

PERSONAL EXPENSE TRACKER APPLICATION

Submitted by

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CHAPTER 1

INTRODUCTION

A personal expense tracker is a great way to keep track of your spending and make sure you're not overspending. This application can help you manage your finances better and ensure that you're not wasting money. This is a useful application for all people who want to keep track of their expenses and save money by spending less. Expenses can be anything from shopping, dining out, paying off debts and more. Everyone has different expenses that impact their finances and it's important to keep track of them all so that you can manage your money effectively and avoid spending too much. There are many different tools and apps that can help with keeping track of your expenses but most of them are too complicated and difficult to use. It's important to have a simple and easy to use tool that can help you keep track of all your expenses and help you save more money.

When it comes to tracking expenses, you can make your system as simple as collecting receipts and organizing them once a month. You might get a little more information from other expense tracking systems (listing them in a spreadsheet, using money management software or even choosing an online application), but all methods have one thing in common: you have to get in the habit of thinking about your expenses. It's very easy to misplace a receipt or forget about any cash you spent. You may even think that a cup of coffee or a trip to the vending machine isn't worth tracking – although those little expenses can add up amazingly fast.

There are all sorts of opportunities to throw a kick into your plan to track expenses. You have to get in the habit of doing so, to reduce those lapses, and make sure that the data you're basing financial decisions on is solid.

1.1 PROJECT OVERVIEW

In simple words, personal finance entails all the financial decisions and activities that a Finance app makes your life easier by helping you to manage your finances efficiently. A personal finance app will not only help you with budgeting and accounting but also give you helpful insights about money management. 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.

1.2 PURPOSE

An expense tracker is a software or application that helps to keep an accurate record of your money inflow and outflow. Many people in India live on a fixed income, and they find that towards the end of the month they don't have sufficient money to meet their needs. While this problem can arise due to low salary, invariably it is due to poor money management skills.

People tend to overspend without realizing, and this can prove to be disastrous. Using a daily expense manager can help you keep track of how much you spend everyday and on what. At the end of the month, you will have a clear picture where your money is going. This is one of the best ways to get your expenses under control and bring some semblance of order to your finances.

CHAPTER 2

LITERATURE SURVEY

P.Thanapal et.al [2015] have proposed an Android Application that provides provisions to add some information about what income comes from other persons and what are all the expenses or payments we have to pay on a specific date or month.

Angad Manchanda et.al [2016] have proposed that the Expense Tracker Mobile Application was developed for iPhone users to keep track of their expenses and determine whether they are spending as per their set budget.

Atiyaz Kazi et.al [2015] have proposed an Android Application that tracks the daily expenses of the user. This app is like digital record keeping which keeps the records of expenses done by a user. The application keeps track of the Income and Expenses of both users on a day-to-day basis.

Nidhi Jitendra Jadhav et.al [2022] have proposed that an expense tracker is a tool that can assist anyone in keeping track of their expenses and reducing their spending. Expense Tracker is a mobile application that users may download to their phones and use to track and update their daily costs so they are always aware of how much they are spending

Nuura Najati Binti Mustafa et.al [2021] have proposed Daily Expense Tracker Mobile Application is an application meant for all type of people concerned and cautious about their daily expenses. With the help of this application, users will be able to more careful of their spendings and save more. Also, this application is an easier alternative to keeping track of users' use of money than the traditional way of writing their expenses in their diary

A Velmurugan et.al [2020] have proposed The Expense Manager is a multi-purpose finance related android application intended to run on android devices. The android application can be run on all android devices above android version 5.0. It is designed efficiently to give you the best suggestions for finance planning

Ashaha Walal et.al [2021] have proposed An android app which users can execute on their mobile phones and update their daily expenses so that they are well known to their expenses. Here users 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.

Chunye Gong et.al [2010] This paper tries to summarize general characteristics of cloud computing which will help the development and adoption of this rapidly evolving technology. The service oriented conceptional characteristic abstracts the details of inner implementations. As a technical characteristic, the loose coupling is the key technical feature of all kinds of cloud computing systems. select category of expense, enter other information like user can capture photo, add location, select amount of expense etc

SUMMARY OF LITERATURE REVIEW

Mobile Application that keeps track of the user's personal expenses, as well as his or her own contribution to group expenses, monthly. As of now the data is stored in the users mobile application itself and it doesn't provide Email insights for the users.

2.1 EXISTING PROBLEM

Personal finance entails all the financial decisions and activities that a Finance app makes your life easier by helping you to manage your finances efficiently. A personal finance app will not only help you with budgeting and accounting but also give you helpful insights about money management.

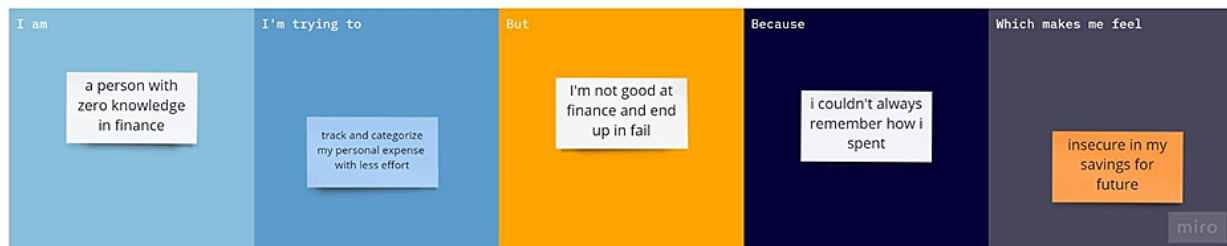
Personal finance applications will ask users to add their expenses and based on their expenses wallet balance will be updated which will be visible to the user. Also, users can get an analysis of their expenditure in graphical forms. They have an option to set a limit for the amount to be used for that particular month. if the limit is exceeded the user will be notified with an email alert.

2.2 REFERENCE

- [1] Thanapal, P., Patel, M.Y., Raj, T.L. and Kumar, J.S., 2015. Income and expense tracker. Indian Journal of Science and Technology, 8(S2), pp.118-122.
- [2] Manchanda, A., 2012. Expense Tracker Mobile Application (Doctoral dissertation, San Diego State University).
- [3] Kazi, A., Kherade, P.S., Vilankar, R. and Sawant, P.M., 2021. Expense Tracker. [7] Jadhav, N.J., Chakor, R.V., Gunjal, T.M. and Pawar, D.D., Expense Tracker. [8] Mustafa, N.N.B., Daily Mobile Expense Tracker Application.
- [4] Jadhav, N.J., Chakor, R.V., Gunjal, T.M. and Pawar, D.D., Expense Tracker.
- [5] Mustafa, N.N.B., Daily Mobile Expense Tracker Application.
- [6] Velmurugan, A., Mayan, J.A., Niranjana, P. and Francis, R., 2020, December. Expense manager application. In Journal of Physics: Conference Series (Vol. 1712, No. 1, p. 012039). IOP Publishing.
- [7] Wahal, A. and Aggarwal, M., 2021. Cloud based Expense Tracker.
- [8] Gong, C., Liu, J., Zhang, Q., Chen, H. and Gong, Z., 2010, September. The characteristics of cloud computing. In 2010 39th International Conference on Parallel Processing Workshops (pp. 275-279). IEEE.

2.3 PROBLEM STATEMENT DEFINITION

A personal finance app will not only help you with budgeting and accounting but also give you helpful insights about money management. 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.



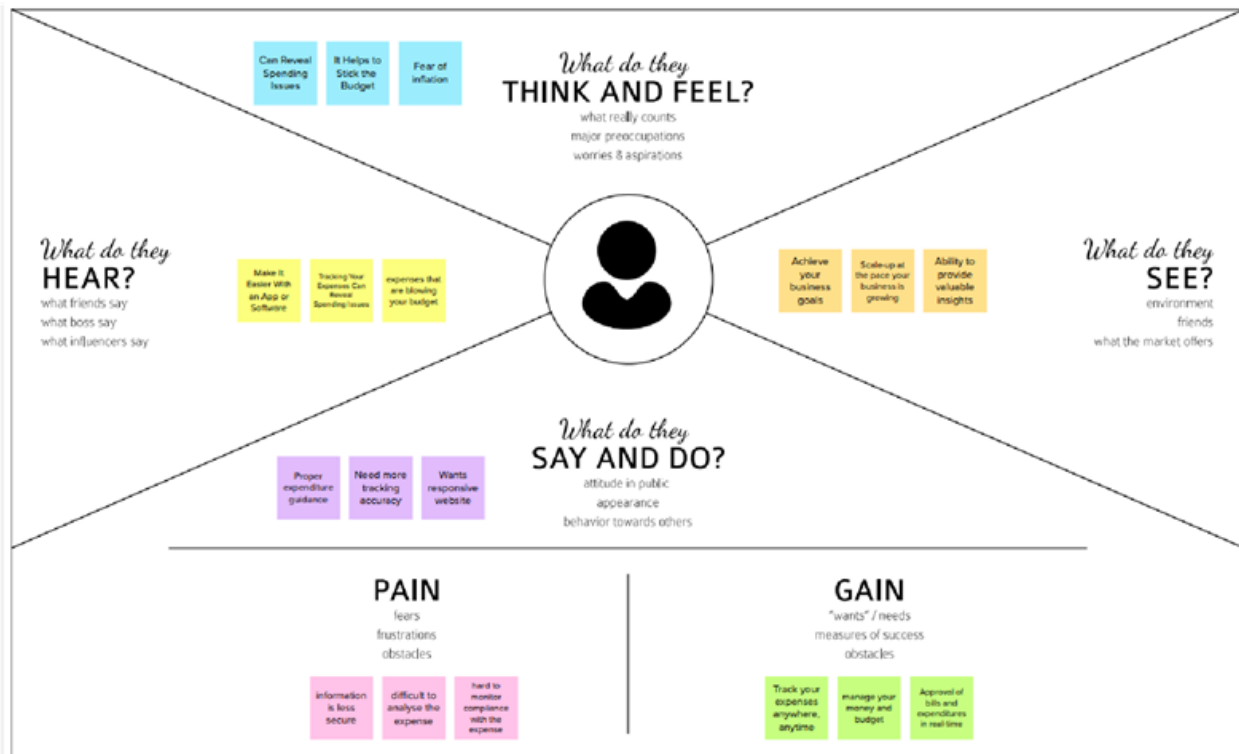


CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP

An empathy map is a short, easy-to-understand visual that gathers information about a user's actions and attitudes. It is a valuable tool for assisting teams in a greater understanding of their users. Understanding the major issue and the person experiencing it is essential for developing an effective solution. The map-making exercise makes participants analyze things from the user's point of view, as well as his or her goals and obstacles.




3.2 IDEATION AND BARISTROM

Ideation refers to the whole creative process of coming up with and communicating new ideas. It can take many different forms, from coming up with a peculiar idea to combining multiple existing ideas to create a new process or organizational system. Ideation is similar to a




practice known as brainstorming.

Template




Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.


 10 minutes to prepare
 1 hour to collaborate
 2-8 people recommended

[Share template feedback](#)



Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

 10 minutes

A

Team gathering

Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B


Set the goal

Think about the problem you'll be focusing on solving in the brainstorming session.

C

Learn how to use the facilitation tools


Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) 

1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

 5 minutes

The main focus of this problem statement is

1. Track expenses in an easy and effective way
2. Remind the user about their spending whenever the user is out of limit
3. Reduce the risk of overspending by setting a monthly target

=

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

10 minutes

Tip

You can select a sticky note and hit the pencil (switch to sketch) icon to start drawing!

Person 1

Notifications on certain time limit about the expenses

Person 2

reduce the spendings by providing AI inside the application

Person 3

Need a personal assistant to assist the user on expense insurance

Person 4

The expenses need to be auto-updated and also to be linked with bank account

Person 5

Need of a minimal User Interface that would be comfortable for all set of ages

Person 6

setting a limit and also a reminder when the expenses limit is crossed

Person 7

Give insights in terms of graphical representation for better understanding

Person 8

Web application instead of mobile apps

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

Notifications on certain time limit about the expenses

Need of a minimal User Interface that would be comfortable for all set of ages

Give insights in terms of graphical representation for better understanding

Tip
Add customisable tags to sticky notes to make it easier to find, remove, organize and categorize important ideas as themes within your mural.

setting a limit and also a reminder when the expenses limit is crossed

Web application instead of mobile apps

Tip

You can select a sticky note and hit the pencil (switch to sketch) icon to start drawing!

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

⌚ 20 minutes



→

After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

- A Share the mural**
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.
- B Export the mural**
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

- Strategy blueprint**
Define the components of a new idea or strategy.
[Open the template →](#)
- Customer experience journey map**
Understand customer needs, motivations, and obstacles for an experience.
[Open the template →](#)
- Strengths, weaknesses, opportunities & threats**
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
[Open the template →](#)

[Share template feedback](#)

3.3 PROPOSED SOLUTION

The Proposed a Mobile application in which the user will get email insights and we have used IBM db2 cloud as a platform to store data.

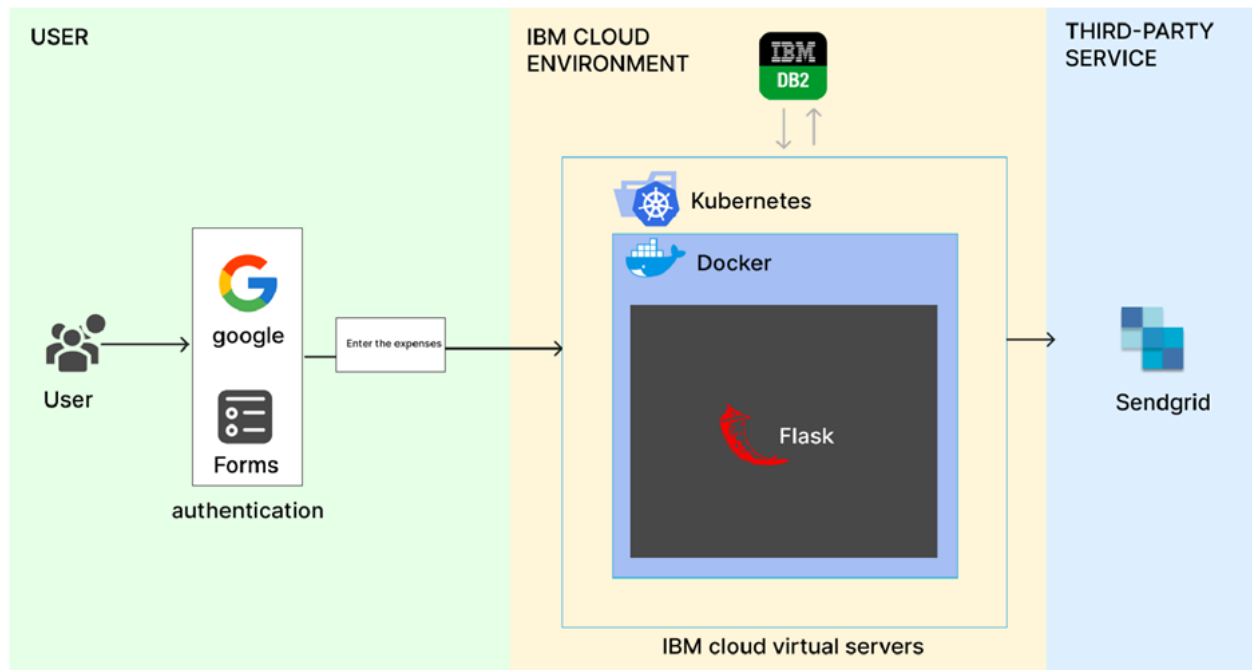
Tools used: IBM Cloud, HTML, Javascript, IBM Cloud Object Storage, Python-Flask, Kubernetes, Docker, IBM DB2, IBM Container Registry

S.No	Parameter Description	Description
1.	Problem Statement (Problem to be solved)	To simplify the expense tracking process
2.	Idea/Solution	A web application for tracking expenses backed with IBM Cloud which sends notifications and insights using SendGrid

3.	Novelty/Uniqueness	Using 2FA which protects the expense data of the user and clean UI for easy navigation
4.	Social Impact	It improves the quality of spending of the user which results in better economic growth for our users.

3.4 PROPOSED SOLUTION FIT

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) <small>CS</small> Who is your customer? Person who try to manage their expenses in an efficient way	6. CUSTOMER CONSTRAINTS <small>CC</small> What constraints prevent your customers from taking action or limit their choices? No Internet Connection	5. AVAILABLE SOLUTIONS <small>AS</small> Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? Note & pen system, Mind Calculation	Explore AS, differentiate
Focus on J&P, tap into BE, understand RC	2. JOBS-TO-BE-DONE / PROBLEMS <small>J&P</small> Which jobs-to-be-done (or problems) do you address for your customers? <ul style="list-style-type: none"> Large manual calculations are need to calculate the monthly expenses Human error may be happen 	9. PROBLEM ROOT CAUSE <small>RC</small> What is the real reason that this problem exists? What is the back story behind the need to do this job? <ul style="list-style-type: none"> Lack of tracking their expenses No graphical representation to track their expenses 	7. BEHAVIOUR <small>BE</small> What does your customer do to address the problem and get the job done? Easier for the user to follow the process of tracking expenses	Focus on J&P, tap into BE, understand RC
	3. TRIGGERS <small>TR</small> What triggers customers to act? It reduces time rather than writing it manually in the notebook	10. YOUR SOLUTION <small>SL</small> <ul style="list-style-type: none"> Create a web application to track their expenses anywhere at any time Get real-time graphical representation of their expenses Alert notification through email 	8. CHANNELS of BEHAVIOUR <small>CH</small> #ONLINE What kind of actions do customers take online? <ul style="list-style-type: none"> Tracking their expenses Getting detailed reviews from email notification #OFFLINE What kind of actions do customers take offline? Export the data when online and use it in offline	
	4. EMOTIONS: BEFORE / AFTER <small>EM</small> How do customers feel when they face a problem or a job and afterward? Before: Difficult to track the expense and struggle to analyze their expenses after spending it After: Easy to track the expenses and graphical representation allow them to understand the expenses they made before easily			



CHAPTER 4

REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Application Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User monthly expense tentative data	Data to be registered in the app
FR-4	User monthly income data	Data to be registered in the app
FR-5	Alert/ Notification	Alert through E-mail Alert through SMS
FR-6	User Budget Plan	Planning and Tracking of user expense vs budget limit

4.2 NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Effectiveness, efficiency and overall satisfaction of the user while interacting with our application.
NFR-2	Security	Authentication, authorization, encryption of the application.
NFR-3	Reliability	Probability of failure-free operations in a specified environment for a specified

		time.
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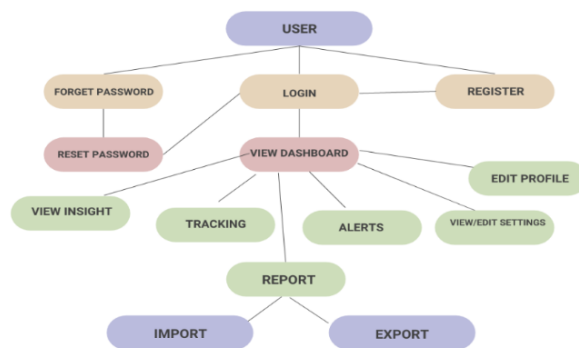
FR No.	Non-Functional Requirement	Description
NFR-4	Performance	How the application is functioning and how responsive the application is to the end-users.
NFR-5	Availability	Without near 100% availability, application reliability and the user satisfaction will affect the solution.
NFR-6	Scalability	Capacity of the application to handle growth, especially in handling more users.

CHAPTER 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

A New User have to signup and verify the mail



5.2 SOLUTION & TECHNICAL ARCHITECTURE

Components & Technologies

S.No	Component	Description	Technology
1.	User Interface	The user can interact with the application via web browser as a web application	HTML, CSS, React Js
2.	Application Logic-1	The application contains the register and login services to access the dashboard of the application	React Js, Python (Flask)
3.	Application Logic-2	Dashboard contains insights about income and expenses	React Js, Python (Flask)
4.	Application Logic-3	The user will get the reports weekly and monthly as email notifications	React Js, Python (Flask), SendGrid
5.	Database	Income and expense-related data stored In SQL Database	MySQL
6.	Cloud Database	User data are stored in a remote cloud database for high availability and insights	IBM DB2
7.	File Storage	User's financial reports are stored	IBM Block Storage
8.	Infrastructure (Server / Cloud)	Kubernetes application with docker pods containing the application that can be deployed in IBM K8s clusters	Local, Cloud Foundry, Kubernetes, etc.

Application Characteristics

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Flask is used to implement API	Flask
2.	Security Implementations	The IBM Container Registry in IBM Cloud provides high security to the user's data	Container Registry, K8s Cluster, IBM Cloud
3.	Scalable Architecture	Kubernetes cluster scales the application based on the traffic	Container Registry, K8s Cluster, IBM Cloud
4.	Availability	This application is available to the user at any part of the world at any time	IBM Cloud
5.	Performance	The performance will be high because of the scalability by k8 engine	Container Registry, K8s Cluster, IBM Cloud

5.3 USER STORY

User Type	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, and password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive a confirmation email once I have registered for the application	I can receive a confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-8	As a user, I need to enter my income and expenses	I can view my insights about spending	High	Sprint-2
		USN-9	As a user, I need to set a budget alert for a month or a week	I can set spending alerts for a month or a week	Medium	Sprint-2
		USN-10	As a user, I need to get email notifications about my weekly and monthly spendings and earning	I can see my insights through mail about weekly and monthly insights	Medium	Sprint-2
Customer Care Executive		USN-11	As a customer care executive, I can solve login issues and other issues of the application	I can provide customer support 24/7	Medium	Sprint-3
Administrator		USN-12	As an administrator, I can update the features and roll out a new version of application	I can fix the bugs and add features as per the request of the user	Low	Sprint-4

CHAPTER 6

PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

In Scrum Projects, Estimation is done by the entire team during Sprint Planning Meeting. The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the Sprint.

Product Owner ensures that the prioritized User Stories are clear, can be subjected to estimation, and they are brought to the beginning of the Product Backlog.

As the Scrum Team in total is responsible for the delivery of the product increment, care would be taken to select the User Stories for the Sprint based on the size of the Product Increment and the effort required for the same.

The size of the Product Increment is estimated in terms of User Story Points. Once the size is determined, the effort is estimated by means of the past data, i.e., effort per User Story Point called Productivity.

Sprint Planning

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	<ul style="list-style-type: none">User have to Create AccountUser Verification Using Mail	3	High	Riyazur Razak N Ragul R
Sprint -1	Login	USN-2	<ul style="list-style-type: none">User LoginHold the User Logged Status	2	Low	Saran VT Saran Kumar N
Sprint-2	Add Income	USN-3	<ul style="list-style-type: none">Add User Details	5	High	Saran VT Ragul R
Sprint-2	Add Expense	USN-4	<ul style="list-style-type: none">Add User day-to-day Expense	1	High	Riyazur Razak N Saran Kumar N
Sprint-3	Display Expense	USN-4	<ul style="list-style-type: none">Display the Expense Data	3	Medium	Ragul R Saran Kumar N
Sprint-3	Budgeting	USN-5	<ul style="list-style-type: none">Provide weekly and monthly Budgets & currency conversion	5	High	Riyazur Razak N Saran VT
Sprint-4	Show Charts	USN-6	<ul style="list-style-type: none">Display Charts	2	Low	Saran Kumar N
Sprint-4	Show Alerts	USN-7	<ul style="list-style-type: none">Notify Alerts if they reached the limit	2	Low	Ragul R Riyazur Razak N Saran VT
Sprint-4	Deployment	USN-8	<ul style="list-style-type: none">Deploy the applicationTest the deployed application	8	High	Riyazur Razak N Ragul R Saran VT SaranKumar N

USING JIRA SOFTWARE

6.2 SPRINT DELIVERY SCHEDULE

Sprint is a set period where an agile team works to complete a specific set of development tasks. In most cases, there are multiple sprints within a larger development project. Sprints ultimately provide a framework for taking large, complex software projects and breaking them down into digestible phases.

When a sprint ends, the team shows their work to the project owner, who reviews it. If the project meets expectations, the team moves on to the next sprint.

Since sprints take place over a fixed period of time, it's critical to avoid wasting time during planning and development. And this is precisely where sprint scheduling enters the equation.

In case you're unfamiliar, a sprint schedule is a document that outlines sprint planning from end to end. It's one of the first steps in the agile sprint planning process—and something that requires adequate research, planning, and communication.

Sprint 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	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	15 Nov 2022

6.3 REPORTS FROM JIRA

a.Velocity Report

Velocity is the average amount of work a scrum team completes during a sprint. In team-managed Jira Software projects, this can be measured in either story points or number of issues. Teams can use velocity to predict how quickly they can work through the backlog because the report tracks the forecasted and completed work over several sprints. The more sprints, the more accurate the forecast



The above report describes

- The vertical axis displays the statistic used for estimating stories. The horizontal axis displays the last 7 sprints completed by the team; this data is used to calculate velocity.
- The **Commitment** (blue) bar for each sprint shows the total estimate of all issues in the sprint when it begins. After the sprint has started, any stories added to the sprint, or any changes made to estimates, will not be included in this total.
- The **Completed** (green) bar in each sprint shows the total completed estimates when the sprint ends. Any scope changes made after the sprint started are included in this total.

b.Sprint burndown Chart

A sprint burndown chart shows the amount of work that has been completed in a sprint and the total work remaining. Sprint burndown charts are used to predict your team's likelihood of completing their work in the time available. By tracking the remaining work throughout the sprint, a team can manage its progress, and respond to trends accordingly. For example, if the burndown chart shows that the team may not reach the sprint goal, then the team can take the necessary actions to stay on track.

Sprint-1/Story points

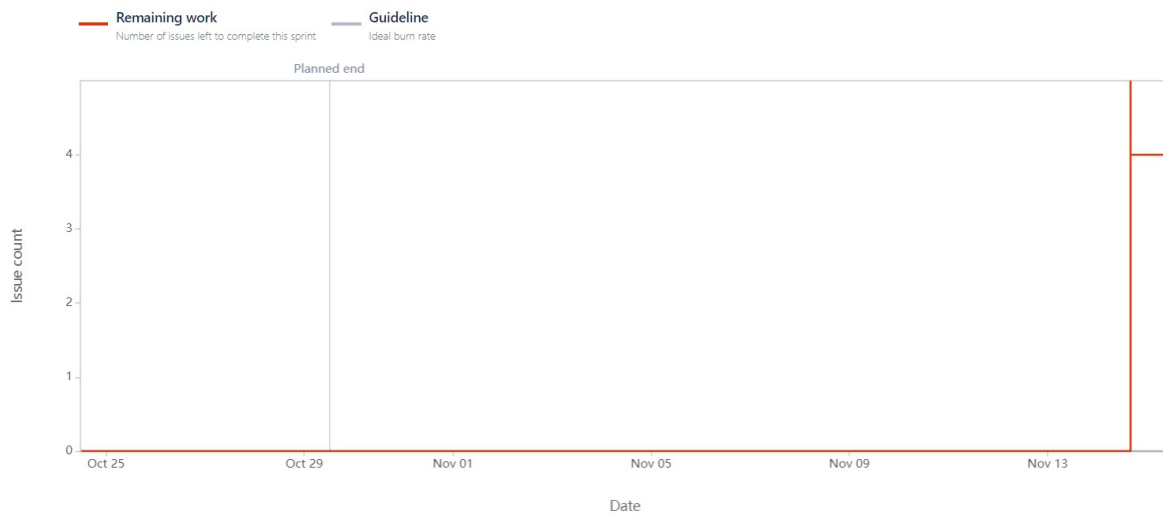
- The vertical axis represents amount of work; either number of issues or story points (if

Estimation is enabled). The horizontal axis represents the timeframe of the sprint.

- The **grey** line shows the ideal progress rate. It trends downwards at a linear rate, because teams should ideally be completing work at a consistent pace.
- The **red** line shows how much work remains in the sprint. The closer this line is to the grey line, the better.
-

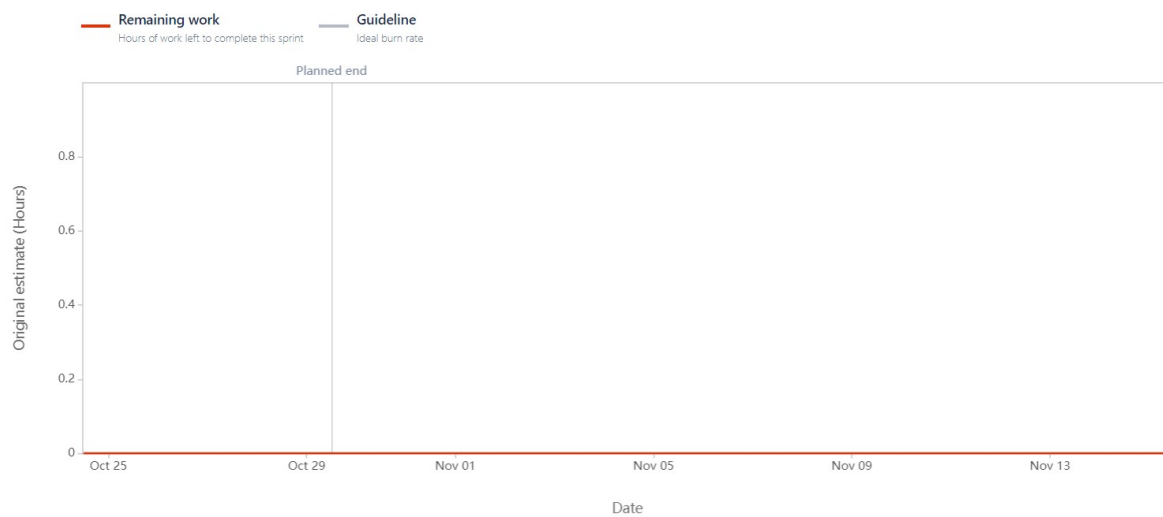
Sprint-1/Issue Count

Date - October 24th, 2022 - October 29th, 2022



Sprint-1/Time

Date - October 24th, 2022 - October 29th, 2022



Report: ET Sprint 4

*Issue added after sprint start

Scope changes log

[View in issue navigator](#)

Date	Key	Summary	Issue type	Epic	Details of scope change	Change in estimation
2022-11-14	ET-11*	Dockerize the application	Story		Issue added to sprint	-
2022-11-14	ET-12*	Deploy the application in ibm cloud	Story		Issue added to sprint	-
2022-11-14	ET-13*	test the application	Story		Issue added to sprint	-
2022-11-15	ET-11	Dockerize the application	Story		Estimate of 8 has been added	- → 8
2022-11-15	ET-12	Deploy the application in ibm cloud	Story		Estimate of 8 has been added	- → 8
2022-11-15	ET-13	test the application	Story		Estimate of 8 has been added	- → 8

Completed issues

[View in issue navigator](#)

Key	Summary	Issue type	Epic	Status	Assignee	Story points
ET-1	User have create an account	Story		DONE		-
ET-2	Email Verification	Story		DONE		3
ET-3	User Login	Story		DONE		2
ET-4	Login session using token authentication	Story		DONE		2

- The report also has a number of tables that provide more context for the chart. Table data can be sorted by selecting the column header. The tables are:
 - **Scope changes log:** Issues that were added to the sprint, removed from the sprint, or had estimation changes, while the sprint was in progress.
 - **Incomplete issues:** Issues in the sprint that were never completed (ie: never moved to a *Done* status). This includes issues that were never started.
 - **Completed issues:** Issues that were moved to a *Done* status while the sprint was in progress.
 - **Issues completed outside of sprint:** This includes issues that were:
 - completed and then added to the sprint, either before the sprint started or after the sprint started.
 - added to the sprint, but completed before the sprint started.
 - **Issues removed from sprint:** Issues that were removed from the sprint while the sprint was in progress.

CHAPTER-7

CODING & SOLUTIONING

7.1 FEATURE 1

Currency converter

There are a lot of expense tracker applications out there, but most of them don't have currency converters built-in. This can be a big problem if you're traveling a lot and need to keep track of your spending in different currencies.

Currency converters are usually fairly simple to use (and pretty accurate). People don't need to have advanced knowledge of currency exchange rates in order to use them. They can be a huge timesaver for travelers who are constantly traveling between different parts of the world. When you enter different expenses into an app like Expensify or TravelBank, they should be automatically converted into the currency of the country where the expense took place. This can save you a lot of time and effort in the long run.

CODE:

```
import { Avatar, Divider, Flex, Text } from '@chakra-ui/react'

import React from 'react'

import { useRecoilValue } from 'recoil'

import { transaction as transactionAtom } from '../../state/state'

const SingleTrans = (props: any) => {

  return (

    <Flex flexDir="row" alignItems="center" justifyContent="space-between" mt={3} mb={3} px={3}>

      <Flex flexDir="row" alignItems="center" justifyContent="space-
```

```

between">

    <Avatar name={props.type} width="8" height="8"/>

    <Flex flexDirection="column" alignItems="start"
justifyContent="center" ml={3}>

        <Text fontSize="lg" fontWeight="bold">{props.date}</Text>

        <Text fontSize="md"
color="whiteAlpha.500">{props.category}</Text>

    </Flex>

</Flex>

    <Text fontSize="lg" fontWeight="bold" color={props.type ===
"Credit" ? "green" : "red"}>{props.amount}</Text>

</Flex>

)

}

```

```

const TransactionSection = () => {

    const transaction = useRecoilValue(transactionAtom)

    return (

        <Flex flexDir="column" width="49%" bg="#fff" px={5} py={3}>

            <Text fontSize="xl" fontWeight="bold" mt={5}
mb={3}>Transactions</Text>

            {transaction.slice(0,5).map((t: any, ind: any) => {

```

```

        return <div key={ind}>

            <SingleTrans type={t.type === 'C' ? 'Credit': 'Debit'}
date={t.date} amount={t.amount} category={t.type === 'D' ? t.category : ''}
/>

            <Divider color="whiteAlpha.500"/>

        </div>

    }}}

</Flex>

)

}

```

```
export default TransactionSection
```

7.2 FEATURE 2

Email Notification

If you're like most people, keeping track of your personal expenses is a time-consuming and tedious task. Wouldn't it be great if there was a way to receive email notifications when something important changes in your expense tracker, so you never have to worry about missing an important update. Well, now there is! With our mobile app for iOS and Android, you can receive email notification alerts whenever the status of an expense changes in limits.

CODE:

```

from flask import request
import bcrypt
import json
import uuid
from db.db import db

```

```

import ibm_db
from sendgrid import SendGridAPIClient
from sendgrid.helpers.mail import Mail

class Register:

    def __sanitizer(self, args: dict):
        if "email" not in args:
            raise KeyError({
                "status": "Error",
                "message": "email is required field",
                "data": None
            })
        if "password" not in args:
            raise KeyError({
                "status": "Error",
                "message": "password is required field",
                "data": None
            })
        if "name" not in args:
            raise KeyError({
                "status": "Error",
                "message": "name is required field",
                "data": None
            })
        if "currency" not in args:
            raise KeyError({
                "status": "Error",
                "message": "currency is required field",
                "data": None
            })

    def post(self):
        payload = request.json
        try:
            self.__sanitizer(payload)
            hashed_password =
bcrypt.hashpw(bytes("{}".format(payload["password"])), 'utf-
8'),bcrypt.gensalt(13))

```

```

        token = str(uuid.uuid4())

        ibm_db.exec_immediate(db, "INSERT INTO USERS(NAME, EMAIL,
PASSWORD,CURRENCY, TOKEN) VALUES('{}', '{}', '{}', '{}',
'{}');".format(payload["name"], payload["email"], str(hashd_password, "utf-
8"), payload["currency"], token))
        message = Mail(
            from_email="nanthakumarans.19ece@kongu.edu",
            to_emails=payload["email"],
            subject='Verify Your Email Address',
            html_content='<h3>Please Verify Your Email Address By Click
The Link Below</h3><br /><a
href="http://localhost:5000/verification/{}">Verify
Now</a>'.format(payload["email"]))
        sg =
SendGridAPIClient("SG.1B9zdNfCQnmH2sDm8hrE6Q.9lwBzJpBsJs09etmh4LCDJ4AA0GMQ07g
LC-y_kGqctY")
        res = sg.send(message)
        print(res.headers)
        print(res.body)

        payload = {
            "email": payload["email"],
            "token": token
        }
        return json.dumps({"status": "Success", "data": payload,
"message": "User Created Successfully"})
    except KeyError as e:
        return json.dumps(e.args)
    except:
        return json.dumps({"status": "Error", "data": None, "message":
"Server Error"})

def verify(self, email):
    result = ibm_db.exec_immediate(db, "SELECT * FROM USERS WHERE
EMAIL='{}'".format(email))
    value = ibm_db.fetch_tuple(result)
    if value == False:
        return "<h1>Invalid</h1>"
    if value[2] == email:

```

```

        result = ibm_db.exec_immediate(db, "UPDATE USERS SET
VERIFIED=TRUE WHERE EMAIL='{ }'".format(email))
        return "<h1>Account Verified Successfully</h1>"
    else:
        return "<h1>Invalid</h1>"

```

7.3 DATABASE SCHEMA

USER TABLE

S.No.	FIELD NAME	DATA TYPE
1	ID	INTEGER
2	NAME	VARCHAR
3	EMAIL	VARCHAR
4	PASSWORD	VARCHAR
5	TOKEN	VARCHAR
6	VERIFIED	BOOLEAN
7	CURRENCY	VARCHAR

TRANSACTION TABLE

S.No.	FIELD NAME	DATA TYPE
1	ID	INTEGER
2	AMOUNT	VARCHAR
3	DATE	DATE
4	CATEGORY	VARCHAR
5	DESCRIPTION	VARCHAR
6	TYPE	VARCHAR

7	USER	INTEGER
---	------	---------

CATEGORY TABLE

S.No.	FIELD NAME	DATA TYPE
1	ID	INTEGER
2	NAME	VARCHAR
3	KEY	VARCHAR

TRANSACTION TABLE

S.No.	FIELD NAME	DATA TYPE
1	NAME	VARCHAR
2	CREATED_AT	DATE
3	RANGE	VARCHAR
4	LIMIT	VARCHAR
7	USER	INTEGER

CHAPTER-8

TESTING

8.1 TEST CASES

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
LoginPage_TC_OO 1	Functional	Home Page	Verify user is able to see the Login/Signup page		1.Enter URL and click go 2.Verify login/Signup displayed or not	http://expense-tracker-pnt2022mtd04671.s3-web.jp-to-k.cloud-object-storage.appdomain.cloud/authenticate	Login/Signup page should display	Working as expected	pass	Initial Load is very less			Riyazur razak N
LoginPage_TC_OO 2	UI	Home Page	Verify the UI elements in Login/Signup		1.Enter URL and click go 2.Verify login/Signup with below UI elements: a.email text box b.password text box c.Login button d.Last password? Forgot password link	http://expense-tracker-pnt2022mtd04671.s3-web.jp-to-k.cloud-object-storage.appdomain.cloud/authenticate	Application should show below UI elements: a.email text box b.password text box c.Login button with orange colour d.New customer? Create account link e.Last password? Recovery password link	Working as expected	pass	user friendly and attractive			Ragul R
LoginPage_TC_OO 3	Functional	Home page	Verify user is able to log into application with Valid credentials		1.Enter URL(http://expense-tracker-pnt2022mtd04671.s3-web.jp-to-k.cloud-object-storage.appdomain.cloud/) and click go 2.Enter Valid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: sarasvt@gmail.com password: Testing123	User should navigate to user account Dashboard		pass	Components are routed			sarankumar N
LoginPage_TC_OO 4	Functional	Login page	Verify user is able to log into application with Invalid credentials		1.Enter URL(http://expense-tracker-pnt2022mtd04671.s3-web.jp-to-k.cloud-object-storage.appdomain.cloud/) and click go 2.Enter Valid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: sarasvt@gmail.com password: Testing123	Application should show "Incorrect email or password" validation message.		pass	Components are routed			ragul R
LoginPage_TC_OO 4	Functional	Login page	Verify user is able to log into application with Invalid credentials		1.Enter URL(http://expense-tracker-pnt2022mtd04671.s3-web.jp-to-k.cloud-object-storage.appdomain.cloud/) and click go 2.Enter Valid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: sarasvt@gmail.com password: Testing123	Application should show "Incorrect email or password" validation message.		pass	Its comfortable to use			Saran Vt

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
LoginPage_TC_OO 5	Functional	Login page	Verify user is able to log into application with Invalid credentials		1.Enter URL(http://expense-tracker-pnt2022mtd04671.s3-web.jp-to-k.cloud-object-storage.appdomain.cloud/) and click go 2.Enter Valid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: sarasvt@gmail.com password: Testing123	Application should show "Incorrect email or password" validation message.		pass	user friendly and attractive			Sarankumar N
LoginPage_TC_OO 6	Functional	Dashboard	Add income and expense and check whether the insights are changing		1.After login 2.Add Expenses and income 3.View Charts	Income:Rs in Inr Expense:Rs in usd	View Charts		pass	Every Events are changing accurately			saran vt
LoginPage_TC_OO 7	Functional	Dashboard	Email insights		insights are viewed in mail		Mail Insights		pass	Insights are reached on time			Riyazur razak N

8.2 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	10	5	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37

Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	5	2	1	8
Totals	24	14	13	26	7 5

Test case Analysis

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

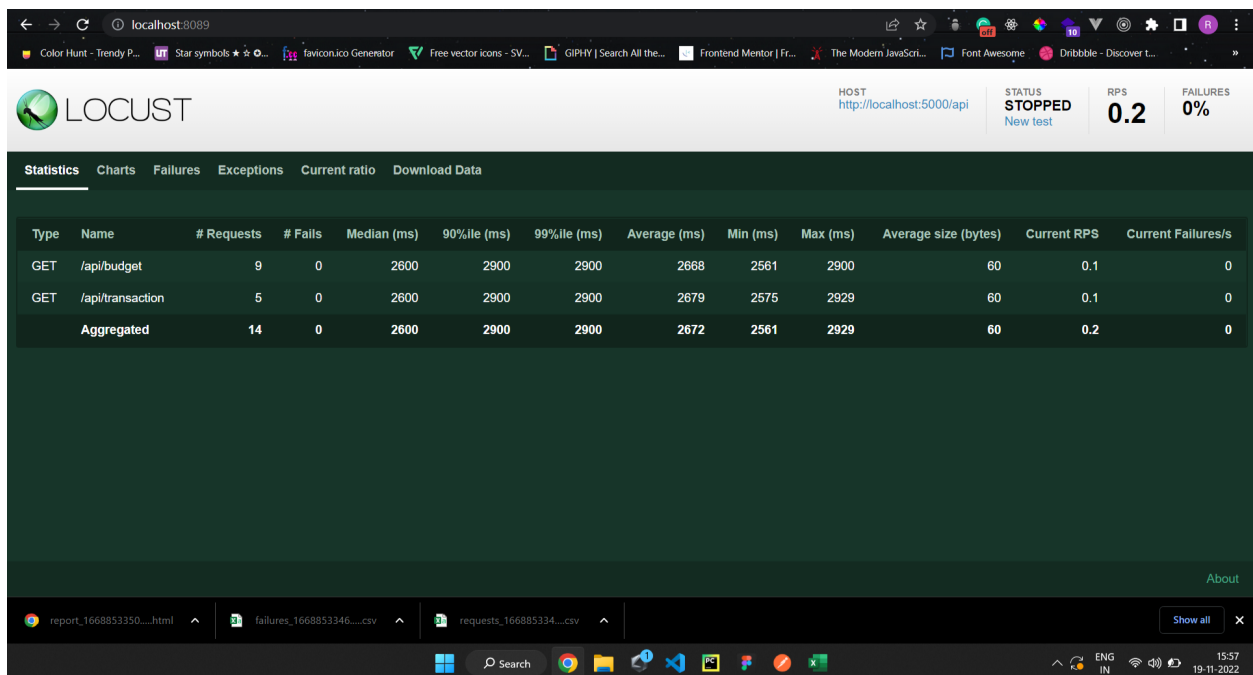
Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	29	0	0	29
Security	4	0	0	4
Outsource Shipping	6	1	0	5
Exception Reporting	7	0	0	7
Final Report Output	4	0	0	4
Version Control	8	0	0	8

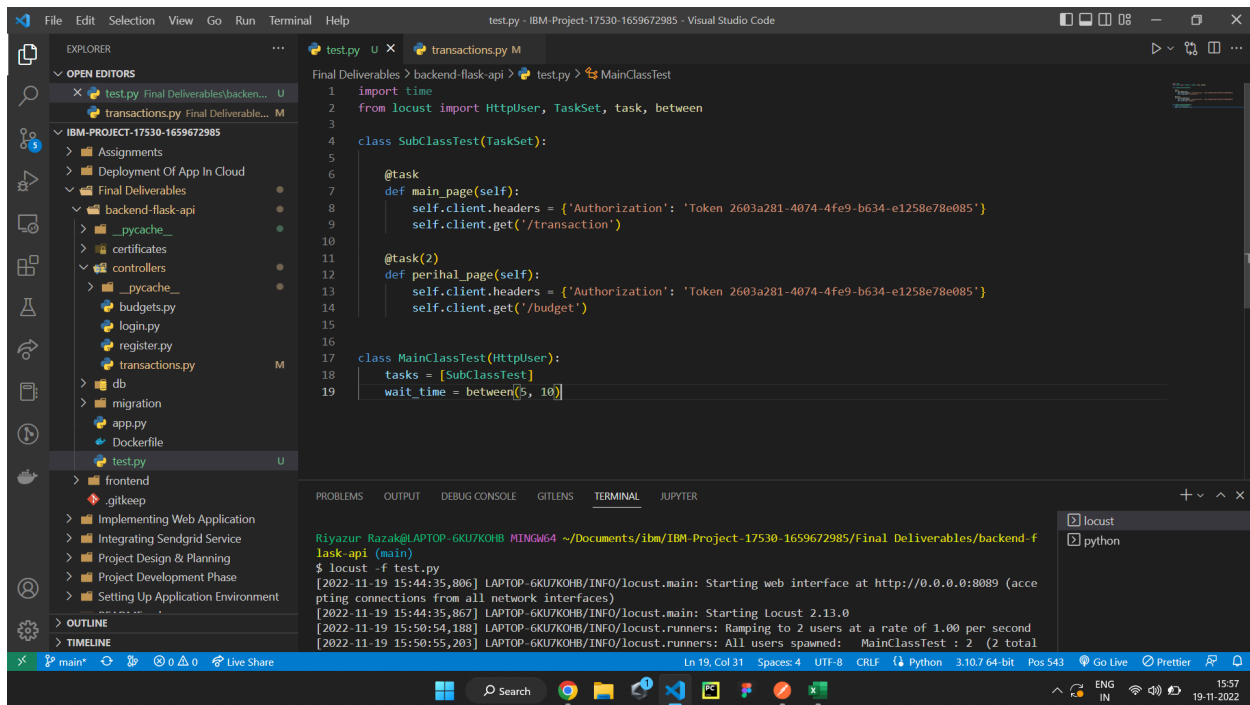
CHAPTER-9

RESULTS

9.1 PERFORMANCE METRICS

The locust is a commonly used application performance test tool. It has the ability to generate large amounts of traffic and measure response times, throughputs and more. Using this tool to identify performance issues before they become a problem can help you avoid potential outages and negative customer experiences.

[illegible]



CHAPTER-10

ADVANTAGES & DISADVANTAGES

10.1 ADVANTAGES

There are a lot of reasons why you might want to use a personal expense tracker, and we're here to highlight a few of the most important ones. One of the main advantages of using a personal expense tracker is that it can help you keep track of where your money is going each month. This is especially important if you're trying to keep your finances under control – not having a clear idea of where you're spending your money can be a huge burden. By using an expense

tracker, you'll be able to stay on top of your spending so you can identify problem areas and make necessary changes to get back on track.

Another reason why you might want to use a personal expense tracker is that it can be a useful tool for budgeting. This can be particularly useful if you don't have a system in place to keep track of how much money you spend each month – it can be difficult to reach your goals if you don't even know how much money you have available to spend. Using an expense tracker can help you create an accurate budget so that you'll have a better idea of how much you can spend without going broke.

Advantages of using a personal expense tracker include:

- 1) You can keep track of the expenses you incur on a regular basis, such as groceries and utilities.
- 2) You can set up budget categories for your expenses and keep an eye on how much you are spending in each category.
- 3) You can see exactly where your money is going each month so you can make necessary changes to improve your spending habits.
- 4) It's easy to categorize and categorize your costs.
- 5) You can easily see your weekly or monthly expenses at a glance so you know where you are at financially at all times.

10.2 DISADVANTAGES

One of the many advantages to using a personal expense tracker is that you can keep track of your spending in an organized and easy-to-use format. However, there are a few disadvantages to consider when using this type of expense tracking system. One of the primary disadvantages to using a personal expense tracker is that it requires a lot of dedication in order to properly use it.

Disadvantages of using a personal expense tracker include:

- 1) It can be difficult to keep track of all of your expenses in one place.

- 2) It can be time consuming to enter all of the details of your transactions each week or month.
- 3) It can be stressful to see how much money you have spent during the month and can cause you to feel guilty about spending too much in some areas.
- 4) It can take a long time to categorize each transaction if you use the app to record your expenses.
- 5) It's not always easy to find a category for a transaction if you don't know where to put it.

CHAPTER-11

CONCLUSION

As a business owner, you know that tracking your expenses is essential for keeping your business running smoothly. However, doing this manually can be a time-consuming and difficult task. Therefore, it is important to have an automated expense tracking system that records all of your business expenses and allows you to track them efficiently. Once you have such a system in place, you can use it to analyze your spending and identify areas where you may be able to reduce your costs. This will allow you to save money in the long run and improve the performance of your business. Below, you will find a list of some benefits that your business can expect to receive from implementing a fully automated expense management system.

1. It makes it easy to identify and eliminate unnecessary expenses Your business may not be getting the most out of its expenses if it has no way of identifying and eliminating unnecessary expenses. However, when you implement a system that allows you to automatically record and analyze your expenses, you can quickly and easily identify any areas that are not yielding positive results for your business. You can then implement strategies to eliminate these expenses and get your business back on track

2. It allows you to analyze your spending patterns and identify areas of improvement A system that tracks your expenses allows you to identify areas where you may be overspending so that you can make the necessary adjustments and cut costs where necessary. These adjustments will help you to reduce your overall costs and improve the efficiency of your business

CHAPTER-12

FUTURE SCOPE

As the world becomes more digitized, individuals are increasingly looking for ways to manage their finances in a convenient and effective way. One popular way to do this is through the use of personal expense trackers. Personal expense trackers allow you to monitor all your expenses in real time - giving you an easy way to stay on top of your finances and make sure that you're sticking to your budget. There are a number of great options on the market when it comes to personal expense trackers, but what really sets them apart is their comprehensive range of features. In this article, we're going to take a closer look at some of the best personal expense trackers on the market today and see what sets them apart from their competitors. Let's start by

taking a look at some of the key features that you can expect from a good personal expense tracker...

12.1 KEY FEATURES OF A PERSONAL EXPENSE TRACKER

12.1.1 HELPS YOU STICK TO YOUR BUDGET

While it's great to be able to monitor all your transactions in real time, it can often be difficult to figure out where all the money goes. This is where a personal expense tracker can help. Most personal expense trackers include budget tracking functionality that allows you to monitor your spending on a daily basis. By setting a budget, you can keep on top of your spending and ensure that you're not spending more than you can afford. This can prevent you from falling deep into debt and help you to stay on top of your finances.

12.1.2 MONITORS YOUR SPENDING IN REAL TIME

When it comes to personal finance, it's more important than ever to keep track of where your money is going. A good personal expense tracker will help you to do this by monitoring all of your transactions in real time. This helps you to identify areas where you may be overspending or where you can make some savings. It also lets you track unexpected expenses and plan for the future. When you monitor all your transactions in real time, you can take corrective action right away to ensure better financial health in the future.

12.1.3 WORKS ON ANY DEVICE

These days, most people access the internet using mobile devices such as smartphones and tablets. This means that you need a tool that is accessible from any device so that you can track your spending on the go. With most personal expense trackers, you can access your account from any smartphone, tablet, or computer and view your account information in real-time.

CHAPTER-13

APPENDIX

SOURCE CODE:

GITHUB LINK

<https://github.com/IBM-EPBL/IBM-Project-17530-1659672985>

PROJECT DEMO LINK

https://player.vimeo.com/video/772695968?h=86f073c5a3&badge=0&autopause=0&player_id=0&app_id=58479

LIVE URL

<http://expense-tracker-pnt2022tmid04671.s3-web.jp-tok.cloud-object-storage.appdomain.cloud/>

