Project Report

1. INTRODUCTION

a. Project Overview

Due to the lack of a complete tracking system, there is a constant overload to rely on the daily entry of the expenditure and totalling it down at the end of the month. So to avoid all the hassles of the age-old traditional system, this project is an attempt to manage our daily expenses in a more efficient, simple, fast, smooth and effective way.

b. Purpose

This system enables the user to track their expenses as well as it makes valuable suggestions, feedback and timely alerts for a smooth experience.

2. LITERATURE SURVEY

a. Existing problem

In existing, we need to maintain the excel sheets, csv etc. files for the user daily and monthly expenses. In existing, there is no as such complete solution to keep a track of its daily expenditure easily. to do so a person as 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. This project is about mobile application Expenses system with geo-location tracking, Based on the location of the user, it using Google Places, to check, the available store in the area, provides a notification for offers purpose, In term of security design, this system may implement a login authentication such as OTP message to your mobile device, this function may bring more security confidence to user.

b. References

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c. Problem Statement Definition

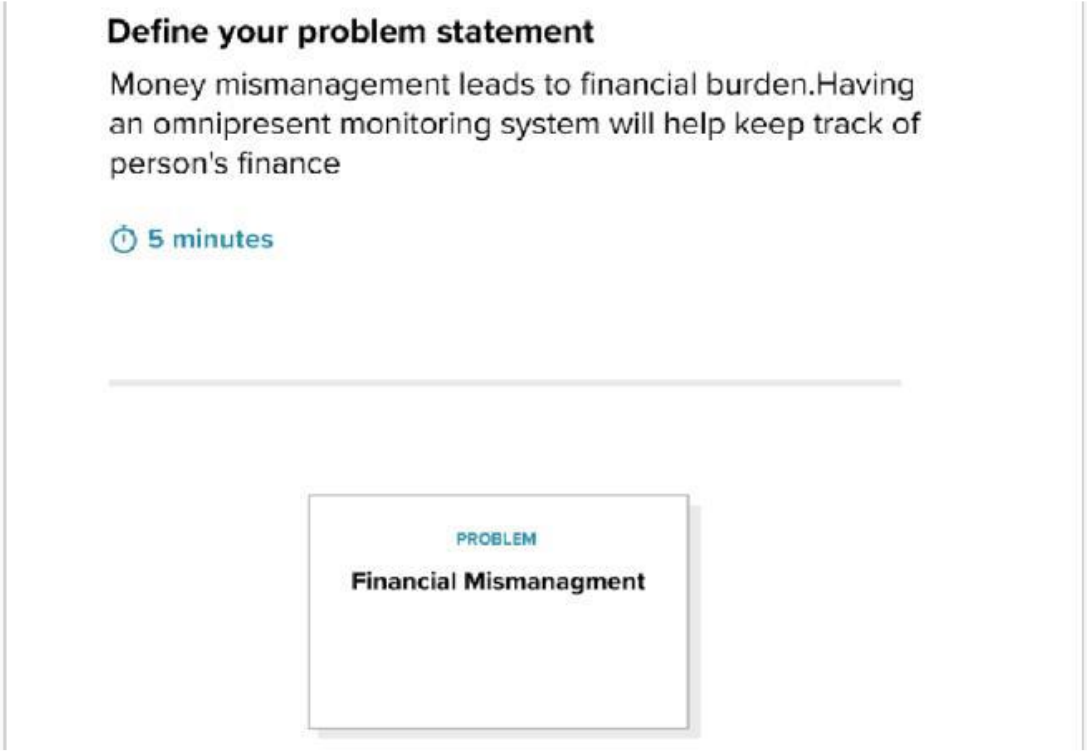
There is no proper solution available in the market which enables people to keep a track of their daily expenses easily. To do so people have to maintain all the records of their expenses in some form or other, also all the calculations are to be performed manually by the user which may at times result in errors leading to unfavourable circumstances. Due to the lack of a complete tracking system, there is a constant overload to rely on the daily entry of the expenditure and totalling it down at the end of the month. So to avoid all the hassles of the age-old traditional system, this project is an attempt to manage our daily expenses in a more efficient, simple, fast, smooth and effective way. The system aims to eliminate the burden of the user by eliminating the need for manual tracking and calculations to keep track of the expenditure. This system enables the user to track their expenses as well as it makes valuable suggestions, feedback and timely alerts for a smooth experience.

3. IDEATION & PROPOSED SOLUTION

a. Empathy Map Canvas

b. Ideation & Brainstorming

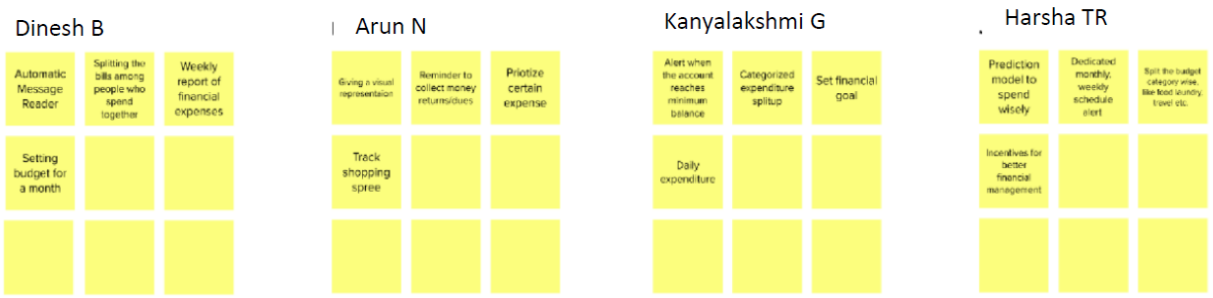
Step-1: Team Gathering, Collaboration and Problem Statement



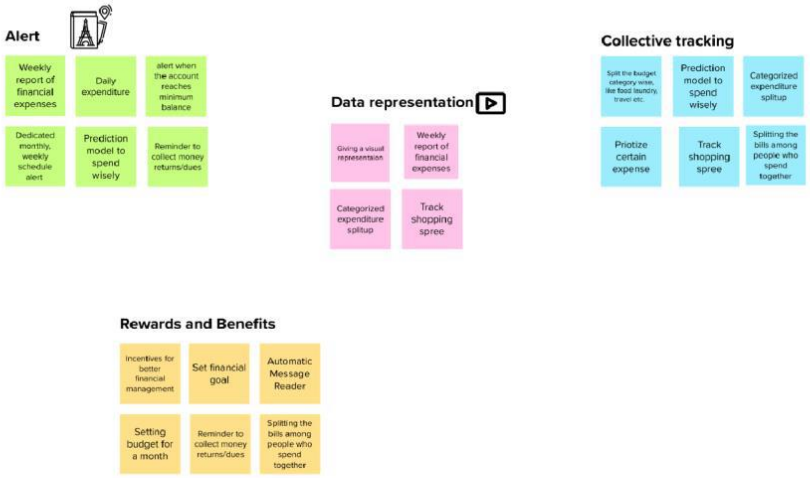
Step-2: Brainstorm, Idea Listing and Grouping

Brainstorm

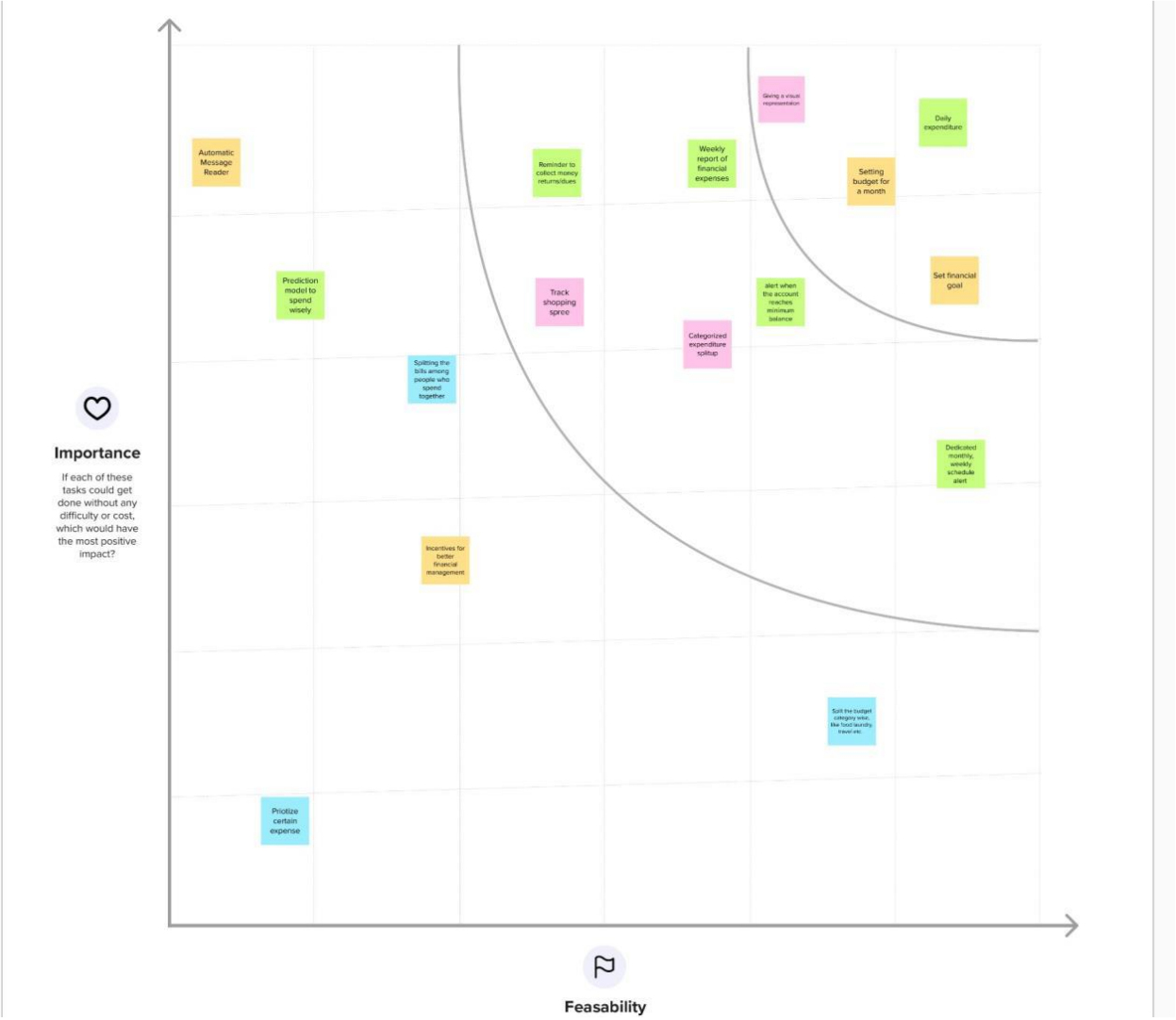
10 minutes



20 minutes



Step-3: Idea Prioritization

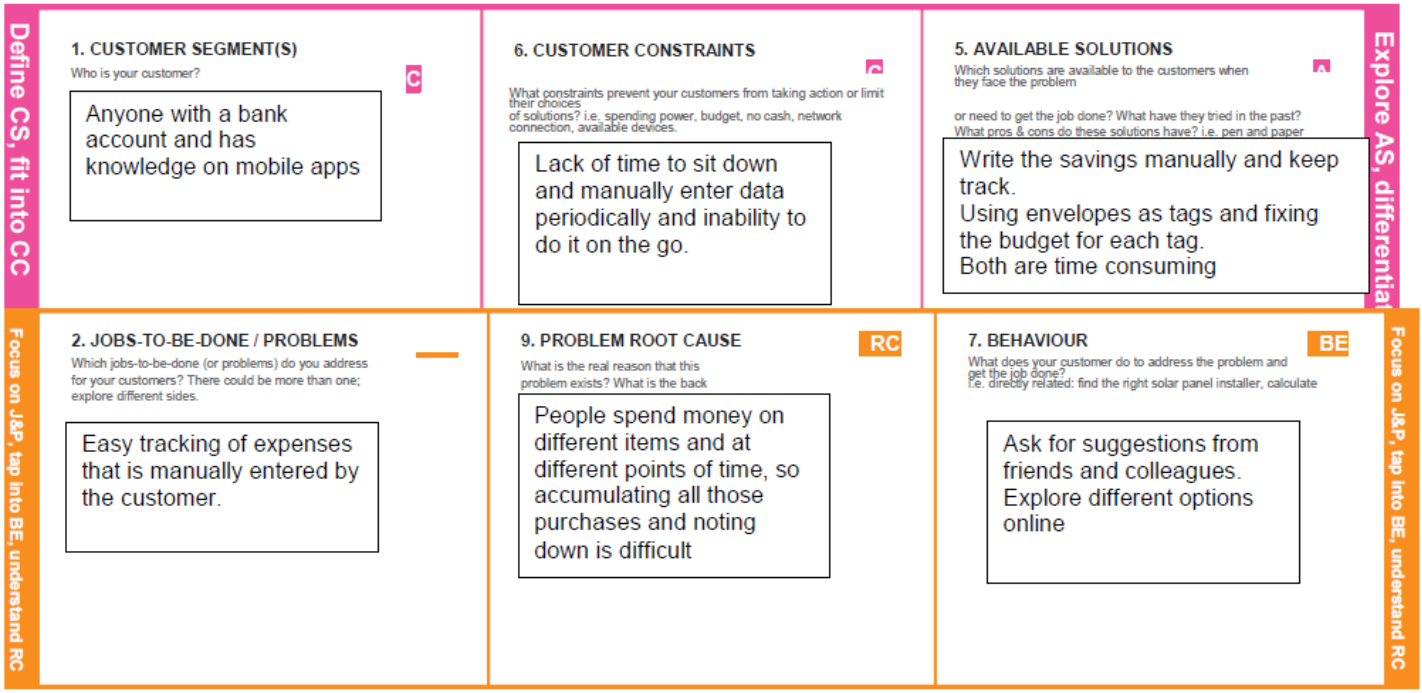


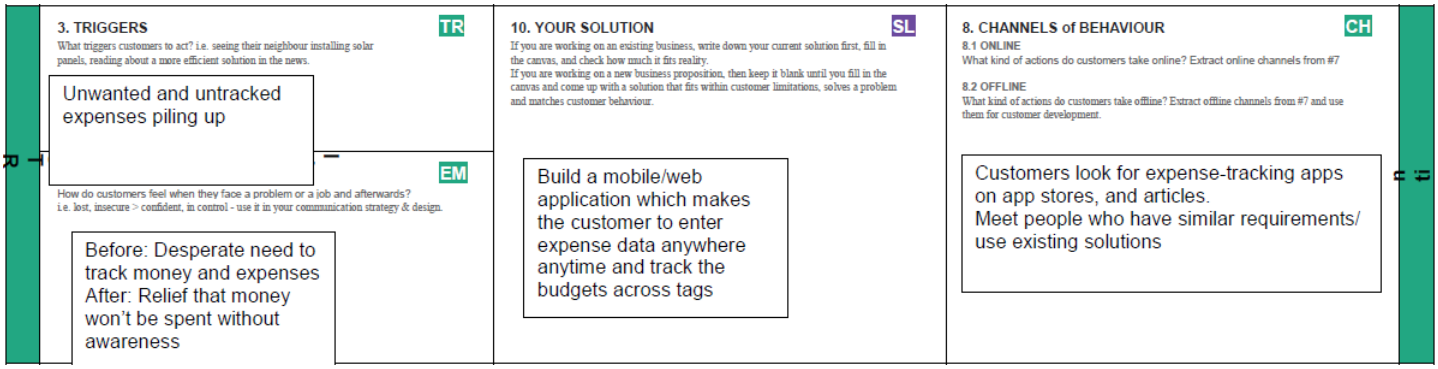
c. Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Money mismanagement leads to financial burden. Having an omnipresent monitoring system will help keep track of a person's finances.
2.	Idea / Solution description	To solve the above we could introduce an App to monitor and keep track of expenses, with suggestions.
3.	Novelty / Uniqueness	Adding a group expense feature, where a user can control other users ids along

		with the type of activity and the total group expense. App automatically evenly splits the money and records it in all mentioned users profile
4.	Social Impact / Customer Satisfaction	It will help the people to track their expenses and also alert when they exceed the limit of your budget. Group expenses are handled seemlessly
5.	Business Model (Revenue Model)	Rewards and expansion with maintenance fee can be viewed for getting profit after boarding sufficient customers. Making new Data analytics for premium users will also pay off in the long run.
6.	Scalability of the Solution	Since the tracking data is completely cloud supported, the solution is fully scalable and for doing so, the architecture needs to be scaled to preferred ones.

d. Problem Solution fit





4. REQUIREMENT ANALYSIS

a. Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Delete Account	Confirmation via Email Confirmation via Password
FR-4	Transaction summary	Weekly Transactions Monthly Transactions
FR-5	Budget Carryover	Option to move the leftover budget to next month.
FR-6	Summary/Report	Based on categories and priorities. Inputs/Feedback based on spends.
FR-7	Mitigate Manual Errors	Using API's make note of online transactions and classify them.
FR-8	Prevent Data Loss	Replication Sharding
FR-9	Visualisation of expenses	Using visualisation tools to display the expense split

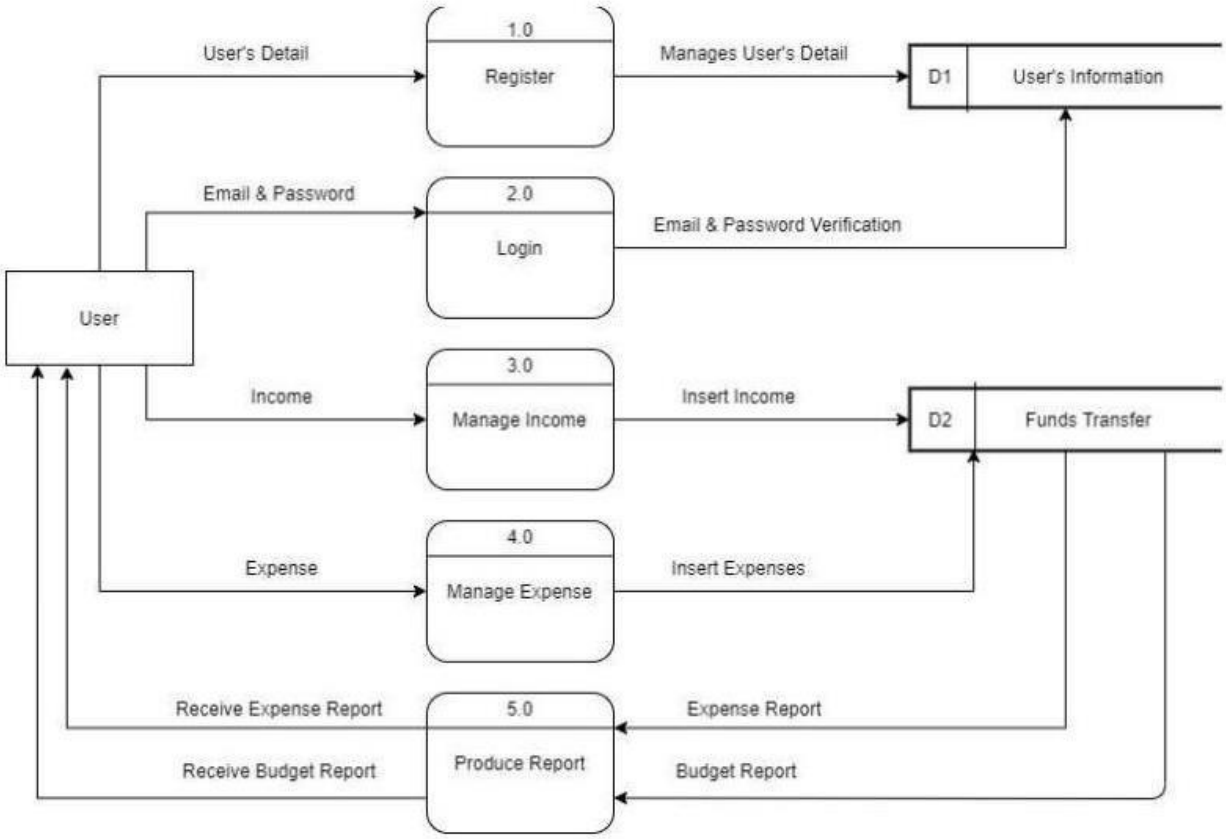
b. Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The system shall be user-friendly and can be used easily by the masses.
NFR-2	Security	The system shall only permit authorized users to access the system. The system shall prevent unauthorized users

		from entering the system.
NFR-3	Reliability	The system shall be in the operational mode for at least 320 days in a year. In case of failure, the system shall be able to recover in under 5 seconds.
NFR-4	Performance	The system shall be able to record a user's expense as input, process and display it in under 2 seconds.
NFR-5	Availability	The system shall be available for public use as long as it remains operational.
NFR-6	Scalability	The system shall be accessible to over 10,000 concurrent users without any loss of performance.

5. PROJECT DESIGN

a. Data Flow Diagrams



b. Solution & Technical Architecture

Solution Architecture:

- Software Requirements:

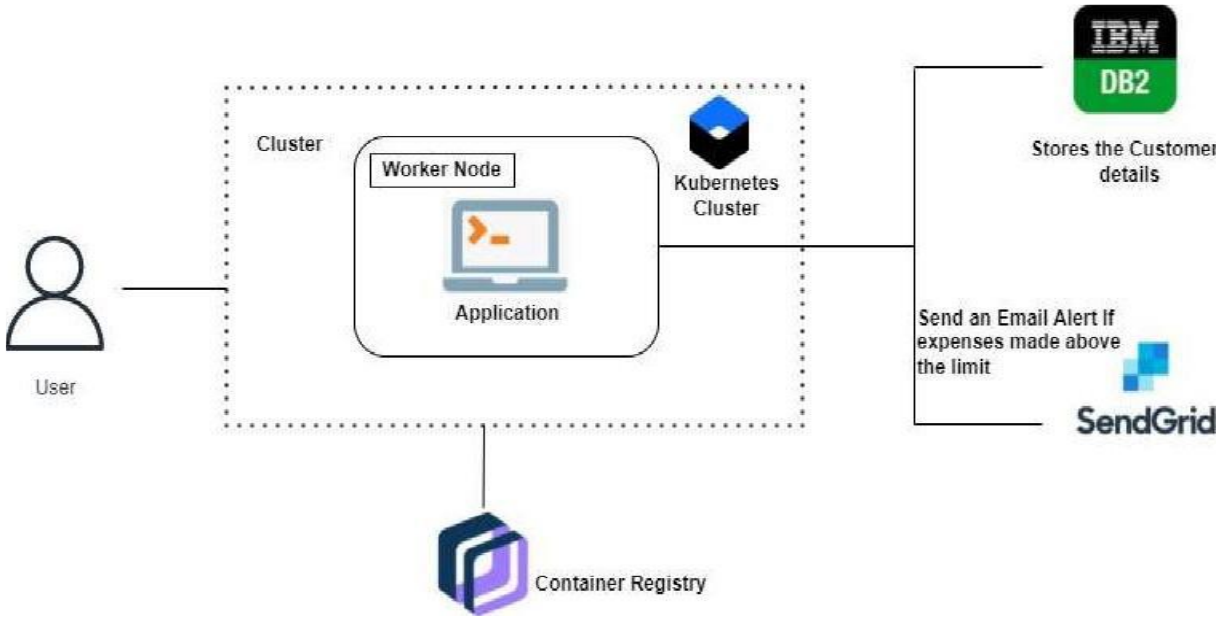
  Python, Flask , Docker, IBM Cloud, SendGrid

- Minimum System Requirements:

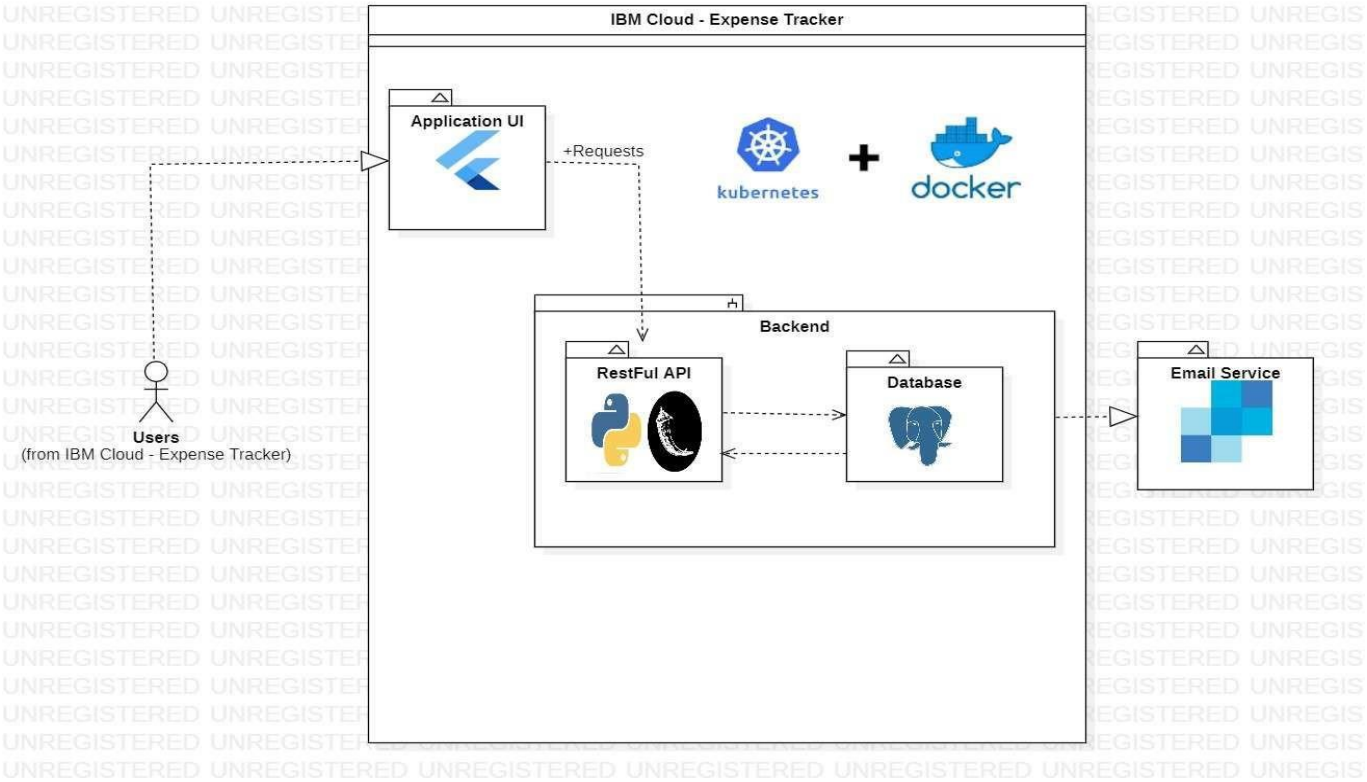
  8GB RAM,Intel Core i3,OS-Windows/Linux/MAC ,Laptop or Desktop

Product Requirements:

1. Initialize balance on signing up.
2. Update balance whenever necessary.
3. Add expenses along with their categories.
4. Update an expense.
5. Display remaining balance.
6. Visualize expenditure patterns with pictorialization tools.
7. Set a monthly limit on expenditure.
8. Notify users when they exceed their monthly limit



Technology Architecture



Component	Description	Technology
UI	User Interface for accessing features of the application	Flutter
Server Implementation	Provides RestFul Services for manipulating user data from the events of UI	Python:Flask
DB	Persistent Data storage	PostgresSQL
Mail Service	Sending mail to user in case of any important event	Sendgrid
Deployment	Deployment of application in the cloud	Containerization by Docker, Orchestration by Kubernetes

Application Characteristics: Personal Expense Tracker Application

Characteristics	Description	Technology
Open Source	Source Code of tools available to public	All tools used for development are open source by nature
Security	Maintaing Data Confidentiality and Authorization	Brcypt for hashing and AES for encryption, HTTPS for overall security during transmission
Scalability and Availability	Use of microservices ensures scalability in business logic, Cloud Application serves very well in Scability and Availability	Flask - microservices architecture, Kubernetes for maintaing scalibility in deployment

c. User Stories

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task
Sprint-1	Login Page	IM-1	As a user I should be able to register to the app
Sprint-1	Login Page	IM-2	As a user I should be able to login to the app
Sprint-2	Timeline Page	IM-4	As a user I should be able to access my Timelines tab
Sprint-2	Timeline Page	IM-5	As a user I should be able to filter according to date
Sprint-2	Timeline Page	IM-6	As a user I should be able to see my expenses graph
Sprint-2	Timeline Page	IM-7	As a user I should be able to see my daily expenditure
Sprint-2	Timeline Page	IM-8	As a user I should be able to fix the category of expense

Sprint-3	Profile Page	IM-16	As a user I should be able to access my profile page
Sprint-3	Profile Page	IM-17	As a user I should be able to edit my details
Sprint-3	Profile Page	IM-18	As a user I should be able to logout
Sprint-4	Budget Page + Deployment	IM-10	As a user, I can launch the application and add or manage the expenses and get notified for over spent.
Sprint-4	Budget Page + Deployment	IM-11	As a user I should be able to access the budgets page
Sprint-4	Budget Page + Deployment	IM-12	As a user I should be able to set my monthly budgets
Sprint-4	Budget Page + Deployment	IM-13	As a user I should be able to monitor different category of expenses
Sprint-4	Budget Page + Deployment	IM-14	As a user I should be able to see the graphical representation of my expenses
Sprint-4	Budget Page + Deployment	IM-19	As a user I should be able to use the app on the cloud platform

6. PROJECT PLANNING & SCHEDULING

a. Sprint Planning & Estimation

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

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Login Page	IM-1	As a user I should be able to register to the app	2	High	Kanyalakshmi G, Arun N R, Dinesh B

Sprint-1	Login Page	IM-2	As a user I should be able to login to the app	2	High	Dinesh B, Harsha TR
Sprint-2	Timeline Page	IM-4	As a user I should be able to access my Timelines tab	3	High	Harsha TR, Kanyalakshmi G
Sprint-2	Timeline Page	IM-5	As a user I should be able to filter according to date	2	High	Dinesh B, Arun N R
Sprint-2	Timeline Page	IM-6	As a user I should be able to see my expenses graph	2	Medium	Harsha TR, Kanyalakshmi G, Dinesh B
Sprint-2	Timeline Page	IM-7	As a user I should be able to see my daily expenditure	5	High	Harsha TR, Arun N R
Sprint-2	Timeline Page	IM-8	As a user I should be able to fix the category of expense	5	High	Dinesh B, Arun N R
Sprint-3	Profile Page	IM-16	As a user I should be able to access my profile page	3	High	Harsha TR, Kanyalakshmi G, Arun N R
Sprint-3	Profile Page	IM-17	As a user I should be able to edit my details	2	Medium	Kanyalakshmi G, Arun N R
Sprint-3	Profile Page	IM-18	As a user I should be able to logout	3	High	Dinesh B, Harsha TR
Sprint-4	Budget Page + Deployment	IM-10	As a user, I can launch the application and add or manage the expenses and get notified for over spent.	3	High	Harsha TR, Kanyalakshmi G, Arun N R, Dinesh B
Sprint-4	Budget Page + Deployment	IM-11	As a user I should be able to access the budgets page	3	High	Harsha TR, Arun N R
Sprint-4	Budget Page + Deployment	IM-12	As a user I should be able to set my monthly budgets	3	High	Dinesh B, Arun N R
Sprint-4	Budget Page + Deployment	IM-13	As a user I should be able to monitor different category of expenses	3	High	Harsha TR, Kanyalakshmi G, Arun N R

Sprint-4	Budget Page + Deployment	IM-14	As a user I should be able to see the graphical representation of my expenses	3	High	Kanyalakshmi G, Arun N R
Sprint-4	Budget Page + Deployment	IM-19	As a user I should be able to use the app on the cloud platform	4	High	Dinesh B, Harsha TR
						Harsha TR, Kanyalakshmi G, Arun N R, Dinesh B

Project Tracker, Velocity & Burndown Chart: (4 Marks)

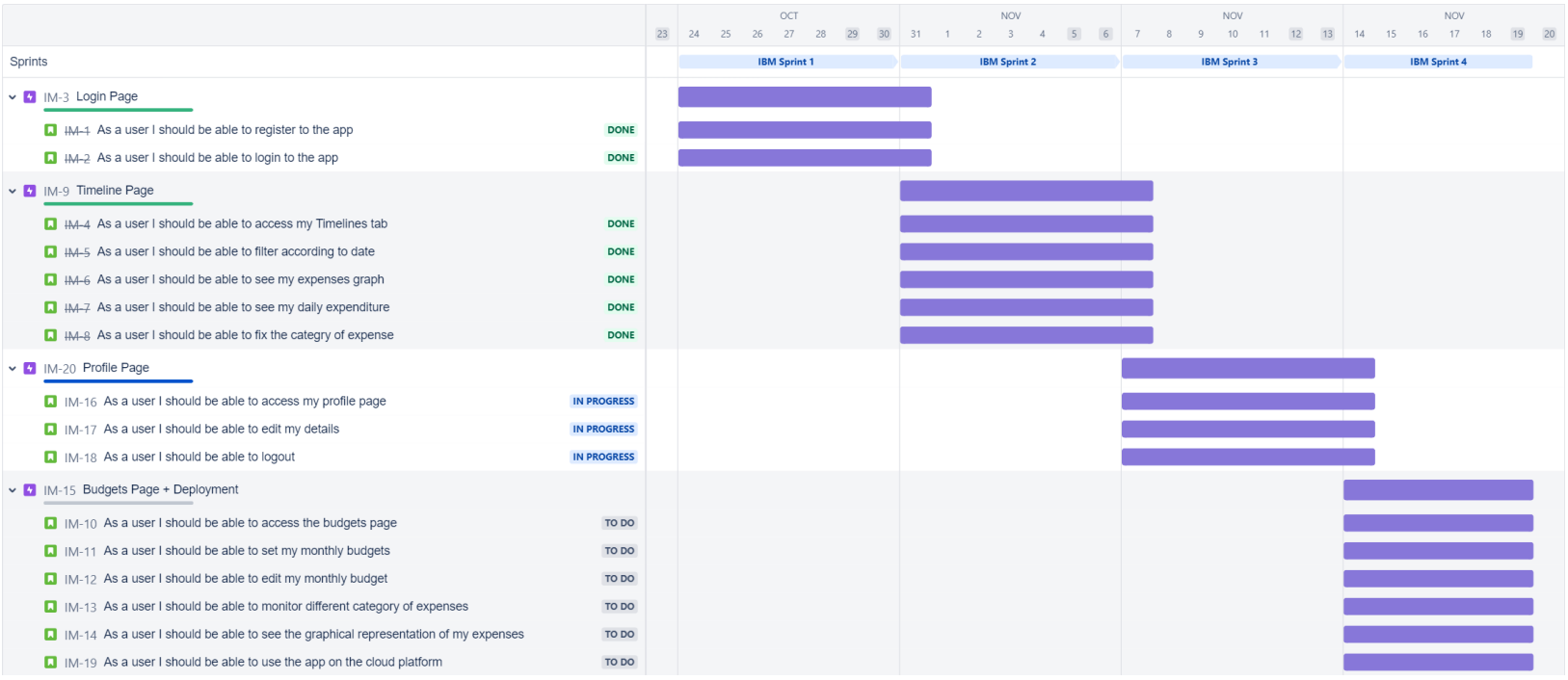
Sprint	**Total Story Points**	**Duration**	**Sprint Start Date**	**Sprint End Date (Planned)**	**Story Points Completed (as on Planned End Date)**	**Sprint Release Date (Actual)**
Sprint-1	7	6 Days	24 Oct 2022	29 Oct 2022	7	- (Meet Planned Date)
Sprint-2	7	6 Days	31 Oct 2022	05 Nov 2022	7	- (Meet Planned Date)
Sprint-3	13	6 Days	07 Nov 2022	12 Nov 2022	13	- (Meet Planned Date)
Sprint-4	8	6 Days	14 Nov 2022	19 Nov 2022	8	- (Meet Planned Date)

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

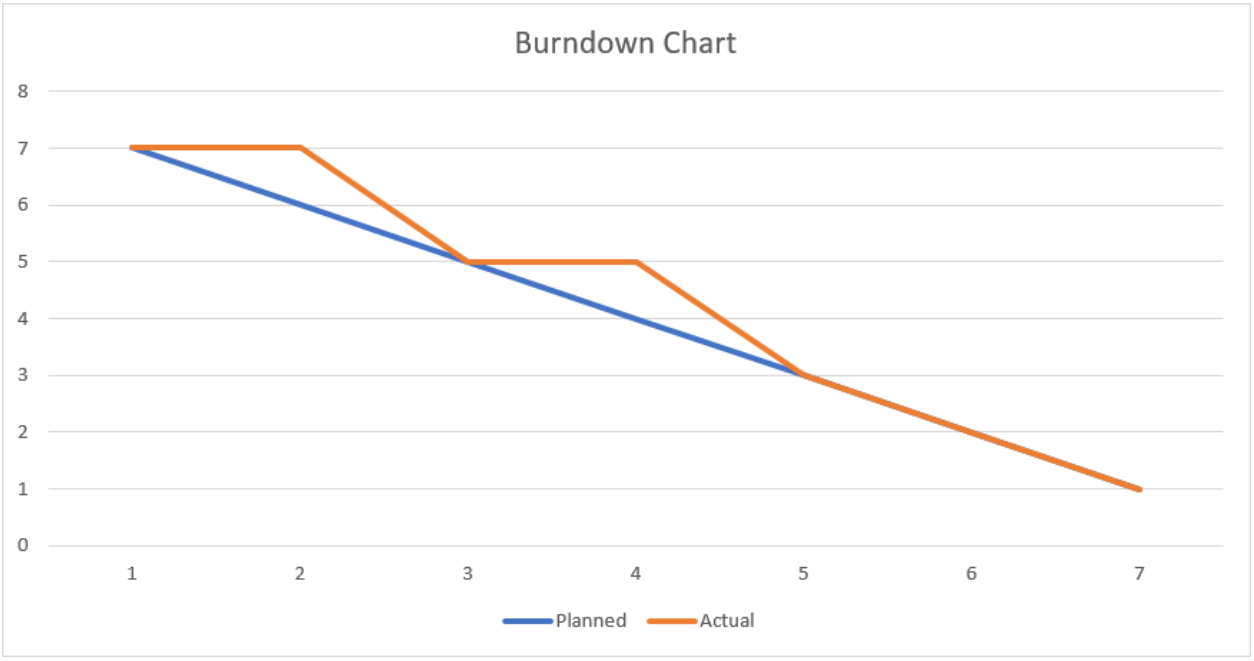
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

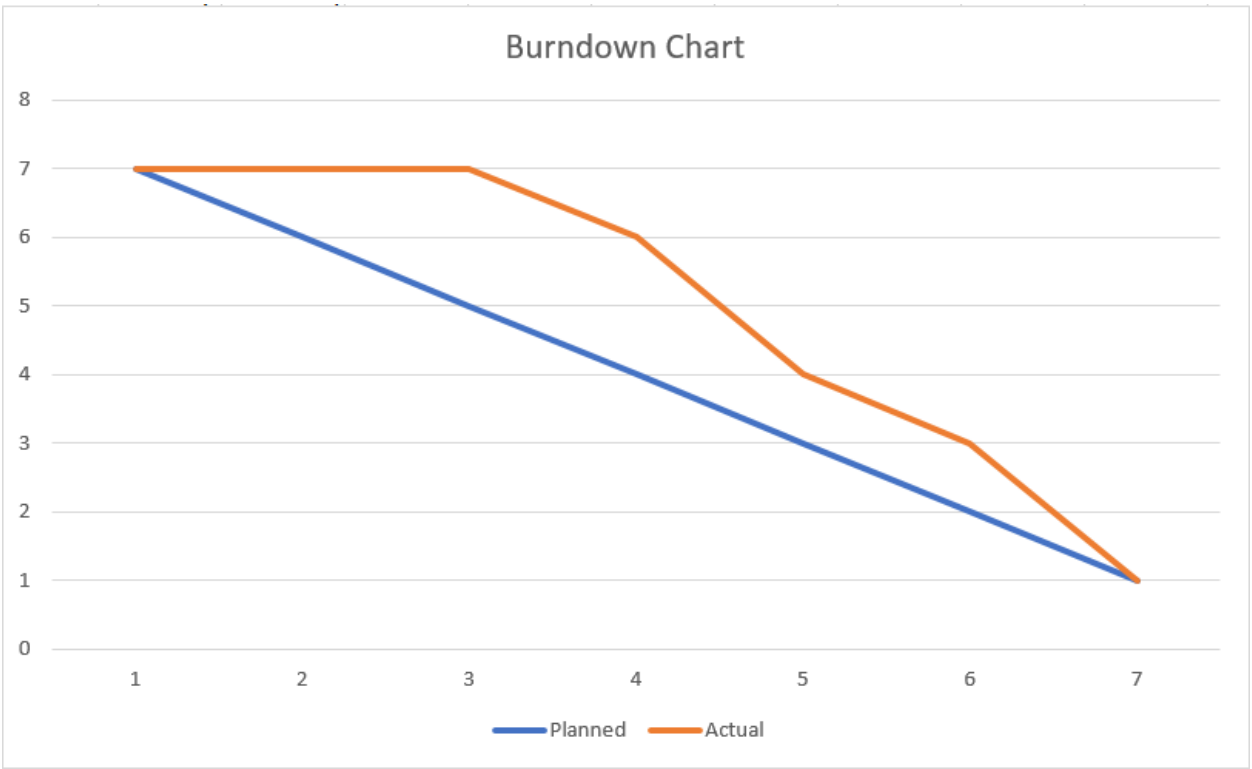
b. Sprint Delivery Schedule

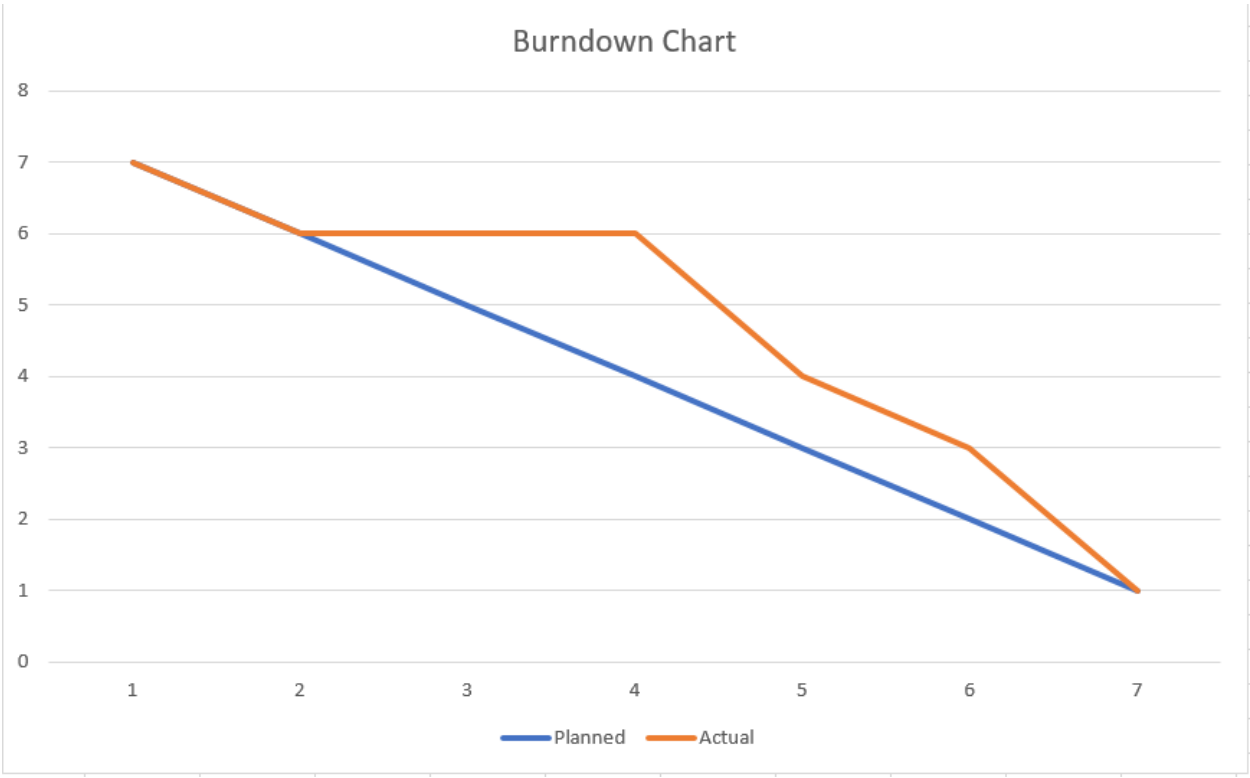


c. Reports from JIRA

Burndown Chart:






Burndown Chart
8
7
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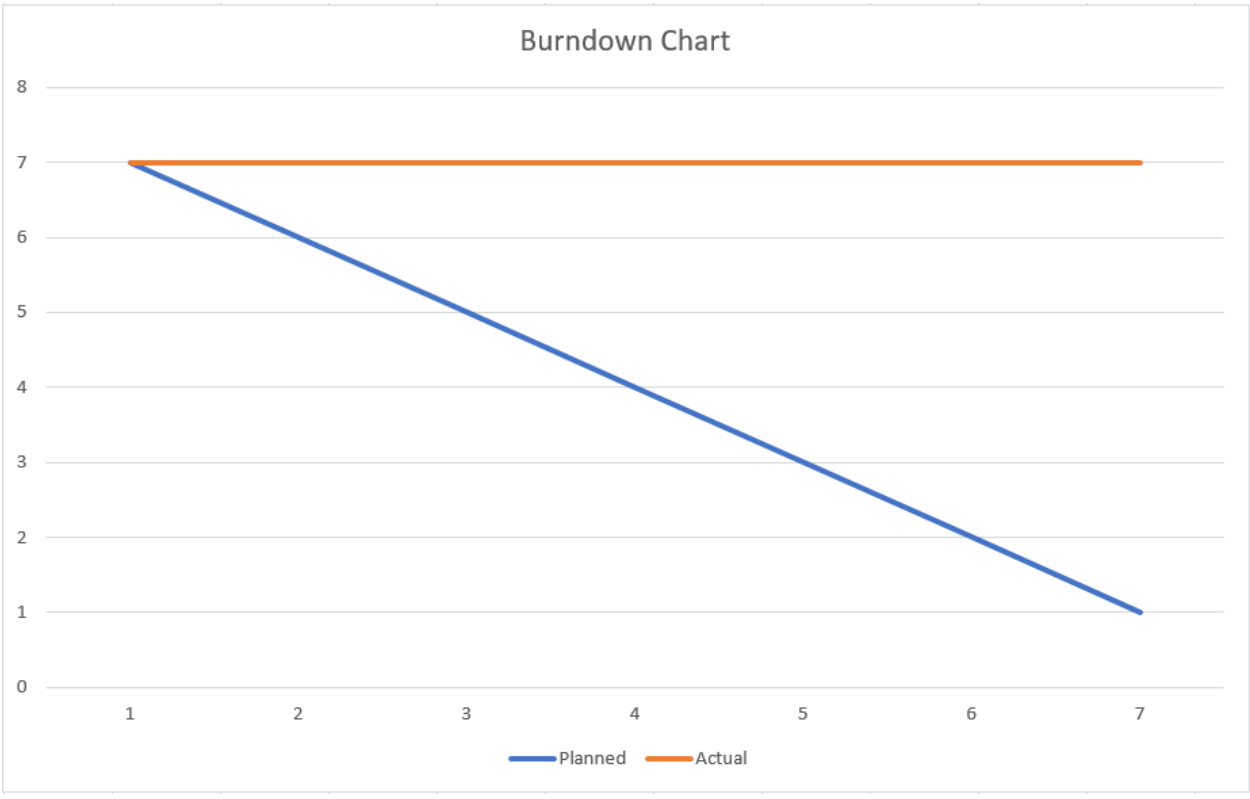
Planned
Actual


Burndown Chart
8
7
6
5
4
3
2
1
0
1
2
3
4
5
6
7
Planned
Actual

7. **CODING & SOLUTIONING (Explain the features added in the project along with code)**

   a. **Feature 1**

   Login Page:

   Aim: to create a login page and test it

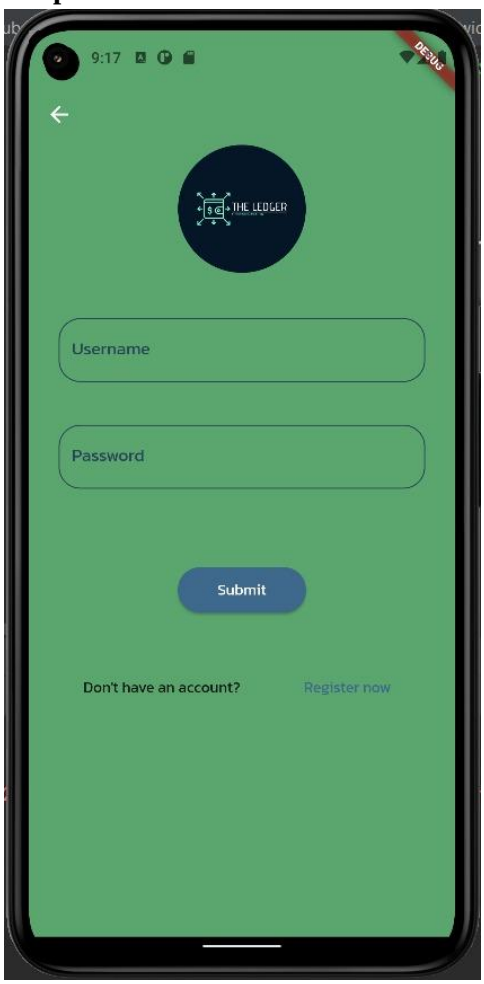
   Purpose: the purpose of the login page is to give a way for the user to login into the application and also to enable him/her to register to the app

   Code:

```
import 'package:flutter/material.dart';
import 'package:flutter/services.dart';
import 'package:google_fonts/google_fonts.dart';
import 'package:ledgerfe/login/utilities/logo.dart';
import 'package:ledgerfe/login/utilities/submit_button.dart';
import 'package:ledgerfe/login/utilities/username_field.dart';

class MobileView extends StatelessWidget {
 const MobileView({Key? key}) : super(key: key);

 @override
 Widget build(BuildContext context) {
  return Scaffold(
   backgroundColor: const Color(0xFF5BA66E),
   appBar: AppBar(
    systemOverlayStyle: SystemUiOverlayStyle(statusBarColor: Colors.white.withOpacity(0)),
    backgroundColor: const Color(0xFF5BA66E),
    elevation: 0,
   ),
   body: SingleChildScrollView(
    child: Column(
     children: <Widget>[
      Logo(),
      SizedBox(
       height: MediaQuery.of(context).size.height*0.05,
      ),
      UsernameField(),
      Padding(
       padding: EdgeInsets.fromLTRB(MediaQuery.of(context).size.width*0.07, 0, MediaQuery.of(context).size.width*0.07, MediaQuery.of(context).size.width*0.07),
       child: TextField(
        obscureText: true,
        enableSuggestions: false,
        autocorrect: false,
        decoration: InputDecoration(
```

```
                labelText: 'Password',
                border: OutlineInputBorder(),
              ),
            ),
          ),
          SizedBox(
            height: MediaQuery.of(context).size.height*0.05 ,
          ),
          const SubmitButton(),
          SizedBox(
            height: MediaQuery.of(context).size.height*0.05 ,
          ),
          Row(
            mainAxisAlignment: MainAxisAlignment.spaceEvenly,
            children: <Widget>[
              Text(
                "Don't have an account?",
                style: GoogleFonts.kanit()
              ),
              TextButton(
                onPressed: () {},
                child: Text(
                  "Register now",
                  style: GoogleFonts.kanit()
                ),
              )
            ],
          )
        ],
      ),
    ),
  );
 }
}
```

Output:



b. Feature 2

Timeline page:

Aim: to create a dashboard page for the app for the user to travel to other associated pages and also to show vital information in the template page and also allow the user to add and monitor daily expenses

Purpose: the purpose of this age is to integrate the functionality of the app using this as the dashboard where the daily expenses and related category of expenses are added and also monitor the expenses by displaying the infographic on a graph structure.

Code:

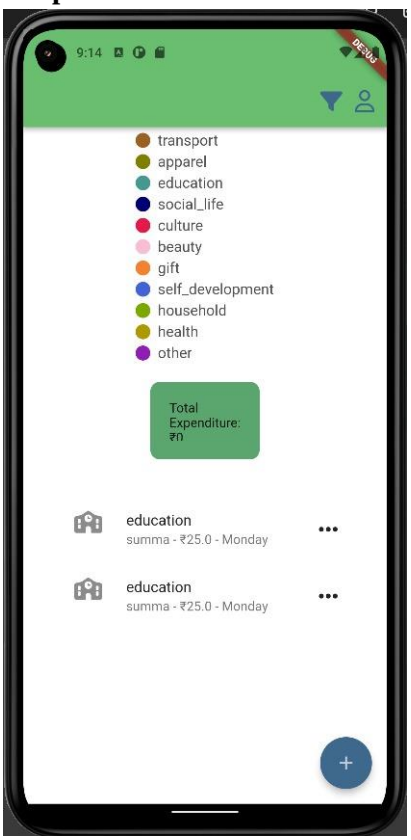
```
import 'package:flutter/material.dart';
import 'package:font_awesome_flutter/font_awesome_flutter.dart';
import 'package:ledgerfe/timeline/services/expense_data.dart';
import 'package:ledgerfe/timeline/utilities/expense_cards.dart';
import 'package:ledgerfe/timeline/utilities/representation.dart';
import 'package:flutter_datetime_picker/flutter_datetime_picker.dart';
```

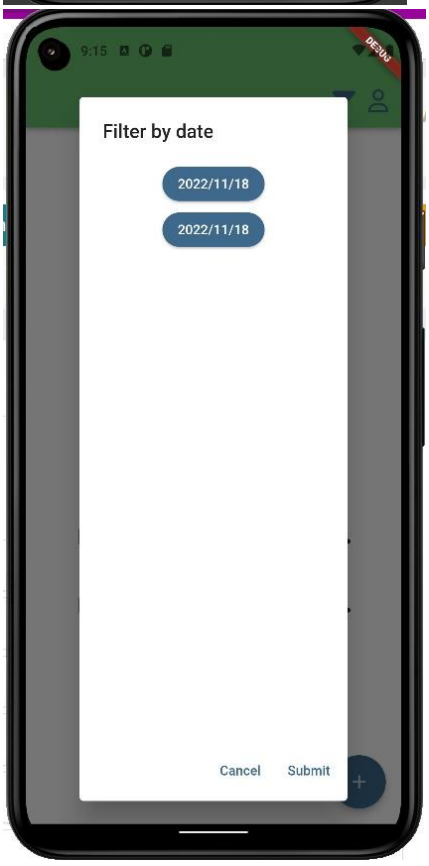
```
class MobileView extends StatefulWidget {
  const MobileView({Key? key}) : super(key: key);

  @override
  State<MobileView> createState() => _MobileViewState();
}

class _MobileViewState extends State<MobileView> {
  PageController controller = PageController(viewportFraction: 1.0);
  List<ExpenseData>          val=<ExpenseData>[ExpenseData(tag:          "education",time:
"Monday",remarks:      "summa",amount:      25.0),ExpenseData(tag:      "education",time:
"Monday",remarks: "summa",amount: 25.0)];
  DateTime from = DateTime.now();
  DateTime to = DateTime.now();
  StatefulBuilder filter(){
    return StatefulBuilder(
      builder: (context,setState){return AlertDialog(
        title: const Text("Filter by date"),
          content: Column(
            children: <Widget>[
              ElevatedButton(
                  onPressed: (){
                    DatePicker.showDateTimePicker(
                      context,
                      showTitleActions: true,
                      minTime: DateTime(1970,1,1),
                      maxTime: DateTime(2080,1,1),
                      onConfirm: (date){
                        setState(() {
                          from = date;
                        });
                      }, currentTime: DateTime.now(), locale: LocaleType.en);
                  },
                  child: Text(
                    "${from.year}/${from.month}/${from.day}"
                  ),
              ),
              ElevatedButton(
                  onPressed: (){
                    DatePicker.showDateTimePicker(
                        context,
                        showTitleActions: true,
```

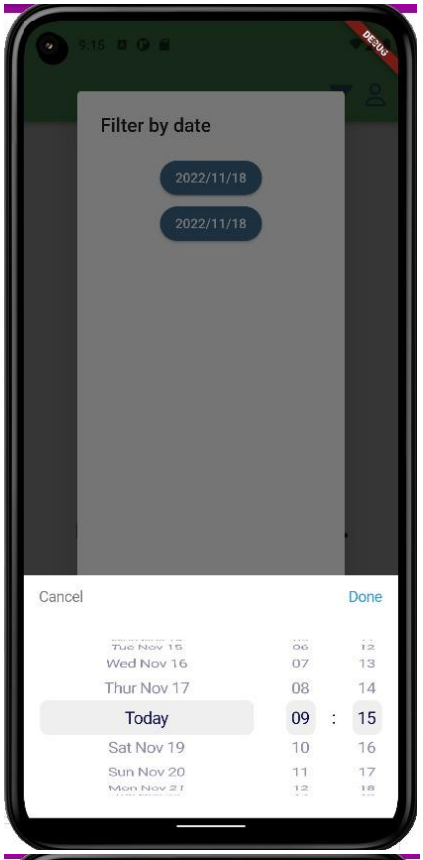
```
                    minTime: DateTime(1970,1,1),
                    maxTime: DateTime(2080,1,1),
                    onConfirm: (date){
                      setState(() {
                        to = date;
                      });
                    }, currentTime: DateTime.now(), locale: LocaleType.en);
                },
                child: Text(
                  "${to.year}/${to.month}/${to.day}"
                ),
              )
            ],
          ),
          actions: <Widget>[
            TextButton(
              onPressed: () => Navigator.pop(context, 'Cancel'),
              child: const Text('Cancel'),
            ),
            TextButton(
              onPressed: () {
               Navigator.pop(context, 'OK');
              },
              child: const Text('Submit'),
            ),
          ],
       );}
      );
    }
    @override
    Widget build(BuildContext context) {
      return Scaffold(
        appBar: AppBar(
          actions: [
            IconButton(
                onPressed: () => showDialog(
                    context: context,
                    builder: (BuildContext context) => filter()
                ),
                icon: const Icon(
                  FontAwesomeIcons.filter,
                  color: Color(0xFF3e688c),
                )
            ),
```

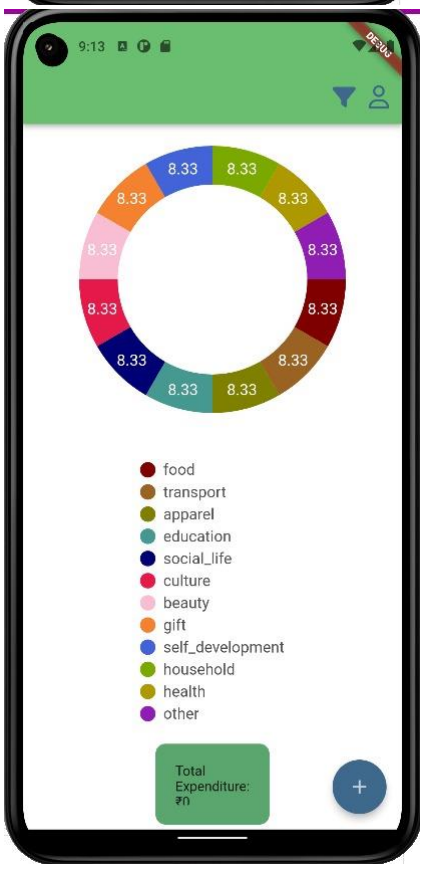
```
          InkWell(
            onTap: () {},
            child: const Padding(
              padding: EdgeInsets.fromLTRB(0, 0, 12, 0),
              child: Icon(
                FontAwesomeIcons.user,
                color: Color(0xFF3e688c),
              ),
            ),
          ),
        ],
      ),
      body: RawScrollbar(
        thickness: 10,
        radius: const Radius.circular(12),
        timeToFade: const Duration(seconds: 1),
        controller: controller,
        child: PageView(
          pageSnapping: false,
          scrollDirection: Axis.vertical,
          controller: controller,
          children: [
            const Representation(),
            ExpenseCards(expenses: val),
          ],
        ),
      ),
      floatingActionButton: FloatingActionButton(
        child: const Icon(Icons.add),
        onPressed: () {},
      ),
    );
  }
}
```

Output:


9:14
DEBUG
transport
apparel
education
social_life
culture
beauty
gift
self_development
household
health
other
Total Expenditure: ₹0
education
summa - ₹25.0 - Monday
education
summa - ₹25.0 - Monday


9:15
DEBUG
Filter by date
2022/11/18
2022/11/18
Cancel
Submit


9:15
DEBUG
Filter by date
2022/11/18
2022/11/18
Cancel
Done
Wed Nov 16
Thur Nov 17
Today
Sat Nov 19
Sun Nov 20
07
08
09
10
11
13
14
15
16
17


9:13
DEBUG
8.33
food
transport
apparel
education
social_life
culture
beauty
gift
self_development
household
health
other
Total Expenditure: ₹0

c. Database Schema

```
olamohno=> \d apparel
                    Table "public.apparel"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
Foreign-key constraints:
    "apparel_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)


olamohno=> \d auth
                         Table "public.auth"
  Column  |       Type        | Collation | Nullable |      Default
----------+-------------------+-----------+----------+-------------------
 uid      | uuid              |           | not null | uuid_generate_v4()
 email    | character varying |           | not null |
 password | character varying |           | not null |
Indexes:
    "auth_pkey" PRIMARY KEY, btree (uid)
Referenced by:
    TABLE "apparel" CONSTRAINT "apparel_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "beauty" CONSTRAINT "beauty_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "culture" CONSTRAINT "culture_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "education" CONSTRAINT "education_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "food" CONSTRAINT "food_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "gift" CONSTRAINT "gift_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "health" CONSTRAINT "health_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "history" CONSTRAINT "history_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "household" CONSTRAINT "household_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "jwt" CONSTRAINT "jwt_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "other" CONSTRAINT "other_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "self_development" CONSTRAINT "self_development_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "social_life" CONSTRAINT "social_life_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
    TABLE "transport" CONSTRAINT "transport_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
```

```
olamohno=> \d jwt
                                  Table "public.jwt"
     Column      |            Type             | Collation | Nullable |      Default
-----------------+-----------------------------+-----------+----------+--------------------
 jti             | uuid                        |           | not null | uuid_generate_v4()
 uid             | uuid                        |           |          |
 expiration_date | timestamp without time zone |           | not null |
Indexes:
    "jwt_pkey" PRIMARY KEY, btree (jti)
Foreign-key constraints:
    "jwt_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)


olamohno=> \d beauty
                    Table "public.beauty"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
Foreign-key constraints:
    "beauty_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)


olamohno=> \d culture
                    Table "public.culture"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
Foreign-key constraints:
    "culture_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
```

```
olamohno=> \d education
                  Table "public.education"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
Foreign-key constraints:
    "education_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)


olamohno=> \d food
                    Table "public.food"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
Foreign-key constraints:
    "food_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)


olamohno=> \d gift
                    Table "public.gift"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
Foreign-key constraints:
    "gift_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)


olamohno=> \d health
                   Table "public.health"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
```

```
olamohno=> \d health
                    Table "public.health"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
Foreign-key constraints:
    "health_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)


olamohno=> \d history
                          Table "public.history"
    Column     |            Type             | Collation | Nullable | Default
---------------+-----------------------------+-----------+----------+---------
 uid           | uuid                        |           |          |
 tag           | character varying           |           | not null |
 amount        | real                        |           | not null |
 remarks       | character varying           |           |          |
 time          | timestamp without time zone |           | not null |
 group_details | json                        |           |          |
Foreign-key constraints:
    "history_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)


olamohno=> \d household
                   Table "public.household"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
Foreign-key constraints:
    "household_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
```

```
olamohno=> \d other
                    Table "public.other"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
Foreign-key constraints:
    "other_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)


olamohno=> \d self_development
                Table "public.self_development"
   Column    |       Type       | Collation | Nullable | Default
-------------+------------------+-----------+----------+---------
 budget      | double precision |           |          |
 expenditure | double precision |           |          |
 uid         | uuid             |           |          |
Foreign-key constraints:
    "self_development_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)


olamohno=> \d transport
              Table "public.transport"
   Column    | Type | Collation | Nullable | Default
-------------+------+-----------+----------+---------
 uid         | uuid |           |          |
 budget      | real |           | not null |
 expenditure | real |           | not null |
Foreign-key constraints:
    "transport_uid_fkey" FOREIGN KEY (uid) REFERENCES auth(uid)
```

8. TESTING

a. Test Cases

S.no	Test Scenarios
	Authentication
1	Verify user is able to see login page
2	Verify user is able to loginto application or not?
3	Verify user is able to navigate to create your account page?
4	Veriify login page elements
	Expense
1	User after successful authentication can view the the time line?
2	Can user view the consolidated expenses in the form of pie chart?
3	Can user filter by date and view that specific expense by date?

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y/N)	BUG ID
LoginPage_TC_OO1	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on My account button		1.Open the app 2.Incase of registered users,enter username and password. 3.If the user doesnt have an account, go over to register now	https://shopenzer.com/	1.Newly registed users are redirected to login page. 2.Exisiting users when entered the correct creditionals get redirected to go timeline	Working as expected	Pass			
LoginPage_TC_OO2	UI	Home Page	Verify the UI elements in Login/Signup.		1.Open the application 2.Verify login/Singup with below UI elements: a.email text box b.password text box c.Dont have an account? register now	https://shopenzer.com/	Application should show below UI elements: a.email text box b.password text box c.Submit button with blue button d.Dont have an account? Register now	Working as expected	Fail	Steps are not clear to follow		BUG-1234

					d.New customer? Create account link							
LoginPage_TC_OO3	Functional	Home page	Verify user is able to log into application with Valid credentials		1.Open the application 2.Enter Valid email in Email text box 4.Enter valid password in password text box 5.Click on submit button	email:test@test.com password: abc	User should be navigated to the timeline	Works as expected	Pass			
LoginPage_TC_OO4	Functional	Login page	Verify user is able to log into application with InValid credentials		1.Open the application 2.Enter IValid username/email in Email text box 4.Enter Invalid password in password text box 5.Click on submit button	email: chalam@gmail.com password:xyz	Application should show 'Invalid Credentials ' validation message.	Worked as expected				

TimeLine_TL_OO1	Functional	TimeLine Page	Verify if the user is automatically redirected to timeline once the user completes authentication successfully		1.Open the application 2.Enter the valid creditionals. 3.Wait	email:test@test.com password: abc	The user is redirected to the timeline page	Worked as expected	pass			

b. User Acceptance Testing

1. **Purpose of Document**

The purpose of this document is to briefly explain the test coverage and open issues of the Personal expense tracker project at the time of the release to User Acceptance Testing (UAT).

2. **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	2	0	0	0	2
External	0	2	0	1	3
Fixed	2	1	0	0	3
Skipped	0	1	0	0	1
Won't Fix	0	0	0	1	1
Totals	4	4	0	2	10

3. **Test Case Analysis**

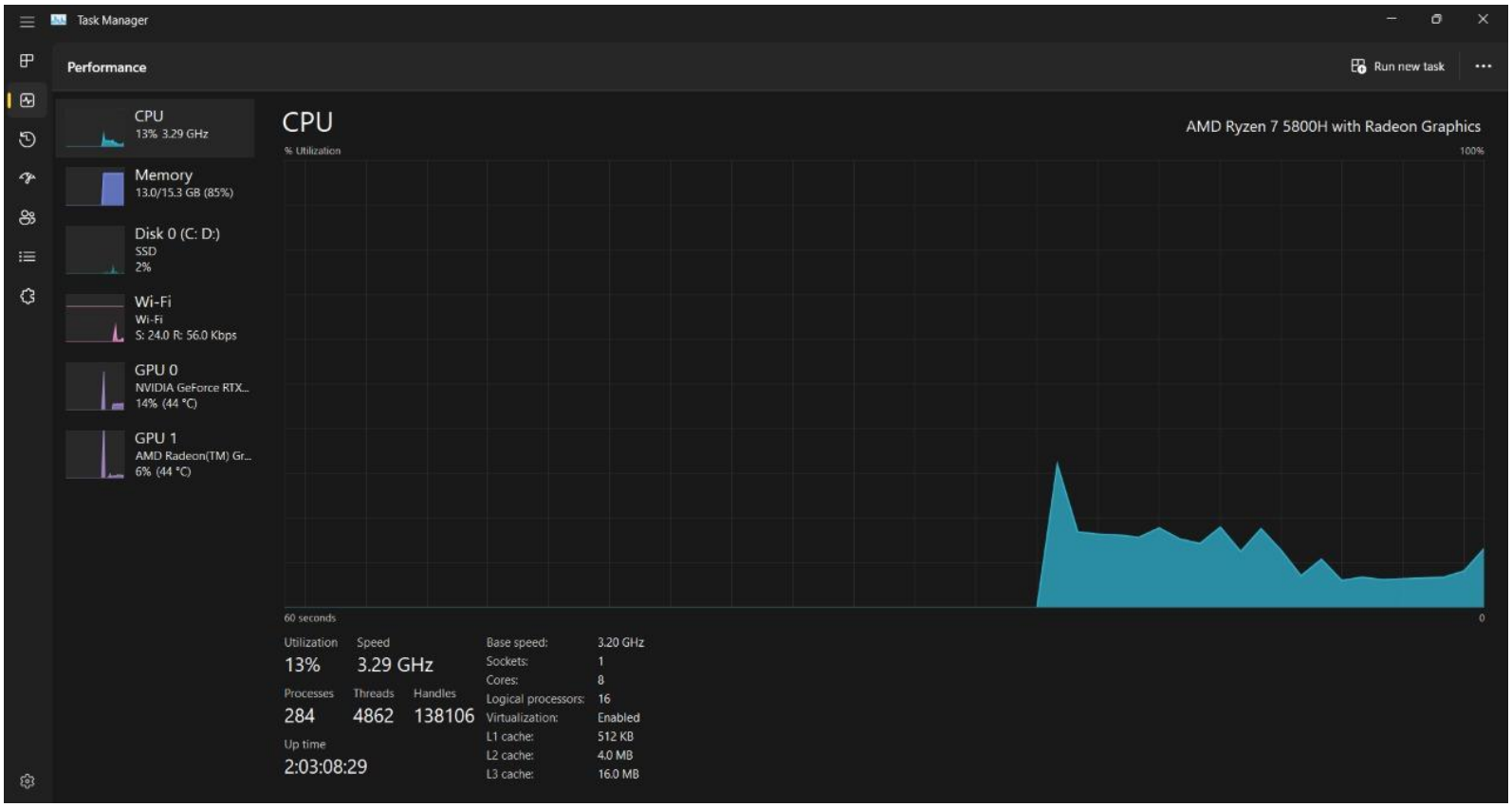
This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
UI	3	0	0	3
Database	2	0	0	2
Design	4	0	0	4
Deployment	1	0	1	0

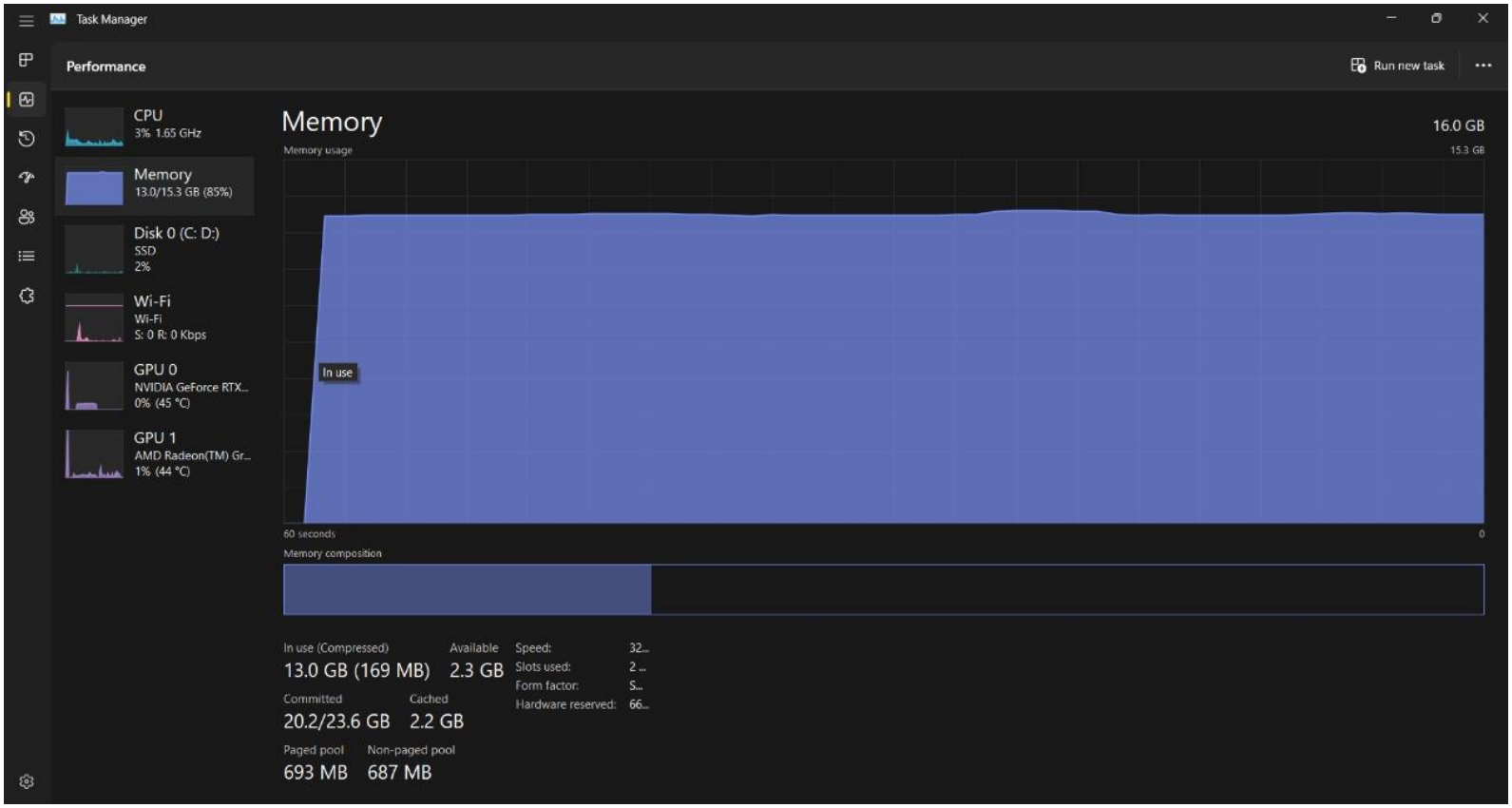
9. RESULTS

a. Performance Metrics

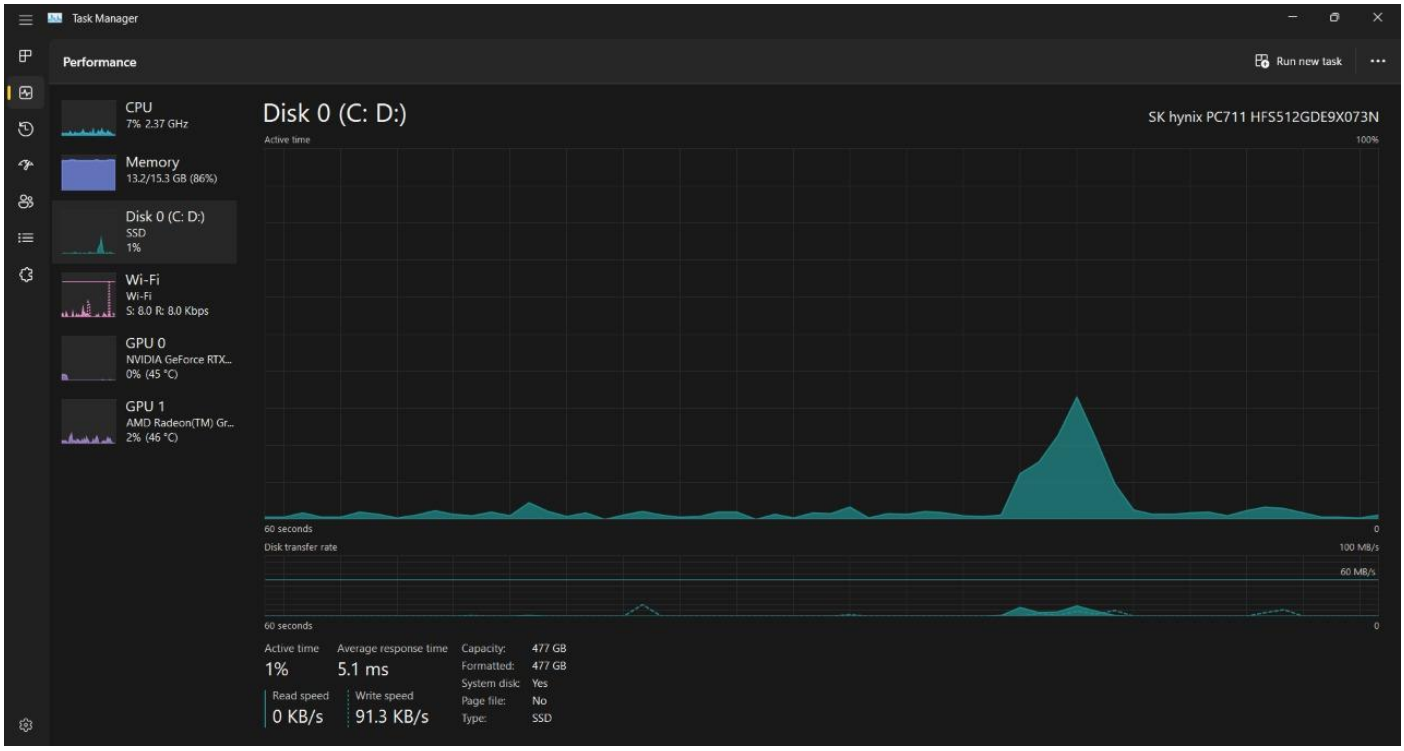
CPU Utilization:



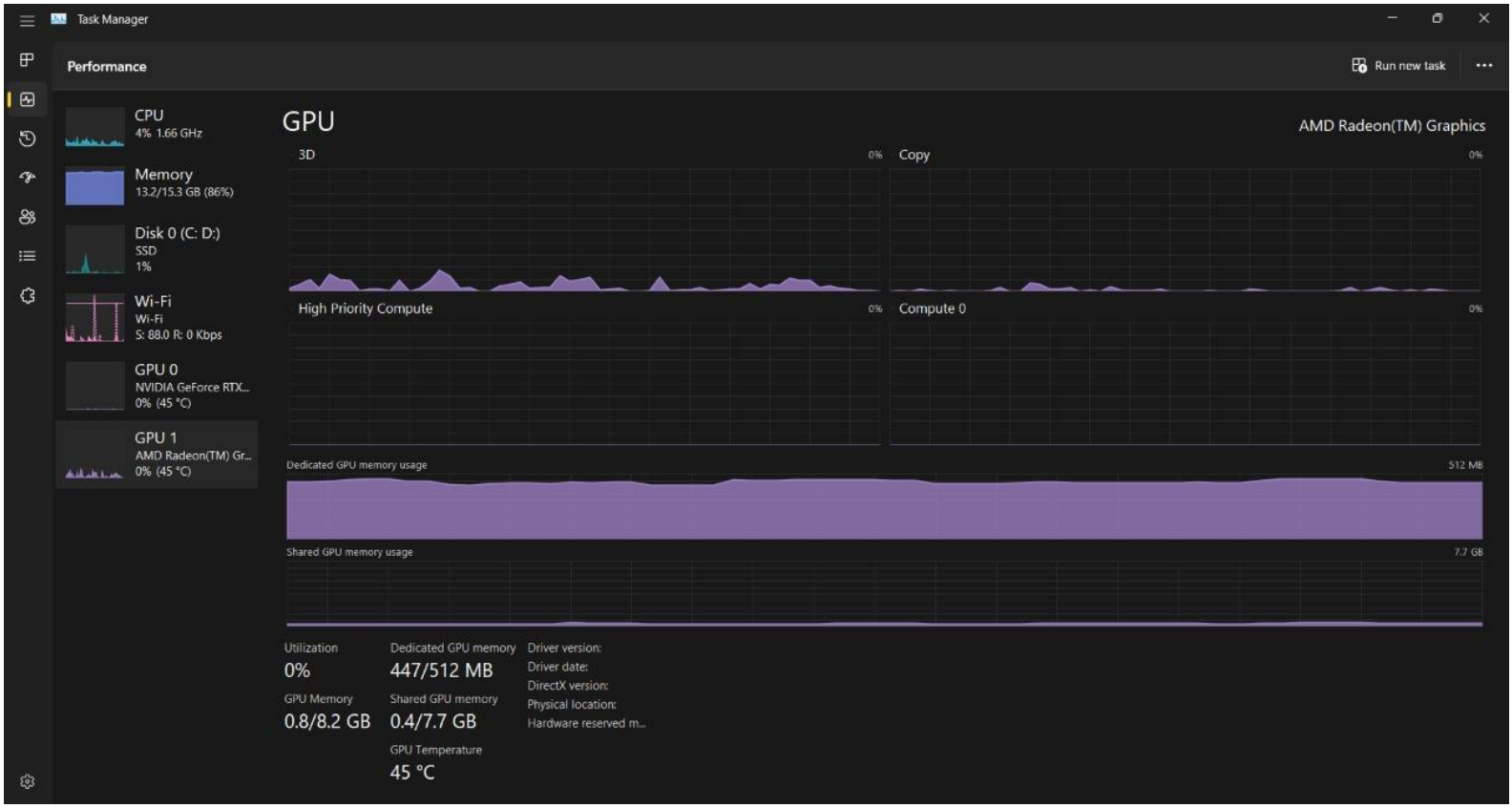
Memory Utilization:



Disc Utilization:



GPU Utilization:



Application Performance Metrics

Error rates :

This is the term that describes the degree of errors encountered during data transmission over a communication or network connection. The higher the error rate, the lower the reliability of the connection or data transfer.A 3rd party tool called new relic was used for this.

The error rate for the application Ledger is as mentioned below:

Call to obtain error

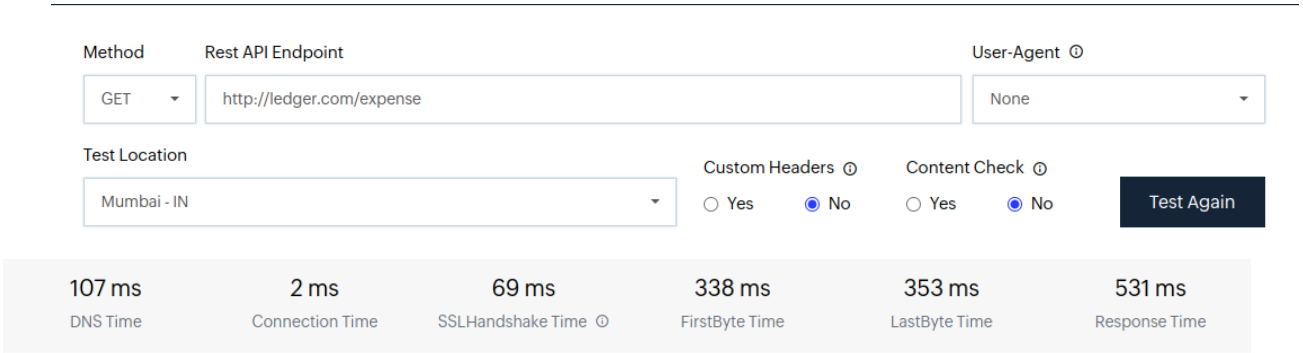
```
curl -X GET "https://api.newrelic.com/v2/applications/$APP_ID/metrics/data.xml" \
    -H "Api-Key:$API_KEY" -i \
   -d 'names[]=Errors/-
all&values[]=error_count&from=2022-11-17T00:00:00+00:00&to=2022-11-18T23:35:00+00:00&summarize=true'
```

Output from error count call

```
{
 "metric_data": {
     "from": "2022-11-17T00:00:00+00:00",
     "metrics": [
         {
             "name": "Errors/all",
             "timeslices": [
                 {
                     "from": "2022-11-17T00:35:00+00:00",
                     "to": "2022-11-18T23:35:00+00:00",
                     "values": {
                         "error_count": 5
                     }
                 }
             ]
         }
     ],
     "metrics_found": [
         "Errors/all"
     ],
     "metrics_not_found": [],
     "to": "2022-11-18T23:35:00+00:00"
 }
}
```


Response times:

Response time is the total amount of time it takes to respond to a request for service.An online too named Site24*7 was used to test the response time of the API endpoints.



Request Rates:

A rate is the number of API calls an app or user can make within a given time period.We can approximately calculate the request rates by identifying the number of times the database has been accessed.

The request rate for the application “Ledger” is:

TPS	0.0011
Index hit rate	92.2%
Cache hit rate	96.9%

Customer experience :

The application starts with collecting registration details and then takes into the login page. Once, after logging in with username and password, I can set the monthly budget limit in the budgets tab's page. Following that I am able to add my daily expenditure report in the form of the amount of money used, reason/purpose of use and also the category of expenditure that it falls under. There are nine exhaustive categories to choose from. The expenditure reports are skillfully displayed with a line graph and bar graph and hence are very easy to understand and refer to. The application is also customisable with different themes and also permits changing passwords. One area to improve is the number of themes available for customisation and other add on features to make it more attractive to the user. Another major drawback is that, though the application takes in the monthly budget, it doesn't indicate when the expenses outrun the budget. If there was an alert system in place for this it will be more helpful. Besides this there are no provisions for group money management to highlight about the expenditure to be shared among the members of this group. If these issues are addressed it will make this wonderful application even better.

10. ADVANTAGES & DISADVANTAGES

Advantages:

1) You will spend mindfully

When you write down every expense it helps you spend more mindfully and prevents you from splurging. It makes you responsible with your spending.

2) Making financial control

When you track your expenses, you take complete control over your finances. At any one time, you will know exactly how much money is sitting in your bank account, and how much you can spend.

3) Identify problem areas

As you track your spending over time, you'll get a better idea of what's happening with your cash. Many of your daily expenses may seem really, but once you add up everything you spend on dining out, coffee, lottery tickets, or whatever your indulgence is, you may be shocked to find out how much your habits actually cost.

4) Make a better budget

By tracking your expenses it will help you make clear budgets for your monthly spends. After you set up a budget, which is a monthly plan for spending that takes into account your income and expenses, tracking expenses daily is essential to keeping you on that budget

5) Tracking your financial progress

Tracking your expenses on a day-to-day basis helps you to see your progress on the road to your financial goals.

Tracking your expenses on a day-to-day basis helps you to see your progress on the road to your financial goals.

6) Keeping finances organized

Disorganized finances lead to financial problems. It is easier to stay organized than it is to organize a messy financial situation.

7) Improving financial security

It helps you track your bank accounts. What if somebody steals your debit card information and starts spending your money? If you have a track on your spends you avoid these risks.

8) Encourages and increases savings

When you track your expenses you are likely to find wasteful expenses you can eliminate. This will help you encourage and increase your savings. By eliminating wasteful expenses it opens up the opportunity to redirect that money into savings.

9) Avoids debt

Tracking your expenses can be a powerful motivator to steer clear of debt. When you are in debt, and not tracking your day-to-day expenses, it's easy to let the amount of debt you are paying each month slip through the cracks, unnoticed. But, once you start tracking every dollar that leaves your bank account, you will start to add up the debt payments, and it can be eye-opening.

Disadvantages:

- Negligence during approval
- Due to the ease of being able to approve expense reports instantly at the click of a button, managers and approvers may sometimes be negligent. Although the software checks the reports for policy violations automatically, any violation that the software misses could be ignored by the approvers. Thus, some expense management software like Fyle offers multi-level approval workflow options.

- Negligence during auditing
- Although software simplifies the work of auditors, there is less scope for auditors to investigate suspicious activities. External verification can become minimal or redundant since all expense reports are already internally verified by the software. Due to this, auditors may choose to trust the software's discretion and neglect uncertainties. For avoiding such a situation, audit trails come in very handy. It helps keep every report audit-ready and traceable.

- Poor customer support
- Poor customer support can be a blocker for your operations when you experience glitches, need to set something up, or even if you just need to ask for information. It is, therefore, crucial to consider a software's customer service reputation while choosing it. Fyle, therefore, provides a detailed implementation plan during onboarding so you know exactly what is happening and when.

- Another important factor to consider while choosing an expense management software is to check customer reviews. After all, both your employees and finance teams have to be happy about the software.

11. CONCLUSION

Tracking your expenses daily can not only save your amount, but it can also assist you set financial goals for the longer term. If you know exactly where your amount goes every month, you will easily see where some cutbacks and compromises can be made. The project that we have developed is more efficient than the other income and expense trackers. The project successfully avoids the manual calculation which is performed usually in the absence of an expense tracker. The modules are developed efficiently and also in an attractive manner. The application will eliminate sticky notes, spreadsheets, and ledgers that cause confusion, data inconsistency problems while recording and splitting expenses. With our application users can manage their expenses more effectively and they will be better at managing the expenses. Tracking the daily expenses can not only help in saving money but also help in setting financial goals for the future. If we know where our money is being spent every day, it is easy to set some cutbacks and such to help reduce expenditure. This project is developed to work more efficiently in comparison to other trackers and avoid manual calculation. It is developed to be efficient and look attractive at the same time.

12. FUTURE SCOPE

1) It will have various options to keep record (for example Food, Travelling Fuel, Salary etc.).

2) Automatically it will keep on sending notifications for our daily expenditure.

3) In today's busy and expensive life, we are in a great rush to make moneys, but at the end of the month we broke off. As we are unknowingly spending money on title and unwanted things. So, we have come over with the plan to follow our profit.

4) 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 spend and likewise can add some data in extra data to indicate the expense.

13. APPENDIX

a. GitHub & Project Demo Link:
   https://github.com/IBM-EPBL/IBM-Project-16952-1659625756