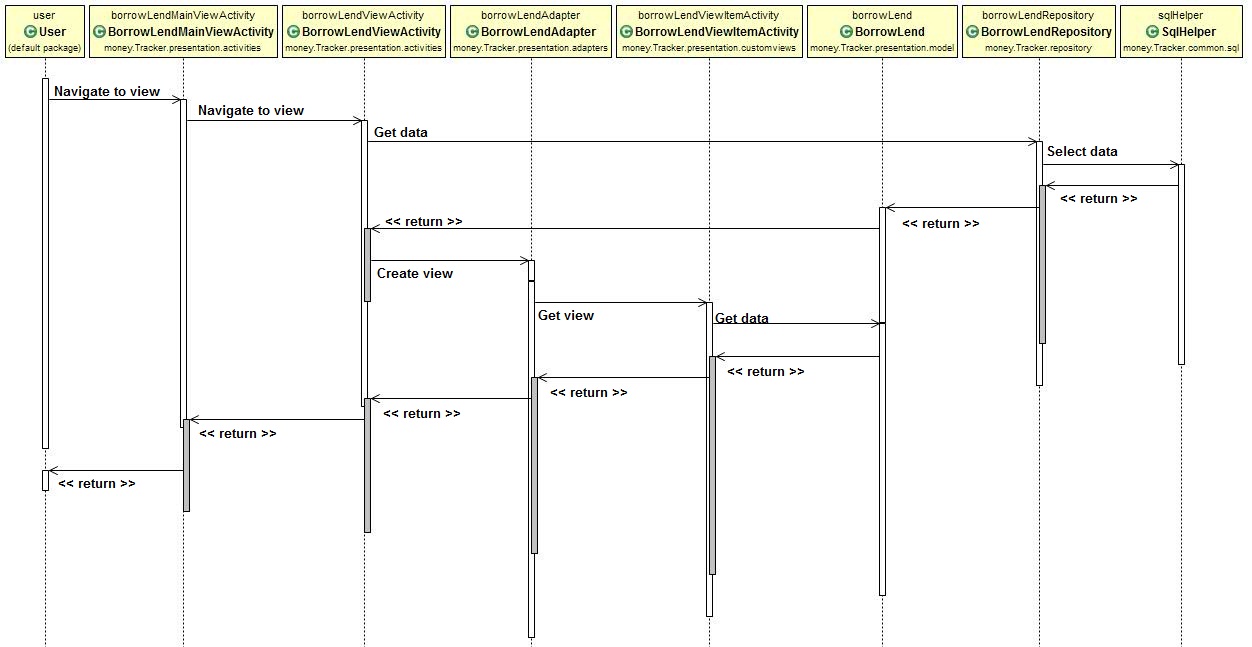
#### Add a record

****

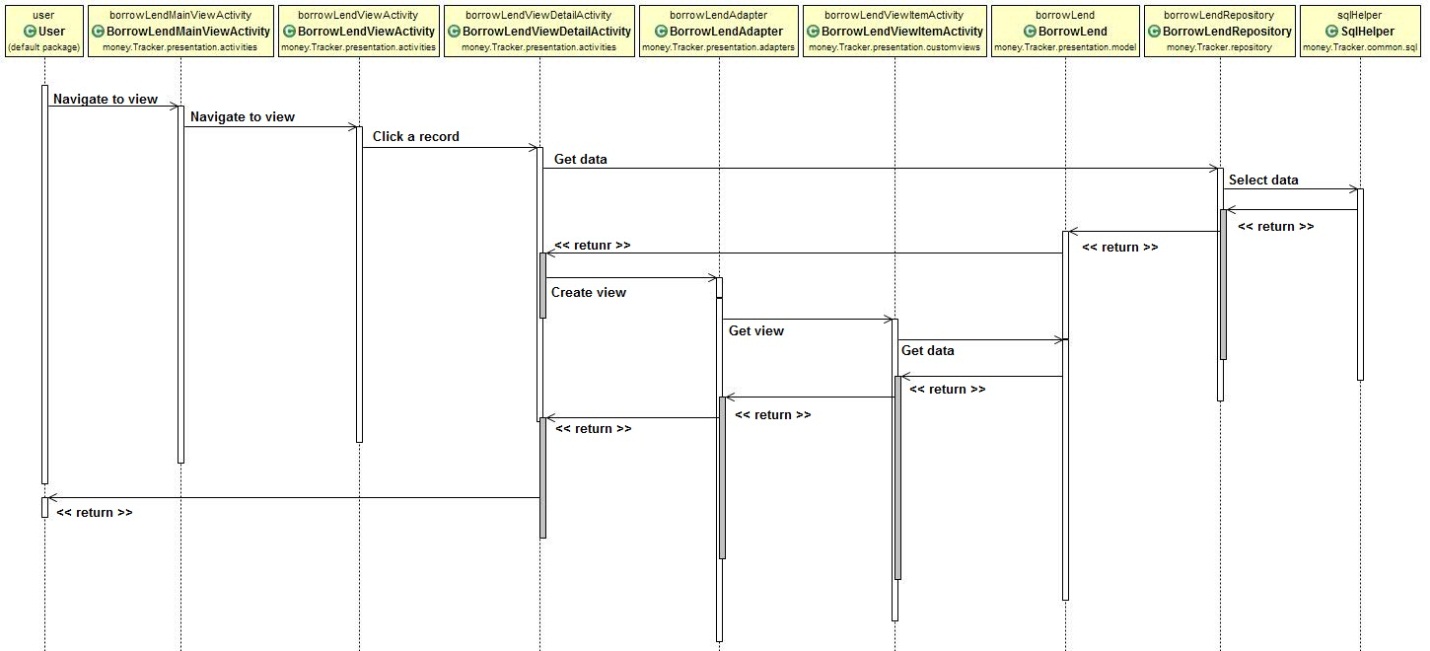
#### Edit a record

****

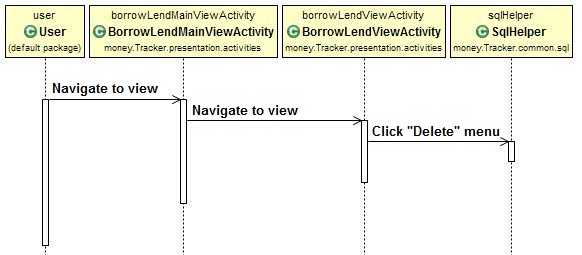
#### View a record

****

#### View a detail record

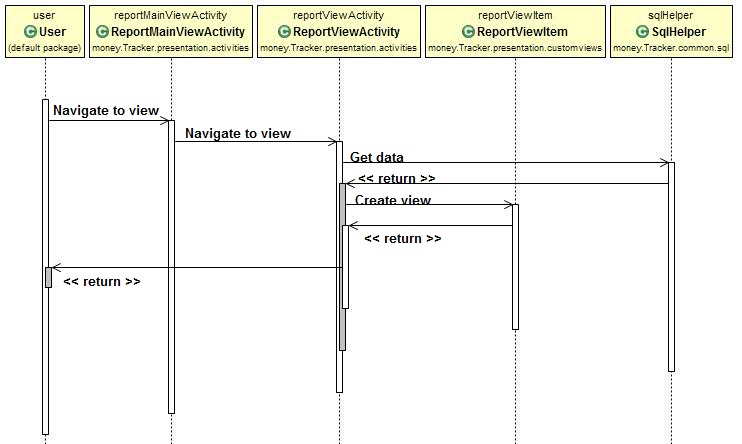
****

#### Delete a record

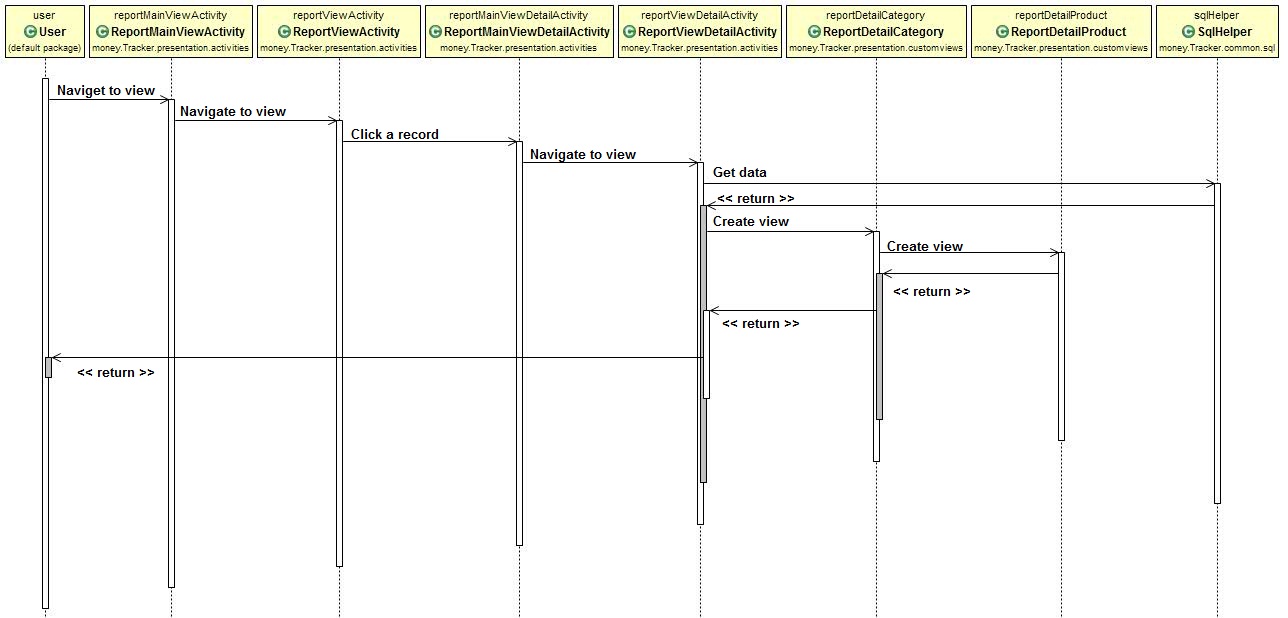


### Statistics function

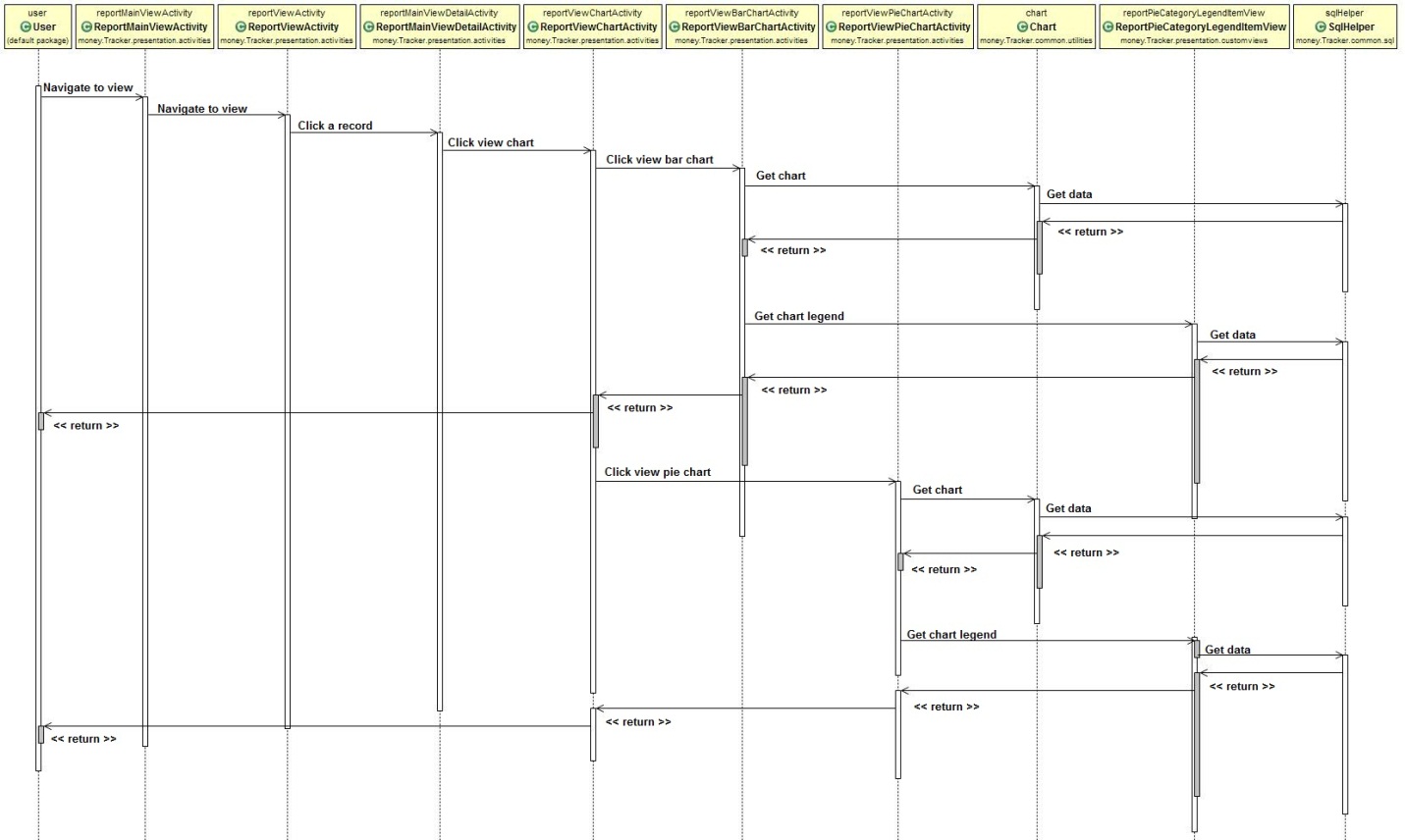
#### View a record

****

#### View a detail record

****

#### View Chart

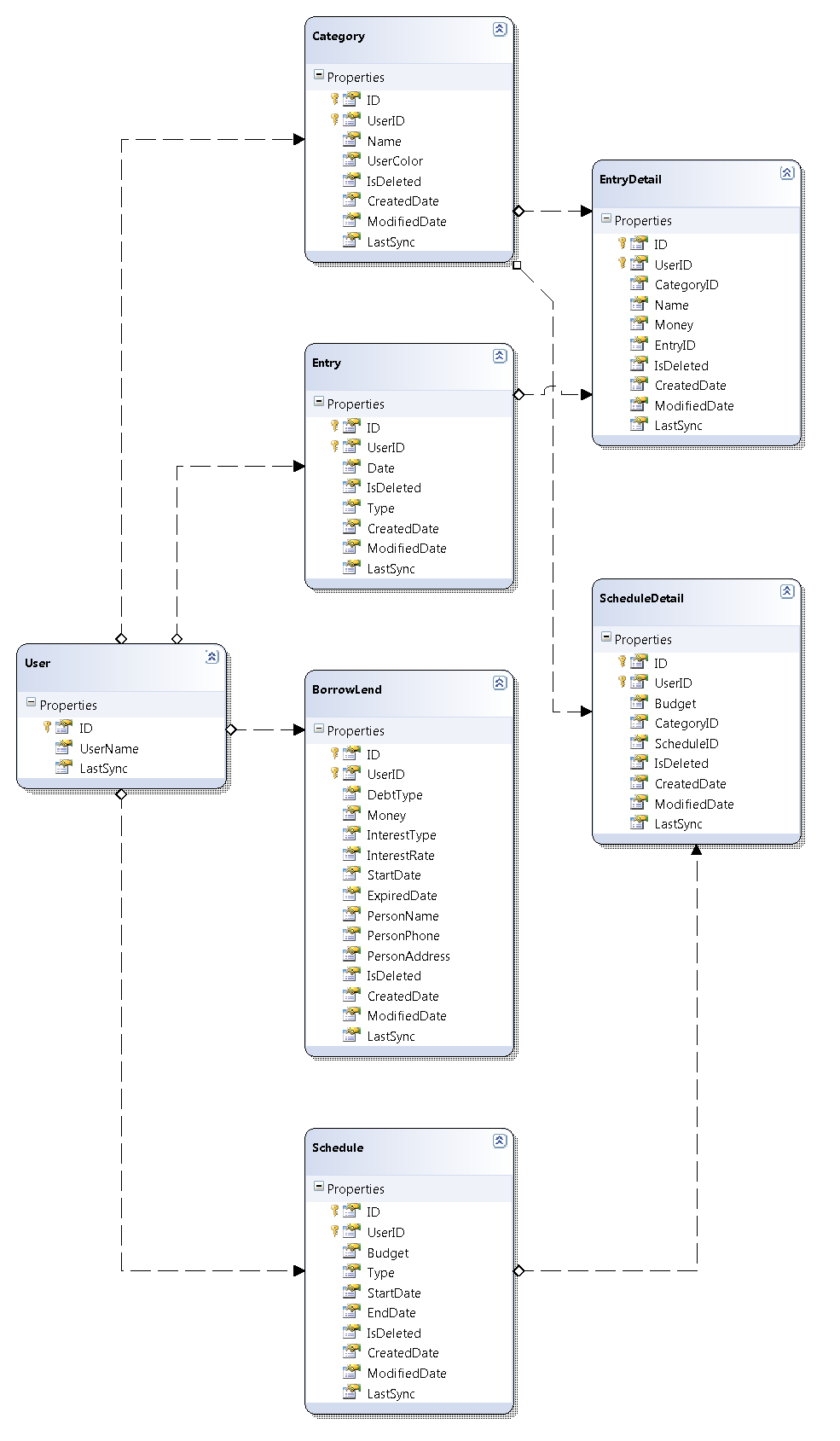
****

## User Interface Diagram

## Database Design

### Database Server Design

#### Database Diagram



#### Tables

|  |  |
| --- | --- |
| **Table Name** | **Description** |
| User | Stores information of user |
| Category | Stores all category |
| Entry | Stores all entry |
| EntryDetail | Stores detail for each entry |
| Schedule | Stores all schedule |
| ScheduleDetail | Stores detail for each schedule |
| BorrowLend | Stores all borrowing and lending |

#### Table Description

##### User

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| ID | INT |  | PK | User ID |
| UserName | VARCHAR(100) |  |  | Account username |
| LastSync | DATETIME |  |  | The latest date time which user synchronize |

##### Category

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| ID | BIGINT |  | PK | Category ID |
| UserID | INT |  | PK, FK | User ID |
| Name | NVARCHAR(100) |  |  | Category Name |
| UserColor | NVARCHAR(100) |  |  | Category Color |
| IsDeleted | INT |  |  | Mark a record is deleted or not |
| CreatedDate | DATETIME |  |  | The creation date time of a record |
| ModifiedDate | DATETIME |  |  | The updated data’s date time of a record |
| LastSync | DATETIME |  |  | The latest date time of record which user synchronized |

##### Entry

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| ID | BIGINT |  | PK | Entry ID |
| UserID | INT |  | PK, FK | User ID |
| Date | DATETIME |  |  | Entry Name |
| Type | NVARCHAR(100) |  |  | Entry Type (Income/ Expense) |
| IsDeleted | INT |  |  | Mark a record is deleted or not |
| CreatedDate | DATETIME |  |  | The creation date time of a record |
| ModifiedDate | DATETIME |  |  | The updated data’s date time of a record |
| LastSync | DATETIME |  |  | The latest date time of record which user synchronized |

##### EntryDetail

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| ID | BIGINT |  | PK | Entry Detail ID |
| UserID | INT |  | PK, FK | User ID |
| CategoryID | BIGINT |  | FK | Category ID |
| EntryID | BIGINT |  | FK | Entry ID |
| Name | NVARCHAR(100) |  |  | Entry Detail Name |
| Money | FLOAT |  |  | The money of entry detail |
| IsDeleted | INT |  |  | Mark a record is deleted or not |
| CreatedDate | DATETIME |  |  | The creation date time of a record |
| ModifiedDate | DATETIME |  |  | The updated data’s date time of a record |
| LastSync | DATETIME |  |  | The latest date time of record which user synchronized |

##### Schedule

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| ID | BIGINT |  | PK | Schedule ID |
| UserID | INT |  | PK, FK | User ID |
| Budget | FLOAT |  |  | The total budget of schedule |
| Type | INT |  |  | The type of schedule (Month/Week) |
| StartDate | DATETIME |  |  | The start of schedule’s period |
| EndDate | DATETIME |  |  | The end of schedule’s period |
| IsDeleted | INT |  |  | Mark a record is deleted or not |
| CreatedDate | DATETIME |  |  | The creation date time of a record |
| ModifiedDate | DATETIME |  |  | The updated data’s date time of a record |
| LastSync | DATETIME |  |  | The latest date time of record which user synchronized |

##### ScheduleDetail

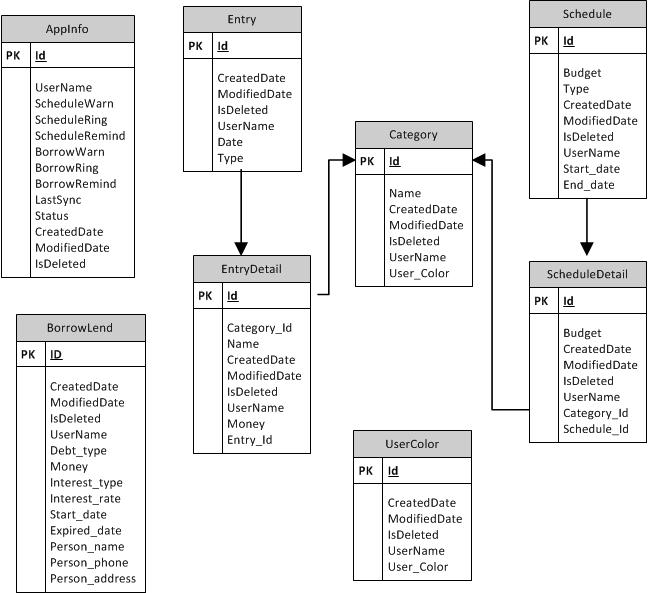
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| ID | BIGINT |  | PK | Schedule Detail ID |
| UserID | INT |  | PK, FK | User ID |
| CategoryID | BIGINT |  | FK | Category ID |
| ScheduleID | BIGINT |  | FK | Schedule ID |
| Budget | FLOAT |  |  | The budget for each category |
| IsDeleted | INT |  |  | Mark a record is deleted or not |
| CreatedDate | DATETIME |  |  | The creation date time of a record |
| ModifiedDate | DATETIME |  |  | The updated data’s date time of a record |
| LastSync | DATETIME |  |  | The latest date time of record which user synchronized |

##### BorrowLend

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| ID | BIGINT |  | PK | Schedule Detail ID |
| UserID | INT |  | PK, FK | User ID |
| DebtType | NVARCHAR(100) |  |  | The type of debt (borrowing/ lending) |
| Money | FLOAT |  |  | The total money of debt |
| InterestType | NVARCHAR(100) |  |  | The type of interest (simple/ compound) |
| InterestRate | INT | X |  | The rate of interest |
| StartDate | DATETIME |  |  | Starting date time of debt period |
| ExpiredDate | DATETIME | X |  | Expired date time of debt period |
| PersonName | NVARCHAR(100) |  |  | The owner’s name of debt |
| PersonPhone | NVARCHAR(100) | X |  | The owner’s phone of debt |
| PersonAddress | NVARCHAR(100) | X |  | The owner’s address of debt |
| IsDeleted | INT |  |  | Mark a record is deleted or not |
| CreatedDate | DATETIME |  |  | The creation date time of a record |
| ModifiedDate | DATETIME |  |  | The updated data’s date time of a record |
| LastSync | DATETIME |  |  | The latest date time of record which user synchronized |

### Database Client Design

#### Database Diagram



#### Tables

|  |  |
| --- | --- |
| **Table Name** | **Description** |
| AppInfo | Stores information of application |
| Category | Stores all category |
| Entry | Stores all entry |
| EntryDetail | Stores detail for each entry |
| Schedule | Stores all schedule |
| ScheduleDetail | Stores detail for each schedule |
| BorrowLend | Stores all borrowing and lending |
| UserColor | Stores all color for category |

#### Table Description

##### AppInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| Id | LONG |  | PK | Application Information ID |
| UserName | TEXT |  |  | Account username |
| ScheduleWarn | INTEGER |  |  |  |
| ScheduleRing | TEXT |  |  |  |
| ScheduleRemind | LONG |  |  |  |
| BorrowWarn | INTEGER |  |  |  |
| BorrowRing | TEXT |  |  |  |
| BorrowRemind | LONG |  |  |  |
| LastSync | DATE |  |  | The latest date time of record which user synchronized |
| CreatedDate | DATE |  |  | The creation date time of a record |
| ModifiedDate | DATE |  |  | The updated data’s date time of a record |
| IsDeleted | INTEGER |  |  | Mark a record is deleted or not |

##### Category

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| ID | Long |  | PK | Category ID |
| Name | TEXT |  |  | Category Name |
| CreatedDate | DATE |  |  | The creation date time of a record |
| ModifiedDate | DATE |  |  | The updated data’s date time of a record |
| IsDeleted | INTEGER |  |  | Mark a record is deleted or not |
| UserName | TEXT |  |  | Account username |
| User\_Color | TEXT |  |  | Category Color |

##### Entry

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| Id | LONG |  | PK | Entry ID |
| CreatedDate | DATE |  |  | The creation date time of a record |
| ModifiedDate | DATE |  |  | The updated data’s date time of a record |
| IsDeleted | INTEGER |  |  | Mark a record is deleted or not |
| UserName | TEXT |  |  | Account username |
| Date | DATE |  |  | Entry Name |
| Type | INTEGER |  |  | Entry Type(1: Income/ 0: Expense) |

##### EntryDetail

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| Id | LONG |  | PK | Entry Detail ID |
| Category\_Id | LONG |  | FK | Category ID |
| Name | TEXT |  |  | Entry Detail Name |
| CreatedDate | DATE |  |  | The creation date time of a record |
| ModifiedDate | DATE |  |  | The updated data’s date time of a record |
| IsDeleted | INTEGER |  |  | Mark a record is deleted or not |
| UserName | TEXT |  |  | Account username |
| Entry\_Id | LONG |  | FK | Entry ID |
| Money | LONG |  |  | The money of entry detail |

##### Schedule

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| Id | LONG |  | PK | Schedule ID |
| Budget | LONG |  |  | The total budget of schedule |
| Type | INTEGER |  |  | The type of schedule (1: Month/0: Week) |
| CreatedDate | DATE |  |  | The creation date time of a record |
| ModifiedDate | DATE |  |  | The updated data’s date time of a record |
| IsDeleted | INTEGER |  |  | Mark a record is deleted or not |
| UserName | TEXT |  |  | Account username |
| Start\_date | DATE |  |  | The start of schedule’s period |
| End\_date | DATE |  |  | The end of schedule’s period |

##### ScheduleDetail

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| Id | LONG |  | PK | Schedule Detail ID |
| Budget | LONG |  |  | The budget for each category |
| CreatedDate | DATE |  |  | The creation date time of a record |
| ModifiedDate | DATE |  |  | The updated data’s date time of a record |
| IsDeleted | INTEGER |  |  | Mark a record is deleted or not |
| UserName | TEXT |  |  | Account username |
| Category\_Id | LONG |  | FK | Category ID |
| Schedule\_Id | LONG |  | FK | Schedule ID |

##### BorrowLend

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| Id | LONG |  | PK | Schedule Detail ID |
| CreatedDate | DATE |  |  | The creation date time of a record |
| ModifiedDate | DATE |  |  | The updated data’s date time of a record |
| IsDeleted | INTEGER |  |  | Mark a record is deleted or not |
| UserName | TEXT |  |  | Account username |
| Debt\_type | TEXT |  |  | The type of debt (borrowing/ lending) |
| Money | LONG |  |  | The total money of debt |
| Interest\_type | TEXT |  |  | The type of interest (simple/ compound) |
| Interest\_rate | INTEGER | X |  | The rate of interest |
| Start\_date | DATE |  |  | Starting date time of debt period |
| Expired\_date | DATE | X |  | Expired date time of debt period |
| Person\_name | TEXT |  |  | The owner’s name of debt |
| Person\_phone | TEXT | X |  | The owner’s phone of debt |
| Person\_address | TEXT | X |  | The owner’s address of debt |

##### UserColor

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Column Name** | **Type** | **Allow Nulls** | **P/F Key** | **Description** |
| ID | Long |  | PK | Color ID |
| CreatedDate | DATE |  |  | The creation date time of a record |
| ModifiedDate | DATE |  |  | The updated data’s date time of a record |
| IsDeleted | INTEGER |  |  | Mark a record is deleted or not |
| UserName | TEXT |  |  | Account username |
| User\_Color | TEXT |  |  | Color code |

# Software Test Documentation

## Introduction

### System Overview

This document describes the approach and methodologies used by the testing group to plan, organize and manage the testing of this system. It describes implementation details of test cases or technical details of how the product features should work.

### Test Approach

The testing for this project will consist of Unit, System/Integration (combined) and Acceptance test levels. It is hoped that there will be at least one full time independent test person for system/integration testing. Most testing will be done by the test manager with the development team’s participation.

Unit Testing will be done by the developers and will be approved by the implementing team leader. All unit test information (sample, output, data printouts, and defect information…) will be managed by developers and it must be showed when team required.

System/Integration Testing will be performed by the test manager and implementing team leader with assistance from the individual developers as required.

Acceptance Testing will be performed by the test manager and development team leader. The acceptance test will be done for a period of 2 weeks after completion of the System/Integration test process. Programs will enter into Acceptance test after all critical and major defects have been corrected. A program may have one major defect as long as it does not obstruct testing of the program (There is a work around for the error). Prior to final completion of acceptance testing all open critical and major defects must be corrected

## Test plan

### Features to be tested

### Features not to be tested

## Test Cases

### Test case for Functions

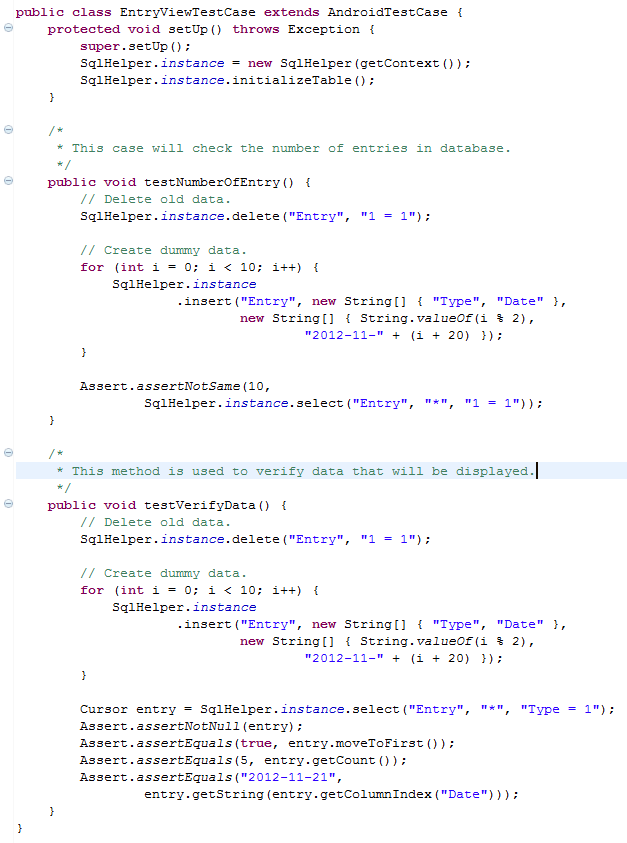
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test case Id** | **Test case Title** | **Test procedure** | **Expected result** | **Priority** |
|  | **Use Case 1: Schedule** | | |  |
|  | **- User role: all users - Pre-condition: Access to "Money tracker" application successful** | | |  |
| [FN\_1] | "Tháng" screen when it hasn't data | 1. Access to "Money tracker" application successful - Touch "Kế hoạch" item | 1. Display "Tháng" screen with "Không có dữ liệu" | Medium |
| [FN\_2] | "Tháng" screen when it has data | 1. Access to "Money tracker" application successful - Touch "Kế hoạch" item | 1. Display “Tuần” screen include list of monthly schedule - Each schedule includes information below: + Total budget + Time + Chart descripts this schedule | Medium |
| [FN\_3] | Create month schedule | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch save icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Display message: "Hãy nhập tổng ngân sách" | High |
| [FN\_4] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch plus icon beside “Ăn uống” field | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Display entered data 4. Display message: "Hãy nhập giá tiền" | Medium |
| [FN\_5] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch save icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Display entered data 4. - Return “Tháng” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_6] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Return “Tháng” screen | Medium |
| [FN\_7] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Enter price for first catalogue field 5. Touch plus icon beside “Ăn uống” field 6. Enter price for second catalogue field 7. Touch save icon  8. Touch schedule that has been saved | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display default first catalogue field is "Ăn uống" (name of catalogues to be arranged alphabetically) - Display entered data 5. Display: - Default value of combobox is: “Ăn uống” - One price field  6. Display entered data 7.  - Return “Tháng” screen - Show message “Đã lưu” - Display saved schedule 8. Display two "Ăn uống" catalogues with same name in the schedule merged into "Ăn uống" catalogue that have sum price | High |
| [FN\_8] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Enter price for first catalogue field 5. Touch plus icon beside “Ăn uống” field 6. Enter price for second catalogue field 7. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display default first catalogue field is "Ăn uống" (name of catalogues to be arranged alphabetically) - Display entered data 5. Display: - Default value of combobox is: “Ăn uống” - One price field  6. Display entered data 7. Return “Tháng” screen | Medium |
| [FN\_9] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch "Ăn uống" combobox 5. Choose "Điện" catalogue 6. Enter price for "Điện" catalogue 7. Touch save icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display list option:  - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. Display combobox value is “Điện” 6. Display entered data 7.  - Return “Tháng” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_10] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch "Ăn uống" combobox 5. Choose "Điện" catalogue 6. Enter price for "Điện" catalogue 7. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display list option:  - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. Display combobox value is “Điện” 6. Display entered data 7. Return “Tháng” screen | Medium |
| [FN\_11] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch start date field 5. Choose desired time - Touch "Đặt" button 6. Touch save icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display DatePickerDialog 5.  - Display chosen date - End date field automatic display last day of chosen month 6.  - Return “Tháng” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_12] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch start date field 5. Choose desired time - Touch "Đặt" button 6. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display DatePickerDialog 5.  - Display chosen data - End date field automatic display last day of chosen month  6. Return “Tháng” screen | Medium |
| [FN\_13] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch start date field 5. Choose desired time - Touch "Hủy" button 6. Enter data "Tổng ngân sách" field 7. Touch save icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display DatePickerDialog 5. Display current day 7.  - Return “Tháng” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_14] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch start date field 5. Choose desired time - Touch "Hủy" button 6. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display DatePickerDialog 5. Display current day 6. Return “Tháng” screen | Medium |
| [FN\_15] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch "Ăn uống" combobox 5. Choose "Khác" field 6. Enter catalogue name  7. Enter price for new catalogue 8. Touch save icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display list option: - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. Display text field 6. Display entered data 7. Display entered data  8.  - Return “Tháng” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_16] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Touch "Ăn uống" combobox 5. Choose "Khác" field 6. Enter catalogue name  7. Enter price for new catalogue 8. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display list option: - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. Display text field 6. Display entered data 7. Display entered data  8. Return “Tháng” screen | Medium |
| [FN\_17] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Enter price for "Ăn uống" field with total of detail budget greater than “Ngân sách” 5. Touch "Có" button 6. Touch save icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display: - Message:“Tổng chi phí đã vượt quá ngân sách, tăng thêm ngân sách?” - 2 buttons: “Có” and “Không” 5. Display total of detail budget at "Tổng ngân sách" field 6. - Return “Tháng” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_18] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Enter data "Tổng ngân sách" field 4. Enter price for "Ăn uống" field with total of detail budget greater than “Ngân sách” 5. Touch "Không" button 6. Touch save icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current date - Default value of end date field is last date of month 3. Display entered data 4. Display: - Message:“Tổng chi phí đã vượt quá ngân sách, tăng thêm ngân sách?” - 2 buttons: “Có” and “Không” 6.  - Display message: "Đã vượt quá ngân sách" - Display create screen entered data | High |
| [FN\_19] | Edit month schedule | 1. Touch "Kế hoạch" icon 2. Long press any schedule  (or Choose one item of list schedule on screen). 3. Touch "Sửa" item (or Touch edit icon). 4. Edit data in all fields 5. Touch save icon | 1. Display "Tháng" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen). 3. Display "Sửa kế hoạch" screen 4. All data is changed - Start date, end date - Ngân sách - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. - Return “Tháng” screen - Display message “Đã lưu” - Display saved data ( or  - Return view detail screen - Show message “Đã lưu” - Display saved data ) | High |
| [FN\_20] |  | 1. Touch "Kế hoạch" icon 2. Long press any schedule  (or Choose one item of list schedule on screen). 3. Touch "Sửa" item  (or Touch edit icon). 4. Edit data in all fields 5. Touch cancel icon | 1. Display "Tháng" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen)  3. Display "Sửa kế hoạch" screen 4. All data is changed - Start date, end date -Ngân sách - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. - Return “Tháng” screen - No data is edited ( or  - Return view detail screen - No data is edited ) | Medium |
| [FN\_21] |  | 1. Touch "Kế hoạch" icon 2. Long press any schedule  (or Choose one item of list schedule on screen)  3. Touch "Sửa” item  (or Touch edit icon)  4. Edit data in all fields (with total of detail budget greater than “Ngân sách”). 5. Touch "Có" button  6. Touch save icon | 1. Display "Tháng" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen)  3. Display "Sửa kế hoạch" screen 4. All data is changed  - Start date, end date  -Ngân sách  - Ăn uống   - Điện   - Nước  - Nhà  - Sinh nhật  - Khác - Display:  - Message:“Tổng chi phí đã vượt quá ngân sách, tăng thêm ngân sách?”  - 2 buttons: “Có” and “Không” 5. Display total of detail budget at "Tổng ngân sách" field 6. - Return “Tháng” screen - Show message “Đã lưu” - Display saved data ( or: - Return view detail screen - Show message “Đã lưu” - Display saved data ) | Medium |
| [FN\_22] |  | 1. Touch "Kế hoạch" icon 2. Long press any schedule  (or Choose one item of list schedule on screen)  3. Touch "Sửa” item  (or Touch edit icon)  4. Edit data in all fields (with total of detail budget greater than “Ngân sách”) 5. Touch "Không" button  6. Touch save icon | 1. Display "Tháng" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen)  3. Display "Sửa kế hoạch" screen 4. All data is changed  - Start date, end date  -Ngân sách  - Ăn uống   - Điện   - Nước  - Nhà  - Sinh nhật  - Khác - Display:  - Message:“Tổng chi phí đã vượt quá ngân sách, tăng thêm ngân sách?”  - 2 buttons: “Có” and “Không” 6.  - Display message: "Đã vượt quá ngân sách" - Display create screen entered data | High |
| [FN\_23] |  | 1. Touch "Kế hoạch" icon 2. Long press any schedule  (or Choose one item of list schedule on screen)  3. Touch "Sửa” item  (or Touch edit icon)  4. Touch start date field 5. Choose desired time (If desired time coincides with available time)  6. Touch save icon | 1. Display "Tháng" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display "Sửa kế hoạch" screen 4. Display DatePickerDialog 5. Display entered data  6. Display message: “Đã có kế hoạch trong thời gian này! Xin vui lòng chọn lại!” | High |
| [FN\_24] | Delete month schedule | 1. Touch "Kế hoạch" icon 2. Long press any schedule 3. Touch "Xóa” item 4. Touch “Có” button | 1. Display "Tháng" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4.  - Return"Tháng" screen  - Clear schedule - Show message: “Đã xóa” | Medium |
| [FN\_25] |  | 1. Touch "Kế hoạch" icon 2. Long press any schedule 3. Touch "Xóa” item 4. Touch “Không” button | 1. Display "Tháng" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4. Return "Tháng" screen | Medium |
| [FN\_26] | "Tuần" screen when it hasn't data | 1. Access to "Money tracker" application successful - Touch "Kế hoạch" item - Touch "Tuần" tab | 1. Display "Tuần" screen with "Không có dữ liệu" | Medium |
| [FN\_27] | "Tuần" screen when it has data | 1. Access to "Money tracker" application successful - Touch "Kế hoạch" item - Touch "Tuần" screen | 1. Display “Tuần” screen include list of weekly schedule - Each schedule includes information below: + Total budget + Time + Chart descripts this schedule | Medium |
| [FN\_28] | Create month schedule | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Touch save icon 6. Touch "Tuần" tab | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. - Return “Tháng” screen - Show message “Đã lưu” 6. Display saved data | High |
| [FN\_29] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Return “Tháng” screen | Medium |
| [FN\_30] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Enter price for first catalogue field 6. Touch plus icon beside “Ăn uống” field 7. Enter price for second catalogue field 8. Touch save icon  9.  - Touch "Tuần" tab - Touch schedule that has been saved | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Display default first catalogue field is "Ăn uống" ( name of catalogues to be arranged alphabetically ) - Display entered data 6. Display: - Default value of combobox is: “Ăn uống” - One price field  7. Display entered data 8.  - Return “Tháng” screen - Show message “Đã lưu” 9. - Display saved schedule - Display two "Ăn uống" catalogues with same name in the schedule merged into "Ăn uống" catalogue that have sum price | High |
| [FN\_31] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Enter price for first catalogue field 6. Touch plus icon beside “Ăn uống” field 7. Enter price for second catalogue field 8. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Display default first catalogue field is "Ăn uống" (name of catalogues to be arranged alphabetically)  - Display entered data 6. Display: - Default value of combobox is: “Ăn uống” - One price field  7. Display entered data 8. Return “Tháng” screen | Medium |
| [FN\_32] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Touch "Ăn uống" combobox 6. Choose "Điện" catalogue 7. Enter price for "Điện" catalogue 8. Touch save icon 9. Touch "Tuần" tab | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Display list option:  - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 6. Display combobox value is “Điện” 7. Display entered data 8.  - Return “Tháng” screen - Show message “Đã lưu” 9. Display saved data | High |
| [FN\_33] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Touch "Ăn uống" combobox 6. Choose "Điện" catalogue 7. Enter price for "Điện" catalogue 8. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Display list option:  - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 6. Display combobox value is “Điện” 7. Display entered data 8. Return “Tháng” screen | Medium |
| [FN\_34] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Touch start date field 6. Choose desired time - Touch "Đặt" button 7. Touch save icon 8. Touch "Tuần" tab | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Display DatePickerDialog 6.  - Display chosen data - End date field automatic display last day of chosen week 7. - Return “Tháng” screen - Show message “Đã lưu” 8. Display saved data | High |
| [FN\_35] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Touch start date field 6. Choose desired time - Touch "Đặt" button 7. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Display DatePickerDialog 6.  - Display chosen data - End date field automatic display last day of chosen week 7. Return “Tháng” screen | Medium |
| [FN\_36] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 4. Touch start date field 5. Choose desired time - Touch "Hủy" button 6. Touch save icon 7. Touch "Tuần" tab | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 4. Display DatePickerDialog 5. Display current day 6. - Return “Tháng” screen - Show message “Đã lưu” 7. Display saved data | High |
| [FN\_37] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 4. Touch start date field 5. Choose desired time - Touch "Hủy" button 6. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 4. Display DatePickerDialog 5. Display current day 6. Return “Tháng” screen | Medium |
| [FN\_38] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Touch "Ăn uống" combobox 6. Choose "Khác" field 7. Enter catalogue name  8. Enter price for new catalogue 9. Touch save icon 10. Touch "Tuần" tab | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Display list option: - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 6. Display text field 7. Display entered data  8. Display entered data 9.  - Return “Tháng” screen - Show message “Đã lưu” 10. Display saved data | High |
| [FN\_39] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Touch "Ăn uống" combobox 6. Choose "Khác" field 7. Enter catalogue name  8. Enter price for new catalogue 9. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Display list option: - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 6. Display text field 7. Display entered data  8. Display entered data 9. Return “Tháng” screen | Medium |
| [FN\_40] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Enter price for "Ăn uống" field with total of detail budget greater than “Ngân sách” 6. Touch "Có" button 7. Touch save icon  8. Touch "Tuần" tab | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Display: - Message:“Tổng chi phí đã vượt quá ngân sách, tăng thêm ngân sách?” - 2 buttons: “Có” and “Không” 6. Display total of detail budget at "Tổng ngân sách" field 7. - Return “Tháng” screen - Show message “Đã lưu” 8. Display saved data | High |
| [FN\_41] |  | 1. Touch "Kế hoạch" item 2. Touch create icon 3. Touch “Tháng” toggle 4. Enter data "Tổng ngân sách" field 5. Enter price for "Ăn uống" field with total of detail budget greater than “Ngân sách” 6. Touch "Có" button 7. Touch cancel icon | 1. Display "Tháng" screen 2. Display create screen with: - Toggle is "Tháng" - Default value of start date field is current day - Default value of end date field is last day of month 3. Change toggle “Tháng” to “Tuần” 4. Display entered data 5. Display: - Message:“Tổng chi phí đã vượt quá ngân sách, tăng thêm ngân sách?” - 2 buttons: “Có” and “Không” 6. Display total of detail budget at "Tổng ngân sách" field 7. Return “Tháng” screen | Medium |
| [FN\_42] | Edit month schedule | 1. Touch "Kế hoạch" icon - Touch "Tuần" tab 2. Long press any schedule  (or Choose one item of list schedule on screen)  3. Touch "Sửa” item  (or Touch edit icon)  4. Edit data in all fields 5. Touch save icon | 1. Display "Tuần" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display "Sửa kế hoạch" screen 4. All data is changed - Start date, end date -Ngân sách - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. - Return “Tuần” screen - Display message “Đã lưu” - Display saved data ( or  - Return view detail screen - Show message “Đã lưu” - Display saved data ) | High |
| [FN\_43] |  | 1. Touch "Kế hoạch" icon - Touch "Tuần" tab 2. Long press any schedule  (or Choose one item of list schedule on screen)  3. Touch "Sửa” item  (or Touch edit icon)  4. Edit data in all fields 5. Touch cancel icon | 1. Display "Tuần" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen)  3. Display "Sửa kế hoạch" screen 4. All data is changed - Start date, end date -Ngân sách - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. - Return “Tuần” screen - No data is edited ( or  - Return view detail screen - No data is edited ) | High |
| [FN\_44] |  | 1. Touch "Kế hoạch" icon - Touch "Tuần" tab 2. Long press any schedule  (or Choose one item of list schedule on screen)  3. Touch "Sửa” item  (or Touch edit icon)  4. Edit data in all fields (with total of detail budget greater than “Ngân sách”) 5. Touch "Có" button  6. Touch save icon | 1. Display "Tuần" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display "Sửa kế hoạch" screen  (or Display detail information screen)  4. All data is changed  - Start date, end date  -Ngân sách  - Ăn uống   - Điện   - Nước  - Nhà  - Sinh nhật  - Khác - Display:  - Message:“Tổng chi phí đã vượt quá ngân sách, tăng thêm ngân sách?”  - 2 buttons: “Có” and “Không” 5. Display total of detail budget at "Tổng ngân sách" field 6.- Return “Tuần” screen - Show message “Đã lưu” - Display saved data ( or: - Return view detail screen - Show message “Đã lưu” - Display saved data ) | High |
| [FN\_45] |  | 1. Touch "Kế hoạch" icon - Touch "Tuần" tab 2. Long press any schedule  (or Choose one item of list schedule on screen)  3. Touch "Sửa” item  (or Touch edit icon)  4. Edit data in all fields (with total of detail budget greater than “Ngân sách”) 5. Touch "Không" button  6. Touch save icon | 1. Display "Tuần" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen)  3. Display "Sửa kế hoạch" screen 4. All data is changed  - Start date, end date  -Ngân sách  - Ăn uống   - Điện   - Nước  - Nhà  - Sinh nhật  - Khác - Display:  - Message:“Tổng chi phí đã vượt quá ngân sách, tăng thêm ngân sách?”  - 2 buttons: “Có” and “Không” 6.  - Display message: "Đã vượt quá ngân sách" - Display create screen entered data | Medium |
| [FN\_46] |  | 1. Touch "Kế hoạch" icon - Touch "Tuần" tab 2. Long press any schedule  (or Choose one item of list schedule on screen)  3. Touch "Sửa” item  (or Touch edit icon)  4. Touch start date field 5. Choose desired time (If desired time coincides with available time)  6. Touch save icon | 1. Display "Tháng" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" ( or Display detail information screen ) 3. Display "Sửa kế hoạch" screen 4. Display DatePickerDialog 5. Display entered data  6. Display message: “Đã có kế hoạch trong thời gian này! Xin vui lòng chọn lại!” | Medium |
| [FN\_47] | Delete month schedule | 1. Touch "Kế hoạch" icon - Touch "Tuần" tab 2. Long press any schedule 3. Touch "Xóa” item 4. Touch “Có” button | 1. Display "Tuần" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4.  - Return"Tuần" screen  - Clear schedule - Show message: “Đã xóa” | High |
| [FN\_48] |  | 1. Touch "Kế hoạch" icon - Touch "Tuần" tab 2. Long press any schedule 3. Touch "Xóa” item 4. Touch “Không” button | 1. Display "Tháng" screen  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4. Return "Tuần" screen | High |
|  | **Use Case 2: Incomes and Expenses management** | | | |
|  | **- User role: all users - Pre-condition: Access to "Money tracker" application successful and phone support NFC** | | | |
| [FN\_49] | "Chi phí" screen when it hasn't data | 1. Access to "Money tracker" application successful | 1. Display “Chi phí” screen with content “Không có dữ liệu” | Medium |
| [FN\_50] | "Chi phí" screen when it has data | 1. Access to "Money tracker" application successful | 1. Display “Chi phí” screen includes list of expense  - Each schedule includes information below: + Total budget + Time + Chart descripts this schedule | Medium |
| [FN\_51] | Add Daily Expense | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Enter data into all fields 4. Touch save icon | 1. Display “Chi phí” screen 2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display all entered data 4.  - Return “Chi phí” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_52] |  | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Enter data into all fields 4. Touch cancel icon | 1. Display “Chi phí” screen 2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display all entered data 4. Return “Chi phí” screen | Medium |
| [FN\_53] |  | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Touch date field 4. Choose desired time - Touch "Đặt" button 5. Enter data into all remaining field 6. Touch save icon | 1. Display new "Chi phí" day schedule  2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display DatePickerDialog 4. Display chosen date 5. Display entered data 6.  - Return “Chi phí” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_54] |  | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Touch date field 4. Choose desired time - Touch "Hủy" button 5. Enter data into all remaining field 6. Touch save icon | 1. Display new "Chi phí" day schedule  2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display DatePickerDialog 4. Display value of date field is current day 5. Display entered data 6.  - Return “Chi phí” screen - Show message “Đã lưu” - Display saved data | Medium |
| [FN\_55] |  | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Touch save icon  4. Enter price for sub item of "Ăn uống" catalogue 5. Touch save icon | 1. Display new "Chi phí" day schedule  2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display message: "Hãy nhập dữ liệu" 4. Display entered data 5. Display message: "Hãy nhập tên sản phẩm" | High |
| [FN\_56] |  | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Touch save icon  4. Enter name for sub item of "Ăn uống" catalogue 5. Touch save icon | 1. Display new "Chi phí" day schedule  2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display message: "Hãy nhập dữ liệu" 4. Display entered data 5. Display message: "Hãy nhập giá sản phẩm" | High |
| [FN\_57] |  | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Touch date field 4. Choose desired time - Touch "Đặt" button 5. Enter data into all field (if amount of money make total expense greater than budget that setting in warning function) 6. Touch save icon | 1. Display new "Chi phí" day schedule  2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display DatePickerDialog 4. Display chosen date 5. Display message: “Chi phí đã vượt quá X% ngân sách.” and ring tone seted in warning function (with X% seted in warning function) 6.  - Return “Chi phí” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_58] | Edit expense | 1. Touch "Quản lý chi tiêu" icon  2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item  (or Touch edit icon) 4. Edit data in all fields 5. Touch save icon | 1. Display new "Chi phí" day schedule  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display "Sửa kế hoạch" screen 4. All data is changed - Date - Ngân sách - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. - Return “Chi phí” screen - Show message “Đã lưu” - Display saved data ( or: - Return view detail screen - Show message “Đã lưu” - Display saved data ) | High |
| [FN\_59] |  | 1. Touch "Quản lý chi tiêu" icon  2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item 4. Edit data in all fields 5. Touch cancel icon | 1. Display new "Chi phí" day schedule  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display "Sửa kế hoạch" screen 4. All data is changed - Date - Ngân sách - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. Return “Chi phí” screen ( or: - Return view detail screen - No data is edited ) | Medium |
| [FN\_60] |  | 1. Touch "Quản lý chi tiêu" icon  2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item  (or Touch edit icon) 4. Touch “Chi phí” toggle 5. Edit data in all fields 6. Touch save icon  7. Touch "Tuần" tab | 1. Display new "Chi phí" day schedule  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display "Sửa kế hoạch" screen 4. Display changed “Chi phí” to “Thu nhập” toggle 5. Display all data is changed 6. - Return “Chi phí” screen - Clear edited expense  (or: Return view "Thu nhập" detail screen of that schedule) 7. Display edited schedule | High |
| [FN\_61] | Delete expense | 1. Touch "Quản lý chi tiêu" icon  2. Long press any schedule 3. Touch "Xóa" item 4. Touch "Có" button | 1. Display new "Chi phí" day schedule  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4.   - Return “Chi phí” screen - Clear expense - Show message: “Đã xóa” | Medium |
| [FN\_62] |  | 1. Touch "Quản lý chi tiêu" icon  2. Long press any schedule 3. Touch "Xóa" item 4. Touch "Không" button | 1. Display new "Chi phí" day schedule  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4. Return “Chi phí” screen | Medium |
| [FN\_63] | "Thu nhập" screen when it hasn't data | 1. Access to "Money tracker" application successful - Touch "Thu nhập" tab | 1. Display “Thu nhập” screen with content “Không có dữ liệu” | Medium |
| [FN\_64] | "Thu nhập" screen when it has data | 1. Access to "Money tracker" application successful - Touch "Thu nhập" tab | 1. Display “Thu nhập” screen includes list of income  - Each schedule includes information below: + Total budget + Time + Chart descripts this schedule | Medium |
| [FN\_65] | Add Daily Income | 1. Touch "Quản lý chi tiêu" icon 2. Touch create icon 3. Touch "Chi phí" toggle 4. Enter data into all fields 5. Touch save icon | 1. Display “Thu nhập” screen 2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display changed "Chi phí" toggle to "Thu nhập" 4. Display all entered data 5.  - Return “Chi phí” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_66] |  | 1. Touch "Quản lý chi tiêu" icon 2. Touch create icon 3. Touch "Chi phí" toggle 4. Enter data into all fields 5. Touch cancel icon | 1. Display “Thu nhập” screen 2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display changed "Chi phí" toggle to "Thu nhập" 4. Display all entered data 5.  - Return “Chi phí” screen - Show message “Đã lưu” - Display saved data | Medium |
| [FN\_67] |  | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Touch "Chi phí" toggle 4. Touch date field 5. Choose desired time - Touch "Đặt" button 6. Enter data into all remaining field 7. Touch save icon | 1. Display “Thu nhập” screen 2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display changed "Chi phí" toggle to "Thu nhập" 4. Display DatePickerDialog 5. Display chosen date 6. Display entered data 7.  - Return “Chi phí” screen - Show message “Đã lưu” - Display saved data | High |
| [FN\_68] |  | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Touch "Chi phí" toggle 4. Touch date field 5. Choose desired time - Touch "Đặt" button 6. Enter data into all remaining field 7. Touch cancel icon | 1. Display “Thu nhập” screen 2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display changed "Chi phí" toggle to "Thu nhập" 4. Display DatePickerDialog 5. Display chosen date 6. Display entered data 7. Return “Chi phí” screen | Medium |
| [FN\_69] |  | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Touch "Chi phí" toggle 4. Touch save icon  5. Enter price for sub item of "Ăn uống" catalogue 6. Touch save icon | 1. Display “Thu nhập” screen 2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display changed "Chi phí" toggle to "Thu nhập" 4. Display message: "Hãy nhập dữ liệu" 5. Display entered data 6. Display message: "Hãy nhập tên sản phẩm" | High |
| [FN\_70] |  | 1. Touch "Quản lý chi tiêu" icon  2. Touch create icon 3. Touch "Chi phí" toggle 4. Touch save icon  5. Enter name for sub item of "Ăn uống" catalogue 6. Touch save icon | 1. Display “Thu nhập” screen 2. Display create screen with: - Default toggle: "Chi phí" - Defaul value of date field is current day 3. Display changed "Chi phí" toggle to "Thu nhập" 3. Display message: "Hãy nhập dữ liệu" 4. Display entered data 5. Display message: "Hãy nhập giá sản phẩm" | High |
| [FN\_71] | Edit income | 1. Touch "Quản lý chi tiêu" icon  - Touch "Thu nhập" tab 2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item  (Touch edit icon) 4. Edit data in all fields 5. Touch save icon | 1. Display new "Thu nhập" day schedule  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display "Sửa kế hoạch" screen 4. All data is changed - Date - Ngân sách - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. - Return “Thu nhập” screen - Show message “Đã lưu” - Display saved data ( or: - Return view detail screen - Show message “Đã lưu” - Display saved data ) | High |
| [FN\_72] |  | 1. Touch "Quản lý chi tiêu" icon  - Touch "Thu nhập" tab 2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item  (Touch edit icon) 4. Edit data in all fields 5. Touch cancel icon | 1. Display new "Thu nhập" day schedule  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display "Sửa kế hoạch" screen 4. All data is changed - Date - Ngân sách - Ăn uống  - Điện  - Nước - Nhà - Sinh nhật - Khác 5. Return “Thu nhập” screen ( or: - Return view detail screen - No data is edited ) | High |
| [FN\_73] |  | 1. Touch "Quản lý chi tiêu" icon  - Touch "Thu nhập" tab 2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item 4. Touch “Thu nhập” toggle 5. Edit data in all fields 6. Touch save icon  7. Touch "Tuần" tab | 1. Display new "Chi phí" day schedule  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display "Sửa kế hoạch" screen 4. Display changed “Thu nhập” to “Chi phí” toggle 5. Display all data is changed 6. - Return “Thu nhập” screen - Clear edited expense  (or: Return view "Chi phí" detail screen of that schedule) 7. Display edited schedule | Medium |
| [FN\_74] | Delete income | 1. Touch "Quản lý chi tiêu" icon  - Touch "Thu nhập" tab 2. Long press any schedule 3. Touch "Xóa" item 4. Touch "Có" button | 1. Display new "Thu nhập" day schedule  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4.   - Return “Thu nhập” screen - Clear expense - Show message: “Đã xóa” | High |
| [FN\_75] |  | 1. Touch "Quản lý chi tiêu" icon  - Touch "Thu nhập" tab 2. Long press any schedule 3. Touch "Xóa" item 4. Touch "Không" button | 1. Display new "Thu nhập" day schedule  2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4. Return “Thu nhập” screen | Medium |
| [FN\_76] | NFC tag has information | 1. At "Quản lý chi tiêu" screen - Touch "Chi phí" tab - Touch any schedule - Touch menu of phone. - Touch "NFC" button 2. Enable NFC applicaton 3.To NFC tags applied to the back of phone | 1. Display message: "Hãy bật thiết bị NFC" 2. Turn on NFC - Display message: "Hãy đưa thẻ NFC tới gần" 3. Display price and name of product - Price and name of product automatic fill in schedule | Medium |
| [FN\_77] |  | 1. At phone screen, when enabled NFC applicaton - To NFC tags applied to the back of phone | 1. Display price and name of product - Display price and name of product automatic fill in "Chi phí" schedule ( automatic launch Money Tracker Applicaton) | Medium |
| [FN\_78] |  | 1. At "Quản lý chi tiêu" screen - Touch "Chi phí" tab - Touch any schedule - Touch menu of phone. - Touch "NFC" button 2. Disable NFC applicaton | 1. Display message: "Hãy bật thiết bị NFC" 2. Display schedule screen | Medium |
| [FN\_79] |  | 1. At "Quản lý chi tiêu" screen - Touch "Quản lý chi tiêu" item - Touch "Chi phí" tab - Touch any schedule - Touch menu of phone. - Touch "NFC" button 2.To NFC tags applied to the back of phone | 1. Display message: "Hãy bật thiết bị NFC" 2. Display price and name of product - Price and name of product automatic fill in schedule | Medium |
| [FN\_80] | NFC tag hasn't information | 1. At phone screen, when enabled NFC applicaton - To NFC tags applied to the back of phone | 1. Display "Empty tag" screen | Medium |
| [FN\_81] | QR code | 1. At "Quản lý chi tiêu" screen - Touch "Chi phí" tab - Touch any schedule - Touch menu of phone  - Touch "QR code" 2. Scanning QR code | 1. Display scan QR code screen  2. Display price and name of product - Price and name of product automatic fill in schedule | Medium |
|  | **Use Case 3: Borrowing and Lending money management** | | | |
|  | **- User role: all users - Pre-condition: Access to "Money tracker" application successful** | | | |
| [FN\_82] | "Vay" screen when hasn't data | 1. Access to "Money tracker" application successful | 1. Display "Vay" screen with content "Không có dữ liệu" | Medium |
| [FN\_83] | "Vay" screen when has data | 1. Access to "Money tracker" application successful | 1. Display "Vay" screen with list of loan - Each schedule includes information below: + Total budget + Start date, expired date | Medium |
| [FN\_84] | Add New borrowing | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into mandatory fields 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Default toggle is "Vay" - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date 4. - Return "Vay" screen - Display message "Đã lưu" - Display saved borrowing | High |
| [FN\_85] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into mandatory fields 4. Touch cancel icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower  ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Default toggle is "Vay" - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date 4. Return "Vay" screen - Nothing is added | High |
| [FN\_86] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields except “Ngày đáo hạn” field 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower  ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Default toggle is "Vay" - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date 4. Display message: “Xin hãy nhập ngày đáo hạn!” - Return create screen | Medium |
| [FN\_87] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields except “Lãi suất” field 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower  ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Display "Lãi suất" field is empty  - Default toggle is "Vay" - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date 4. Display message: “Bạn phải nhập lãi suất!” - Return create screen | Medium |
| [FN\_88] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields except “Lãi suất” field and "Ngày đáo hạn" 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower  ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Display "Lãi suất" field is empty  - Default toggle is "Vay" - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date 4.  - Return "Vay" screen - Display message "Đã lưu" - Display saved borrowing that hasn't expired date | High |
| [FN\_89] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower  ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Display "Lãi suất" field is empty  - Default toggle is "Vay" - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date occurs before the start date - Display message "Ngày đáo hạn không hợp lệ. Xin bạn vui lòng nhập lại" | Medium |
| [FN\_90] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields except “Name” field 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Tên" field is empty - Display data into remaining fields - Default toggle is "Vay" - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date 4. Display message: "Xin hãy nhập tên!" |  |
| [FN\_91] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields except "Tổng số tiền" field 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Tổng số tiền" field is empty - Display data into remaining fields - Default toggle is "Vay" - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date 4. Display message: "Xin hãy nhập tổng số tiền!" |  |
| [FN\_92] | Edit borrowing | 1. Touch "Vay-Cho vay" icon 2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item  (or Touch edit icon) 4. Edit all of data in fields 5. Touch save icon | 1. Display "Vay" screen 2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display edit screen 4. Display all data is changed 5. - Return “Vay” screen - Show message: “Đã lưu” - Display all saved data | High |
| [FN\_93] |  | 1. Touch "Vay-Cho vay" icon 2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item  (or Touch edit icon) 4. Edit all of data in fields 5. Touch cancel icon | 1. Display "Vay" screen 2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display edit screen 4. Display all data is changed 5. Return “Vay” screen - Nothing is changed | Medium |
| [FN\_94] |  | 1. Touch "Vay-Cho vay" icon 2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item  (or Touch edit icon) 4. Edit all of data in fields 5. Touch "Vay" toggle 6. Touch save icon  7. Touch "Cho vay" tab | 1. Display "Vay" screen 2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" (or Display detail information screen) 3. Display edit screen 4. Display all data is changed 5. Display changed "Vay" toggle to "Cho vay" 6. - Return “Vay” screen - Show message: “Đã lưu” - Clear edited schedule 7. Display edited schedule | High |
| [FN\_95] | Delete borrowing | 1. Touch "Vay-Cho vay" icon 2. Long press any schedule 3. Touch "Xóa" item 4. Touch "Có" button | 1. Display "Vay" screen 2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4. - Return "Vay" screen  - Show message: “Đã xóa” - Clear borrowing | Medium |
| [FN\_96] |  | 1. Touch "Vay-Cho vay" icon 2. Long press any schedule 3. Touch "Xóa" item 4. Touch "Không" button | 1. Display "Vay" screen 2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4. Return "Vay" screen | Medium |
| [FN\_97] | "Cho vay" screen when hasn't data | 1. Access to "Money tracker" application successful - Touch "Cho vay" tab | 1. Display "Cho vay" screen with content "Không có dữ liệu" | Medium |
| [FN\_98] | "Cho vay" screen when has data | 1. Access to "Money tracker" application successful - Touch "Cho vay" tab | 1. Display "Cho vay" screen with list of loan - Each schedule includes information below: + Total budget + Start date, expired date | Medium |
| [FN\_99] | Add new lending | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into mandatory fields - Touch "Vay" toggle 4. Touch save icon | 1. Display "Cho vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Display "Cho vay" toggle  - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date 4. - Return "Cho vay" screen - Display message "Đã lưu" - Display saved lending | High |
| [FN\_100] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into mandatory fields - Touch "Vay" toggle 4. Touch cancel icon | 1. Display "Cho vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Display "Cho vay" toggle  - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date 4. Return "Cho vay" screen | High |
| [FN\_101] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields except “Ngày đáo hạn” field - Touch "Vay" toggle 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower  ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields  - Display "Cho vay" toggle  - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date 4. Display message: “Xin hãy nhập ngày đáo hạn!” - Return create screen | Medium |
| [FN\_102] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields except “Lãi suất” field - Touch "Vay" toggle 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower  ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Display "Lãi suất" field is empty  - Display "Cho vay" toggle  - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date 4. Display message: “Bạn phải nhập lãi suất!” - Return create screen | Medium |
| [FN\_103] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields except “Lãi suất” field and "Ngày đáo hạn" - Touch "Vay" toggle 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower  ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Display "Lãi suất" field is empty  - Display "Cho vay" toggle - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date 4.  - Return "Vay" screen - Display message "Đã lưu" - Display saved borrowing that hasn't expired date | High |
| [FN\_104] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields - Touch "Vay" toggle | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Danh bạ" screen of phone and choose borrower  ( or: If entered name is not available in mobile contact, display pop-up to add new contact ) - Display data into remaining fields - Display "Lãi suất" field is empty  - Display "Cho vay" toggle - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date occurs before the start date - Display message "Ngày đáo hạn không hợp lệ. Xin bạn vui lòng nhập lại" | Medium |
| [FN\_105] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields except “Name” field - Touch "Vay" toggle 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Tên" field is empty - Display data into remaining fields - Display "Cho vay" toggle - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date 4. Display message: "Xin hãy nhập tên!" |  |
| [FN\_106] |  | 1. Touch "Vay-Cho vay" icon 2. Touch create icon  3. Enter data into all fields except "Tổng số tiền" field - Touch "Vay" toggle 4. Touch save icon | 1. Display "Vay" screen 2. Display create screen - Defaul toggle: "Vay" - Default start date: current day 3. Display data: - Display "Tổng số tiền" field is empty - Display data into remaining fields - Display "Cho vay" toggle - Chosen interest type: "Lãi đơn" or "Lãi kép" - Show DatePickerDialog. "Ngày bắt đầu" field defaul current date. Chosen start date - Show DatePickerDialog. "Ngày đáo hạn" field defaul current date. Chosen expired date 4. Display message: "Xin hãy nhập tổng số tiền!" |  |
| [FN\_108] | Edit lending | 1. Touch "Vay-Cho vay" icon - Touch "Cho vay" tab 2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item  (or Touch edit icon) 4. Edit all of data in fields 5. Touch save icon | 1. Display "Cho vay" screen 2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" ( or Display detail information screen ) 3. Display edit screen 4. Display all data is changed 5. - Return “Cho vay” screen - Show message: “Đã lưu” - Display all saved data | High |
| [FN\_109] |  | 1. Touch "Vay-Cho vay" icon - Touch "Cho vay" tab 2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item  (or Touch edit icon) 4. Edit all of data in fields 5. Touch cancel icon | 1. Display "Cho vay" screen 2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" ( or Display detail information screen ) 3. Display edit screen 4. Display all data is changed 5. Return “Cho vay” screen | Medium |
| [FN\_110] |  | 1. Touch "Vay-Cho vay" icon - Touch "Cho vay" tab 2. Long press any schedule  (or Choose one item of list schedule on screen) 3. Touch "Sửa" item  (or Touch edit icon) 4. Edit all of data in fields 5. Touch "Cho vay" toggle 6. Touch save icon  7. Touch "Vay" tab | 1. Display "Vay" screen 2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" ( or Display detail information screen ) 3. Display edit screen 4. Display all data is changed 5. Display changed "Cho Vay" toggle to "Vay" 6. - Return “Cho vay” screen - Show message: “Đã lưu” - Clear edited schedule 7. Display edited schedule | High |
| [FN\_111] | Delete borrowing | 1. Touch "Vay-Cho vay" icon - Touch "Cho vay" tab 2. Long press any schedule 3. Touch "Xóa" item 4. Touch "Có" button | 1. Display "Cho vay" screen 2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4. - Return "Cho vay" screen  - Show message: “Đã xóa” - Clear borrowing | Medium |
| [FN\_112] |  | 1. Touch "Vay-Cho vay" icon - Touch "Cho vay" tab 2. Long press any schedule 3. Touch "Xóa" item 4. Touch "Không" button | 1. Display "Vay" screen 2. Display:  - "Danh mục" pop-up - 2 item "Sửa" and "Xóa" 3. Display pop-up confirm includes: - Message: “Xóa?” - 2 buttons: “Có” and “Không” 4. Return "Vay" screen | Medium |
|  | **UC: "Báo cáo"** |  |  |  |
| [FN\_113] | "Tháng" tab of "Báo cáo" screen when it hasn't data | 1. Access to "Money tracker" application successful - Touch "Báo cáo" item | 1. Display “Báocáo” screen default focus “Tháng” screen: "Không có dữ liệu" | Medium |
| [FN\_114] | "Tháng" tab of "Báo cáo" screen when it has data | 1. Access to "Money tracker" application successful - Touch "Báo cáo" item | 1. Display “Báocáo” screen default focus “Tháng” screen includes list of month which have information | Medium |
| [FN\_115] |  | 1. Access to "Money tracker" application successful - Touch "Báo cáo" item 2. Touch one item of list 3. Touch “Đồ thị” tab 4. Touch compare icon on screen 5. Touch some items - Touch “Đồng ý” button | 1. Display “Báocáo” screen default focus “Tháng” screen includes list of month which have information  2. Default display “Chi tiết” screen of this item includes detail information 3. Display “Đồthị” screen includes pie chart which describes income/expense of this item 4. Display list of months which have income or expense information  5. Display trend chart to compared between chosen months | Medium |
| [FN\_116] |  | 1. Access to "Money tracker" application successful - Touch "Báo cáo" item - Touch “Tuần” tab 2. Touch one item of list 3. Touch “Đồthị” tab 4. Touch compare icon on screen 5. Touch some items - Touch “Đồng ý” button | 1. Display “Báocáo” screen default focus “Tháng” screen includes list of week which have information  - Display “Tuần” screen includes list of weeks which have information  2. Default display “Chi tiết” screen of this item includes detail information 3. Display “Đồthị” screen includes pie chart which descripts income/expense of this item 4. Display list of weeks which have income or expense information  5. Display trend chart to compared between chosen weeks | Medium |
| [FN\_117] |  | 1. Access to "Money tracker" application successful - Touch "Báo cáo" item 2. Long click one item of list 3. Touch "Có" button | 1. Display “Báocáo” screen default focus “Tháng” screen includes list of month which have information  2. Display dialog includes: - Message: “Bạn muốn xóa báo cáo tháng MM không?” - 2 buttons: “Có” và “Không” 3. Return "Tháng" screen and clear this item  - Show message: “Đã xóa!” | Medium |
| [FN\_118] |  | 1. Access to "Money tracker" application successful - Touch "Báo cáo" item 2. Long click one item of list 3. Touch "Không" button | 1. Display “Báocáo” screen default focus “Tháng” screen includes list of month which have information  2. Display dialog includes: - Message: “Bạn muốn xóa báo cáo tháng MM không?” - 2 buttons: “Có” và “Không” 3. Return "Tháng" screen | Medium |
| [FN\_119] |  | 1. Access to "Money tracker" application successful - Touch "Báo cáo" item - Touch "Tuần" tab 2. Long click one item of list 3. Touch "Có" button | 1. Display “Báocáo” screen default focus “Tháng” screen includes list of month which have information  - Display “Tuần” screen includes list of weeks which have information  2. Display dialog includes: - Message: “Bạn muốn xóa báo cáo tuần DD/MM - DD'/MM không?” - 2 buttons: “Có” và “Không” 3. Return "Tuần" screen and clear this item  - Show message: “Đã xóa!” | Medium |
| [FN\_120] |  | 1. Access to "Money tracker" application successful - Touch "Báo cáo" item - Touch "Tuần" tab 2. Long click one item of list 3. Touch "Không" button | 1. Display “Báocáo” screen default focus “Tháng” screen includes list of month which have information  - Display “Tuần” screen includes list of weeks which have information  2. Display dialog includes: - Message: “Bạn muốn xóa báo cáo tuần DD/MM - DD'/MM không?” - 2 buttons: “Có” và “Không” 3. Return "Tuần" screen | Medium |
|  | **Use Case 5: Warning** | | | |
|  | **- User role: all users - Pre-condition: Access to "Money tracker" application successful** | | | |
| [FN\_120] | View setting warning for "Chi tiêu" | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Enter data into all field at "Chi phí" screen | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen with: - "Cảnh báo khi đến" label default: 50% - "Nhạc chuông" label default: "Mặc định" - "Nhắc lại" label default: "10 phút" 3. Display message “Chi phí đã vượt quá 50% ngân sách.”, ringtone, snooze when "Chi phí" over 50% budget | Medium |
| [FN\_121] | Setting "Cảnh báo khi đến" label | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch first combobox of "Thiết lập cảnh báo" 4. Touch at least one item of list except "Other" item | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for "Cảnh báo khi đến" label: - 25% - 50% - 70% - 100% - Other 4.Display chosen item (- Will display message “Chi phí đã vượt quá X% ngân sách.” when "Chi phí" over X% budget) | High |
| [FN\_122] |  | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch first combobox of "Thiết lập cảnh báo" 4. Touch "Other" item 5. Enter data into text field  - Touch "Đồng ý" | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for "Cảnh báo khi đến" label: - 25% - 50% - 70% - 100% - Other 4.Display: - "Nhập giá trị" pop-up - Text field - 2 item "Đồng ý" and "Hủy" 5. Display entered data ( - Will display message “Chi phí đã vượt quá X% ngân sách.” when "Chi phí" over X% budget) | High |
| [FN\_123] |  | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch first combobox of "Thiết lập cảnh báo" 4. Touch "Other" item 5. Enter data into text field  - Touch "Hủy" | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for "Cảnh báo khi đến" label: - 25% - 50% - 70% - 100% - Other 4.Display: - "Nhập giá trị" pop-up - Text field - 2 item "Đồng ý" and "Hủy" 5. Display setting screen | Medium |
| [FN\_124] | Setting "Nhạc chuông" label | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch second combobox of "Thiết lập cảnh báo" 4. Touch “Thư mục” item 5. Choose at least one song of list | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for “Nhạc Chuông” label: - Không có - Mặc định - Thư mục 4. Display all song on user mobile phone 5. Display chosen song title on second combobox | High |
| [FN\_125] | Setting "Nhắc lại" label | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch third combobox of "Thiết lập cảnh báo" 4. Choose at least one item of list except "Other" item | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for “Nhắc lại” label: - Không bao giờ - 10 phút - 30 phút - 1 tiếng - Other 4. Display chosen item | Medium |
| [FN\_126] |  | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch third combobox of "Thiết lập cảnh báo" 4. Choose "Other" item 5. Enter data into text field - Touch "Đồng ý" button | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for “Nhắc lại” label: - Không bao giờ - 10 phút - 30 phút - 1 tiếng - Other 4. Display: - "Nhập giá trị" pop-up - Text field, with unit: "phút" - 2 item "Đồng ý" and "Hủy" 5. Display enterde data | High |
| [FN\_127] |  | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch third combobox of "Thiết lập cảnh báo" 4. Choose "Other" item 5. Enter data into text field - Touch "Hủy" button | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for “Nhắc lại” label: - Không bao giờ - 10 phút - 30 phút - 1 tiếng - Other 4. Display: - "Nhập giá trị" pop-up - Text field, with unit: "phút" - 2 item "Đồng ý" and "Hủy" 5. Display setting screen | Medium |
| [FN\_128] | View setting warning for "Vay và cho vay" | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Enter data into all field at "Vay" screen or "Cho vay" screen | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen with: - "Cảnh báo trước khi đáo hạn" label default: "1 tuần" - "Nhạc chuông" label default: "Mặc định" - "Nhắc lại" label default: "10 phút" 3. Display message “Còn 1 tuần là đến ngày đáo hạn.”, ringtone, snooze when expired date remain one week | Medium |
| [FN\_129] | Setting "Cảnh báo khi đến" label | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch fourth combobox of "Thiết lập cảnh báo" 4. Touch at least one item of list except "Other" item | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for "Cảnh báo trước khi đáo hạn" label: - 1 tiếng - 10 tiếng - 1 ngày - 1 tuần - Other 4.Display chosen item (Will display message “Còn X time là đến ngày đáo hạn.”, ringtone, snooze when expired date remain X time) | Medium |
| [FN\_130] |  | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch fourth combobox of "Thiết lập cảnh báo" 4. Touch "Other" item 5. Enter data into text field  - Touch "Đồng ý" | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for "Cảnh báo trước khi đáo hạn" label: - 1 tiếng - 10 tiếng - 1 ngày - 1 tuần - Other 4.Display: - "Nhập giá trị" pop-up - Text field, with unit: "tiếng" - 2 item "Đồng ý" and "Hủy" 5. Display entered data (- Will display message “Còn X time là đến ngày đáo hạn.”, ringtone, snooze when expired date remain X time) | High |
| [FN\_131] |  | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch fourth combobox of "Thiết lập cảnh báo" 4. Touch "Other" item 5. Enter data into text field  - Touch "Hủy" | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for "Cảnh báo trước khi đáo hạn" label: - 1 tiếng - 10 tiếng - 1 ngày - 1 tuần - Other 4.Display: - "Nhập giá trị" pop-up - Text field, with unit: "tiếng" - 2 item "Đồng ý" and "Hủy" 5. Display setting screen | Medium |
| [FN\_132] | Setting "Nhạc chuông" label | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch fifth combobox of "Thiết lập cảnh báo" 4. Touch “Thư mục” item 5. Choose at least one song of list | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for “Nhạc Chuông” label: - Không có - Mặc định - Thư mục 4. Display all song on user mobile phone 5. Display chosen song title on second combobox | Medium |
| [FN\_133] | Setting "Nhắc lại" label | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch sixth combobox of "Thiết lập cảnh báo" 4. Choose at least one item of list except "Other" item | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for “Nhắc lại” label: - Không bao giờ - 10 phút - 30 phút - 1 tiếng - Other 4. Display chosen item | High |
| [FN\_134] |  | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch sixth combobox of "Thiết lập cảnh báo" 4. Choose "Other" item 5. Enter data into text field - Touch "Đồng ý" button | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for “Nhắc lại” label: - Không bao giờ - 10 phút - 30 phút - 1 tiếng - Other 4. Display: - "Nhập giá trị" pop-up - Text field, with unit: "phút" - 2 item "Đồng ý" and "Hủy" 5. Display enterde data | High |
| [FN\_135] |  | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch Sixth combobox of "Thiết lập cảnh báo" 4. Choose "Other" item 5. Enter data into text field - Touch "Hủy" button | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display list of choices for “Nhắc lại” label: - Không bao giờ - 10 phút - 30 phút - 1 tiếng - Other 4. Display: - "Nhập giá trị" pop-up - Text field, with unit: "phút" - 2 item "Đồng ý" and "Hủy" 5. Display setting screen | Medium |
|  | **Use Case 6: Synchronize** | | | |
|  | **- User role: all users - Pre-condition: Access to "Money tracker" application successful and connected internet** | | | |
| [FN\_136] | Log in account | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch add icon at "Quản lý tài khoản" section 4. Log in successful any account type | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display "Thêm tài khoản" screen with account types: - Facebook - Twitter - Microsoft Exchange ActiveSync - Google - Tài khoản Samsung  - Display logged in account at "Quản lý tài khoản" section | Medium |
| [FN\_137] | Choose account to synchronize | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Touch any account  4. When synchronized successful | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display gray icon spinning at beside chosen account 4. Gray icon disappeared | High |
| [FN\_138] | Automatic synchronize | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. First select automatic synchronize field 4. Touch any account 5. Touch "Đồng ý" item  6. When automatic synchronize successful | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Display pop-up: "Nhập dữ liệu" with list logged in account - List account arranged alphabetically, green item appear beside first account and status of this account is "Bật" - 2 item "Đồng ý" and "Hủy" 4. Status of chosen account is "Bât"  - Green item appear beside chosen account  5. Green item spinning at beside chosen account 6. Green item stoped | High |
| [FN\_139] |  | 1. Access to "Money tracker" application successful - Touch menu of phone 2. Touch "Thiết lập" item 3. Select automatic synchronize field 4. Touch any account 5. Touch "Đồng ý" item  6. Touch back key of phone and input data  - Touch save icon | 1. Display pop-up with 3 item: - "Thiết lập" item - "Nhập dữ liệu" item - "Xuất dữ liệu" item 2. Display setting screen 3. Green item appear at last chosen account 4. Status of chosen account is "Bât"  - Green item appear beside chosen account  5. Green item spinning at beside chosen account 6. Still automatic synchronize data | High |

### Test case for GUI

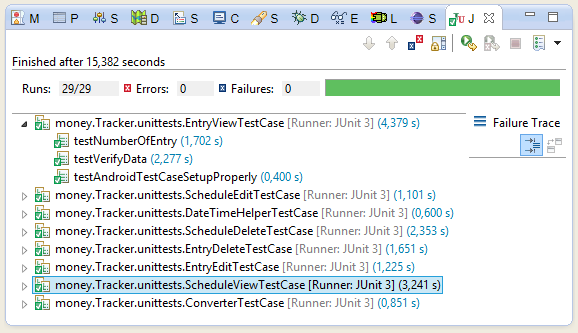
## Unit test

### Incomes and Expenses management

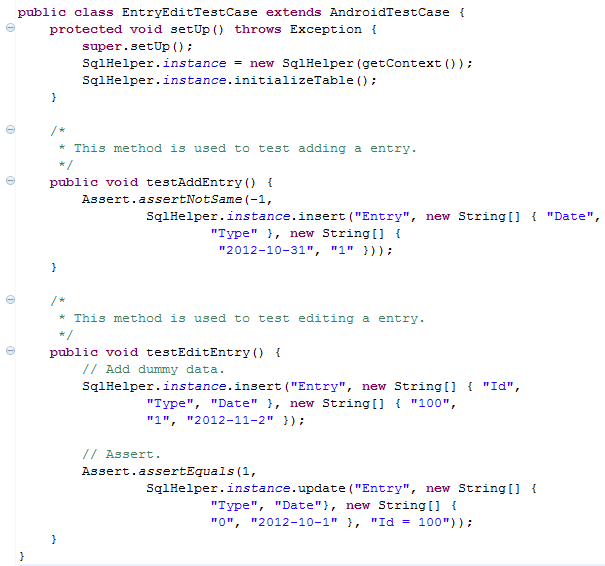
#### View



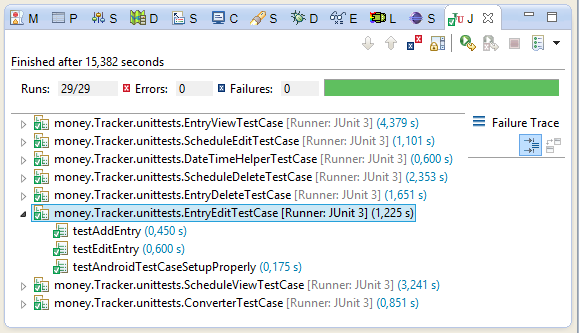
Successful result



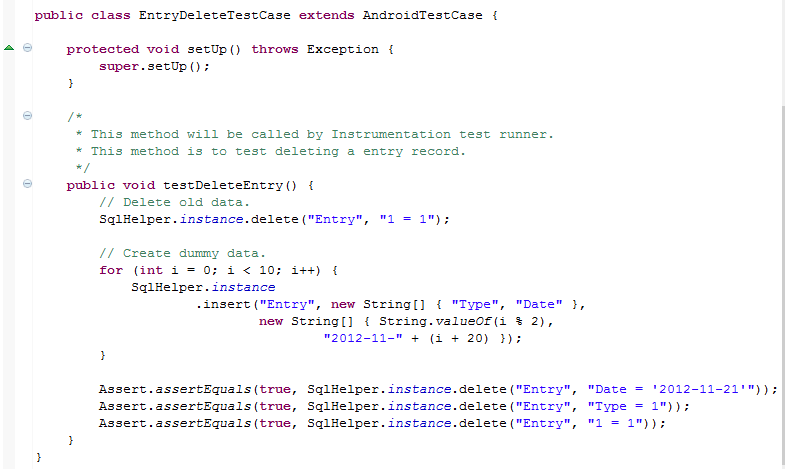
#### Edit



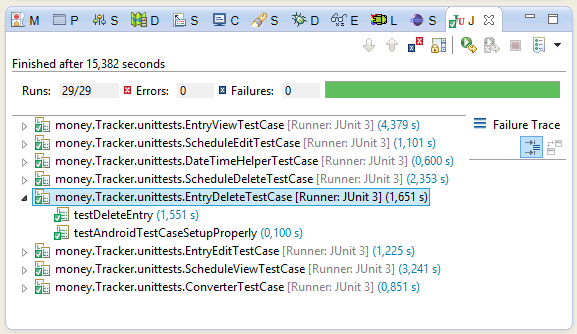
Successful result



#### Delete

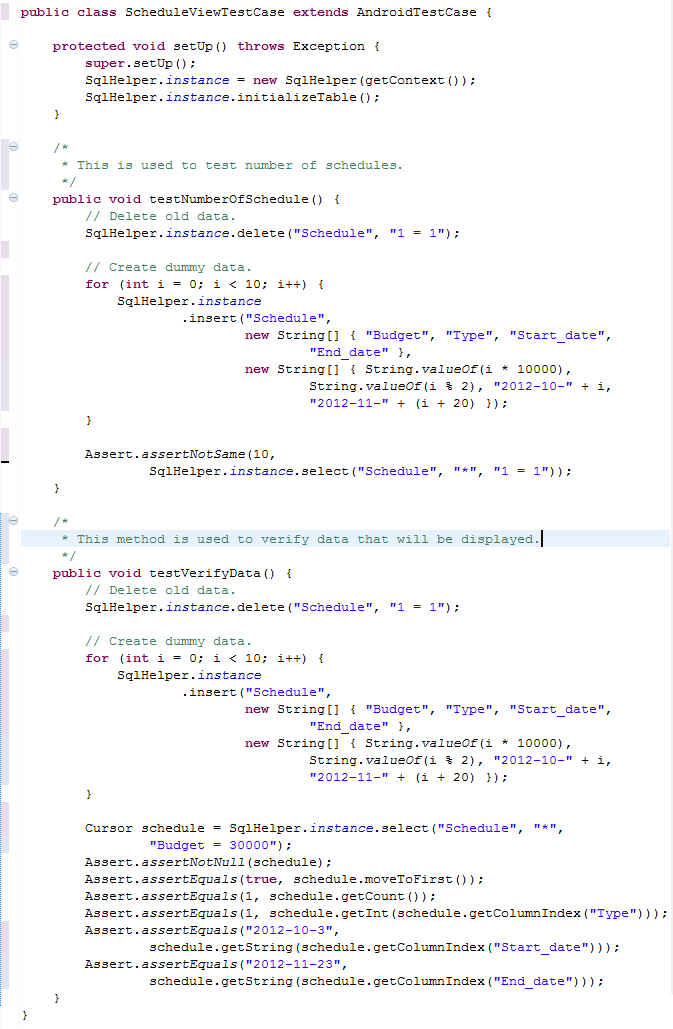


Successful result

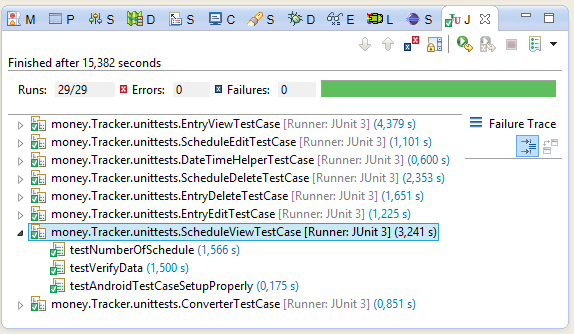


### Schedule function

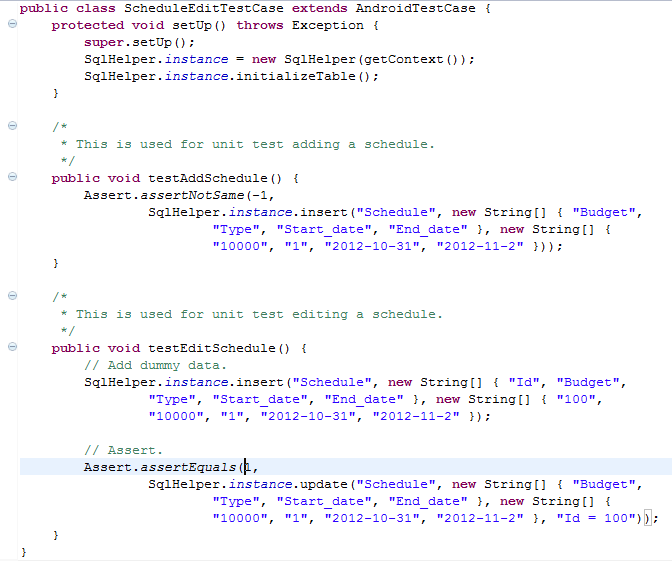
#### View



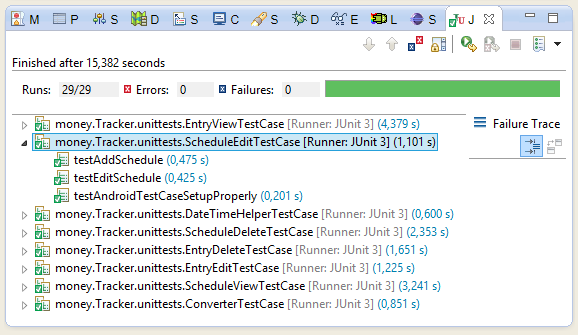
Successful result



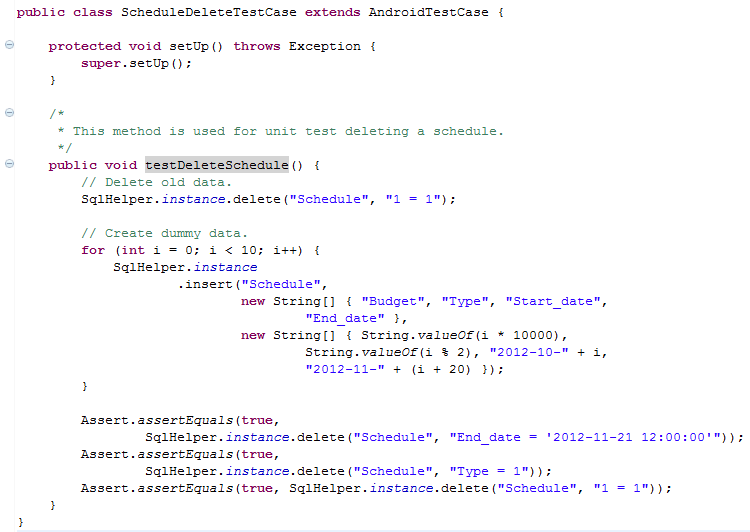
#### Edit



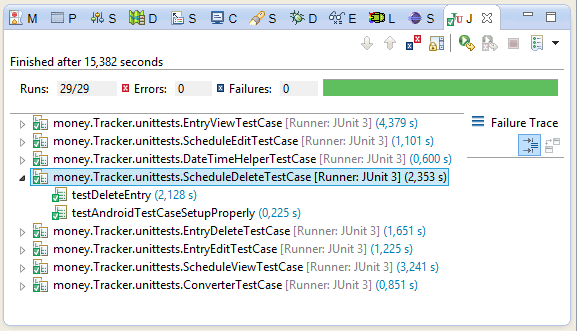
Successful result



#### Delete

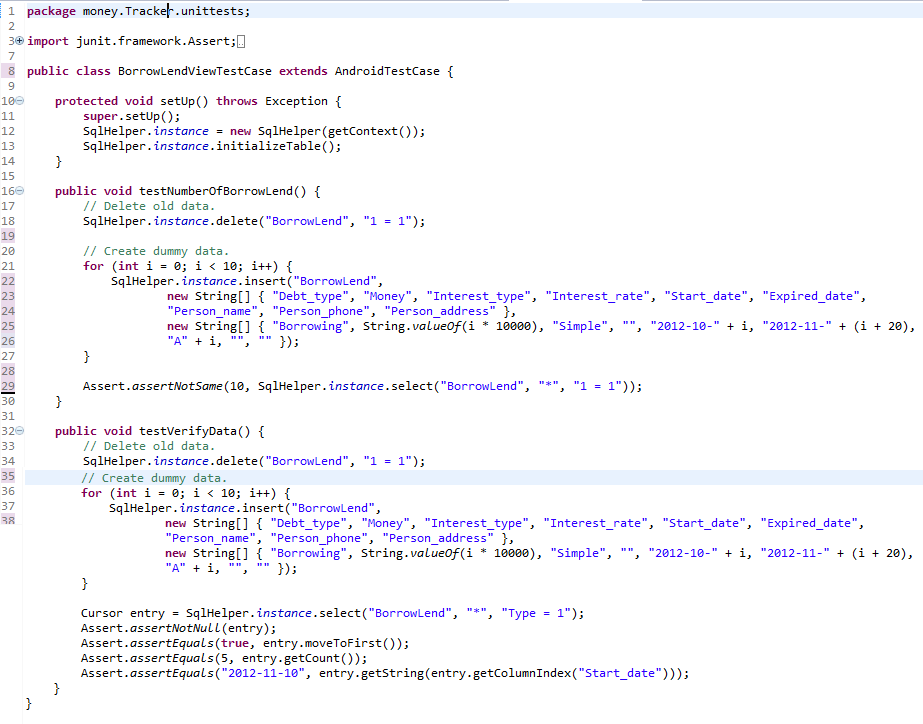


Successful result



### Borrowing and lending management

#### View



#### Edit



#### Delete



### Statistics

#### View

#### Edit

#### Delete

## Test report

# User