

PERSONAL EXPENSE TRACKER APPLICATION

NALAIYA THIRAN PROJECT BASED LEARNING ON PROFESSIONAL READLINESS FOR INNOVATION, EMPLOYNMENT AND ENTERPRENEURSHIP

A PROJECT REPORT

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1. INTRODUCTION

1.1 Project Overview

Category : Cloud Application

Team Id : PNT2022TMID24893

Skills Required:

IBM Cloud, HTML, Java script , IBM Cloud Object Storage, Python-Flask, Kubernetes, Docker, IBM DB2, IBM Container Registry

Project Description:

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

Personal finance management is an important part of people's lives. However, everyone does not have the knowledge or time to manage their finances in a proper manner. And, even if a person has time and knowledge, they do not bother with tracking their expenses as they find it tedious and time-consuming. Now, you don't have to worry about managing your expenses, as you can get access to an expense tracker that will help in the active management of your finances. Also known as expense manager and money manager, 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 every day 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. Today, there are several expense manager applications in the market. Some are paid managers while others are free. Even banks like ICICI offer their customers expense tracker to help them out. Before you decide to go in for a money manager, it is important to decide the type you want.

2.LITERATURE SURVEY

S. No	Author Name	Title	Journal / Conference Title	Volume No	Year	Description
1	Bekaroo, G., & Sunhaloo S.	Intelligent Online Budget Tracker.	International Journal Of Innovative Research and Technology	1	2021	It keeps track of the budget but also provides means to analyze data via charts and graphs as well as intelligently predicting future budgets .
2	Atiya Kazi, Prapullah S. Kherade , Raj S. and etal.,	Expense Tracker	Iconic Research And Engineering Journals	Volume 4 Issue 11	2021	This keep our day-to-day expenditures and also helps us to keep record of our money daily.
3	Y. Anitha, R. Ranjini, S. Gomathi	Easy App for Expanses Manager Using Android	International Journals of Computer Techniques	Volume: 3 Issue: 2	2016	The system facilitates entering expense report and tracks all expenses and income so as to keep the user on

						financial stability path.
4	N. ZahiraJahan , K. I. Vinodhini	Personalized Expense Managing Assistant Using Android	International Journals of Computer Techniques (IJCT),	Volume: 3 Issue: 2	2016	This application will not only helps users to manage their expenses but also help marketing executives to plan marketing according to the needs of users
5	S. Chandini, T. Poojitha, D. Ranjith and etal.,	Online Income and Expense Tracker”	International Research Journal of Engineering and Technology (IRJET),	Volume: 06 Issue: 3,	2019	The user can manage their expenses on a daily,weekly and monthly basis also the user can insert and delete transaction as well as can generate and save their reports .

2.1 Existing problem

In a study conducted by Forrester in 2016 surveying small and medium businesses (SMBs) across the world, 56% companies reported expense management as being the biggest challenge for their finance departments.

In another survey conducted by Level Research in 2018 in North America, respondents reported the following pain points in expense management before adopting automation:

- Manual entry and routing of expense reports (62%)
- Lack of visibility into spend data (42%)
- Inability to enforce travel policies (29%)
- Lost expense reports (24%)
- Lengthy expense approval system and reimbursement cycles (23%)

2.2 Problem Statement Definition

Customer Problem Statement :

A well-articulated customer problem statement allows us to find the ideal solution for the challenges our customers face. Throughout the process, you'll also be able to empathize with your customers, which helps you better understand how they perceive your product or service.

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	an employee.	Make a monthly budget.	There are no facilities to set a budget.	I need to save money for my future plans.	Frustrated.
PS-2	A manager.	Keep track of my expenses.	Can't categorize the various types of expenses.	There is no option to organize the various expenses.	Uncomfortable.

3. IDEATION & PROPOSED SOLUTION


3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming




Step-1: Team Gathering, Collaboration and Select the Problem Statement


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



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


PROBLEM


Expenses are needed to be tracked in many large-scale and small-scale sectors such as in many schools, colleges, marketing companies, departmental stores, etc. So in order to optimize their work and make peoples life easier our expense tracker application will be much helpful for financial management. The outcome of the application will be much useful for them to acknowledge the daily expenses and track the monthly expenses from their income with a limit to spend. They can easily track and view their expenses with a statistical data.


**Key rules of brainstorming**


To run an smooth and productive session


 Stay in topic.

 Encourage wild ideas.

 Defer judgment.

 Listen to others.

 Go for volume.

 If possible, be visual.

Step-2 : Brainstorm, Idea Listing and Grouping

1. Define your problem statement

What problem are you trying to solve? Why? How?
 Do you want to solve this problem?
 How much time do you have to solve this problem?

2. Understand the problem

What does it mean to solve this problem?
 How much time do you have to solve this problem?

3. Generate ideas

What ideas do you have to solve this problem?
 How much time do you have to solve this problem?

4. Evaluate ideas

What ideas do you have to solve this problem?
 How much time do you have to solve this problem?

5. Select an idea

What idea do you have to solve this problem?
 How much time do you have to solve this problem?

6. Develop a solution

What idea do you have to solve this problem?
 How much time do you have to solve this problem?

7. Test your solution

What idea do you have to solve this problem?
 How much time do you have to solve this problem?

8. Present your solution

What idea do you have to solve this problem?
 How much time do you have to solve this problem?

9. Reflect on your solution

What idea do you have to solve this problem?
 How much time do you have to solve this problem?

10. Improve your solution

What idea do you have to solve this problem?
 How much time do you have to solve this problem?

1. Define your problem statement

What problem are you trying to solve? Why? How?
 Do you want to solve this problem?
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What idea do you have to solve this problem?
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Step-3: Idea Prioritization

1 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

Tip
Participants can use their cursor to point at ideas. Sticky notes should go on the grid. The facilitator can confirm the idea by using the sticky pointer holding the idea on the flipboard.

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

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

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	The problem of the current generation population is that they can't remember where all of the money they earned have gone and ultimately have to live while sustaining the little money they have left for their essential needs.
2.	Idea / Solution description	Tracks expenses through bank statements and details provided by the user and sends notification alerts when the suggested savings goal set by the user themselves is crossed.
3.	Novelty / Uniqueness	Basic finance tips can be given to users and also a plan to let users earn a small amount of money through ads etc.
4.	Social Impact / Customer Satisfaction	This helps the user to help them from issues like bankruptcy and save time from manual calculations. Also providing a proper balance
		between income and expense is a must for a comfortable livelihood.
5.	Business Model (Revenue Model)	Expense tracker follows service business model which uses Flask, Docker, Cloud and Kubernetes.
6.	Scalability of the Solution	Expense tracker is infinitely scalable since it is based on a per employee per month basis, this means that we'll never pay for capacity you don't need.

3.3 Problem Solution fit

Template:

Problem-Solution fit canvas 2.0		Purpose / Vision	
Define CS, fit into CC	1. CUSTOMER SEGMENT(S) <small>Who is your customer? i.e. working parents of 0-5 y.o. kids</small> Students, Adults and Families Organizations, Individuals	6. CUSTOMER CONSTRAINTS <small>What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices</small> Even with constant tracking of one's spending habits, there is no guarantee that financial goals will be met. So they might think it is useless to use an expense tracker. Expense tracker might need internet connection to access the user's database.	5. AVAILABLE SOLUTIONS <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? i.e. pen and paper is an alternative to digital notetaking</small> Manually calculate the daily expenses using a notebook and a pen. They can use a budget calculator.
	2. JOBS-TO-BE-DONE / PROBLEMS <small>Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one, explore different sides.</small> Users need to login and register so that the database can easily identify their previous expenses. Users need to provide their receipts and bills which shows the amount they spent. User needs to set a savings goal that will prevent them from spending more than their budget for the month.	9. PROBLEM ROOT CAUSE <small>What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.</small> If you don't check your spending and create a budget, you will have no control whatsoever on your money. Instead, money will control you, and you will either have perpetual lack of funds or you will end up steeped in debt. With proper tracking of your finances, you will not be able to determine unnecessary spending. This spending, if saved, can easily add up to quite a bit.	7. BEHAVIOUR <small>What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)</small> Collect receipts regularly without fail. Know your budget for each month and set appropriate savings goal.
Focus on J&P, tap into BE, understand RC	3. TRIGGERS <small>What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.</small> When they realise they don't have enough money to spend for either themselves or during outing with acquaintances.	10. YOUR SOLUTION <small>If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.</small> Tracks expenses through bank statements and details provided by the user and sends notification alerts when the suggested savings goal set by the user themselves is crossed.	8. CHANNELS of BEHAVIOUR 8.1 ONLINE <small>What kind of actions do customers take online? Extract online channels from #7</small> Reduced turnaround time and faster reimbursements 8.2 OFFLINE <small>What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.</small> Expense tracker provides the option to set up custom reminders and notifications to remind they have reached the savings goal.
	4. EMOTIONS: BEFORE / AFTER <small>How do customers feel when they face a problem or a job and afterwards? i.e. lost, insecure > confident, in control - use it in your communication strategy & design.</small> fear, guilt, shame and envy-->happy, contented		
Identify strong TR & EM			Extract online & offline CH of BE

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

IDENTIFIER	REQUIREMENTS
1. Add transaction	This application will allow adding transaction.
2 Delete transaction	This application will allow the deleting transactions.
3 Amount spent in categories	This application will allow adding the amount spent in a particular category.
4 View all transactions	This application will allow viewing all previous transactions.
5 Total amount	This application will allow seeing the total amount, the amount spent in different categories and balance left.
6 Overview	This application will allow viewing overall transactions.
7 Graph representation	This application will show the graph which will help the users to visualize the budget.
8 Pie representation	This application will show the pie.
9 Bar representation	This application will show the bar.

10 Change background	This application has the option to change the background.
11 Passcode	This application has the option to set a passcode for security.
12 Add multiple accounts	This application has the option of creating multiple accounts for the users
13 Transaction time/date	This application has the ability to show the transaction time along with the date on which it was created.
14 Currency symbol	This application has many currency symbols as per user requirements.
15 Reminder	This application has the option to set a reminder to make the transaction.
16 Delete account	This application will generate PDF reports of the transactions.
17 PDF report	This application has the option to view and filter transactions by day, month and year.
18 Note	This application has the option to add a note about income and expenses.

4.2 Non-Functional requirements

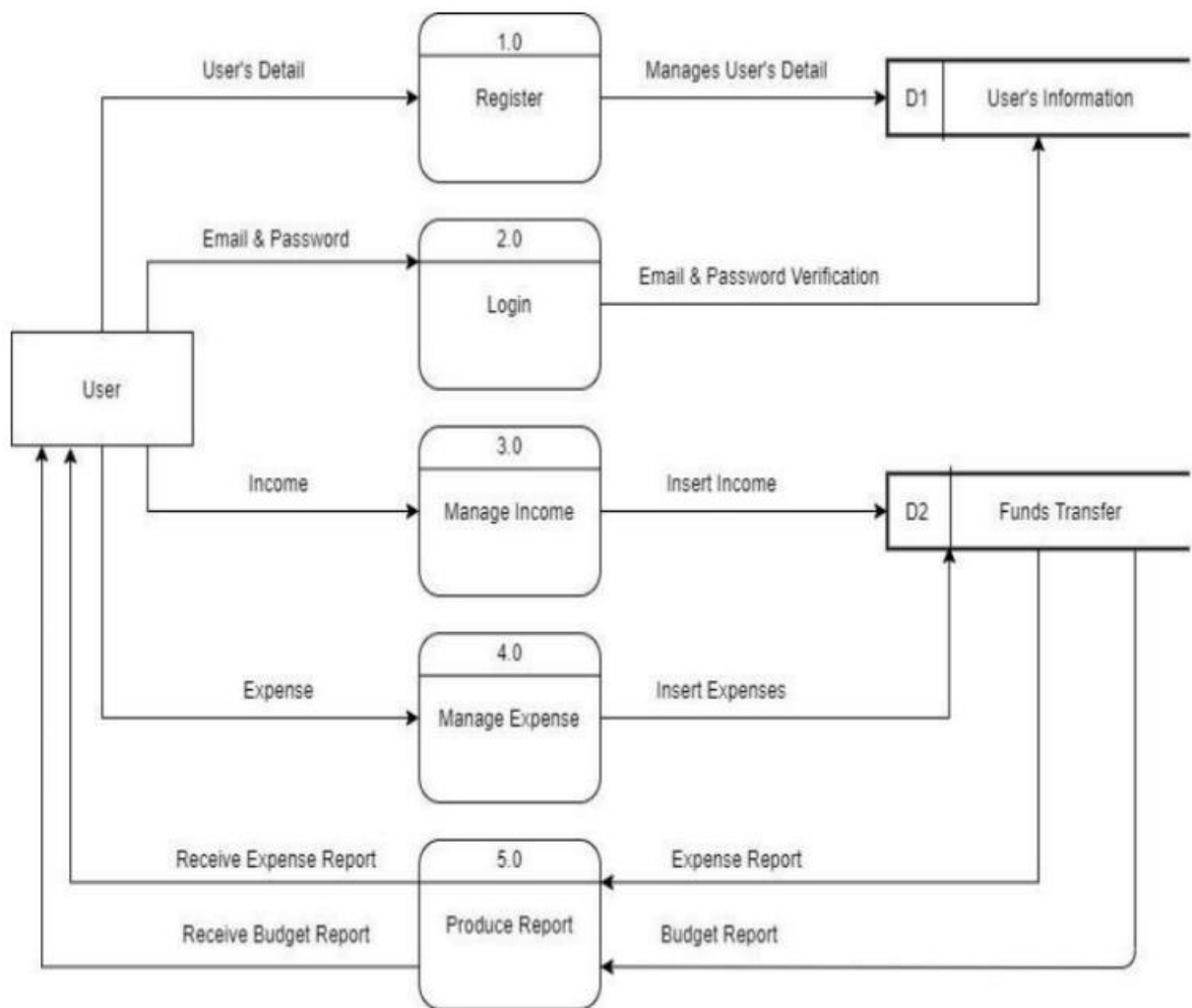
Non-functional Requirements:

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

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.
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.

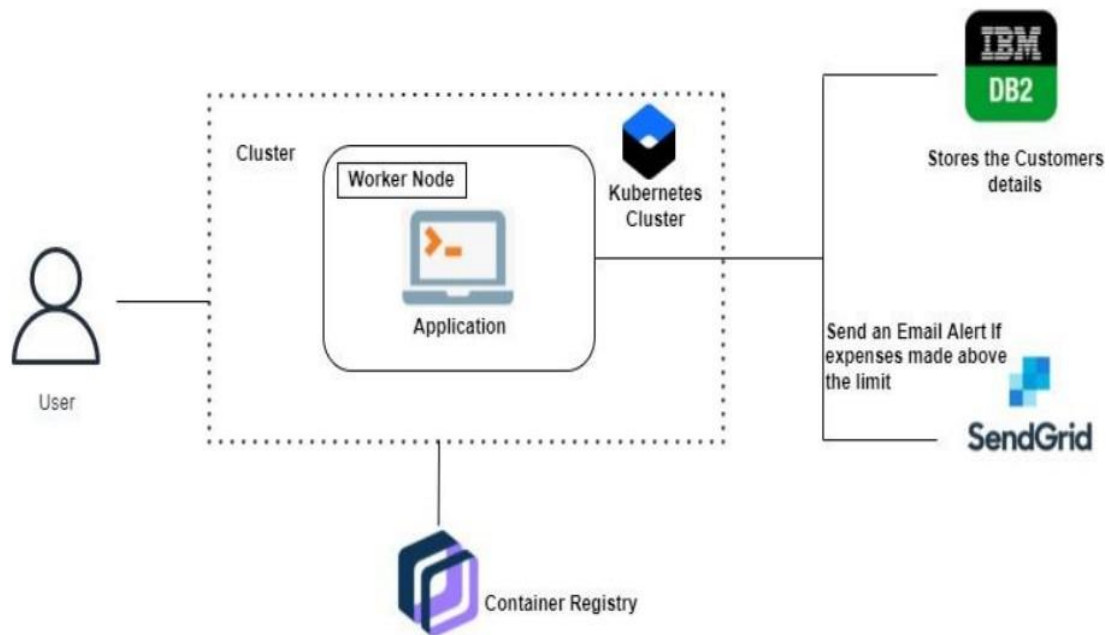
5.PROJECT DESIGN

5.1Data Flow Diagrams

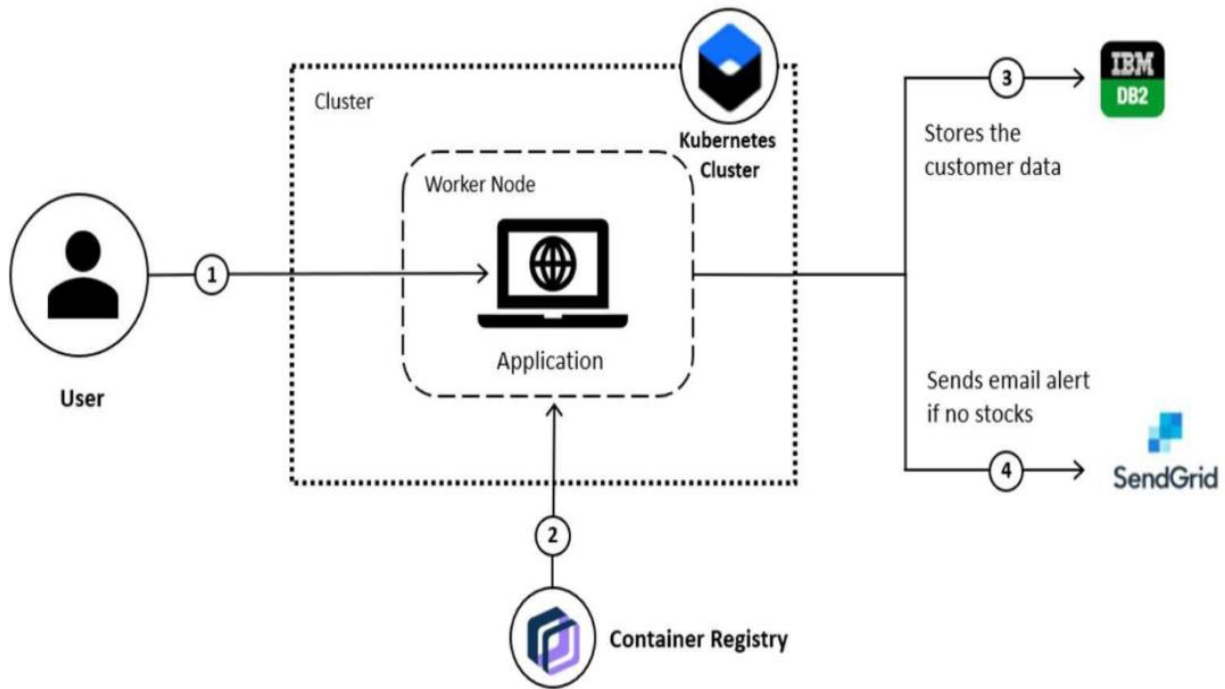


5.2 Solution & Technical Architecture

Technical Architecture:



SOLUTION ARCHITECTURE



5.3 User Stories

User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user & web user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	
		USN- 3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	
	Login	USN - 4	As a user, I can log into the application by entering email & password	I can access the application	High	
	Dashboard	USN - 5	As a user I can enter my income and expenditure details.	I can view my daily expenses	High	
Customer Care Executive		USN – 6	As a customer care executive I can solve the log in issues and other issues of the application.	I can provide support or solution at any time 24*7	Medium	
Administrator	Application	USN - 7	As a administrator I can upgrade or update the application.	I can fix the bug which arises for the customers and users of the application	Medium	

6.PROJECT PLANNING & SCHEDULING

6.1Sprint Planning

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Creating Basic login page	USN-1	As a user, I can create my account and get my login credentials.	2	High	4
Sprint-1	IBM Cloud	USN-2	As a user, I will receive acknowledgement for my account creation.	1	High	4
Sprint-2	Downloading of required software	USN-3	As a user, I can get additional features along with the tracking of my monthly expenses.	2	Low	1
Sprint-2	Creation of SendGrid account	USN-4	As a user, I can get details about my expenses and income at any instant, without any server issues.	2	Medium	2
Sprint-3	Integration of IBM Cloud and SendGrid	USN-5	As a user, I can get my details, my transaction history, latest updates about my expenses.	1	High	4
Sprint-3	Dashboard	USN-6	I can get all my TO DO lists and features at an instant in the dashboard.	2	Medium	2
Sprint-4	Offline Receipt	USN-7	I can get my transaction receipts in offline mode also.	2	High	4
Sprint-4	Overall	USN-8	Expense ,income, transaction, invest and many features can be benefitted from this app.	2	High	4

Estimation

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	16	6 Days	24 Oct 2022	29 Oct 2022	16	29 Oct 2022
Sprint-2	12	6 Days	31 Oct 2022	05 Nov 2022	10	05 Nov 2022
Sprint-3	14	6 Days	07 Nov 2022	12 Nov 2022	13	12 Nov 2022
Sprint-4	14	6 Days	14 Nov 2022	19 Nov 2022	13	19 Nov 2022

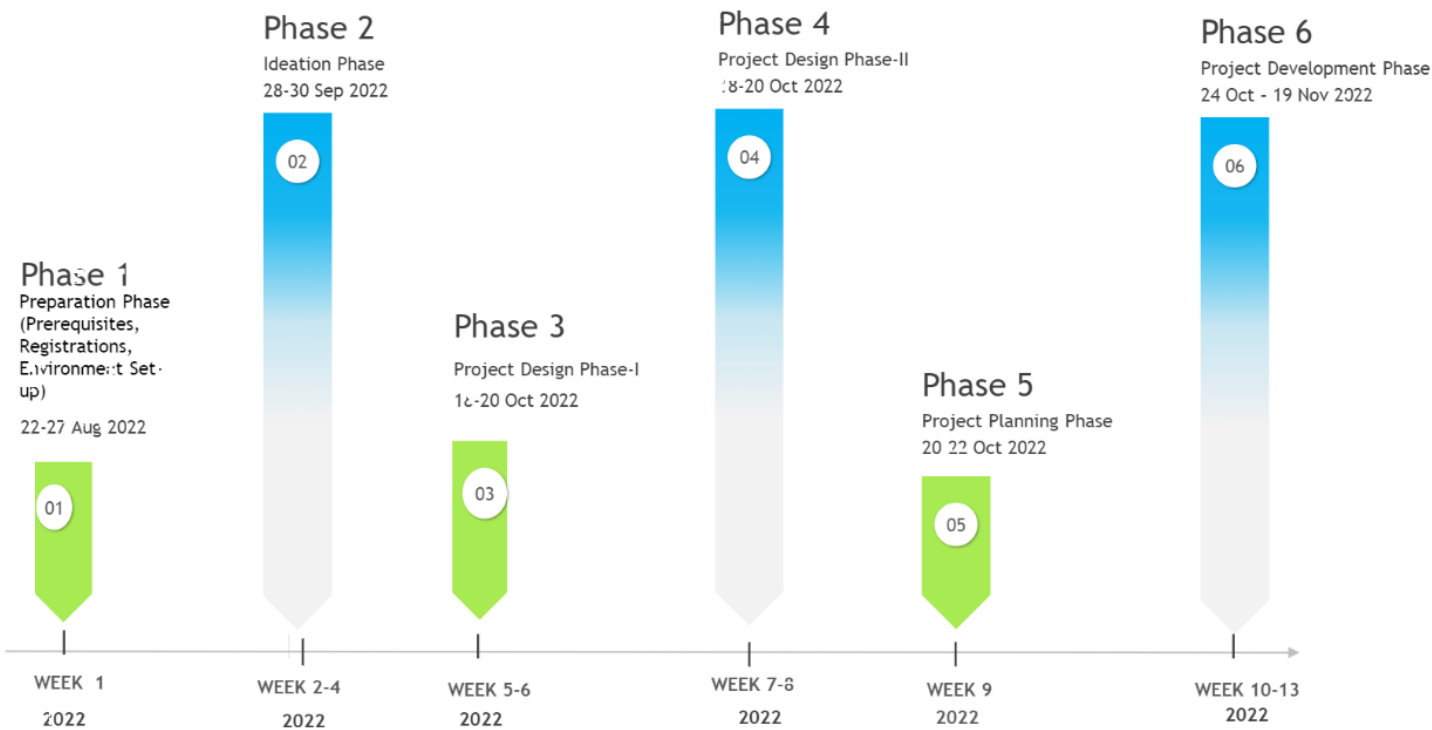
Velocity:

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)

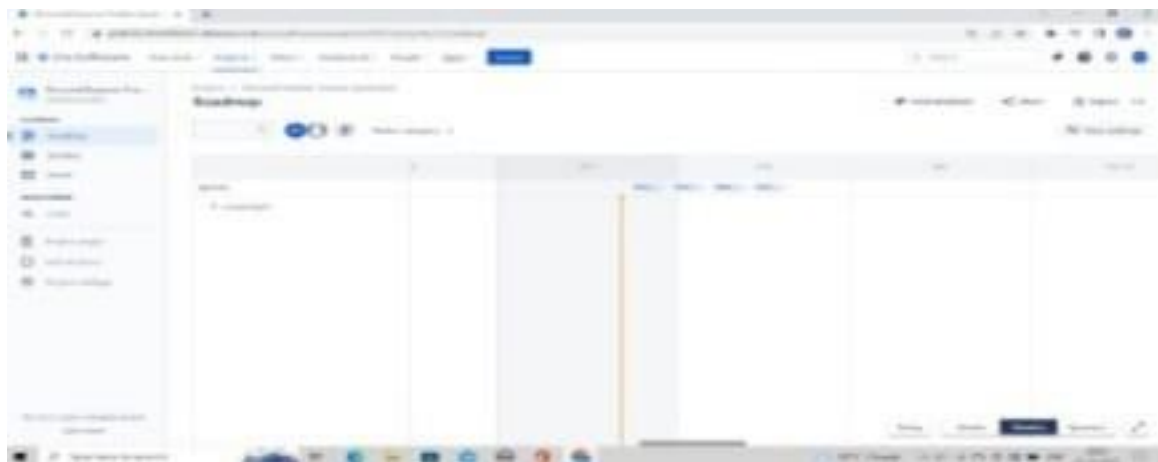
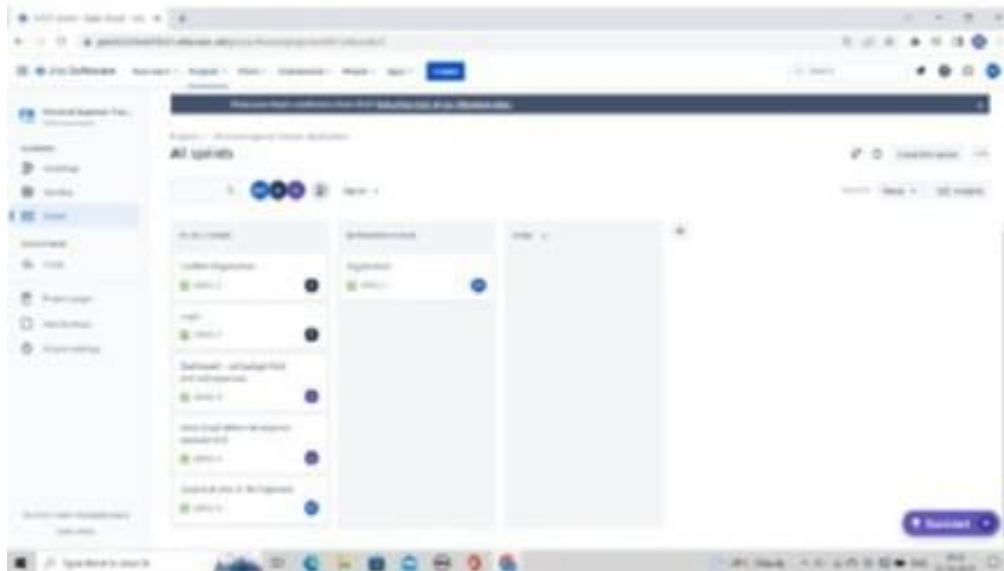
$$AV = \frac{\text{sprint duration}}{\text{velocity}} = \frac{20}{10} = 2$$

6.2 Sprint Delivery Schedule

Timeline Description



6.3 Reports from JIRA



7. CODING & SOLUTIONING

7.1 Feature 1

We have added the data visualization methods for expenditure. The pie chart have been used to represent the monthly expenses. The pie chart is a pictorial representation of data that makes it possible to visualize the relationships between the parts and the whole of a variable. For example, it is possible to understand the industry count or percentage of a variable level from the division by areas or sectors. The recommended use for pie charts is two-dimensional, as three-dimensional use can be confusing.

The dimensions form sectors of the measurement values; they can have one or two sizes and up to two measures. The first dimension is used to define the angle of each sector that makes up the chart and the second dimension optionally determines the radius of each sector. Additionally, these plots are useful for comparing data over a fixed period since they do not show changes over time. Therefore, their use should be considered if:

- You are looking to categorize and compare a set of data.

7.1.1 You only have positive values.

7.1.2 You have less than seven categories since a larger number can make it difficult to perceive each segment.

CODE :

todayExpenses.html & app.py

```
1 {% extends 'base.html' %}
2 {% block body %}
3 <div class="container ">
4 <div class="row">
5     <div class="col-md-5">
6         <h3 class="mt-5">Today Expense
        Breakdown</h3>
7         <div class="card shadow mb-2
        bg-white rounded-pill">
8             <div class="card-body ">
9                 <div class="row">
10                     <div class="col-md-
11                     6">TIME</div>
12                     <div class="col-md-6">AMOUNT
                        </div>
                        </div>
```

```
13         </div>
14     </div>
15     {% for row in texpanse %}
16     <div class="card shadow mb-2
    bg-white rounded-bottom">
17         <div class="card-body ">
18             <div class="row">
19                 <div id ="ttime"
    class="col-md-6">{{row [0]}}</div>
20                 <div id="tamount"
    class="col-md-6">    {{row[1] }}
    </div>
21             </div>
22         </div>
23     </div>
24     {% endfor %}
25 </div>
26 </div>
27 <section>
```

```
28     <div class="row">
29         <div class="col-md-6">
30             <h3 class="mt-5">Expense
31             Breakdown BY Category</h3>
32             <div class="card shadow mb-
33             2 bg-white rounded-bottom">
34                 <div class="card-body
35                 ">
36                     <div class="row">
37                         <div class="col-md-
38                         6">Food</div>
39                         <div id="tfood"
40                         class="col-md-6"> {{ t_food}}
41                         </div>
42                     </div>
43                 </div>
44             </div>
45         </div>
46     </div>
```

```
40         <div class="card-body">
41         <div class="row">
42             <div class="col-md-
43             6">Entertainment</div>
44             <div
45             id="tentertainment" class="col-md-6">
46             {{ t_entertainment}} </div>
47             </div>
48             </div>
49             </div>
50             <div class="card shadow mb-2
51             bg-white rounded">
52             <div class="card-body">
53             <div class="row">
54                 <div class="col-md-
55                 6">Business</div>
56                 <div id="tbusiness"
57                 class="col-md-6"> {{t_business}}
58                 </div>
```



```
52         </div>
53     </div>
54 </div>
55 <div class="card shadow mb-2
    bg-white rounded">
56     <div class="card-body">
57         <div class="row">
58             <div class="col-md-
    6">Rent</div>
59             <div id="trent"
    class="col-md-6"> {{ t_rent }} </div>
60         </div>
61     </div>
62 </div>
63 <div class="card shadow mb-2
    bg-white rounded">
64     <div class="card-body">
65         <div class="row">
66             <div class="col-md-
```

```

6" >EMI</div>
67         <div id="temi"
class="col-md-6">{{ t_EMI }}    </div>
68         </div>
69         </div>
70     </div>
71     <div class="card shadow mb-2
bg-white rounded">
72         <div class="card-body">
73         <div class="row">
74             <div class="col-md-
6">Other</div>
75             <div id="tother"
class="col-md-6"> {{ t_other}}</div>
76             </div>
77         </div>
78     </div>
79     <div class="card shadow mb-2
btn-outline-danger rounded-pill">

```

```
80         <div class="card-body">
81         <div class="row">
82             <div class="col-md-
6">Total</div>
83             <div class="col-md-
6">₹ {{total}} </div>
84         </div>
85     </div>
86 </div>
87 </div>
88 <div class="col-md-6">
89     <canvas id="myChart"
width="400" height="400"></canvas>
90     <script>
91         let food =
document.getElementById('tfood').innerHT
ML
92         let entertainment =
document.getElementById('tentertainment')
```

```
    ).innerHTML
93         let business =
    document.getElementById('tbusiness').inn
    erHTML
94         let rent =
    document.getElementById('trent').innerHT
    ML
95         let emi =
    document.getElementById('temi').innerHT
    ML
96         let other =
    document.getElementById('tother').innerH
    TML
97         var ctx =
    document.getElementById('myChart').getCo
    ntext('2d');
98         var myChart = new Chart(ctx, {
99             type: 'doughnut',
100             data: {
```

```
101             labels: ['Food',
102             'Entertainment', 'Business', 'Rent',
103             'EMI', 'Other'],
104             datasets: [{
105                 label:
106                 'Expenses Chart',
107                 data: [food,
108                 entertainment, business, rent, emi,
109                 other],
110                 backgroundColor: [
111                     'rgb(255, 99,
112                     132)',
113                     'rgb(0, 0,
114                     0)',
115                     'rgb(255, 205,
116                     86)',
117                     'rgb(201, 203,
118                     207)',
```

```
110             'rgb(54,  
111             162, 235)',  
112             'rgb(215,  
113             159, 64)'  
114         ],  
115     },  
116     options: {  
117         responsive: true,  
118         plugins: {  
119             legend: {  
120                 position: 'bottom',  
121             },  
122             title: {  
123                 display: true,  
124                 text: 'EXPENSE BREAKDOWN'  
125             }  
126         }  
127     }
```

```
127         });
128     </script>
129 </div>
130 </div>
131 </div>
132 </section>
133 </div>
134 {% endblock %}
```

```
        param1 = "SELECT TIME(date) as tn, amount FROM expenses
WHERE userid = " + str(session['id']) + " AND DATE(date) =
DATE(current timestamp) ORDER BY date DESC"
5         res1 = ibm_db.exec_immediate(ibm_db_conn, param1)
6         dictionary1 = ibm_db.fetch_assoc(res1)
7         texpanse = []
8
9         while dictionary1 != False:
10             temp = []
11             temp.append(dictionary1["TN"])
```

```
12         temp.append(dictionary1["AMOUNT"])
13         texpanse.append(temp)
14         print(temp)
15         dictionary1 = ibm_db.fetch_assoc(res1)
16
17         param = "SELECT * FROM expenses WHERE userid = " +
18         str(session['id']) + " AND DATE(date) = DATE(current timestamp)
19         ORDER BY date DESC"
20         res = ibm_db.exec_immediate(ibm_db_conn, param)
21         dictionary = ibm_db.fetch_assoc(res)
22         expense = []
23         while dictionary != False:
24             temp = []
25             temp.append(dictionary["ID"])
26             temp.append(dictionary["USERID"])
27             temp.append(dictionary["DATE"])
28             temp.append(dictionary["EXPENSENAME"])
29             temp.append(dictionary["AMOUNT"])
30             temp.append(dictionary["PAYMODE"])
31             temp.append(dictionary["CATEGORY"])
32             expense.append(temp)
33             print(temp)
34             dictionary = ibm_db.fetch_assoc(res)
35
36         total=0
37         t_food=0
38         t_entertainment=0
39         t_business=0
40         t_rent=0
41         t_EMI=0
42         t_other=0
```


7.2 Feature 2

Email notifications will be sent to the users once they cross the expenditure limit through send grid mail system. Most notifications are transactional, meaning a recipient's action or account activity triggers them. But some notifications are marketing related, encouraging the recipient to take a specific action.

Ecommerce product notifications inform recipients about new products or discounts. Plus, unlike general marketing emails, these are highly personalized and focus on a single product. For example, if a customer views an item on your website and that item goes on sale, you can send the customer a notification to let them know this is the best time to buy. Users can also opt into receiving notifications when an out-of-stock item is back in stock.

Notification emails tend to perform well because the content is highly relevant to the recipient. But the only way for the recipient to know this is if you state the content clearly in the subject line.

For example, the subject line "New Sign-in to Your Account" gets straight to the point, letting the user know why you sent this notification.

sendemail.py

```
1 def sendgridmail(user,TEXT):
2     from_email = Email("tproduct8080@gmail.com")
3     to_email = To(user)
4     subject = "Crossed the Expenditure Limit"
5     content = Content("text/plain",TEXT)
6     mail = Mail(from_email, to_email, subject,
7                 content)
8     # Get a JSON-ready representation of the
9     # Mail object
10    mail_json = mail.get()
11    # Send an HTTP POST request to /mail/send
12    response =
13    sg.client.mail.send.post(request_body=mail_json)
14    print(response.status_code)
15    print(response.headers)
```

7.3 Database Schema

Tables :

1) REGISTER

id INT NOT NULL GENERATED ALWAYS AS IDENTITY,
username VARCHAR(255) NOT NULL,
email VARCHAR(255) NOT NULL,
password VARCHAR(255) NOT NULL

2) EXPENSES

id INT NOT NULL GENERATED ALWAYS AS IDENTITY,
userid INT NOT NULL,
date TIMESTAMP NOT NULL,
expensename VARCHAR(255) NOT NULL, amount
INT NOT NULL,
paymode VARCHAR(255) NOT NULL, category
VARCHAR(255) NOT NULL

3) LIMITS

id INT NOT NULL GENERATED ALWAYS AS IDENTITY,
userid VARCHAR(255) NOT NULL,
limitss VARCHAR(255) NOT NULL

8.TESTING

8.1Test Cases

Test Case ID	Purpose	Test Cases	Result
TC1	Authentication	Password with length less than 4 characters	Password cannot be less than 4 characters
TC2	Authentication	User name with length less than 2 characters	User name cannot be less than 2 characters
TC3	Authentication	Valid user name with minimum 2 characters	User name accepted

TC4	Authentication	User name left blank	User name cannot be less than 2 characters
TC5	Authentication	Password field left blank	Password cannot be empty
TC6	Authentication	Minimum 4 characters valid password	Password accepted
TC7	Authentication	Password and Confirm Password did not match	Please enter same password
TC8	Authentication	Confirm Password field left blank	Please enter same password

8.2 User Acceptance Testing

Technical Requirement Document (TSD)	
Test Case ID	Test Case Description
TC_001	Verify if user is able to order single product.
TC_002	Verify if user is able to order multiple products.
TC_003	Verify if user can apply single or multiple filters
TC_004	Verify if user can apply different sort by
TC_005	Verify if user is able to pay by Master Card
TC_006	Verify if user is able to pay by Debit Card
TC_007	Verify if user is able to pay fully by reward points
TC_008	Verify if user is able to pay partially by reward points

9.RESULTS

9.1Performance Metrics

- Tracking income and expenses: Monitoring the income and tracking all expenditures (through bank accounts, mobile wallets, and credit & debit cards).
- Transaction Receipts: Capture and organize your payment receipts to keep track of your expenditure.
- Organizing Taxes: Import your documents to the expense tracking app, and it will streamline your income and expenses under the appropriate tax categories.
- Payments & Invoices: Accept and pay from credit cards, debit cards, net banking, mobile wallets, and bank transfers, and track the status of your invoices and bills in the mobile app itself. Also, the tracking app sends reminders for payments and automatically matches the payments with invoices.
- Reports: The expense tracking app generates and sends reports to give a detailed insight about profits, losses, budgets, income, balance sheets, etc.,

- E-commerce integration: Integrate your expense tracking app with your eCommerce store and track your sales through payments received via multiple payment methods.
- Vendors and Contractors: Manage and track all the payments to the vendors and contractors added to the mobile app.
- Access control: Increase your team productivity by providing access control to particular users through custom permissions.
- Track Projects: Determine project profitability by tracking labor costs, payroll, expenses, etc., of your ongoing project.
- Inventory tracking: An expense tracking app can do it all. Right from tracking products or the cost of goods, sending alert notifications when the product is running out of stock or the product is not selling, to purchase orders.
- Recurrent Expenses: Rely on your budgeting app to track, streamline, and automate all the recurrent expenses and remind you on a timely basis.

10.ADVANTAGES & DISADVANTAGES

1. **Achieve your business goals** with a tailored mobile app that perfectly fits your business.
2. **Scale-up** at the pace your business is growing.
3. Deliver an **outstanding** customer experience through additional control over the app.
4. Control the **security** of your business and customer data.
5. **Boost the productivity** of all the processes within the organization.
6. Increase **efficiency** and **customer satisfaction** with an app aligned to their needs.
7. **Seamlessly integrate** with existing infrastructure.
8. Ability to provide **valuable insights**.
9. Optimize sales processes to generate **more revenue** through enhanced data collection.

11.CONCLUSION

From this project, we are able to manage and keep tracking the daily expenses as well as income. While making this project, we gained a lot of experience of working as a team.

We discovered various predicted and unpredicted problems and we enjoyed alot solving them as a team. We adopted things like video tutorials, text tutorials, internet and learning materials to makeour project complete.

12.FUTURE

The project assists well to record the income and expenses in general. However, this project has some limitations:

- The application is unable to maintain the backup of data once it is uninstalled. This application does not provide higher decision capability.

To further enhance the capability of this application, we recommend the following features to be incorporated into the system:

- Multiple language interface.
- Provide backup and recovery of data.
- Provide better user interface for user.
- Mobile apps advantage.

