A Project Report

on

Cloud based Expense Tracker

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Under The Supervision of
Dr. T Poongodi
Professor

Submitted By

Asthha Wahal
18SCSE1010407

Muskan Aggarwal
18SCSE1180081

SCHOOL OF COMPUTING SCIENCE AND ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
GALGOTIAS UNIVERSITY, GREATER NOIDA
INDIA

BONAFIDE CERTIFICATE

Certified that this project report titled Daily **Cloud based Expense Tracker** is the bonafide work of Muskan Aggarwal(18SCSE1180081) and AsthhaWahal(18SCSE1010407) who carried out the research under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

Dr. T Poongodi
Professor

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ABSTRACT

In today’s busy and expensive life we are in a great rush to make money. But at the end of the month we broke off. As we are unknowingly spending money on little and unwanted things. So, we have come over with the idea to track our earnings. Cloud based Expense Tracker aims to help everyone who are planning to know their expenses and save from it. DET is an android app which users can execute in their mobile phones and update their daily expenses so that they are well known to their expenses. Here user can define their own categories for expense type like food, clothing, rent and bills where they have to enter the money that has been spent and also can add some information in additional information to specify the expense. User can also define expense categories. User will be able to see pie chart of expense. Also, DET app is capable of clustering. Personal and administration clustering is possible by the use of Apriori algorithm. Although this app is focused on new job holders, interns and teenagers, everyone who wants to track their expense can use this app.

Keywords: android app, define expense categories, Clustering, Apriori algorithm

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LIST OF ABBREVIATIONS

DET	Daily Expense Tracker
UI	User Interface
UML	Unified Modelling Language
XHTML	Extensible Hypertext Markup Language
YNAB	You Need a Budget

Acronyms

B.Tech.	Bachelor of Technology
JS	JavaScript
HTML	Hyper Text Markup Language
CSS	Cascading Styling Sheet
CS	Computer Science

CHAPTER 1

INTRODUCTION

1.1 Background

Expense tracker is a refined system which allows user to efficiently manage his/her expenses with ease. Tracking expenses daily can really help to us save lot of money. Once we start off by tracking our expenses each day, we will be able to get a better idea where you are spending your money, so you stay in control and achieve your goal. It will be able to generate your expense and saving report as time duration you selected. There will be a reminder that will help to save money for your pre-defined expenses.

1.2 Literature Review

Tracking daily expense is not so innovative. Many traditional and technological approach is found to track our expenses and budget with their own functionality. From decades ago and today we have been writing our expenditure in a register to calculate the profit or saving. Not only this many desktop and mobile applications has been developed for this purpose. Quicken and Microsoft money were the first desktop applications was developed decades ago but was not so familiar with the users. Personal capital and dollar bird application were used to visualize the expenses in chart or graphs with the calendar system. QuickBooks were the application for the small business holder to wrap up their whole business. YNAB and Penny were the latest application which were embedded with AI and applicable for importing expenses automatically. However, Mint was the one which was widely used and trusted.

Explaining about the latest application built in this category, YNAB is an expense tracker that gives the automatic tracking of our expense through our bank account or credit cards. We can also define expenses that may take place in future so that we do not go out of bound. This application is mobile friendly and is emerging since 2013. This application is embedded with AI to define and manage our daily expenses.

This application does not give any detail information about out expenses while our application will get those information via text and image. Moreover, we will be working on the GPS tracking of the possible places where user is supposed to expense his/her amount. This feature is also not included by YNAB.

Comparison of existing similar application is shown below:

Software Name	YNAB	Quicken	Microsoft Money	QuickBooks
Emerging Date	2013	2008	2000	2008
Automatic	Yes	No	No	No
Expense Information	No	No	No	Yes
Pre-define Expenses	Yes	No	No	No
Mobile Friendly	Yes	Yes	Yes	No

1.3 Problem Definition

Every earning people are mostly obsessed at the end of the month as the they cannot remember where all of their money have gone when they have spent and ultimately have to sustain in little money minimizing their essential needs. There is no as such complete solution present easily or we should say free of cost which enables a person to keep a track of its daily expenditure easily and notify them if they are going to have money shortage. To do so a person has to keep a log in a diary or in a computer, also all the calculations needs to be done by the user which may sometimes results in errors leading to losses. Due to lack of a complete tracking system, there is a constant overload to rely on the daily entry of the expenditure and total estimation till the end of the month.

1.4 Objectives

The objective of this system are:

a) To keep track of daily expenses and budgeting;

b) To save money for pre-defined expenses which will help planning on your future investments

1.5 Scope and Limitations

1.5.1 Scope

This application can take a good market as it is usable by anyone who are willing to manage their expenses and aiming to save for the future investments and many more. There is not any range criteria or any kind of profession or gender are focused, it will used hugely.

1.5.2 Limitations

- User have to entry every record manually.
- The category divided may be blunder or messy.
- Person who is handling system must have some technnical knowledge.

1.6 Prerequisite

1.6.1 HARDWARE REQUIREMENTS

- Processor: Pentium 4 (or equivalent)
- 4 GB RAM
- Hard disk space: 20 GB
- A projecting device (for the instructor only)
- A connection to the internet
- Keyboard and mouse or other pointing device
- Processor: Pentium 4 (or equivalent)

1.6.2 SOFTWARE REQUIREMENTS

- Operating System: Windows 10 version 1507
- MYSQL workbench
- Supported Internet browser: Chrome - Latest version, or the penultimate version
- Netbeans or eclipse
- Java 8 or higher versions
- Libraries included

1.7 Report Organization

Chapter 2:

This chapter covers all the history, methods, requirement specification and feasibility analysis and structured system requirements.

Chapter 3:

Design of DET project is explained in detail with all the necessary diagrams and brief functionality.

Chapter 4:

Process of implementation and testing is described along with all the tools used for the development.

Chapter 5:

Conclusion and future scope of the application are explained.

Chapter 6 :

The previous reports which helped in our project are listed.

CHAPTER 2

REQUIREMENT ANALYSIS AND FEASIBILITY ANALYSIS

2.1 Data Collection Methods

2.1.1 Source of Data

-User

I. **Interview**: Interviews were carried out with some of the students in our own college asking about the expenses that they do in day to day life. While taking those samples we got that they always broke off at the end of the month, which means they do not end up calculating those expenses that they spend day to day. So in order to control the unnecessary spending habits expense tracker is must. While using this tracker they can control their expenses and also save some of those too.

II. **Questionnaire**: Set of questionnaire were prepared to gain knowledge about how people track their budget. This process conclude that maximum of them do not plan for what they have earned and no track at all.

2.2 Requirement Specification

2.3.1 Functional Requirements

1. Dashboard panel

The system shall authenticate the user and then display panel based on the particular identified user.

2. Add bill

The system shall allow the user to add bill details based on the user's need to track the type of expenses.

3. Expense planner

The system should graphically represent the current month figure based on user's current month expenses and user's own budget share.

4. Expense tracker

The system should graphically represent the yearly expense numbers in form of report

5. Add notes

The system shall allow users to add notes to their expenses.

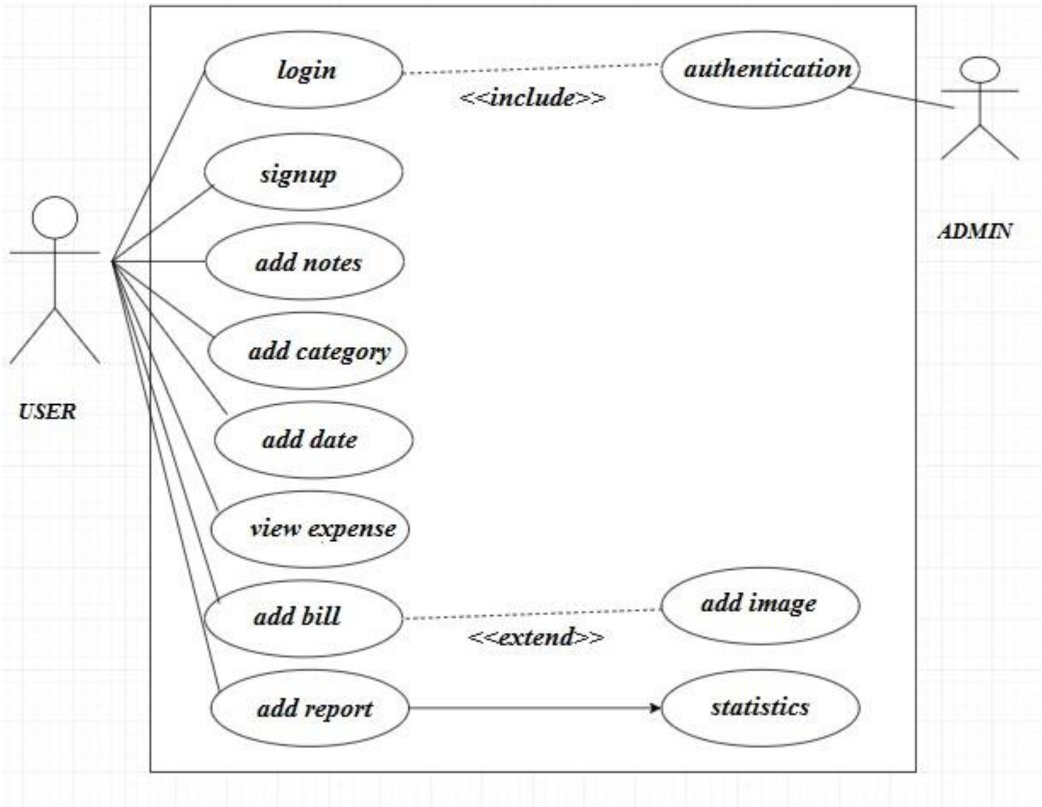
6. Calender

The system shall allow users to add the date to their expenses

7. Category

The system shall allow users to add categories of their expenses

Use Case Diagram



Name	Description
Initiating actor	User
Login	to provide identification details and enter the system
Authentication	To validate the details entered by the user
View expenses	Provide the updated log of expenses
Add bill	To add new expenses
Add image	To add image of the bill (optional)

Track report	Display the record
Statistical analysis	Internal scrutinized evaluation of the data
Add Notes	Can add further more information about the expense
Add Category	To add category where the user is supposed to spend more
Add date	To add the date of the expenditure.

2.3.2 Non-Functional requirements

1. Usability

There is a consistency in all the modules and webpages. To ease the navigation there is a back tab to provide access to previous page. There is proper instruction on each page.

2. Reliability

Each data record is stored on a well-built efficient database schema. There is no risk of data loss. The internal evaluation of data is well coded.

3. Supportability

The system is well built to support any machine. Maintainability of the system is easy.

4. Performance

In order to ease the accessibility, the types of expenses are categorized along with an option to name on the own. Throughput of the system is increased due to light weight database support.

5. Availability

The system is available all the time, no time constraint.

2.3 Feasibility Analysis

2.4.1 Technical Feasibility

This assessment focuses on the technical resources available. It helps to determine whether the technical team is capable of converting the ideas into working systems. It also involves evaluation of the hardware, software and other technology requirements of the proposed system.

Hardware Specification:

- Android mobile phone

- 10 MB memory

Software Specification:

- Front End : XHTML
- Back End : Java and SQlite
- Android version 4.0 (Ice cream sandwich).

2.4.2 Operational Feasibility

This assessment has a simple UI. Anyone with the basic knowledge of android mobile phones an use DET. DET takes few seconds approx. 2 seconds to take you from home screen to front page. With a click data are entered.

2.4.3 Economic Feasibility

The only cost for building this project is for printing and binding the report files and system uses cost. Additionally, effort and time of every team member is the cost involved for this project. Also, the user does not need to pay a single penny to use this app. Just the use of android mobile. And hence, DET is economically feasible for any one with the android mobile.

2.4.4 Scheduling Feasibility

The diagram explains the schedule of the project where the first prototype is completed in four days while the deadline was of five days. On the same time, other tasks were also scheduled to the team members where designing of UML diagrams were carried out in eight days. Further all the designing part were completed as per schedule which was followed by back end coding and database connection. Side by side, process of documentation was also carried out until the completion of the project.

2.4 Structured System Requirements

2.4.1 Data Modeling (ER Diagram)

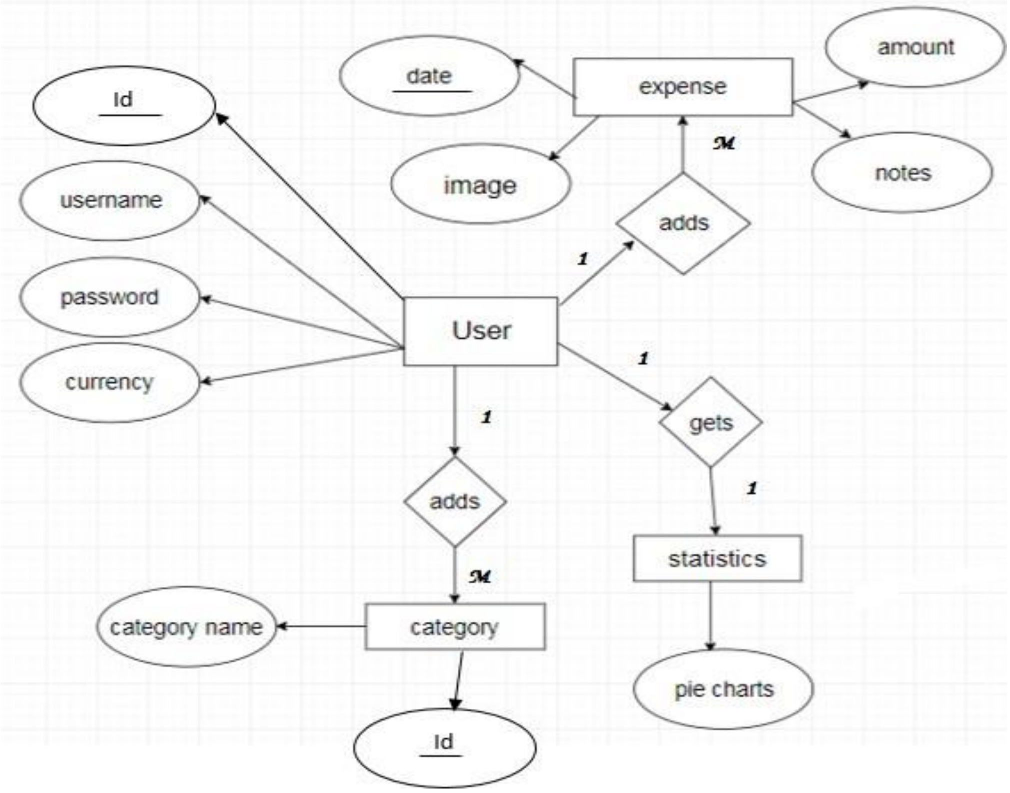


Figure 3: ER Diagram

The above diagram explains the relationship between the databases where rectangle represents entity, oval represents attributes and diamond represents relation. There are four entities with their respective attributes.

2.5.2 Process Modeling (DFD-0 DFD-1)

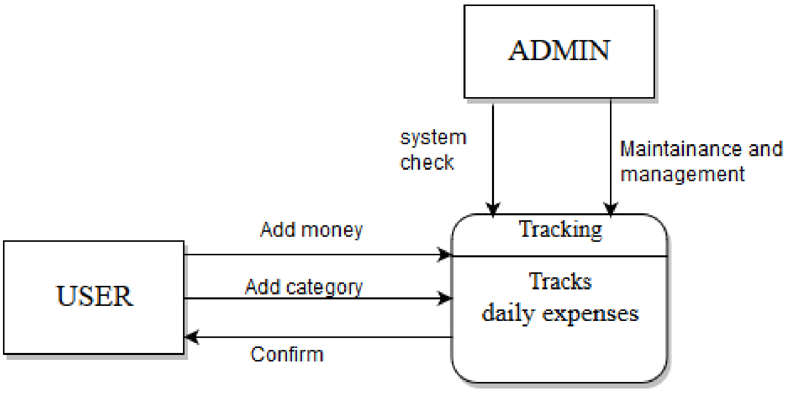


Figure 4:context diagram

The above diagram shows the dfd level-0 where user adds money to the tracking system. The tracking system update it to the database then data base will retrieve it to tracking system.After retrieving the system confirms data to the user. The admin checks system and maintains the system.

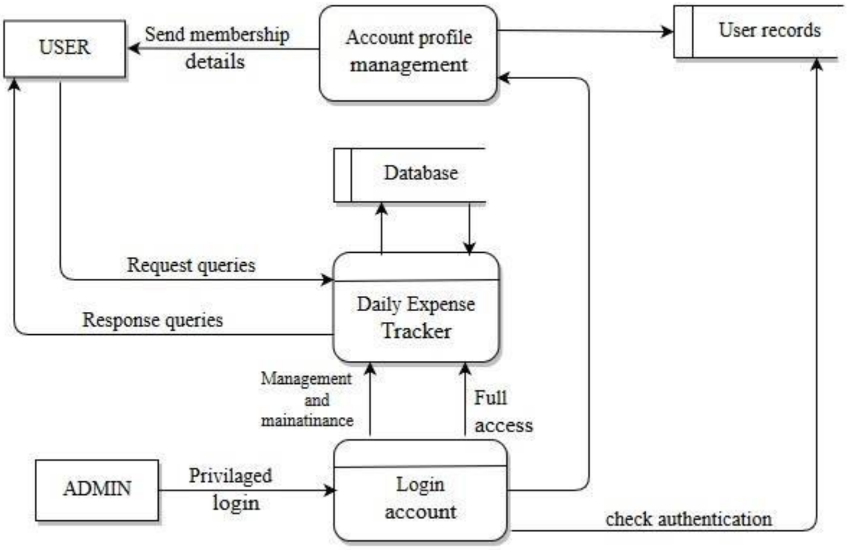


Figure 5: DFD level 1

The above diagram is for dfd level 1 where we can track data through the processes it is involving. The process daily expense tracking is further divided as account profile management and login account management. The user requests queries to the daily expense tracker and gets response from it. The login account checks the authentication of the user records. The account profile management sends membership details to the user.

CHAPTER 3

TOOLS AND TECHNOLOGY

3.1 Netbeans

NetBeans IDE is a free and open source integrated development environment for application development on Windows, Mac, Linux, and Solaris operating systems.

The IDE simplifies the development of web, enterprise, desktop, and mobile applications that use the Java and HTML5 platforms. The IDE also offers support for the development of PHP and C/C++ applications.

NetBeans IDE offers first-class tools for Java web, enterprise, desktop, and mobile application development. It is consistently the first IDE to support the latest versions of the JDK, Java EE, and JavaFX. It provides smart overviews to help you understand and manage your applications, including ouf-of-the-box support for popular technologies such as Maven.

With its end-to-end application development features, constantly improving Java Editor, and continual speed and performance enhancements, NetBeans IDE sets the standard for application development with cutting edge technologies out of the box.

NetBeans IDE 6.5, released in November 2008, extended the existing Java EE features (including Java Persistence support, EJB 3 and JAX-WS). Additionally, the NetBeans Enterprise Pack supports the development of Java EE 5 enterprise applications, including SOA visual design tools, XML schema tools, web services orchestration (for BPEL), and UML modeling. The NetBeans IDE Bundle for C/C++ supports C/C++ and FORTRAN development.

3.2 JDBC

JDBC or Java Database Connectivity is a specification from Sun microsystems that provides a standard abstraction(that is API or Protocol) for java applications to communicate with various databases. It provides the language with java database connectivity standard. It is used to write programs required to access databases. JDBC along with the database driver is capable of accessing databases and spreadsheets. The enterprise data stored in a relational database(RDB) can be accessed with the help of JDBC APIs.

JDBC is an API(Application programming interface) which is used in java programming to interact with databases.
The classes and interfaces of JDBC allows application to send request made by users to the specified database.

Enterprise applications that are created using the JAVA EE technology need to interact with databases to store application-specific information. So, interacting with a database requires efficient database connectivity which can be achieved by using the ODBC(Open database connectivity) driver. This driver is used with JDBC to interact or communicate with various kinds of databases such as Oracle, MS Access, Mysql and SQL server database.

3.3 Collections

Any group of individual objects which are represented as a single unit is known as the collection of the objects. In Java, a separate framework named the *"Collection Framework"* has been defined in JDK 1.2 which holds all the collection classes and interface in it.

The Collection interface (java.util.Collection) and Map interface (java.util.Map) are the two main "root" interfaces of Java collection classes.

A framework is a set of classes and interfaces which provide a ready-made architecture. In order to implement a new feature or a class, there is no need to define a framework. However, an optimal object-oriented design always includes a framework with a collection of classes such that all the classes perform the same kind of task.

Before the Collection Framework(or before JDK 1.2) was introduced, the standard methods for grouping Java objects (or collections) were Arrays or Vectors, or Hashtables. All of these collections had no common interface. Therefore, though the main aim of all the collections is the same, the implementation of all these collections was defined independently and had no correlation among them.

3.4 OOPS

As the name suggests, Object-Oriented Programming or OOPs refers to languages that uses objects in programming. Object-oriented programming aims to implement real-world entities like inheritance, hiding, polymorphism etc in programming. The main aim of OOP is to bind together the data and the functions that operate on them so that no other part of the code can access this data except that function.

Let us do discuss pre-requisite by polishing concepts of methods declaration and passing. Starting off with the method declaration, it consists of six components:

- **Access Modifier** : Defines **access type** of the method i.e. from where it can be accessed in your application. In Java, there 4 type of the access specifiers.
- **public:** accessible in all class in your application.
- **protected:** accessible within the package in which it is defined and in its **subclass(es)(including subclasses declared outside the package)**
- **private:** accessible only within the class in which it is defined.
- **default (declared/defined without using any modifier):** accessible within same class and package within which its class is defined.
- **The return type**: The data type of the value returned by the method or void if does not return a value.
- **Method Name**: the rules for field names apply to method names as well, but the convention is a little different.
- **Parameter list**: Comma separated list of the input parameters are defined, preceded with their data type, within the enclosed parenthesis. If there are no parameters, you must use empty parentheses ().
- **Exception list**: The exceptions you expect by the method can throw, you can specify these exception(s).
- **Method body**: it is enclosed between braces. The code you need to be executed to perform your intended operations.

A class is a user defined blueprint or prototype from which objects are created. It represents the set of properties or methods that are common to all objects of one type. In general, class declarations can include these components, in order:

1. **Modifiers**: A class can be public or has default access (Refer this for details).
2. **Class name:** The name should begin with a initial letter (capitalized by convention).
3. **Superclass(if any):** The name of the class's parent (superclass), if any, preceded by the keyword extends. A class can only extend (subclass) one parent.
4. **Interfaces(if any):** A comma-separated list of interfaces implemented by the class, if any, preceded by the keyword implements. A class can implement more than one interface.
5. **Body:** The class body surrounded by braces, { }.

Object is a basic unit of Object Oriented Programming and represents the real life entities. A typical Java program creates many objects, which as you know, interact by invoking methods. An object consists of:

1. **State** : It is represented by attributes of an object. It also reflects the properties of an object.
2. **Behavior** : It is represented by methods of an object. It also reflects the response of an object with other objects.
3. **Identity** : It gives a unique name to an object and enables one object to interact with other objects.
4. **Method:** A method is a collection of statements that perform some specific task and return result to the caller. A method can perform some specific task without returning anything. Methods allow us to **reuse** the code without retyping the code. In Java, every method must be part of some class which is different from languages like C, C++ and Python.

   Methods are **time savers** and help us to **reuse** the code without retyping the code.

3.5 MYSQL

MySQL is an open-source relational database management system (RDBMS). Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language. A relational database organizes data into one or more data tables in which data types may be related to each other; these relations help structure the data. SQL is a language programmers use to create, modify and extract data from the relational database, as well as control user access to the database. In addition to relational databases and SQL, an RDBMS like MySQL works with an operating system to implement a relational database in a computer's storage system, manages users, allows for network access and facilitates testing database integrity and creation of backups.

MySQL is free and open-source software under the terms of the GNU General Public License, and is also available under a variety of proprietary licenses. MySQL was owned and sponsored by the Swedish company MySQL AB, which was bought by Sun Microsystems (now Oracle Corporation). In 2010, when Oracle acquired Sun, Widenius forked the open-source MySQL project to create MariaDB.

MySQL has stand-alone clients that allow users to interact directly with a MySQL database using SQL, but more often, MySQL is used with other programs to implement applications that need relational database capability. MySQL is a component of the LAMP web application software stack (and others), which is an acronym for Linux, Apache, MySQL, Perl/PHP/Python. MySQL is used by many database-driven web applications, including Drupal, Joomla, phpBB, and WordPress. MySQL is also used by many popular websites.

3.7 Java or versions

The Java language has undergone several changes since JDK 1.0 as well as numerous additions of classes and packages to the standard library. Since J2SE 1.4, the evolution of the Java language has been governed by the Java Community Process (JCP), which uses *Java Specification Requests* (JSRs) to propose and specify additions and changes to the Java platform. The language is specified by the *Java Language Specification* (JLS); changes to the JLS are managed under JSR 901. In September 2017, Mark Reinhold, chief Architect of the Java Platform, proposed to change the release train to "one feature release every six months" rather than the then-current two-year schedule. This proposal took effect for all following versions, and is still the current release schedule.

In addition to the language changes, other changes have been made to the Java Class Library over the years, which has grown from a few hundred classes in JDK 1.0 to over three thousand in J2SE 5. Entire new APIs, such as Swing and Java2D, have been introduced, and many of the original JDK 1.0 classes and methods have been deprecated. Some programs allow conversion of Java programs from one version of the Java platform to an older one (for example Java 5.0 backported to 1.4) (see Java backporting tools).

Regarding Oracle Java SE Support Roadmap, version 17, 11 and 8 are the currently supported long-term support (LTS) versions, where Oracle Customers will receive Oracle Premier Support. Java 8 LTS last free software public update for commercial use was released by Oracle in January 2019, while Oracle continues to release no-cost public Java 8 updates for development and personal use indefinitely. Java 10 a previously supported rapid release version, had its support ended in September 2018 the same date support for Java 11 began. Java 7 is no longer publicly supported. For Java 11, long-term support will not be provided by Oracle for the public; instead, the broader OpenJDK community, as Eclipse Adoptium or others, is expected to perform the work.

Java is one of the most popular and widely used programming languages.

- Java has been one of the most popular programming languages for many years.
- Java is Object Oriented. However, it is not considered as pure object-oriented as it provides support for primitive data types (like int, char, etc)
- The Java codes are first compiled into byte code (machine-independent code). Then the byte code runs on Java Virtual Machine (JVM) regardless of the underlying architecture.
- Java syntax is similar to C/C++. But Java does not provide low-level programming functionalities like pointers. Also, Java codes are always written in the form of classes and objects.
- Java is used in all kinds of applications like Mobile Applications (Android is Java-based), desktop applications, web applications, client-server applications, enterprise applications, and many more.
- When compared with C++, Java codes are generally more maintainable because Java does not allow many things which may lead to bad/inefficient programming if used incorrectly. For example, non-primitives are always references in Java. So we cannot pass large objects (like we can do in C++) to functions, we always pass references in Java. One more example, since there are no pointers, bad memory access is also not possible.
- When compared with Python, Java kind of fits between C++ and Python. The programs are written in Java typically run faster than corresponding Python programs and slower than C++. Like C++, Java does static type checking, but Python does not.

3.8 Cloud

3.8.1 The humble beginnings of cloud

Believe it or not, the modern day idea of “cloud computing” dates back to the 1950s, when large-scale mainframes were made available to schools and corporations. The mainframe’s colossal hardware infrastructure was installed in what could be called a “server room” (since the room would generally only be able to hold a single mainframe). Multiple users were able to access the mainframe via “dumb terminals”—stations with the sole function of facilitating access to the mainframes.

Due to the cost of buying and maintaining mainframes, an organization wouldn’t be able to afford a mainframe for each user. It became practice to allow multiple users to share access to the same data storage layer and CPU power from any station. By enabling shared mainframe access, an organization would get a better return on its investment in this sophisticated piece of technology.

3.8.2 Virtualization changes everything

Twenty years later in the 1970s, IBM released an operating system called VM that permitted admins on its System/370 mainframe systems to have multiple virtual systems, or “virtual machines (VMs)” on a single physical node. The VM operating system took the 1950s application of shared access of a mainframe to the next level by allowing multiple distinct compute environments to live in the same physical environment.

Most of the basic functions of any virtualization software that you see nowadays can be traced back to this early VM OS. Every VM ran custom operating systems or guest operating systems that had their own memory, CPU, and hard drives, along with CD-ROMs, keyboards, and networking—despite the fact that those resources were shared. “Virtualization” became a technology driver, and it became a huge catalyst for some of the biggest evolutions in communications and computing.

In the 1990s, telecommunications companies that historically only offered single dedicated point-to-point data connections began offering virtualized private network connections—with the same service quality as dedicated services at a reduced cost. Rather than building out physical infrastructure to allow more users to have their own connections, telecommunications companies provided users with shared access to the same physical infrastructure. This change allowed telecommunications companies to shift traffic as necessary, leading to better network balance and more control over bandwidth usage.

3.8.3 Virtualization meets the Internet

Meanwhile, virtualization for PC-based systems started in earnest. As the Internet became more accessible, the next logical step was to take virtualization online. If you were in the market to buy servers 10 or 20 years ago, you know that the costs of physical hardware—while not at the same level as the mainframes of the 1950s—were pretty outrageous. As more and more people expressed the demand to be online, the costs had to come out of the stratosphere and into reality.

One of the ways that happened was through—you guessed it—virtualization. Servers were virtualized into shared hosting environments, virtual private servers, and virtual dedicated dervers using the same types of functionality provided by the VM OS in the 1950s.

What did this look like in practice? Let’s say your company required 13 physical systems to run your sites and applications. With virtualization, you can take those 13 distinct systems and split them up between two physical nodes. Obviously, this kind of environment saves on infrastructure costs and minimizes the amount of actual hardware you would need to meet your company’s needs.

CHAPTER 4

SYSTEM DESIGN

4.1 System Architecture and Overview

We have developed the required system that works without internet. To use this system we need a database, android mobile handset, app and the user.

Algorithm Used

The Apriori Algorithm is an influential algorithm for mining frequent itemsets for boolean association rules. Apriori uses a "bottom up" approach, where frequent subsets are extended one item at a time (a step known as candidate generation, and groups of candidates are tested against the data. Apriori is designed to operate on database containing transactions (for example, collections of items bought by customers, or details of a website frequentation).

4.1.1 System Design

Systems design is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements. Systems design could be seen as the application of systems theory to product development.

3.1.1 Database Schema

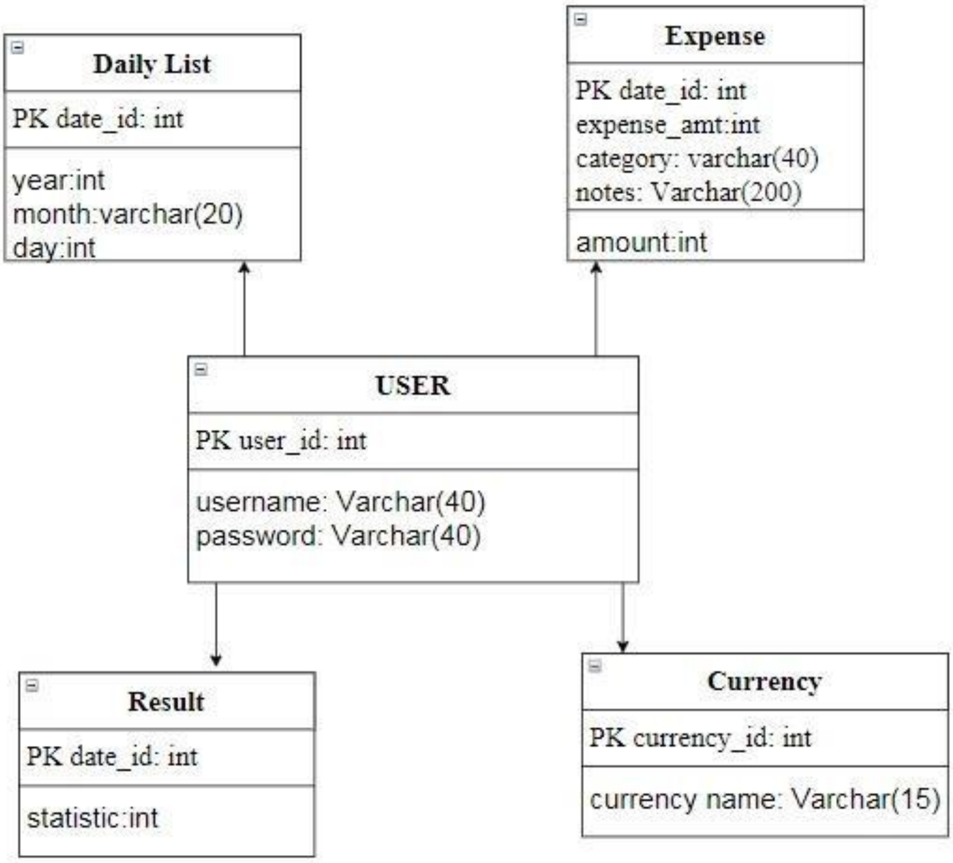


Figure 6: Database schema

There are five tables in our application database which are user, expense, result, income and daily list. In above diagram the tables covers their respective primary key and their fields.

4.1.2 Data Dictionary

A data dictionary also known as metadata repository is a centralized repository of information about data such as meaning, relationship to other data, origin, usage and format.

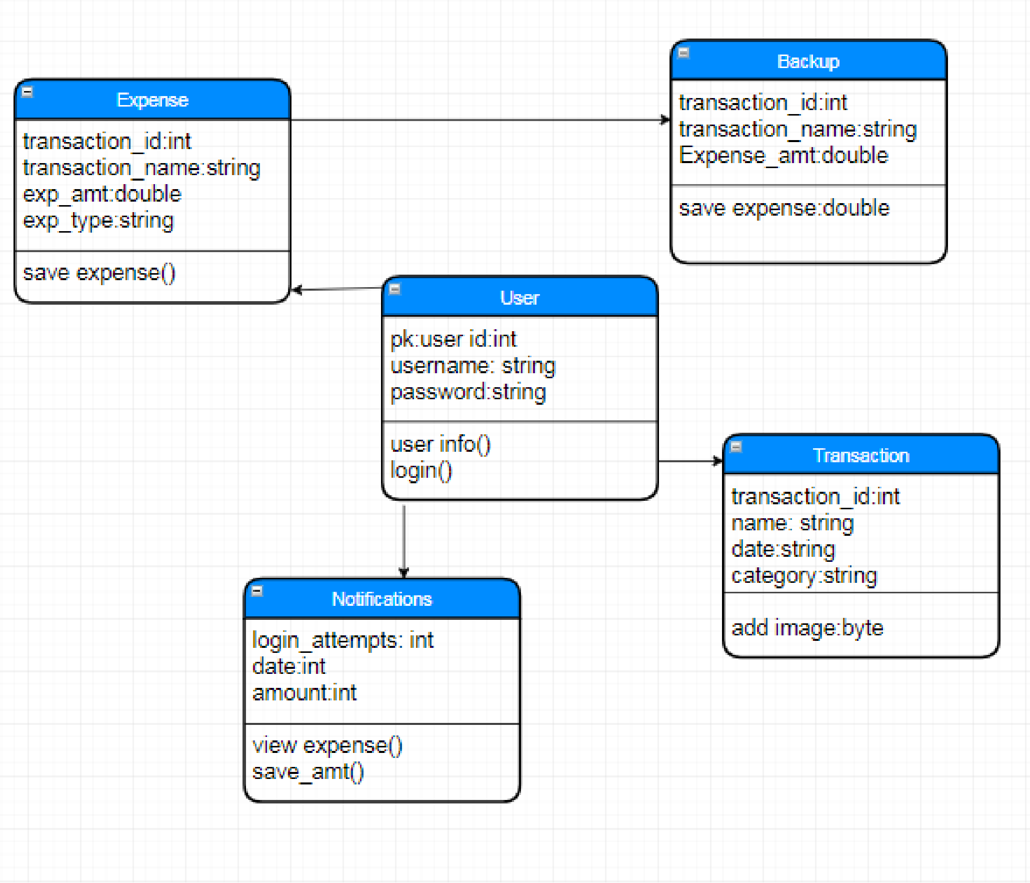
Table 3: Data Dictionary

S.N	Entity	Attribute	Data type	Constraints
1	DateUser sdhb User	User_id	int	Primary
		username	varchar(20)	
		password	varchar(20)	

2	Daily list	date_id	int	Primary
		year	int	
		month	int	
		day	int	
3	Expense	date_id	int	Foreign
		exp_id	Int	Primary
		expense category	Varchar(20)	
		expense notes	Varchar(20)	
4	Result	statistics	long Int	

4.1.3 UML class diagram

Class Diagram



application have five entities: expense, user, backup, notification, transaction, which have their own data members and methods. Above diagram shows the flow of the functionality from entity to entity. Also, types of data members and methods of respective entity are mentioned above.

Sequence diagram

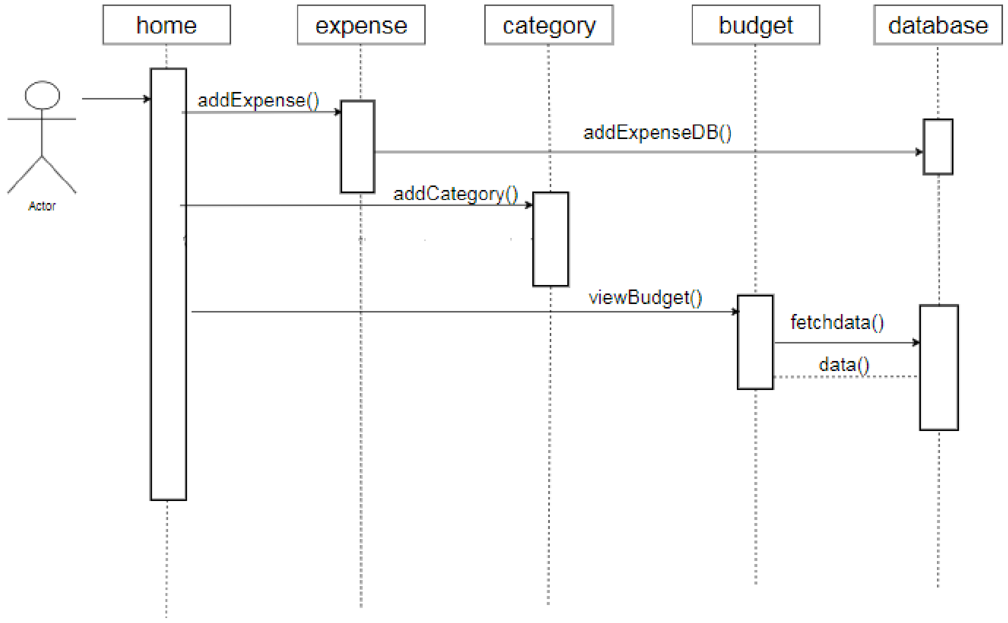
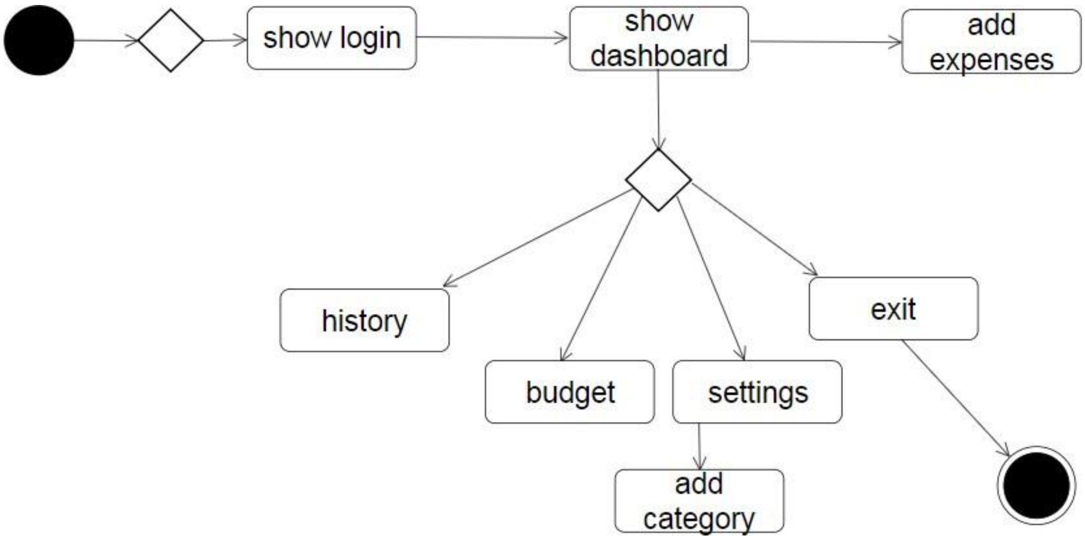
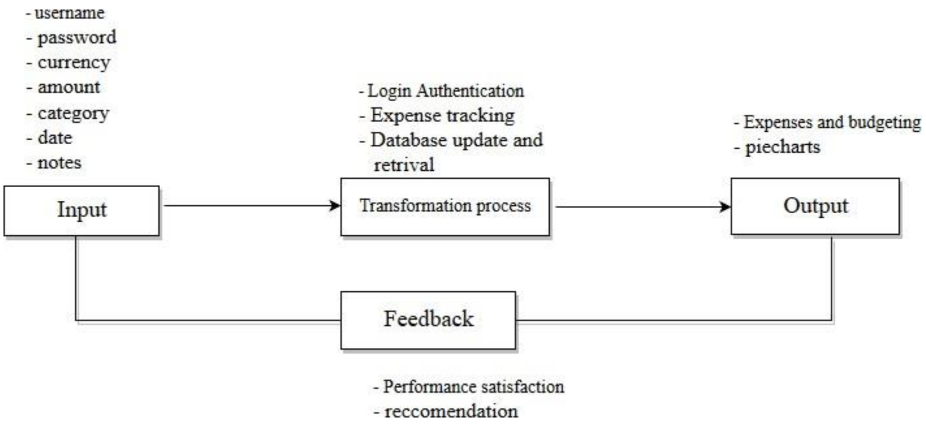


Figure 8: Sequence Diagram

Activity Diagram

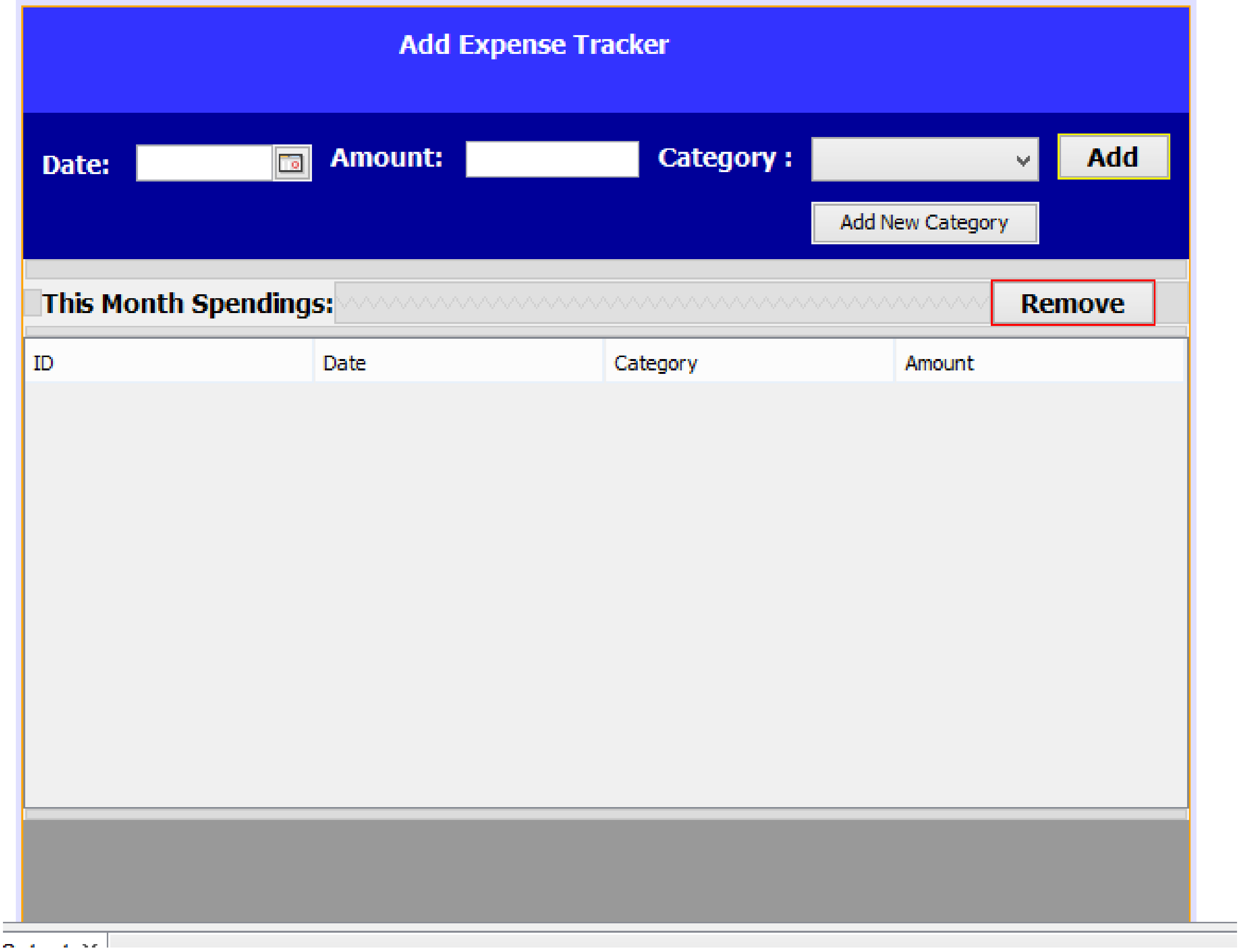


Input Output Diagram



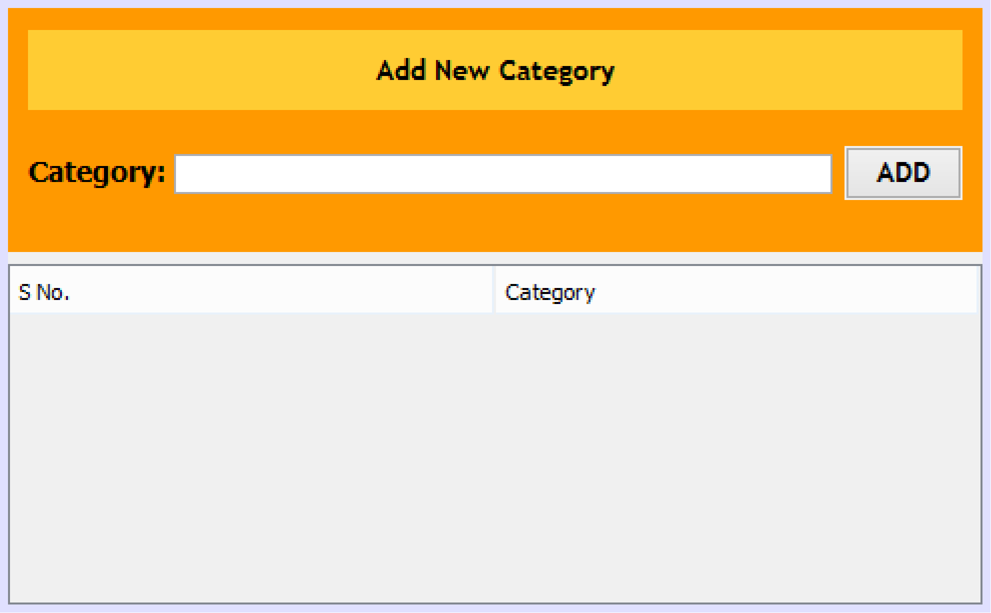
The above diagram shows the major input that this system ‘Daily Expense Tracker’ in which the input includes username, password, currency, amount, category, date, notes while the transformation processing includes login authentication, expense tracking, database update and retrival where as output includes expense and budgeting and piecharts. The feedback includes performance satisfaction and recommendation.

Screenshots of designing

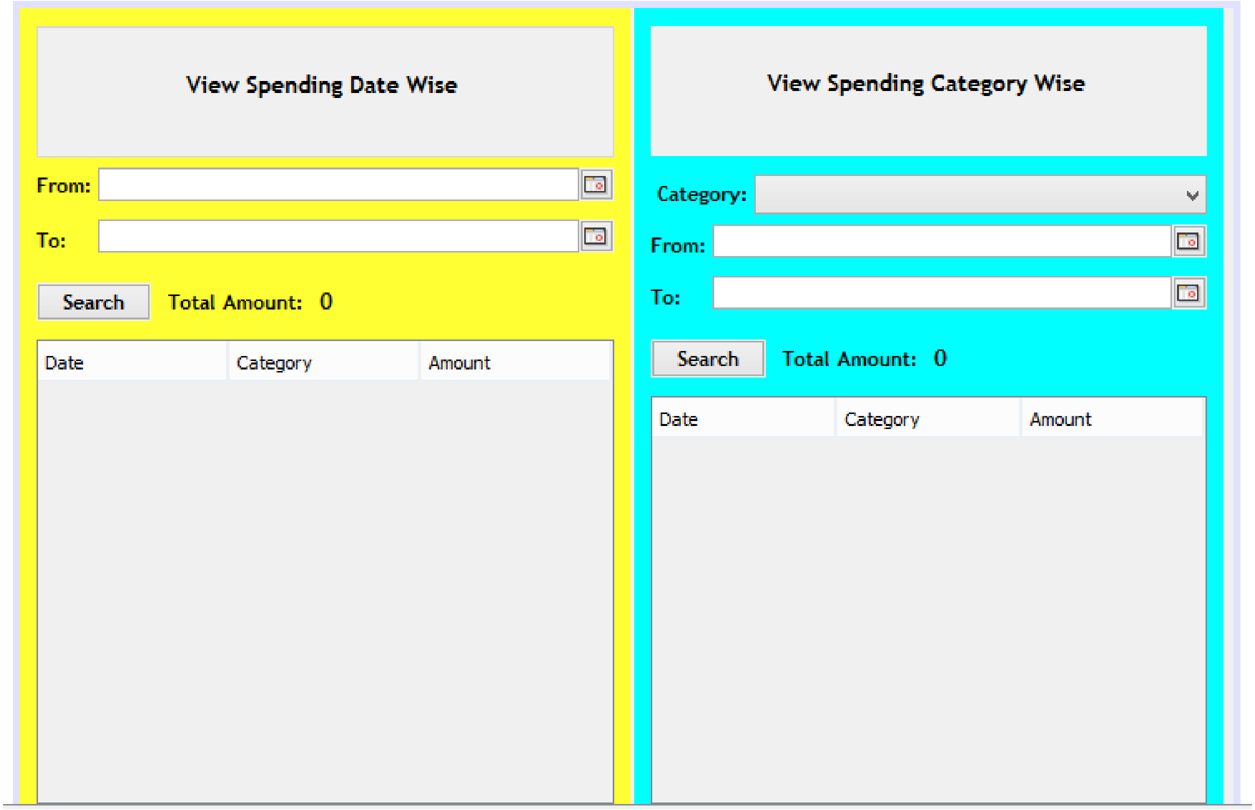


ID	Date	Category	Amount

Homepage of application



To add new category in expense



View Spending Date Wise

From:

To:

Total Amount: 0

Date	Category	Amount

View Spending Category Wise

Category:

From:

To:

Total Amount: 0

Date	Category	Amount

To view date and category wise spending

CHAPTER 5

System Implementation and Testing

5.1 Implementation Overview

Process Model Used

The waterfall model is a sequential approach, where each fundamental activity of a process represented as a separate phase, arranged in linear order.In the waterfall model, you must plan and schedule all of the activities before starting working on them (plan-driven process).

Waterfall model is used for the project because all the requirements are clear as this project is not dealing with the clients and hence beforehand planning can be made about how to carry out each phase of development.

5.2 Tools Used

5.2.1 Front End Tools

XHTML: Extensible Hypertext Markup Language is part of the family of XML markup languages. It mirrors or extends versions of the widely used Hypertext Markup Language, the language in which Web pages are formulated. XHTML is used to design the UI in android platform for the ease of the user.

5.2.2 Back End Tools

JAVA: Java is a general-purpose computer-programming language that is concurrent, class-based, object-oriented, and specifically designed to have as few implementation dependencies as possible. As the back end tools java is used to provide functionality to the attributes displaying in UI.

SQLITE: It is a relational database management system contained in a C programming library. In contrast to many other database management systems, SQLite is not a client–server database engine. Rather, it is embedded into the end program. So, SQLITE 3.8.2 is used for manipulating data from database and visualizing to the user.

5.2.3 Module Description

A modularization consists of well-defined manageable units with well-defined interfaces among the units.

Desirable property of modular system include

a) Each module is a well-defined sub-system.

b) Single, well – defined purpose of each module.

c) Modules can be separately compiled and stored in a library.

d) Modules can use other module.

e) Modules should be easier to use than to build.

f) Modules should be simpler from outside then from inside.

The project can be decomposed in following modules:

a) **Login module**: This module is responsible for a registered user to login to the web application and do the proceedings.

b) **Signup module**: This module is responsible for registering a new user to the web application and create a new account for him/her

c) **Sessions module**: This module is responsible for creating a session when a user logs in and continues till he/she logs out.

d) **Add Bill**: This module is responsible to enable the user to add a new bill

e) **Delete the bill**: This module is responsible for the pre-defined bill.

f) **View Expense**: This module is responsible for viewing all the expenses in detail added to the log by a logged in user

g) **Edit Module**: This module is responsible for editing a pre-defined bill.

h) **Categories module**: This module is responsible for various options. In this app users have options of selecting various basic expense categories and currency according to their country.

i) **Add note and date:** This module is responsible for adding notes and dates to the expenditure of user.

The classes used for this project are:

- AddNewExpense
- Budget
- CDBHelper
- Contact
- DBHelper

- Expense
- Graph_all
- Graph_all_adapter
- Graph_all_list
- History
- Login
- MainActivity
- Overview
- Overview_list_Adapter
- Overview_ListView
- Piegraph
- Settings
- SignupActivity
- Tab1
- Tab1_Adapter
- Tab1_ListView
- Tab2
- TabHistory_week
- Tab2
- WelcomeScreen

Methods are:

- addData()
- loadListView()
- onCreateOptionsMenu(Menu menu)
- showDate(int year, int month, int day)
- onCreateView()
- queryXData()
- queryYData()

5.3 Testing

Testing is the process of evaluation a software item to detect differences between given input and expected output. Testing is a process that should be done during the development process.

5.3.1 Unit Testing

The Unit testing part of a testing methodology is the testing of individual software modules or components that make up an application or system.

SN	Test Case Id	Test description	Input test data	Expected Result	Actual Result	Remarks
1	TC-INS-01	Install DET app in android phone	Transfer DET app	Open application with its home page	Application executed with home page	Pass

SN	Test Case Id	Test description	Input test data	Expected Result	Actual Result	Remarks
1	TC-LG-01	Enter valid data in username and password field	rashna *********	Show home page for user Rasna	Displayed home page for user Rasna	pass
2	TC-LG-02	Enter valid data in username and leave password field empty	rasna	Show error	Didn’t show any error	fail

3	TC-LG-03	Leave username and password field empty and press login	*********	Show error	Printed “Enter Username”	Pass
4	TC-LG-04	Enter invalid username and password	rashana ******	Show error	Printed “You are not registered”	Pass

SN	Test Case Id	Test description	Input test data	Expected Result	Actual Result	Remarks
1	TC-DT-01	Enter expense values with their category	1500 with category clothing	Update category table with value 1000	Updated category table with value 100	Pass
2	TC-DT-02	Enter non numeric value for expense field	Rashna	Show error	Printed “Enter Valid value”	Pass
3	TC-DT-03	Enter decimal value for expense field	155.65 with category food	Update category table with value 155.65	Updated category table with value 155.65	Pass
4	TC-DT-04	Enter negative value for	-2635 with category rent	Update category table with	Updated category table with	fail

		expense field		value -2635	value -2635	
5	TC-DT-05	Enter expense values without any category	1860	Update default category others with value 1860	Cannot update table	fail
6	TC-DT-06	Enter future date for expense	2020/02/16	Show error in entering future expense	Updated table with future date	fail

5.3.3 Integration Testing

The Integration testing part of a testing methodology is the testing of the different modules/components that have been successfully unit tested when integrated together to perform specific tasks and activities. The test is often done on both the interfaces between the components and the larger structure being constructed, if its quality property cannot be assessed from its components. After integrating the requirements we tested it, it was fine and satisfactory.

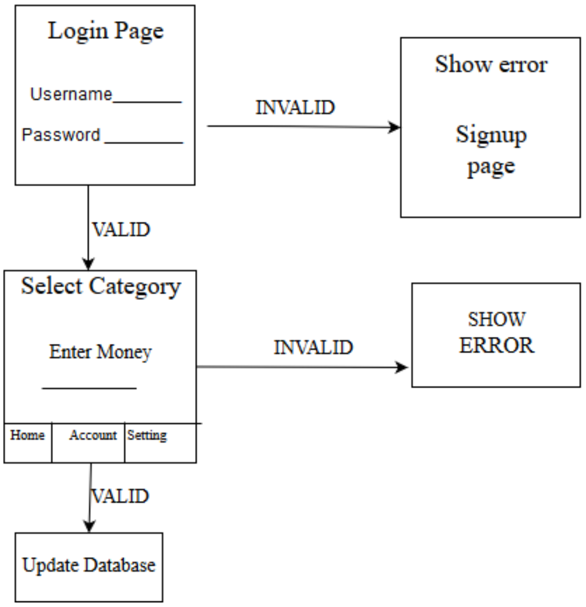


Figure 11: Integration Testing

5.3.4 System Testing

The system testing part of a testing methodology involves testing the entire system for errors and bugs. This test is carried out by interfacing the hardware and software components of the entire system, and then testing it as a whole.

SN	Test Case Id	Test description	Input test data	Expected Result	Actual Result	Remarks
1	TC-INS-01	Install DET app in android phone	Transfer DET app	Open application with its home page	Application executed with home page	Pass
2	TC-LG-01	Enter valid data in username and password field	rashna *********	Show home page for user Rasna	Displayed home page for user Rasna	pass
3	TC-DT-05	Enter expense values without any category	1860	Update default category others with value 1860	Updated category others with value 1860	Pass
4	TC-CL-01	Go to chart page which shows the data in chart format	Click account tab	Show the chart of all the expenses of that day	Showed the chart of all the expenses of that day	Pass

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

After making this application we assure that this application will help its users to manage the cost of their daily expenditure. It will guide them and aware them about there daily expenses. It will prove to be helpful for the people who are frustrated with their daily budget management, irritated because of amount of expenses and wishes to manage money and to preserve the record of their daily cost which may be useful to change their way of spending money. In short, this application will help its users to overcome the wastage of money.

The name of our project is “CLOUD BASED EXPENSE TRACKER” which is basically an Cloud based Expense Tracker. It works on the top of latest technology stack and is as interactive and friendly as it is named. You have to provide the input manually or with the help of your speech (thanks to speechly for making it happen easily). The moment you fill in the input manually and click the "CREATE" button or the moment you provide your voice command , the app stores the data with the help of context that makes your app faster and the information is easily flowed between the various components of the app. Then the information is populated in a list which if displayed just below the input form . The list holds all the transaction be it any expenditure or income for your reference so that any time you want to have a look at your previous activities you could easily have it.

As we know , the technology is moving from alphabetical data to the images as they are easy to read , understand and are attractive. So our Cloud based Expense Tracker is not behind in this trend also. The graph of income and expenses updated automatically as soon as any transaction is added to the list. The next thing that is more important is all the information is stored in the local storage so that any time you want to clean the tabs or even shut down the browser , and the next time you open it you have all you transactions saved just like before. The possibility of human error is always estimated while creating any app so the Cloud based Expense Tracker also has the options to delete any transaction that your typed incorrectly so that your budget sheet is always very precise and accurate.

6.2 Recommendation

DET app is usable by anyone who are willing to manage their expenses and aiming to save for the future investments. This app has no range criteria or any kind of profession or gender are focused so it will used hugely by any other person.

Future Scope

In further days, there will be mails and paymode embedded with the app. Also, backup details will be recorded on cloud.

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