UNIVERSITY OF NORTH TEXAS
COLLEGE OF ENGINEERING
COMPUTER SCIENCE AND ENGINEERING

CSCE 5430 –Software Engineering
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Appendix A – A Case Study
A Personal Finance Management System (iFINANCE)

1. Overview

A Personal Finance Management system is a software intended to control the users' personal finances, keeping track of bank accounts, cash, credit cards, and investment accounts. Users record all their deposits and expenses and the system generates many reports that help them to monitor their financial health. It is versatile and user-friendly software system that make the principle of double-entry bookkeeping simple enough to be used by people with very little or no accounting knowledge at all. The system maintains four main financial accounting categories, Assets, Liabilities, Income, and Expenses, which, in turn, is classified as one of the two types; Debits type or Credits type. Financial transactions are classified under these categories (or user-defined sub-categories under these four categories). This categorization helps allow the system to prepare a Balance Sheet, a Profit and Loss statement, or a cash flow statement from the financial data. Typically, the system allows the user to create accounts (called Master Accounts) for each Income, Expense, Asset, and Liability account types in order to manage his/her bank accounts, cash, credit cards, etc. by moving money between them. In addition, the system allows the user to figure out where his/her money comes from and where it goes.

Congratulations! You have been hired as a software engineer in Solution@CSCE5430.Projects, Inc. to analyze, design and partially develop this software system. The system is called iFINANCE and assumed to run on Windows-based desktop computers and tablet PCs

2. System Requirements

iFINANCE is multi-purpose Personal Finance Management tool for Windows based computers intended to help control all kinds of money issues. iFINANCE can serve several small accounting needs for either private users, or clubs, associations, self-employed, small businesses or simply to be used at home, making keeping track of incomes, expenses and Banks transactions a snap. Below is a detail list of iFINANCE system functionalities.

1. iFINANCE shall provide a way for the users to log in using a user name and an encrypted password. Once the user has logged in, the access controls of the system dynamically change in order to match the permissions of this account.
2. Only the system administrator has the privileges to add user accounts into the system, edit and delete their profiles. The administrator account will be shipped with the system.
3. Each user shall have the ability to change his or her password.
4. iFINANCE maintains four predefined account categories (Assets, Liabilities, Income, and Expenses) and two account types (Debits and Credits). Each category is either of type "Debit" or type "Credit."

5. "iFINANCE Custom Group" is a main form to be provided. This form shall allow the user to add, update, or delete a custom sub-categories (called Groups). This includes groupID, groupName, groupElement, i.e., Assets, Liabilities, Income, and Expenses, and groupParent. Each group can be decomposed to further level of sub-groups (the groupParent field is responsible to maintain the parent-children link).

6. "iFINANCE Chart of Accounts" will be another UI component to help the users to add, update, or delete Master Account (e.g., cash, bank, and credit card). Each Master Account in the Chart of Accounts record will include accountID, accountName, openingAmount, closingAmount, and accountGroup (to specify a group/sub-group to which the account belongs). Note that, when iFINANCE prepare a report like Balance Sheet or Profit and Loss, it will do a summation based on groups and/or sub-groups. Note also that, the closingAmount field holds the closing balance of the account at any given time. This field is automatically updated due to the user transactions between the Master Accounts; this will help in displaying the closing balances in the Balance Sheet or Profit and Loss reports.

7. iFINANCE shall provide a tool to manage accounts' transactions (called double entry bookkeeping or double entry accounting). Each transaction will always have two effects: a debit entry and a credit entry. Please read Section 3 below to get familiar with the concept of Double Entry transactions. This tool will facilitate the user to add, update, or delete a transaction's entry in a Master-Detail style form. The Master part of the form includes the transaction number, date, the total amount of debit, the total amount of credit in addition to a comments/notes field. The Detail part of this form is a grid that has in each line the account number and name, the debit amount, the credit amount and a field of comments.

8. iFINANCE shall generate valuable financial reports including the Trial Balance, Balance Sheet, a Profit and Loss statement, or a cash flow statement from the user financial data. The purpose of each of these reports is as follows:
   a. A Trial Balance is a report that presents the closing balance of all master accounts in a tabular layout with the debit accounts on one side and the credit accounts on the other. The sum of all credit balances should always match the sum of all debit balances. The Trial Balance is the basis of preparing the Profit and Loss account and the Balance Sheet.
   b. The Profit and Loss statement is all about subtracting all Expenses from Income to derive a Profit or Loss figure. Thus: Profit or (Loss) = Income – Expenses.
   c. The Balance Sheet is a report that shows Assets plus Inventory on one side and Liabilities + Profit or Loss (as derived above) on the other. These two sides should be equal.

9. iFINANCE shall provide the user the ability to display all the reports mentioned above on the computer screen or printed as a PDF document format.

3. Detail Requirements

Every transaction has two effects. For example, if someone transacts a purchase of a drink from a local store, he pays cash to the shopkeeper and in return, he gets a bottle of drink. This simple transaction has two effects from the perspective of both, the buyer as well as the seller. The buyer's cash balance would decrease by the amount of the cost of purchase while on the other hand he will acquire a bottle of drink. Conversely, the seller will be one drink short though his cash balance would increase by the price of the drink.

Accounting attempts to record both effects of a transaction or event on the entity's financial statements. This is the application of double entry concept. Without applying double entry concept, accounting records would only reflect a partial view of the users' affairs.

Traditionally, the two effects of an accounting entry are known as "Debit" and "Credit". Accounting system is based on the principal that for every Debit entry, there will always be an equal Credit entry.

Debit entries are ones that account for the following effects:

- Increase in assets
- Increase in expense
- Decrease in liability
- Decrease in income

Credit entries are ones that account for the following effects:

- Decrease in assets
- Decrease in expense
- Increase in liability
- Increase in income

3.1 Examples of Double Entry

1. Interest received on bank deposit account (**Deposit Transaction**)
Debit	Cash Account (Increase in Asset)
Credit	Personal Income Account (Increase in Income)

2. Payment of utility bills (**Withdrawal Transaction**)
Debit	Utility Expense Account (Increase in Expense)
Credit	Cash Account (Decrease in Asset)

3.2 Rules for Deposits and Withdrawals in iFINANCE

For simplicity, we will consider the rules that are relevant to creating transaction entries in this assignment. iFINANCE deals with two basic transactions—deposits and withdrawals. The rules for these are summarized as follows:

Transaction	Debit	Credit
Deposit	Bank, Cash, or Credit Card accounts	Salary, Interest, or Other Income accounts
Withdrawal	Rent or Utilities Expenses accounts	Bank, Cash, or Credit Card accounts