
CSCE 5430: Software Engineering

Project Workbook

Spring 2023

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Revision History

Date	Issue	Description	Author
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iFINANCE System Glossary

1.1 Introduction

This document is used to define terminology specific to the problem domain, explaining terms, which may be unfamiliar to the reader of the use-case descriptions or other project documents. Often, this document can be used as an informal *data dictionary*, capturing data definitions so that use-case descriptions and other project documents can focus on what the system must do with the information.

1.2 Glossary

The glossary contains the working definitions for the key concepts in the iFINANCE System.

Term	definition
Authentication	Authentication is the process of determining whether someone or something is, in fact, who or what it is declared to be.
User account	A user is a person who uses iFINANCE system. Each user should have an account in order to be identified by iFINANCE. To login to an account, a user is typically required to authenticate himself/herself with a password or other credentials for the purposes of accounting, security, logging, and resource management.
Double-entry bookkeeping	It is a system of accounting in which every transaction has a corresponding positive and negative entry (debits and credits).
Assets	Tangible and intangible items that the company owns that have value (e.g. cash, computer systems, patents).
Liabilities	The money that the company owes to others (e.g. mortgages, vehicle loans).
Income	The money the company earns from its sales of products or services, and interest and dividends earned from marketable securities.
Expenses	The money the company spends to produce the goods or services that it sells (e.g. office supplies, utilities, advertising).
Chart of Accounts	A chart of accounts is a listing of the names of the accounts that a company has identified and made available for recording transactions in its general ledger. A company has the flexibility to tailor its chart of accounts to best suit its needs, including adding accounts as needed.
Master Accounts	The Master Accounts are a super-set of all allowable accounts in the chart of accounts. Transactions are never posted to the Master Accounts.
UI component	UI stands for User Interface. It is a junction between a user and a computer program. An interface is a set of commands or menus through which a user communicates with a program.
PDF Document	Portable Document Format (PDF) is a file format used to present and exchange documents reliably, independent of software, hardware, or operating system.
Windows-based computers	A personal computer powered by Microsoft Windows operating system in a form intended for regular use at a single location desk/table due to its size and power requirements.
Controller	Used in MVC (Model-View-Controller) model of programming that controls the views (user interaction) and sends data after processing or retrieving data from database.
ID (attribute used in each class)	Number or a string (set of characters) used to identify a record in a table of information stored in a database. Indexing is used to speed up the searching process. Using id is common practice in storing and retrieving data effectively and efficiently.

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Entity	Presents static structure of a real-world entity by including its attributes and functions(behavior). It also describes the access modifiers for an attribute.
Access modifiers	Used to tell the accessibility of an attribute by a different class or itself. Usually, it is recommended to use private (-) modifier for attributes in class. This will prevent major defects in production environments.
Model	Model can be described as how we store information regarding a real-world entity in a database and how it relates with other entities.
View	View shows the data sent by controller and in turn sends data from user interface for processing to a controller. It is used to show UI components that user can use to interact with the data and manipulate it accordingly.
Form	Different types of input methods can be shown depending on the data stored in database like textbox, date selector(calendar), radio buttons, buttons, image/file selector. Used to submit data in an application

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IFINANCE System Actors

The first useful step to analyze the system functionality is to look in the problem statement at the things that interact with the system. In UML use case analysis, these external things are called **actors**. Actors are identified based on the following:

- Actors are always external to the system – they are therefore outside our control.
- Actors interact directly with the system.
- Actors represent roles that people and things play in relation to the system, not specific people or specific things.
- Each actor has a unique name and description.

Actor	Description
iFINANCE User	A general user interacting with iFINANCE system. This general user can be the day-to-day regular user (we called non-admin user) or the system administrator. In order to this general user to use iFINANCE, he/she needs to successfully login to the system.
Administrator	A special type of iFINANCE User who has the privileges to add user accounts into the system, edit and delete their profiles. The administrator user account will be shipped with the system.
Non admin user	A day-to-day iFINANCE user who wish to use iFINANCE system to control his/her personal finances, keeping track of bank accounts, cash, credit cards, and investment accounts.

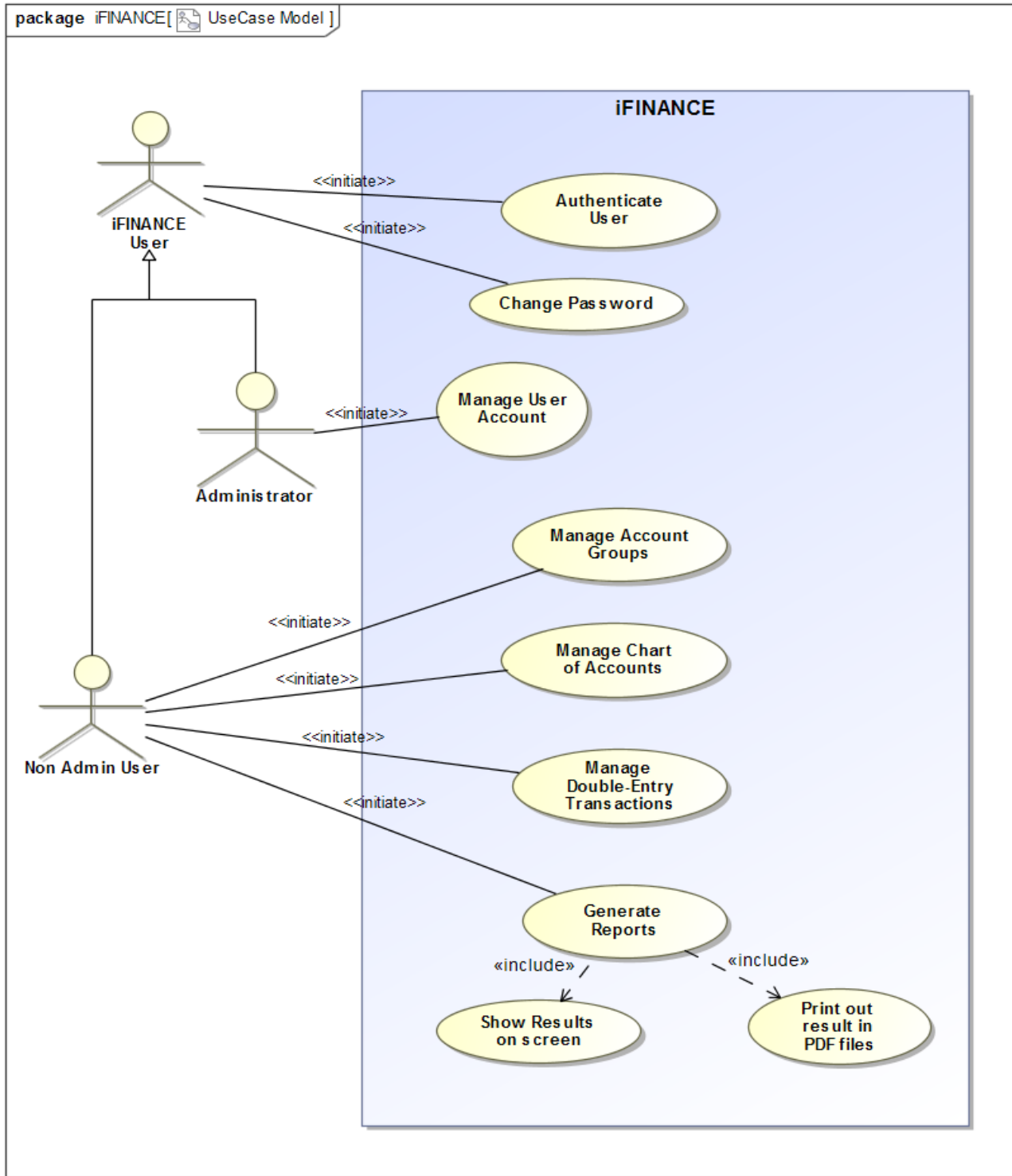
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IFINANCE System Use cases

Use Case	Description
Authenticate User	iFINANCE shall provide a functionality to authenticate its user by using a username and encrypted password. Once the user has logged in, the set of controls dynamically changes to match the permissions of this account. Note that, each user should be successfully authenticated before using any of iFINANCE functionalities.
Manage User Account	iFINANCE shall provide the functionality for the system administrator to create user accounts for the regular iFINANCE users according to a set of access controls predefined for each user type. The administrator account itself is shipped with the system.
Change Password	iFINANCE shall provide the functionality for its users to change their secret passwords.
Manage Account Group	iFINANCE shall provide the ability for its non-admin users to add, update, or delete a custom sub-category (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).
Manage Chart of Accounts	Manage Chart of Accounts UC shall provide a graphical user interface GUI to help non-admin 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).
Manage Double-Entry Transactions	<p>iFINANCE shall provide a tool for its non-admin users 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.</p> <p>This tool will facilitate the non-admin 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.</p>
Generate Reports	<p>iFINANCE shall allow the non-admin users to 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.</p> <p>This UC includes two UCs Show Results on Screen and Print out results in PDF files.</p>
Show Results on Screen	This is a supplier UC for the Generate Reports UC that shall allow the non-admin users to see the generated reports in an easy to see in the computer screen.
Print out results in PDF files	This is a supplier UC for the Generate Reports UC that shall allow the non-admin users to export the generated reports in a formatted style to PDF file type. These PDF files can be printed out later.

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iFINANCE System Use case Diagram



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List of Candidate Classes

- Administrator
- Non-admin user
- Custom Group
- Master Account
- ShowResultsOnScreen
- Transactions
- ManageAccountsForm
- GenerateReportsController
- Report Metadata
- Show Results on Screen
- Print Results in PDF
- Assets
- Liabilities
- Income
- UserAuthenticationController
- Expenses
- UserAuthenticationForm
- Balance Sheet
- Profit Loss Statement
- UpdatePasswordController
- Chart of Accounts
- Debits
- UserRole
- Master-DetailStyle Form
- Credits
- Username
- User Password
- UpdatePasswordController
- Group ID
- Group Name
- Group Element
- Group Parent
- Account ID
- Account Name
- Opening Amount
- Closing Amount
- iFINANCEChart ofAccountsController
- Add Transaction
- Update Transaction
- Delete Transaction
- Trial Balance
- ManageAccountsController
- iFINANCECustomGroupController
- iFINANCEChartofAccountsForm
- Transactions
- Double-EntryTransactionsController
- GenerateReportsForm
- ReportMetadata
- PrintResultsInPDF

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Potential iFinance Classes

Class name	Type	Brief Description
UserAuthenticationForm	Boundary	The UserAuthenticationForm will be displayed by the iFinance system asking the user to enter its username and password to be authenticated.
iFINANCE User	Entity	The common information of the iFINANCE administrator and the iFINANCE non admin and user such as User ID and Username will be maintained by this entity class.
Administrator	Entity	Administrator is a specification class inherits the iFINANCE User class and add specific information about the administrator such as the starting and ending date for the admin responsibility.
Non admin user	Entity	Non admin user is a specification class inherits the iFINANCE User class and add specific information about the non admin Username, Id, group, etc.
UserPassword	Entity	The UserPassword class store the iFINANCE user account information that include a password related information like an encrypted password of a user, the day the password expires, whether the password has to be changed from time to time, the minimum and maximum time between password changes, etc.
UserAuthenticationController	Control	A control class to accept and validate the iFINANCE username and its corresponding password. It takes the decision whether the iFINANCE user is allowed to access the iFINANCE services or not.
UpdatePasswordForm	Boundary	The UpdatePasswordForm will be displayed when iFINANCE user initiates the process of updating the password, where the user enters his/her User ID, Username, old password, new password.
UpdatePasswordController	Control	A control class to validate the iFINANCE username and its corresponding old password. If validation succeeds, then old password will be replaced by new password.
ManageAccountsForm	Boundary	iFINANCE displays the ManageAccountsForm when the system admin initiates the process of adding/modifying/deleting iFINANCE user account. This form will help the admin to enter the user general information like name and addresses and the secret information like password and the associated access roles.
UserRole	Entity	UserRole class maintains a list of all available iFINANCE access roles and the related permissions. For example, System administrator who has a privilege to create/modify/delete user accounts. Every user has the privilege to change his or her password.

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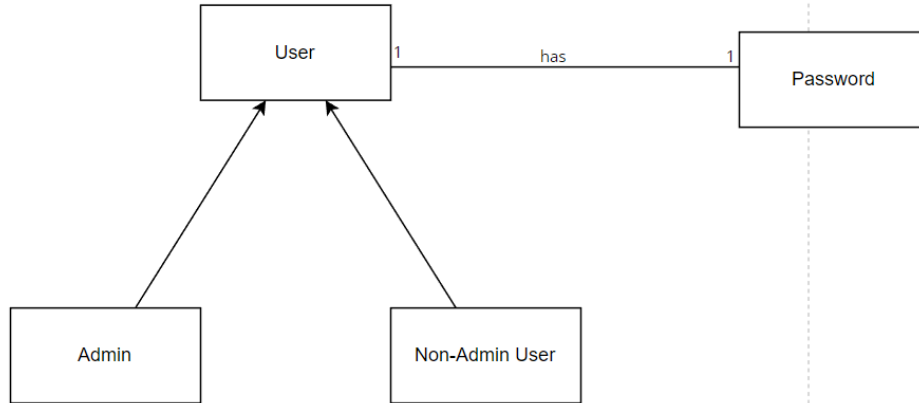
ManageAccountsController	Control	A control class to create and store the new iFINANCE users' information. It also determines whether the entered username has been used by other user or not, it encrypts the password before storing, and finally assign a specific system access role to the user.
iFINANCECustomGroupForm	Boundary	iFINANCECustomGroupForm is a boundary class, allows the user to add, update, or delete a custom sub-category (called Groups).
CustomGroup	Entity	CustomGroup is a class which stores information of the group created by a user. This includes groupID, groupName, groupElement (Assets, Liabilities, Income, and Expenses, and groupParent).
iFINANCECustomGroupController	Control	This class enables the user to enter his/her group information which will be stored in CustomGroup class. Each group can be decomposed to further level of sub-groups. It uses groupParent field to maintain this parent-children link.
iFINANCEChartofAccountsForm	Boundary	A boundary class to define a graphical user interface GUI element that will help the users to add, update, or delete Master Account (e.g., cash, bank, and credit card).
MasterAccount	Entity	This class will store the master account details of each user such as accountID, accountName, openingAmount, closingAmount, and accountGroup
iFINANCEChart ofAccountsController	Control	This class lets the user to enter their master account details which will be stored in MasterAccount class.
Double-EntryTransactionsForm or Master-DetailStyle Form	Boundary	Double-EntryTransactionsForm is a boundry class which facilitates the user to add, update, or delete a transaction's entry.
Transactions	Entity	This class stores information related to every transaction made by a user, which includes, transaction number, date, the total amount of debit, the total amount of credit, comments/notes field, account number, name, debit amount, credit amount and a field of comments.
Double-EntryTransactionsController	Control	This class is used to manage account transactions of all users. When a transaction is made by the user, the transaction's related information such as transaction number, amount debited, amount credited, account number etc are stored in Transactions entity.
GenerateReportsForm	Boundary	GenerateReportsForm is a class that defines the attributes and methods needed to generate reports based on the user financial data.
ReportMetadata	Entity	This entity class will be used to store the information required to manage iFINANCE Reports. This information includes User ID, Report ID, Date of creation, the user ID of the creator, Report type (It can be a Trial Balance, Balance Sheet, a Profit and Loss

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		statement), Brief description about report. As iFINANCE provides the functionality to display all the reports on the computer screen. This can be achieved in a separate entity class called "DisplayOnComputer" as described below.
ShowResultsOnScreen	Entity	This entity gets the data from generated report and sends it to the display device.
PrintResultsInPDF	Entity	If the report is downloaded in PDF format, the details of this PDF should be saved in this entity class. This information includes the User ID, downloaded date, downloaded time.
GenerateReportsController	Control	This control class helps the users to generate reports. The details of the report will be linked to the Report Metadata. This UC includes two UCs Show Results on Screen and Printing out the Results in PDF

Potential iFinance Class Diagram

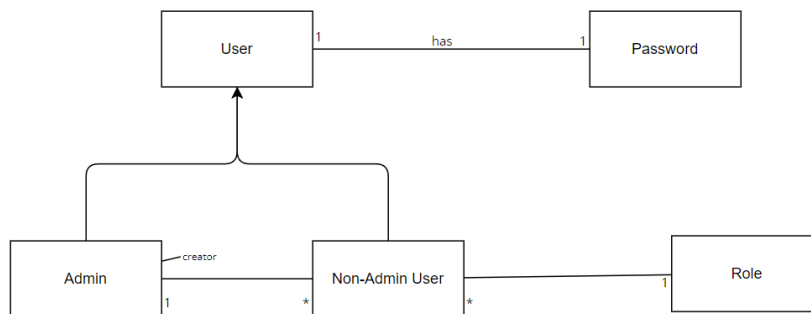
Authentication



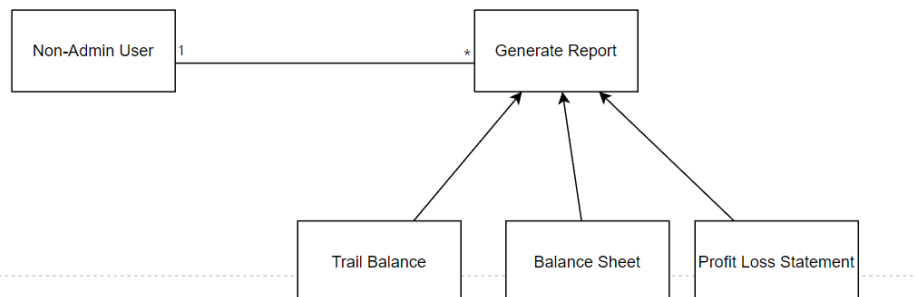
Manage Account Groups



Manage User Account

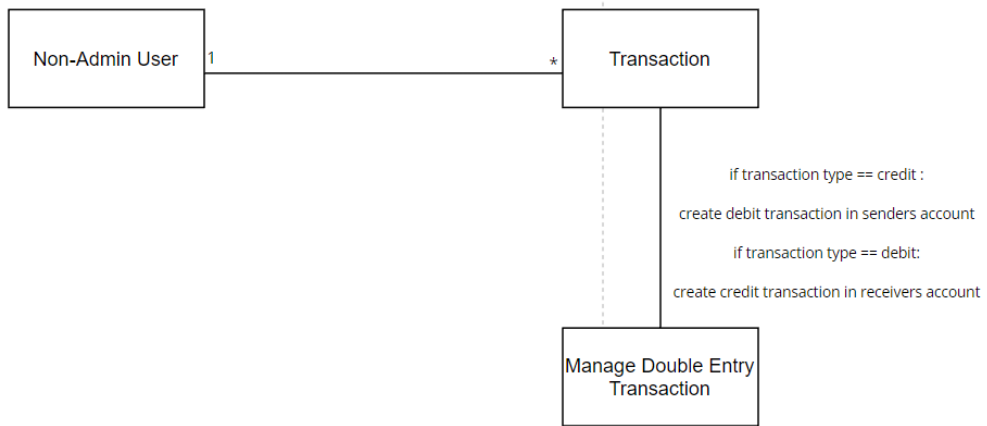


Generate Reports

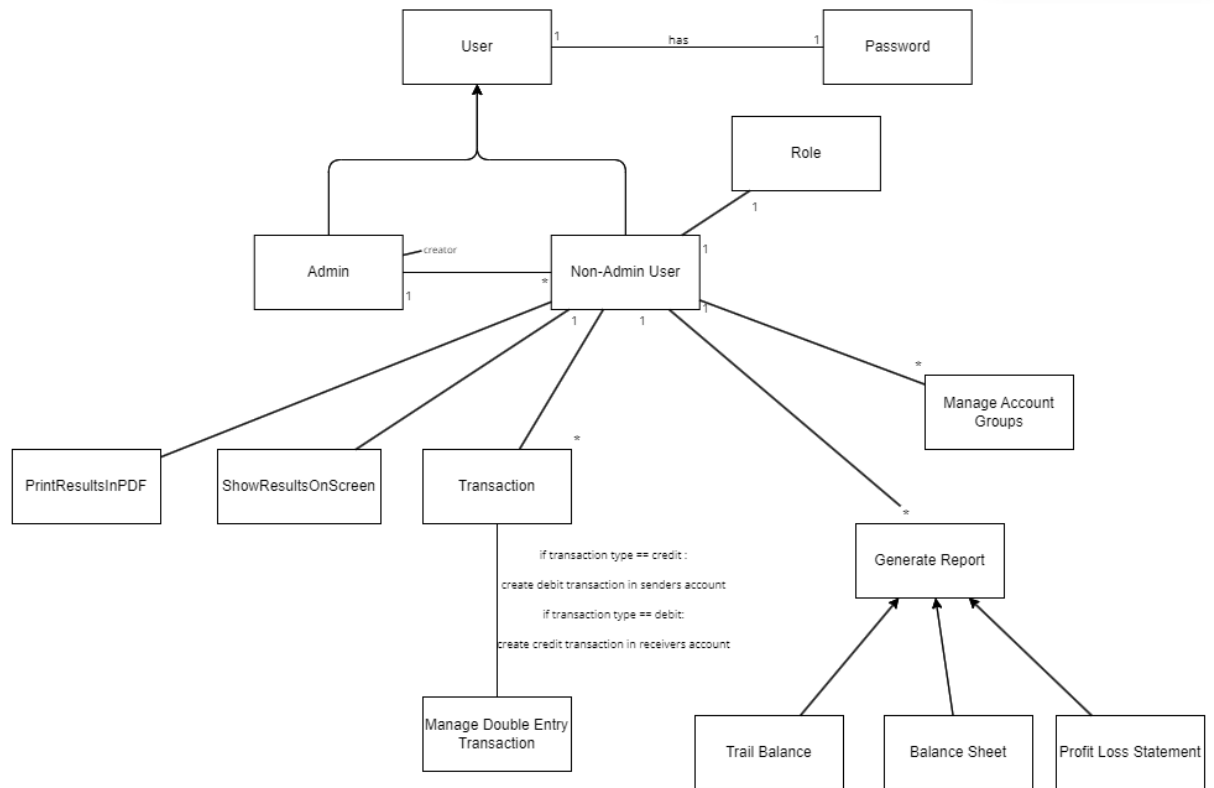


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Manage Double Entry Transactions



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Revised iFinance Class Diagram

1. iFINANCE User Class

Attribute name	Type	Brief Description
userID	String	This is the primary key of the iFINANCE user class. A unique user ID is assigned to every registered iFINANCE user.
userName	String	The name attribute stores the full name of the iFINANCE user.

2. Administrator Class

Attribute name	Type	Brief Description
adminEmail	String	The adminEmail attribute stores the administrator email address.
dateHired	Date	The date when the system administrator is hired by iFINANCE.
dateFinished	Date	The date when the system administrator left the iFINANCE.

3. Non admin user Class

Attribute name	Type	Brief Description
profession	String	The profession attribute stores the Non admin user profession name.

4. UserPassword Class

Attribute name	Type	Brief Description
userID	String	This is the primary key of the UserPassword class. The value of this attribute needs to be the same as the value corresponding customer.
userName	String	The name attribute stores the use account name of the customers.
encryptedPassword	String	The user encryptedPassword attribute stores the encrypted version of the customer password. A salted hash will be used in order to encrypt the password.
passwordExpiryTime	Integer	From time to time the system requires the customer to change the password. The passwordExpiryTime attribute stores this period of time.
userAccountExpiryDate	Date	The userAccountExpiryDate attribute stores the expiry date of the customer account if any.

5. UserRole Class

Attribute name	Type	Brief Description
Role ID	String	This is the primary key of the UserRole class. The value of this attribute distinguishes one role from the other.

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roleName	String	The roleName attribute stores the iFINANCE access roles and the related permissions. Example, System administrator who has a privilege to create/modify/delete user accounts. Every user has the privilege to change his or her password.
userPermission	String	Lists the permissions granted for the user

6. CustomGroup Class

Attribute name	Type	Brief Description
groupID	String	This is the primary key of the CustomGroup class. The value of this attribute distinguishes one group from the other.
groupName	String	The groupName attribute stores the name of the group.
groupElement	String	The groupElement attributes stores any one type of: Assets, Liabilities, Income, and Expenses,
groupParent	String	groupParent attributes stores the parent-children link

7. MasterAccount Class

Attribute name	Type	Brief Description
accountID	String	This is the primary key of the MasterAccount class. The value of this attribute distinguishes one account from the other.
accountName	String	The accountName attribute stores the name of the account
openingAmount	Double	openingAmount attribute holds the opening balance amount of the account at any given time.
closingAmount	Double	closingAmount attribute holds the closing balance amount of the account at any given time.
accountGroup	String	The accountGroup attribute stores group/sub-group to which the account belongs

8. Transactions Class

Attribute name	Type	Brief Description
transactionNumber	String	This is the primary key of the MasterAccount class. The value of this attribute distinguishes one account from the other.
date	String	The date attribute stores the data when the transaction happens.
transactedAmount	Double	Amount transacted during a transaction that can be of debit or credit.
comments/notes	String	comments/notes attribute stores the comments user mentions while performing a transaction.
recipientAccountId	String	The accountNumber to which the amount was sent
selfAccountId	String	The accountNumber from which the amount was debited

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transactionType	String	Tells whether the transaction is of debit or credit.
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9. GenerateReport Class

Attribute name	Type	Brief Description
UserID	String	User ID attribute stores the Id of the user
dateOfCreation	Date	The date attribute stores the data when the transaction happens
reportId	String	Id assigned to the generated report
reportType	String	Provides information about the report being generated by the user
Brief Description	String	Brief description about report
reportFileURL	String	Stores the URL of the report file from static directory on the site

10. ShowResultsOnScreen

Attribute name	Type	Brief Description
UserID	String	User ID attribute stores the Id of the user requested the Results
reportId	String	Tells software which report to pull up on screen

11. PrintResultsInPDF- User ID, downloaded date, downloaded time.

Attribute name	Type	Brief Description
UserID	String	UserID attribute stores the Id of the user
reportId	String	ReportId generated while creating report
downloadedDate	Date	downloadedDate attribute stores the date when the PDF file is downloaded
downloadedTime	Time	downloadedDate attribute stores the time when the PDF file is downloaded

