



# IBM PROJECT

## PERSONAL EXPENSE TRACKER APPLICATION

**Batch:** B1 - 1M3E

**Team ID:** PNT2022TMID47461

**Team Leader:** CROSSWIN KIRUBAKARAN D

**Team members:**

- ARAVINDAN MK
- JASMINE PRAMILA I
- LIJI J XAVIER

**Industry Mentor(s) Name:** KUSHBOO

**Faculty Mentor(s) Name:** DR. JANARDHANA PRABHU

## **CONTENT**

<b>Title</b>	<b>Page Number</b>
<b>1.INTRODUCTION</b>	4
a. Project overview	4
b. Purpose	4
<b>2. LITERATURE SURVEY</b>	4
a. Existing problems	4
b. References	4
c. Problem Statement Definitions	4
<b>3. IDEATION &amp; PROPOSED SOLUTION</b>	5
a. Empathy Map Canvas	6
b. Ideation and Brainstorming	7
c. Proposed Solution	7
d. Problem Solution Fit	10
<b>4. REQUIREMENT ANALYSIS</b>	11
a. Functional requirements	11
b. Non-functional requirements	12
<b>5. PROJECT DESIGN</b>	13
a. Data flow diagrams	13
b. Solution and technical architecture	14
c. User Stories	16
<b>6. PROJECT PLANNING AND SCHEDULING</b>	17
a. Sprint planning and estimation	17
b. Sprint delivery schedule	17
c. Reports from JIRA	18

<b>7. CODING AND SOLUTIONING</b>	20
a. Feature 1	20
b. Feature 2	20
c. Database Schema	21
<b>8. TESTING</b>	21
a. Test cases	21
b. User Acceptance Testing	21
<b>9. RESULTS</b>	23
a. Performance Metrics	23
<b>10. ADVANTAGES AND DISADVANTAGES</b>	23
<b>11. CONCLUSION</b>	23
<b>12. FUTURE SCOPE</b>	24
<b>13. APPENDIX</b>	24
a. Source Code	24
b. GitHub & Project Demo link	24

## **1. INTRODUCTION**

### **a. Project overview**

The main aim of this Personal Expense Tracker application is that it tracks individual budget which involves every one of the monetary choices and exercises that this application makes your life more straight forward by assisting you with dealing with your funds effectively. This Personal tracker application won't just assist you with planning and bookkeeping yet in addition give you supportive bits of knowledge about cash the executives.

### **b. Purpose**

This application will request the clients add their costs and in light of their cost wallet equilibrium will be refreshed which will be noticeable to the client. Additionally, clients can get an examination of their consumption in graphical structures. They have a choice to put down a boundary for the sum to be utilized for that specific month assuming the breaking point is surpassed the client will be informed with an email alert.

## **2. LITERATURE SURVEY**

### **a. Existing problems**

In this busy world it is very difficult for an individual to track their expense whatever they did day to day. Due to laziness or lack of time to calculate the expense, people forget and they are not aware of their daily expense. And this maintenance of tracking will make use of the sticky notes, spread sheets, confusion and data handling problems.

### **b. References**

- [1]. EXPENSE MANAGER APPLICATION, Velmurugan A, Albert Mayan J, Niranjana P and Richard Francis
- [2]. Expense Tracker, ATIYA KAZI, PRAPHULLA S. KHERADE, RAJ S. VILANKAR, PARAG M. SAWANT
- [3]. Family Expense Manager Application in Android, Rajaprabha M N
- [4]. A Review on Budget Estimator Android Application, Namita Jagtap, Priyanka Joshi, Aditya Kamble
- [5]. Expense Tracker, Prof Miriam Thomas, Lekshmi, and Dr. Mahalekshmi T
- [6]. Expense Tracker, Aman Garg, Mukul Goel, Sagar Mittal, Mr. Shekhar Singh
- [7]. Money Tracker - <https://moneytracker.cc/>

### c. Problem Statement & Solutions

#### PROBLEM STATEMENT

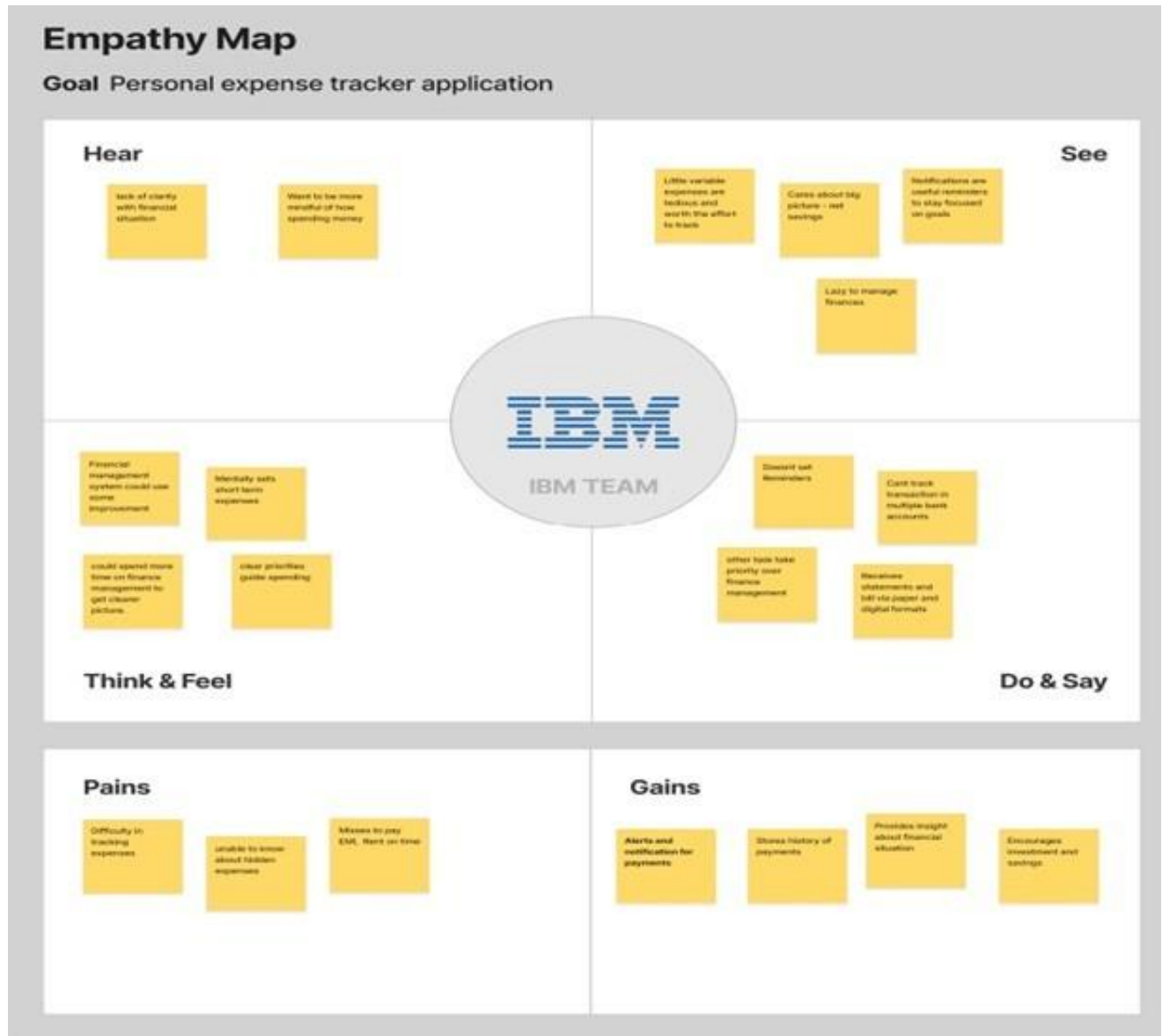
- Users who are young (recently entered the workforce) and beginners in financial planning need a digital way to track their Income and expenses so that they can reduce borrowing and credit card debt when they are earning relatively low.
- Customers who are busy, working personnel need an application that reminds or notifies about recurring payments like rent, Monthly installment, taxes and scheduled payments so that they don't delay payments but should also take less time setting up the settings.
- The Users who are using spreadsheets, notes for finance tracking will benefit from faster and Easier calculation of the expenses and valuable insights from graphical representation of the available data (differentiating them based on categories) and from easy maintenance of the history of transactions for a long time which the solution will provide.
- Some Users who are busy will forget to update the expenses so a reminder feature should be added.

#### SOLUTION

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Young and recently entered the workforce	track my Income and expenses	its confusing and hard	hard to maintain notes and get insights just from numbers	annoyed
PS-2	busy, working person	pay rents , monthly installments , taxes and scheduled payments timely	i miss and pay them late	its hard to remember	frustrated

### 3. IDEATION AND PROPOSED SOLUTION

#### a. Empathy Map Canvas



[link for empathy map](#)

## b. Ideation and Brainstorming



[link for Ideation and brainstorming](#)

## c. Proposed solution

S.No.	Parameter	
1.	Problem Statement (Problem to be solved)	<ol style="list-style-type: none"> <li>For spending, a person has to keep a log in diary or in a computer. All the calculations need to be done by the user which may sometimes result in errors that lead to Losses.</li> <li>When you don't keep watch on your spending, you will be short of money, always this will stress you out.</li> <li>Customers who are busy, working personnel need an application that reminds or notifies about recurring payments like rent, Monthly installment, taxes and scheduled payments</li> </ol>

2.	Idea / Solution description	Personal finance applications will ask users to add their expenses and based on their expenses, wallet balance will be updated which will be visible to the user. Also, users can get an analysis of their expenditure in graphical forms. They have an option to set a limit for the amount to be used for that particular month if the limit is exceeded the user will be notified with an email alert.
3.	Novelty / Uniqueness	<ol style="list-style-type: none"> <li>1. It will be a web application easy and lightweight accessible from any device</li> <li>2. Expense Tracker can give you a clear picture of how much you are earning and spending and You can evaluate if you are making more expenses and where you need to cut.</li> <li>3. Expense tracking will help you identify, limit, or eliminate your wasteful spending habits. It will further help you put your money where you need to.</li> </ol>
4.	Social Impact / Customer Satisfaction	It will help the people to track their expenses and also alerts when you exceed the limit of your budget.
5.	Business Model (Revenue Model)	<p>The Expense tracker app will solve crucial problems for our users, the best way and simplest way to make money is through Launching our app as a paid one.</p> <p>For free or lite version of application advertisements are the</p>



		best means to earn regular income.
6.	Scalability of the Solution	<p>The web application will be developed in a microservices framework which is flexible and different services can use different resources.</p> <p>The data will be stored and the application will run on cloud services which has the ability to expand when needed.</p>

#### d. Problem solution fit

Problem-Solution Fit canvas		Purpose / Vision	Version
Define CS, fit into CL	<b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span> People who are earning money and spending them on their daily basis	<b>6. CUSTOMER LIMITATIONS</b> <span>CL</span> <small>EG. BUDGET, DEVICES</small> Burdensome work of making notes about the expenditure and also it's difficult to recall all the expenses.	<b>5. AVAILABLE SOLUTIONS</b> <span>AS</span> <small>PROS &amp; CONS</small> Making a record of the expenses that they did by the manual process (notes)
	<b>2. PROBLEMS / PAINS</b> <span>PR</span> <small>• ITS FREQUENCY</small> In this modern world ,it is very hard to maintain the daily expenses and making a note of expense we did  Spending too much on wants rather than needs  Unplanned Expenditure make it difficult to save money for end of the month	<b>9. PROBLEM ROOT / CAUSE</b> <span>RC</span> Exceeding the budget limit beyond what we have planned  Any emergency needs like health issues or certain needs to be completed at that time.  Not having a pre-planned saving for the education purpose or any family functions and other needs	<b>7. BEHAVIOR</b> <span>BE</span> <small>• ITS INTENSITY</small> They may keep a temporary note on their mobile  He/she will tell the other persons to remember the expense they do  While calculating the expenses they consider only the expenses that are single time and huge and leave the rest.
Identify strong TR & EM	<b>3. TRIGGERS TO ACT</b> <span>TR</span> In this digitalized world , it is difficult to remember all the expense we did, so that, this app will be a very easy way to store ,that may trigger them.	<b>10. YOUR SOLUTION</b> <span>SL</span> "The personal expense Tracker" Application that can record all the expenses , and enables you to save more and can overcome all these problems by updating the daily expense data. This will be very useful and this will help us in the state of emergency , then for the personal needs.	<b>8. CHANNELS of BEHAVIOR</b> <span>CH</span> ONLINE Download Statements from bank and pay Monthly Installment  OFFLINE Using spreadsheets and Notes for financial management
	<b>4. EMOTIONS</b> <span>EM</span> <small>BEFORE / AFTER</small> <b>Before:</b> Discouraging and its an Hassle to track expenses. <b>After:</b> they will be stress free, no frustration .There will be a clarity about all the expenses he/she did.		

## 4. REQUIREMENT ANALYSIS

### a. Functional Requirements

FR No.	Functional Requirement (Epic)	Sub Requirement (Story/ Sub-Task)
FR-1	User Registration	Registration throughApp Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Dashboard	Once the user successfully login, a dashboard will enable theuser to keepall their spendings, like Monthlyincome, Today Expense, weekly expense, Monthly expense andTotal expense.
FR-4	User profile	In this profile usercan edit or update theirinformationif theywant information Like Full name, Email,Mobile number, registration date
FR-5	Addexpense /income	In this page allows users to add expenses and add income to keep recordsand also deleteany income orexpenses.
FR-5	Pie chart	It offersgraphical representation in the formof charts to help userseasily understand How moneycan be managed.
FR-6	Set budget	When theexpenses are beyondthe certain set limitation the alertmessage will sendto the user mail.

**b.Non-functional Requirements:**

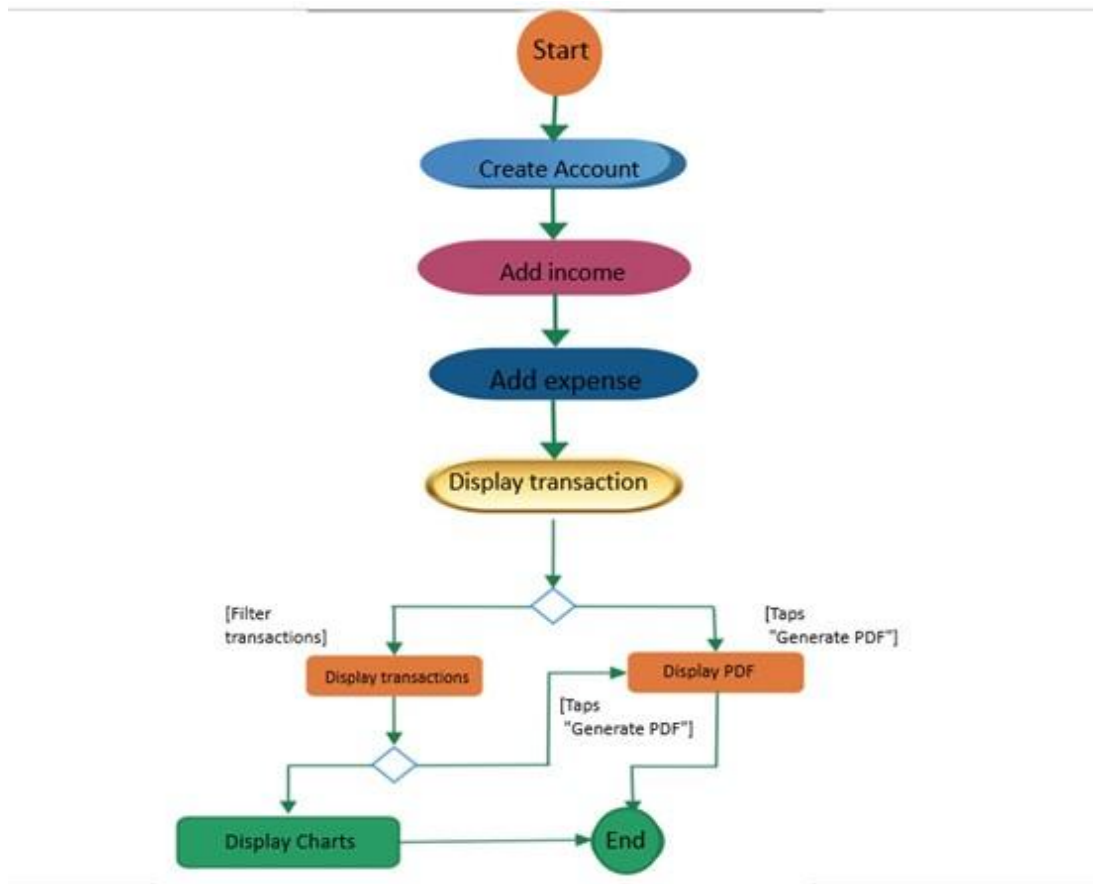
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	<b>Usability</b>	This application is used based on daily basis.
NFR-2	<b>Security</b>	Only the user can login the application. If any third party try to access the application in any other a Android device without the user knowledge then alert message will be sent to the user mail.
NFR-3	<b>Reliability</b>	This application is safe and secure, because only the can add their expenses and also the

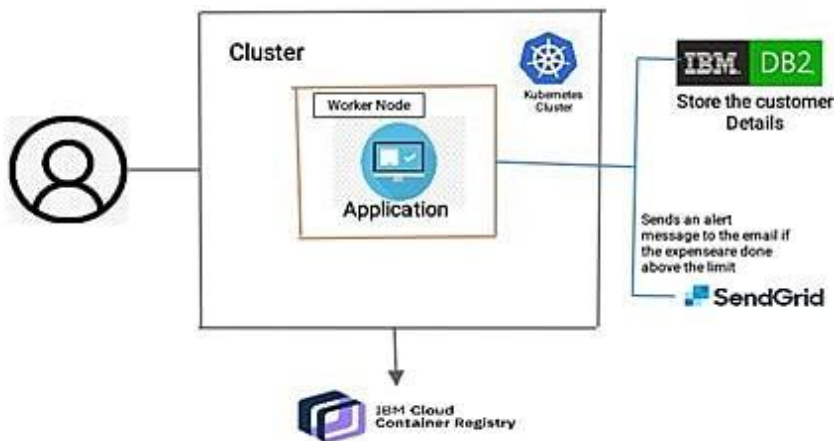
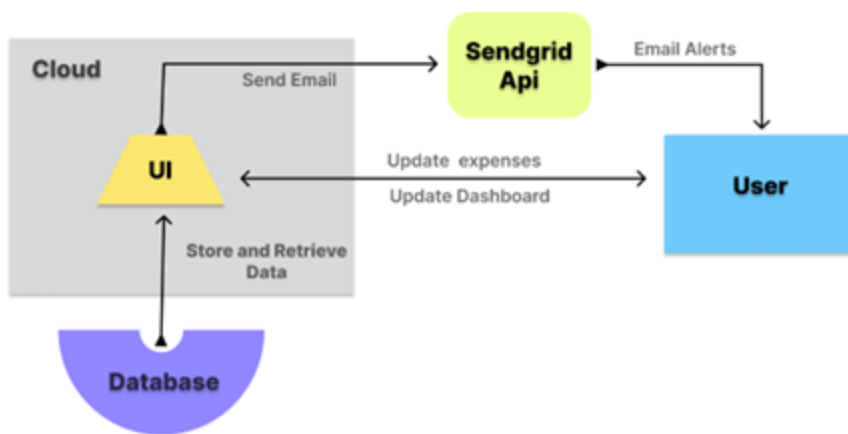
		app will send a message in offline to the user when third person login user account.
NFR-4	<b>Performance</b>	The system is performed by both online and offline. This system can only be used by individuals and only the user is allowed to manage the maintenance of the expenses.
NFR-5	<b>Availability</b>	Making a record of the expenses that they did by the manual process and also alerts when the budget exceeds more than a limit.
NFR-6	<b>Scalability</b>	The data will be stored and the application will run on cloud services which has the ability to expand when needed. It's a user friendly application.

## 5. PROJECT DESIGN

### a. Data flow diagrams



b. Solution and technical architecture



**Table-1 : Components & Technologies**

S.No	Component	Description	
1.	User Interface	How user interacts with application e.g.Web UI, MobileApp, Chatbot etc.	HTML, CSS, JavaScript
2.	Programming Language	Logic for a process in the application	Python-Flask
3.	Cloud Database	Database Service on Cloud	IBM Database
4.	Cloud Storage	File storage requirements	IBM Cloud object Storage
5.	Email API	Purpose of External API used in the application	Sendgrid
6.	PDF	API for pdf download	JavaScript PDF
7.	Chart	API for charts	Plotly
8.	Container Registry	Contain the register id	IBM Container Registry
9.	Infrastructure (Server / Cloud)	Application Deployment on Local System/ CloudLocal	IBM Kubernetes Cluster

**Table-2: Application Characteristics:**

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Python, HTML, CSS
2.	Security Implementations	List all the security / access controls implemented, use of firewalls etc.	SHA-256
3.	Scalable Architecture	Justify the scalability of architecture	Microservices
4.	Availability	Justify the availability of application	Kubernetes

### c. User Stories

#### Product Backlog, Sprint Schedule, and Estimation (4 Marks)

UserType	Functional Requirement (Epic)	User Story Number	User Story/ Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-4	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-5	As a user, I can have user information, data display, bin level		High	Sprint-2
Customer (Webuser)	Login	USN-1	As a user, I can register for the application by entering my email and password	I can access my account or dashboard	High	Sprint-1
		USN-2	As a user, I can confirm the captcha as I am not a robot.	Security prioritize	High	Sprint-1
Customer Care Executive	Resolving issues	USN-1	As a customer care executive, I can resolve all the issues regarding to the user application.	I can access user login details	High	Sprint-1



Administrator	Managing and controlling	USN-1	As an administrator, I can manage the application and control the issues in higherlevel.	I can access each and every details in the application of the particular user.	High	Sprint-1
---------------	--------------------------	-------	--	--	------	----------

## 6. PROJECT PLANNING & SCHEDULING

### a. Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	5	High	Crosswin
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	2	Low	Liji
Sprint-1	Login	USN-3	As a user, I can log into the application by entering email & password	4	High	Jasmine
Sprint-2	Dashboard	USN-5	As a user, I can view my expenses in the web UI shows weekly expense	5	High	Liji
Sprint-2		USN-6	As a User, I can to see my expenses as a Graph based on the predefined categories	10	High	Crosswin

Sprint-3	Add Expense or Income	USN-7	As a user, I can add Expenses and income.	5	High	Aravindan
Sprint-3		USN-8	Modify expenses and Income	5	Medium	Liji
Sprint-3	Maximum limit	USN-9	As a user, I want to set an upper limit in the Expenses.	3	High	Crosswin
Sprint-3		USN-10	As a user, I want to receive a email when my expenses exceed the limit	3	High	Jasmine
Sprint-4	User Profile	USN-4	As a user ,I can edit my details and change my password	4	High	Aravindan
Sprint-4	Chatbot	USN-11	As a User, it will be helpful to have a interactive Chatbot	4	Low	Jasmine, Liji
Sprint-4	Forgot password	USN - 12	Login to the account when password is missing	4	High	Crosswin
Sprint-4	Switch month	USN - 13	change the transaction history and budget between months	2	Low	Crosswin
Sprint-4	Download as pdf	USN - 14	Download the transactions as pdf file	2	Low	Crosswin

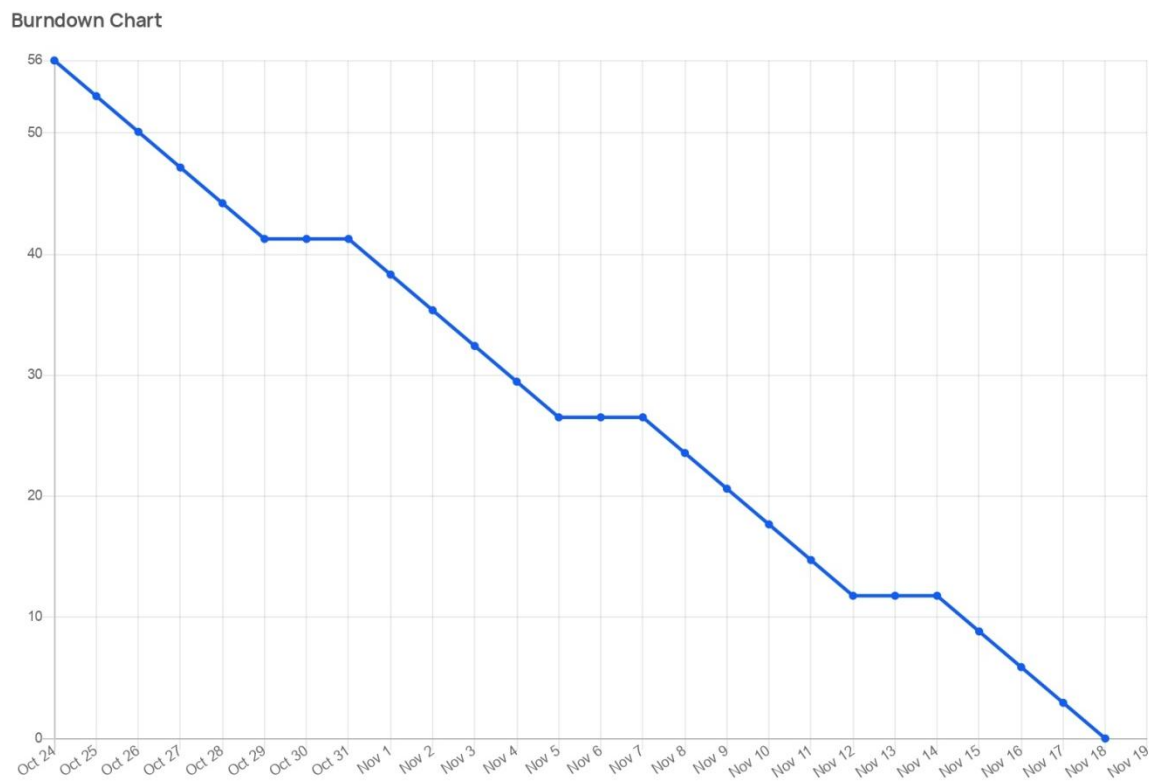
## b. Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	11	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	15	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	16	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	14	19 Nov 2022

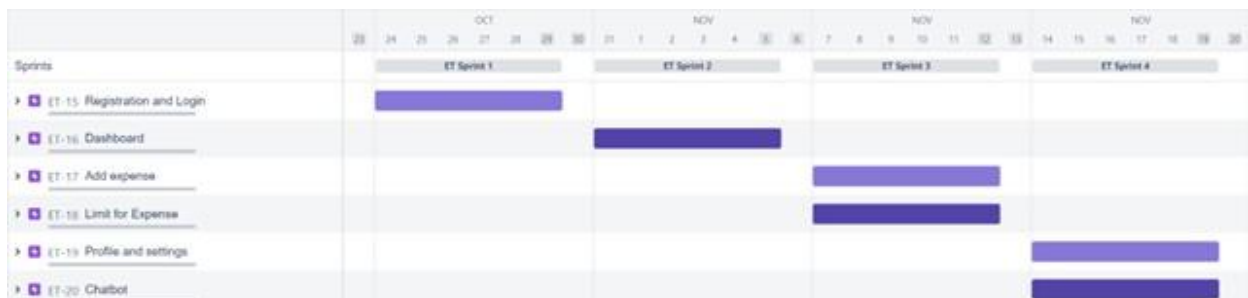
## Velocity:

Sprint	Days	Story points	Velocity
Sprint 1	6	11	1.8
Sprint 2	6	15	2.5
Sprint 3	6	16	2.7
Sprint 4	6	14	2.4

## Burndown chart :

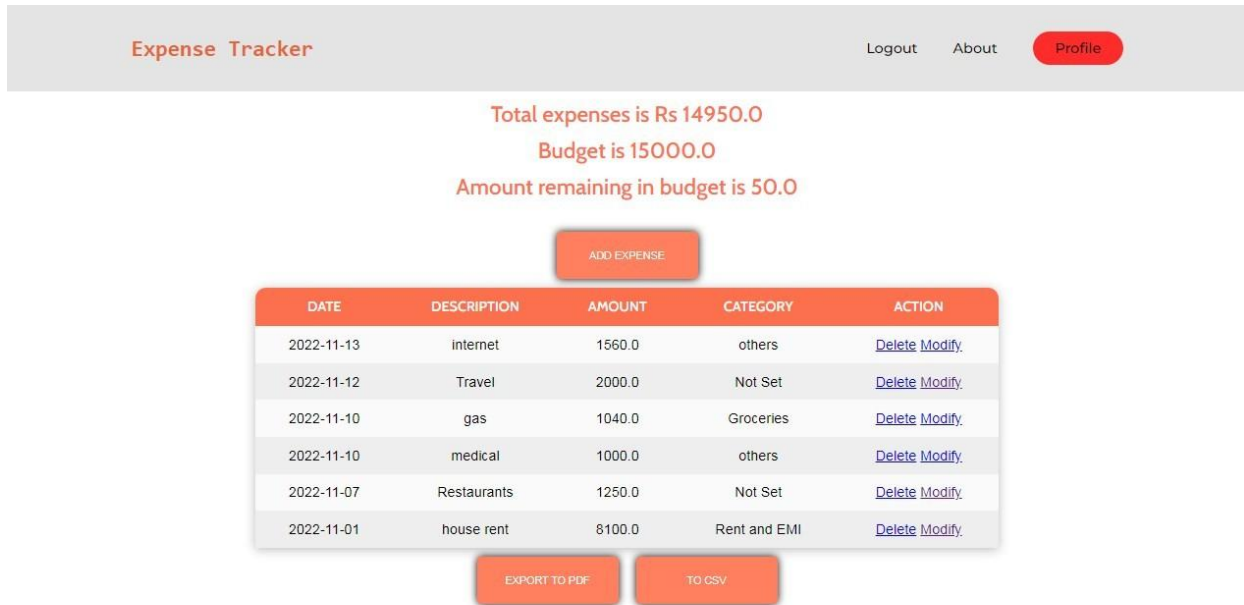


## c. Reports from JIRA

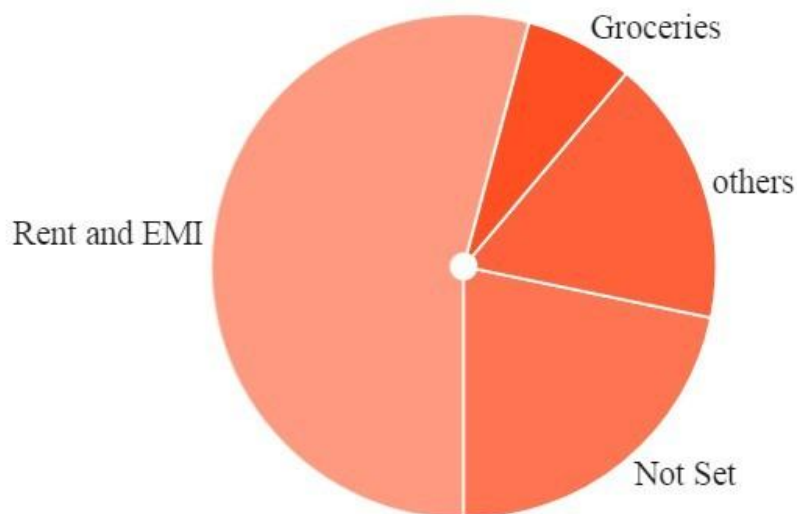


## 7. CODING AND SOLUTIONING

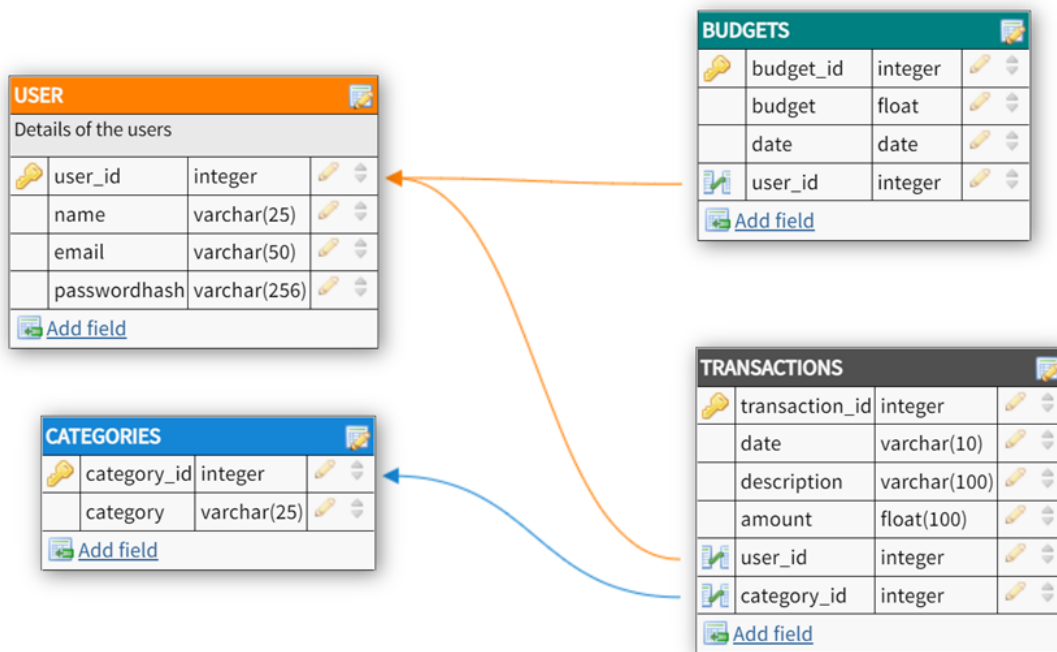
### a. Feature 1 - Download expense list as a pdf



### b. Feature 2 - Interactive Pie Chart using Javascript



### c. Database Schema



## 8. TESTING

### a. Test Cases

### b. User Acceptance Testing

#### Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	5	4	2	3	14
Duplicate	1	0	3	0	4

External	2	3	2	1	8
Fixed	5	2	4	9	20
Not Reproduced	0	0	0	0	0
Skipped	1	1	1	1	4
Won't Fix	0	0	0	0	0
Totals	14	10	12	14	50

### Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	10	0	0	10
Client Application	75	0	0	75
Security	8	0	0	8
Outsource Shipping	2	0	0	2
Exception Reporting	10	0	0	10
Final Report Output	5	0	0	5
Version Control	10	0	0	10

## 9. RESULTS

### a. Performance Metrics

[\(other files related to User acceptance testing , Jira , performance metrics \)](#)

## 10. ADVANTAGES AND DISADVANTAGES

### Advantages

- The best organizations have a way of tracking and handling reimbursements. This ideal practice guarantees that the expense tracked are accurately and in a timely manner. From a company perspective, timely settlements of these expense when tracked well will certainly boost employees' morale.
- Financially Aware and Improve Money management tracking your expenditures ensures you achieve your project financial targets. And this will be possible by clearly understanding your project spending using project budget limit, you can aptly make the necessary changes to complete your project within time and budget.
- This application eliminates the use of sticky notes , spread sheets, confusion and data handling problems.
- This makes us stress free and can lead your life in an effective manner , saves your time and money.
- By using this application you can limit you expense and can save more and that will be more useful at the time of emergency and any our financial need.
- An e-mail alert will be given to the user if he/she exceeds the limit of the budget amount and that will make aware of the user , in which they are spending the most and avoid unwanted expenses.

### Disadvantages

- Unraveling of the complexity of your financial records by hand may be time consuming. Since it takes time to generate reports.
- A person with knowledge about the android application is needed to ensure that the accounting is done properly.

## 11. CONCLUSION

This system has overcome the most limitations of tracking the daily expense manually. The venture effectively evades the manual computation for trying not to ascertain the pay and cost per

month. The modules are created with productive and furthermore in an alluring way. The created frameworks administer the issue and address the issues of by giving dependable and thorough data. Every one of the prerequisites projected by the client have been met by the framework. This developed framework consumes less handling time and every one of the subtleties are refreshed and handled right away. Since the screen gives online assistance messages and is user friendly manner, any client will get acclimated with its use. Modules are intended to be exceptionally adaptable so any disappointment prerequisites can be handily added to the modules without dealing with numerous issues.

This ideal practice guarantees that the expense tracked accurately and in a timely manner.

## **12. FUTURE SCOPE**

Consequently, it will continue to send notices for our day-to-day expenses. In the present occupied and costly life, we are in an extraordinary race to make cash, however toward the month's end we severed. As we are unconsciously spending cash on title and undesirable things. In this way, we have come over with the arrangement to follow our benefit. In this modern world everything is digitalized so this digitalized software application helps us to track our expenses and this will have more scope in the future.

## **13. APPENDIX**

- a. [Source Code](#)
- b. [GitHub](#)
- c. [Demonstration video](#)
- d. [Application](#)