

# ***Personal Expense Tracker Application***

IBM-Project-17328-1659634188

## **PERSONAL EXPENSE TRACKER APPLICATION**

**NALAIYA THIRAN PROJECT BASED LEARNING ON  
PROFESSIONAL READLINESS FOR INNOVATION,  
EMPLOYMENT AND ENTREPRENEURSHIP**

### **A PROJECT REPORT**

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## **1.INTRODUCTION**

### **1.1 Project Overview**

Category: Cloud App

Development Team ID :

PNT2022TMID19407

#### **Skills Required:**

IBM Cloud,HTML,Javascript,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.

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## **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.

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## **2.LITERATURE SURVEY**

### **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 Levvel 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%)

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## 2.2 References

S.No	TITLE	PROPOSED WORK	TOOLS USED/ ALGORITHM	TECHNOLOGY	ADVANTAGES/ DISADVANTAGES
1.	<b>EXPENSE MANAGER APPLICATION. (2020)</b>	To Develop A Moblie Application That Keeps Record Of User Personal Expenses Contribution In Group Expenditure Top Investment Options View Of The Current Stock Market ,Read Authenticated Financial News	Android Studio	Cloud Application	Advantages: ➤ Keeps Track All Of Your Daily Transactions, Keeps Track Of Your Money Lent Or Borrowed. Disadvantages: ➤ Occupy Lot Of Space.
2.	<b>A NOVEL EXPENSE TRACKER USING STATISTICAL ANALYSIS. (2021)</b>	To Maintain And Manage Data Of Daily Expenditure In A More Precise Way.	SQL Lite	Cloud Application	Advantages: ➤ Its Suggest You With The Most Effective Investment Options. Disadvantages: ➤ The Work Done Being Is Not Accurate.

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S.No	TITLE	PROPOSED WORK	TOOLS USED/ ALGORITHM	TECHNOLOGY	ADVANTAGES/ DISADVANTAGES
3.	EXPENSE TRACKER. (2021)	Facilitates The User To Keep Track And Manage Their Personal As Well As Business Expenses.	Android OS	Cloud Application	Advantages: ➤ Become Aware Of Poor Spending Habits And Take Care Of Your Finances Saving And Investment. Disadvantages: ➤ Searching And Referencing Is Difficult And Time-consuming.
4.	EXPENSE TRACKER. (May 2021)	The Application Keeps The Track Of The Income And Expenses Both Of User On A Day To Day Bases	Java	Cloud Application	Advantages: ➤ The Project Effectively Keeps Away From The Manual Figuring. Disadvantages: ➤ Report Generation Is A Tedious Process.

## 2.3 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.



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<b>I am</b>	Describe customer with 3-4 key characteristics - who are they?	Describe the customer and their attributes here
<b>I'm trying to</b>	List their outcome or "job" the care about - what are they trying to achieve?	List the thing they are trying to achieve here
<b>but</b>	Describe what problems or barriers stand in the way - what bothers them most?	Describe the problems or barriers that get in the way here
<b>because</b>	Enter the "root cause" of why the problem or barrier exists - what needs to be solved?	Describe the reason the problems or barriers exist
<b>which makes me feel</b>	Describe the emotions from the customer's point of view - how does it impact them emotionally?	Describe the emotions the result from experiencing the problems or barriers

## Personal Expense Tracker Application:

I am	I'm trying to	but	Because	Which makes me feel
a Traveller.	track my expenses during every trip.	unable to sort out my expenses with my records.	there is no root for me to do so.	worried.

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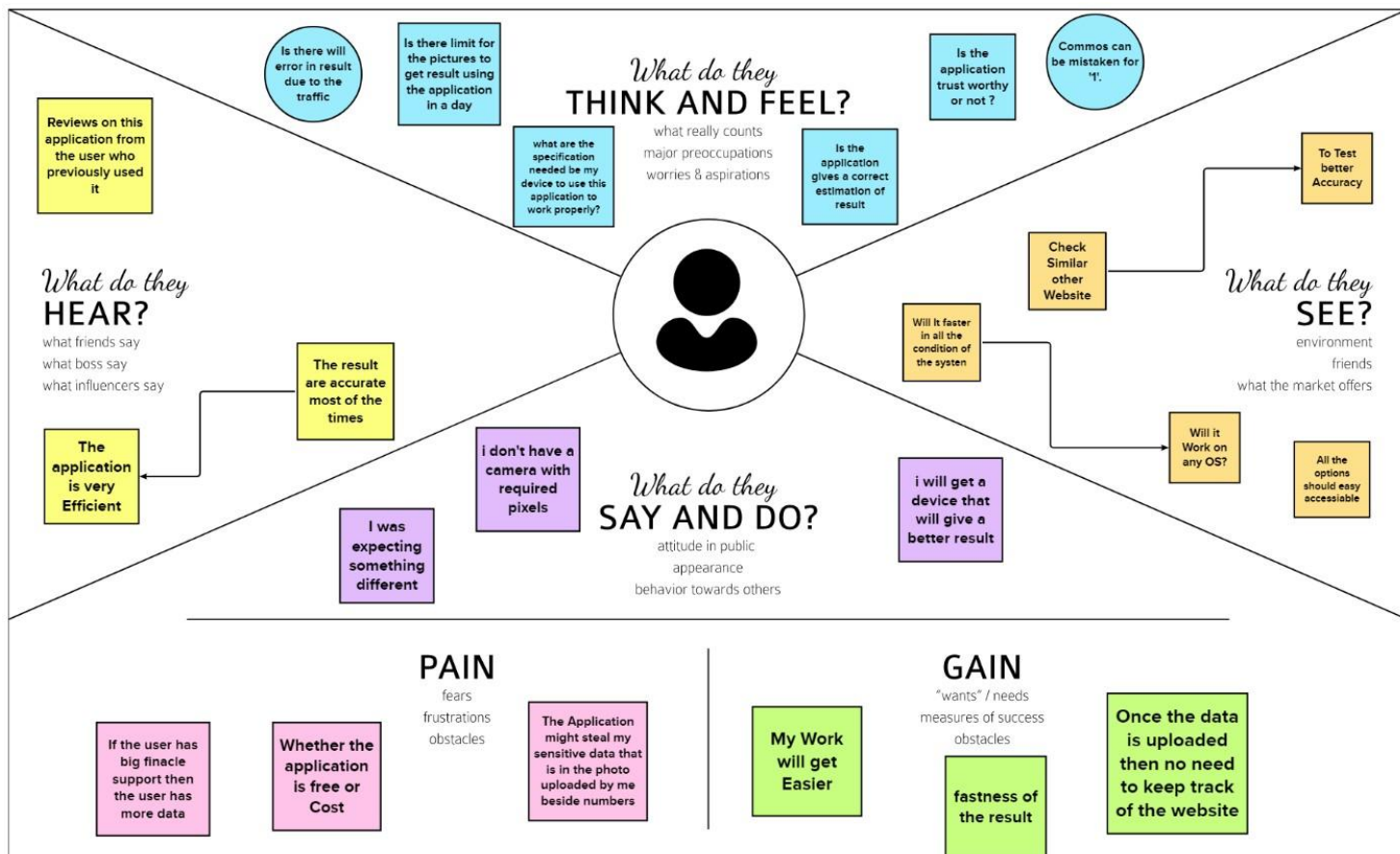
<b>Problem Statement (PS)</b>	<b>I am (Customer)</b>	<b>I'm trying to</b>	<b>But</b>	<b>Because</b>	<b>Which makes me feel</b>
PS-1	an employee.	Make a monthly budget.	There are no facilities to set a budget.	I need to save money for my future plans.	Frustrated.
PS-2	A manager.	Keep track of my expenses.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

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## 3.IDEATION & PROPOSED SOLUTION

### 3.1 Empathy Map Canvas




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## 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


How might we [your problem statement]?





### 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.

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## Step-2 : Brainstorm,Idea Listing and Grouping

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!

#### Naveen M R

USER CAN CHOOSE THEIR OWN BUDGET PLAN	AVOID DELAY PAYMENTS	BASIC FINANCE TO AVOID HIGH INTEREST TO THE USER
USER CAN CHOOSE THE CHANNEL THROUGH WHICH TO ENTER THEIR SPENDING		

#### Sai Sudharasan S

MANAGE THE BUDGET	AVOID TO GET INTO THE HIGH-INTEREST RATE	REDUCE THE RISK OF THE HANDLING CASH
WANT TO AVOID PAYING OUTSIDE THE MONTH	SPEND 30% AROUND THE MONTH	

#### Sreenidhi S

HELP THE USER TO MANAGE THEIR FINANCIALS	SAVE MONEY FOR INVESTING	KEEP THE TRANSACTION RECORD OF THE USER
PREVENTED BY THE ACCOUNT OWNER THAT HAVE BEEN SPENT		

#### Rohit A S

HELP THE USER TO SAVE THE BUDGET AMOUNT	SAVE THE PROCESSING COST	USER CAN CHECK HOW MUCH THE BUDGET FOR NEXT MONTH
BUDGET REPORT FOR THE USER		

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 can break it up into smaller sub-groups.

🕒 20 minutes

#### APPLICATION



#### PROCESSING



#### GOALS



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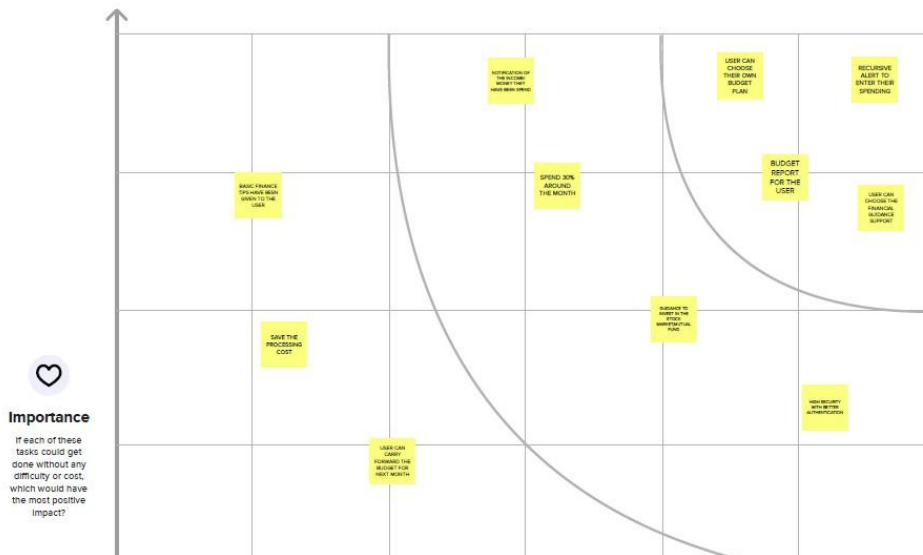
## Step-3: Idea Prioritization

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 →](#)



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## 3.3 Proposed Solution

### **Proposed Solution Template:**

Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	There are many budgeting tools online, but not all of them are effective in assisting users in actually creating and adhering to a budget. The ongoing maintenance, the consolidation of all user financial accounts and activity into a single dashboard are some of the negatives. However, a lot of this current software includes convoluted features that are difficult to use.
2.	Idea / Solution description	People tend to neglect their budgets due to their busy and chaotic lifestyles, which results in them spending more than they should have because they usually didn't plan their budget carefully. Future costs cannot be foreseen by the user. Their inexperience with money management will be a concern even though they can record their costs in an excel spreadsheet.
3.	Novelty / Uniqueness	Without utilizing paper receipts, this application keeps track of all of your spending. To enter your expense, simply click. to decrease human error, prevent data loss, and expedite settlements. in this programme to supply the pie chart or graph lines.
4.	Social Impact / Customer Satisfaction	One can keep track of their own costs and create a monthly or annual budget with this tool. The application will display a pie chart-style alert message if your spending exceeds the specified limit.

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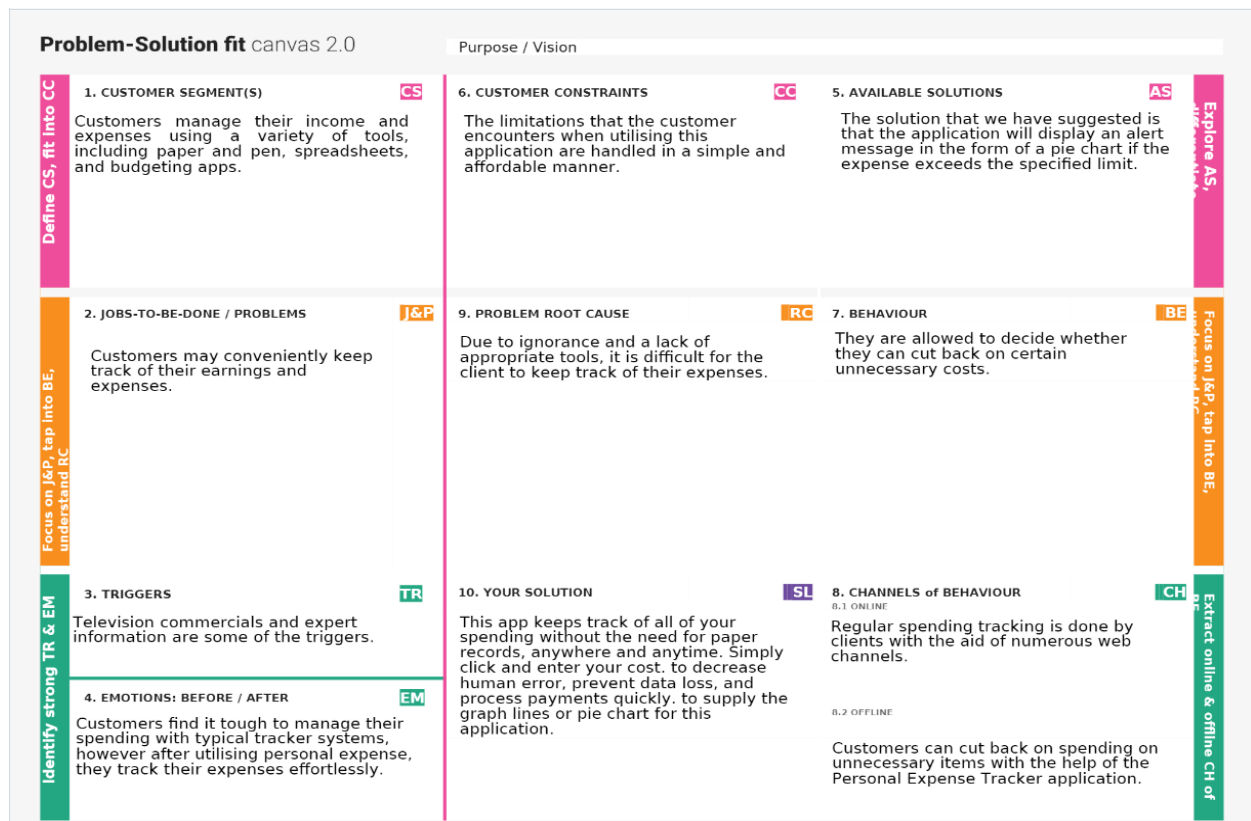
5.	Business Model (Revenue Model)	The subscription/premium functionality of this application can be used by business people to generate revenue.
6.	Scalability of the Solution	IBM cloud will automatically allocate the storage for the users.



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## 3.4 Problem Solution fit



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## **4.REQUIREMENT ANALYSIS**

### 4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Financial Accounts	Account Details Verification of Details
FR-4	User Dashboard	Expense Data Data Records
FR-5	User Notifications	System Access Real time Alerting
FR-6	Security of User Data	Secured Database Data Security Algorithms

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## 4.2 Non-Functional requirements

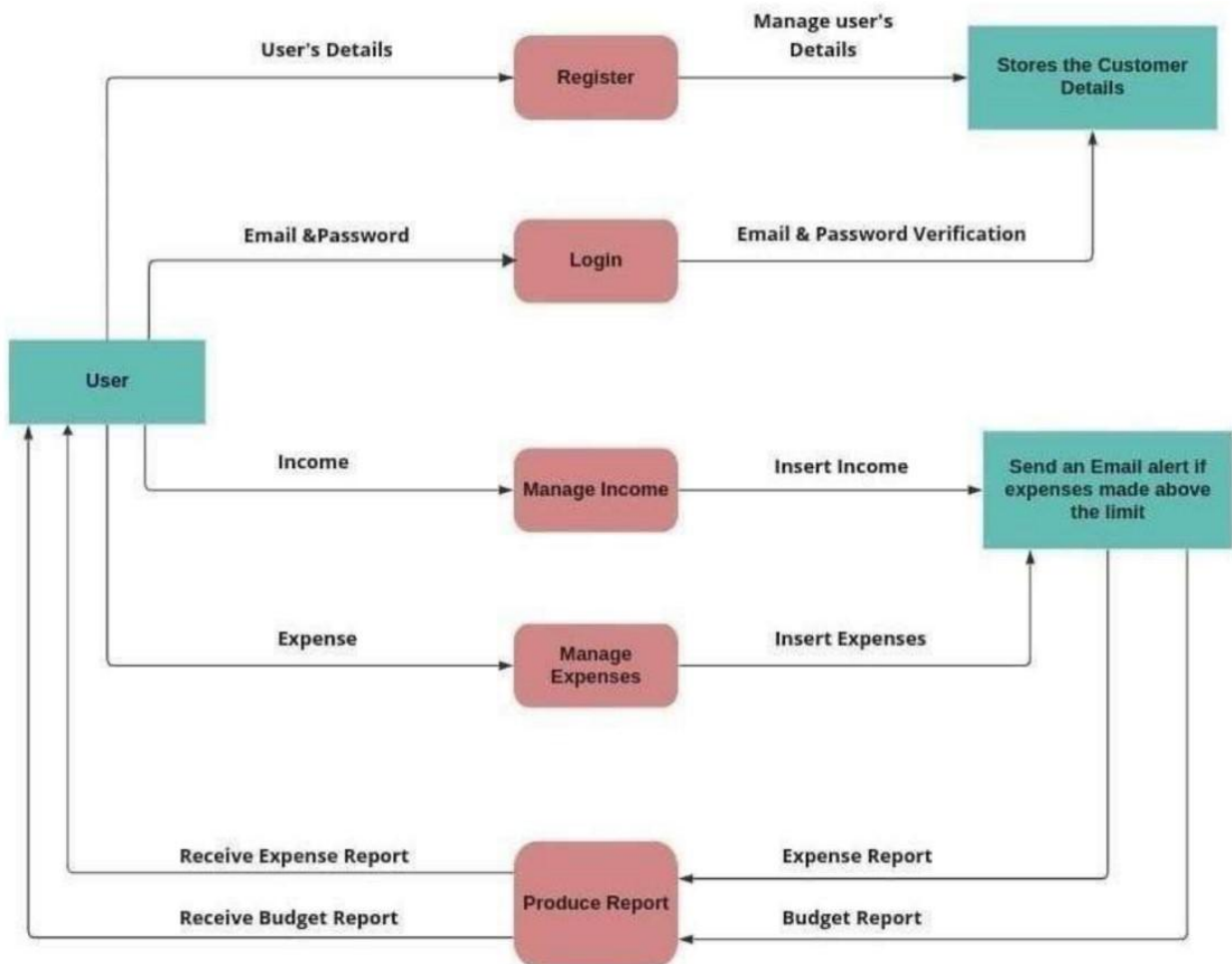
FR No.	Non-Functional Requirement	Description
NFR-1	<b>Usability</b>	By using this application, the user can keep track of their expenses and can ensure that user's money is used wisely.
NFR-2	<b>Security</b>	Maintain user personal details in a encrypted manner by using data security algorithms .
NFR-3	<b>Reliability</b>	It will maintain a proper tracking of day-to-day expenses in an efficient manner.
NFR-4	<b>Performance</b>	By enter our incoming and departing cash, and the software can help you keep and monitor it with at-most quality and security with high performance.
NFR-5	<b>Availability</b>	Using charts and graphs may help you monitor your budgeting and assets.
NFR-6	<b>Scalability</b>	Rely on your budgeting app to track, streamline, and automate all the recurrent expenses and remind you on a timely basis.

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## 5.PROJECT DESIGN

### 5.1 Data Flow Diagrams

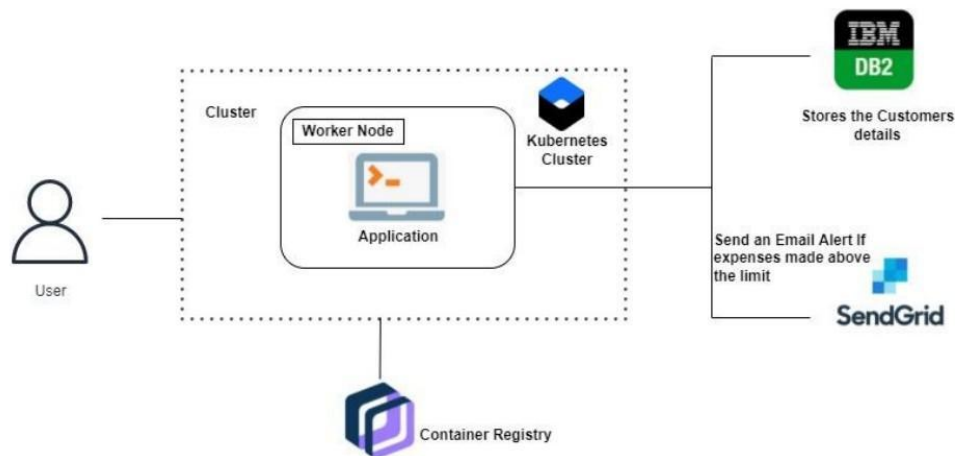


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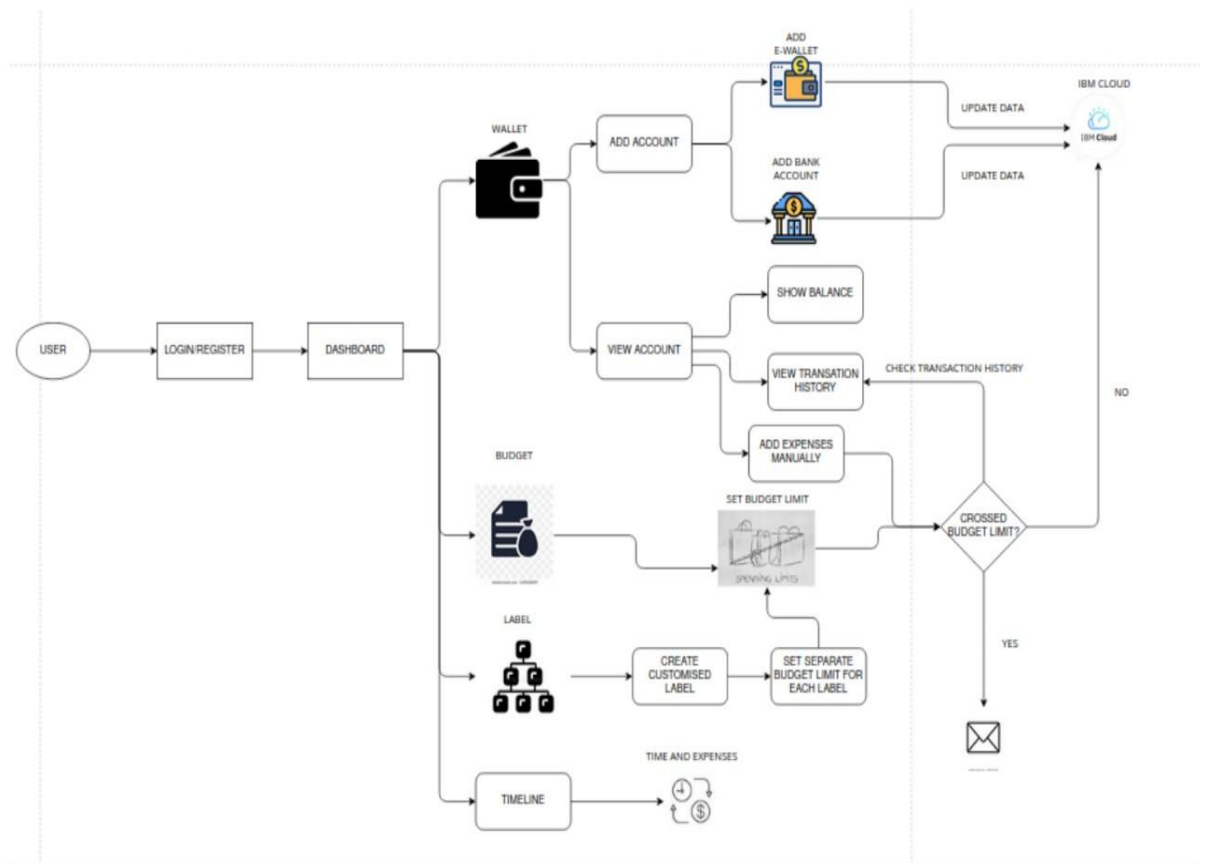
## 5.2 Solution & Technical Architecture

### Technical Architecture:



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## 5.3 User Stories

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, password, and confirming my password.	I can access my account /dashboard	High	
	Login	USN-2	As a user, I can log into the application by entering email & password	I can access the application	High	
	Dashboard	USN-3	As a user I can enter my income and expenditure details.	I can view my daily expenses	High	
Customer Care Executive		USN-4	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-5	As an administrator I can upgrade or update the application.	I can fix the bug which arises for the customers and users of the application	Medium	

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## 6.PROJECT PLANNING & SCHEDULING

### 6.1 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	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	3	High	Naveen M R Rohit A S
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	3	High	Rohit A S Sai Sudarshan S
Sprint-1	Login	USN-3	As a user, I can log into the application by entering email & password	5	High	Sreenidhi S Naveen M R
Sprint-1	Dashboard & Logout	USN-4	As a user, once I logged in I can access all the features of the web app and Logout once I completed all the work.	5	High	Sai Sudarshan S Sreenidhi S
Sprint-1		USN-5	Once logged In, Keep me logged for few hours to avoid repeated login if the page is refreshed	4	Medium	Rohit A S Sreenidhi S
Sprint-2	Expense	USN-6	Add total income for the month and Allow for edit option	6	High	Sai Sudarshan S
Sprint-2		USN-7	Split the total income based on usage like entertainment, food, shopping etc.	2	Low	Naveen M R
Sprint-2		USN-8	Add the day to day expense.	6	High	Sreenidhi S
Sprint-2		USN-9	Display the user added expense	6	High	Naveen M R
Sprint-3		USN-10	Filter the expense data based on criteria	6	Medium	Split Between 4
Sprint-3	Charts	USN-11	As a user I can display it in graphs	4	Low	Rohit A S
Sprint-3	Alerts	USN-12	As a user I create custom alert for the balance	10	High	Sai Sudarshan S Sreenidhi S
Sprint-4	Deployment	USN-13	As a user I should able to access it anywhere in the net	20	High	Split between 4



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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	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	24 Nov 2022

## Velocity:

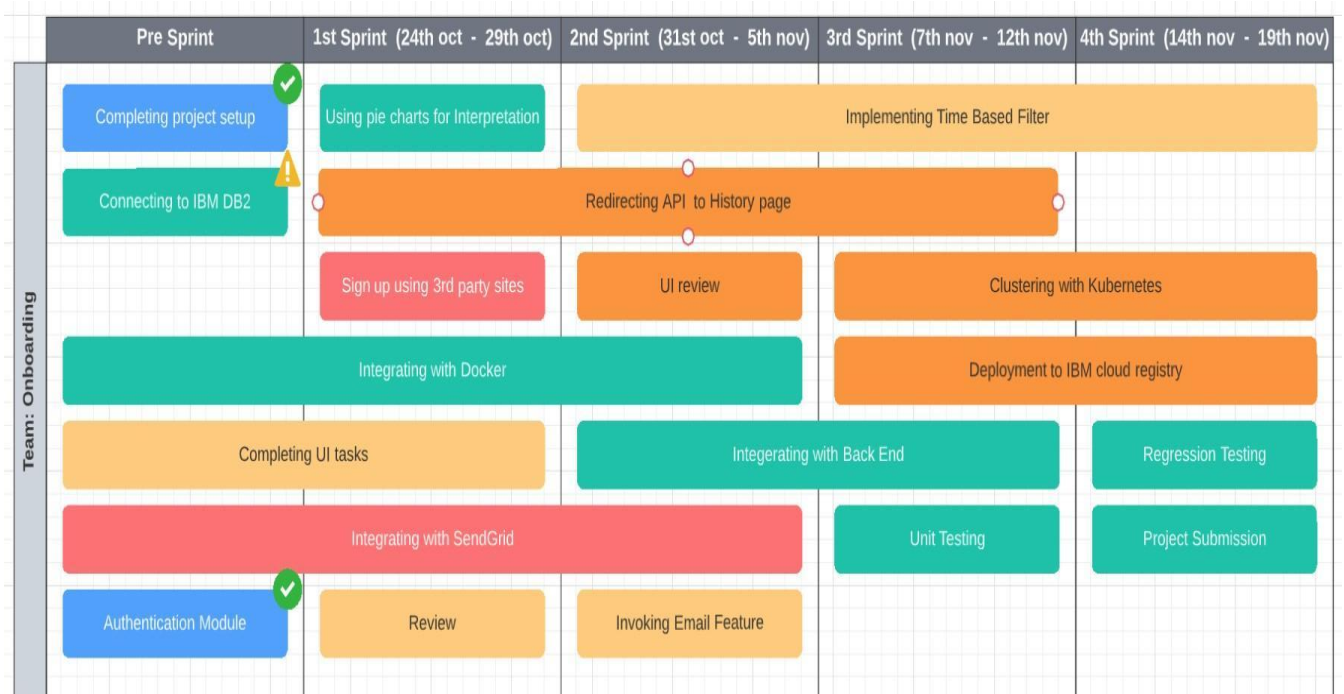
Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

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

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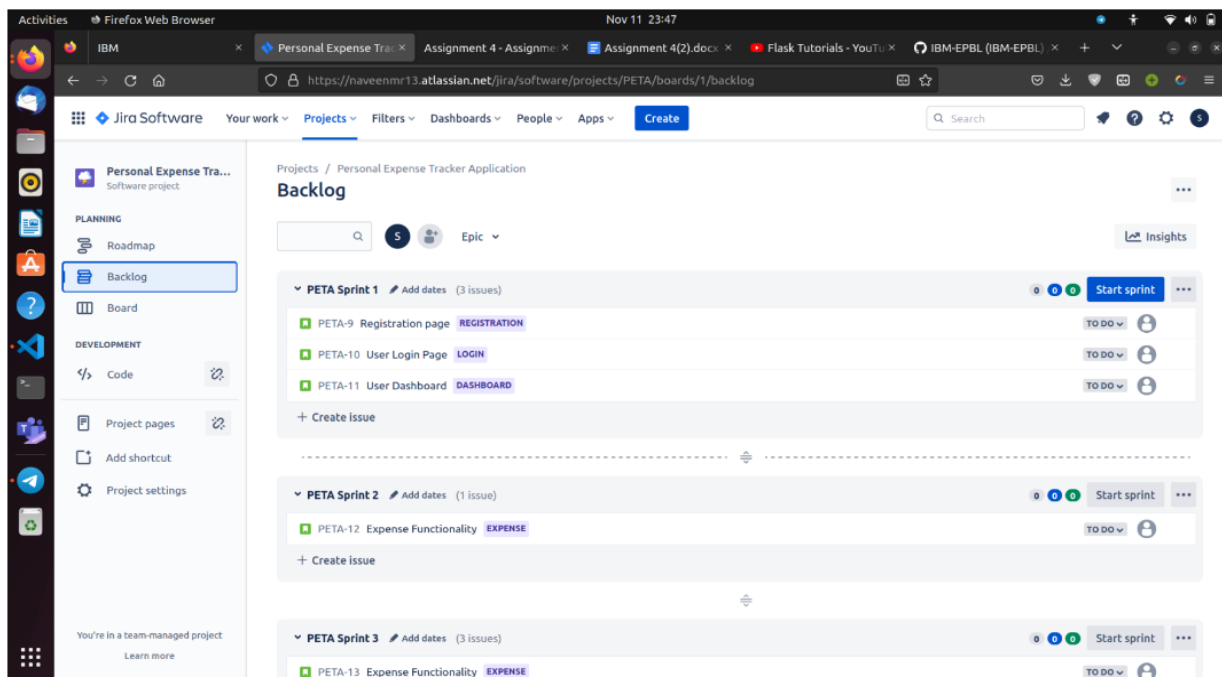
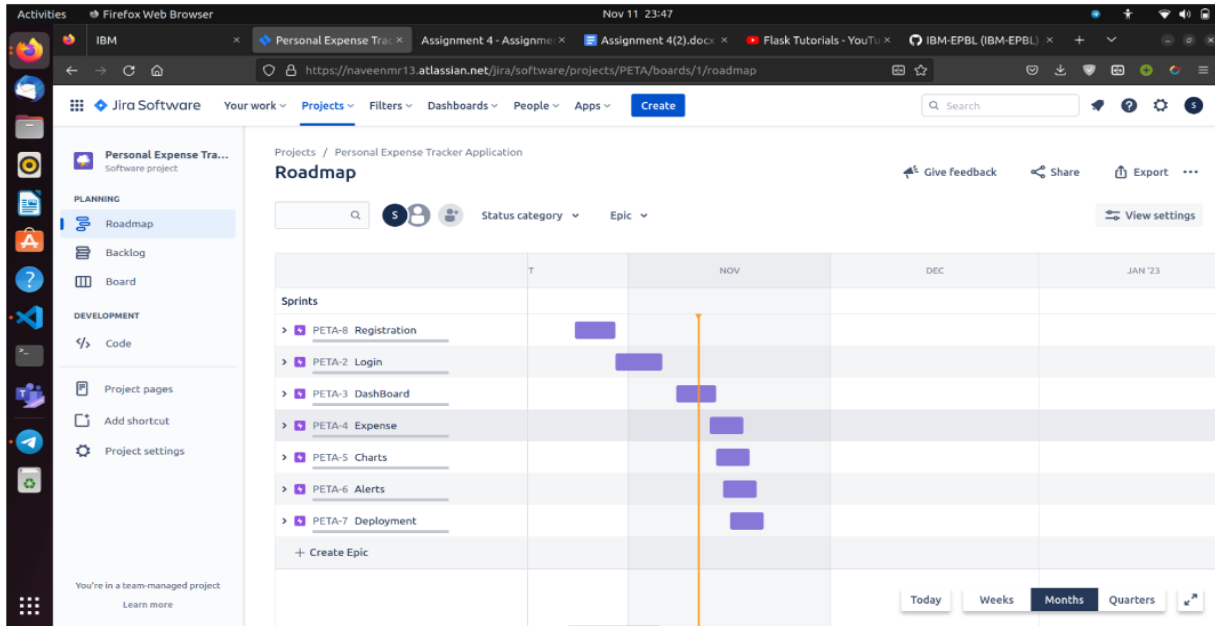
## 6.2 Sprint Delivery Schedule



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## 6.3 Reports from JIRA



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The screenshot shows the Jira Software interface for the 'Personal Expense Tracker Application' project. The left sidebar contains navigation options: PLANNING (Roadmap, Backlog, Board) and DEVELOPMENT (Code, Project pages, Add shortcut, Project settings). The main area displays the 'Backlog' with two sprints: 'PETA Sprint 3' (3 issues) and 'PETA Sprint 4' (1 issue). Each sprint contains a list of issues with their IDs, titles, and types. The 'Backlog' section at the bottom shows 0 issues.

Projects / Personal Expense Tracker Application

## Backlog

Search [S] Epic [v] Insights

**PETA Sprint 3** Add dates (3 issues) Start sprint [v] [v] [v]

- PETA-13 Expense Functionality EXPENSE TO DO [v] [v]
- PETA-14 Display Charts CHARTS TO DO [v] [v]
- PETA-15 Show Alerts ALERTS TO DO [v] [v]

+ Create issue

**PETA Sprint 4** Add dates (1 issue) Start sprint [v] [v] [v]

- PETA-16 Deployment of App DEPLOYMENT TO DO [v] [v]

+ Create issue

**Backlog** (0 issues) Create sprint [v] [v] [v]

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## **7.CODING & SOLUTIONING**

### **7.1 Feature 1**

We have added the data visualization methods for expenditure. The pie chart has 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.
- You only have positive values.
- You have less than seven categories since a larger number can make it difficult to perceive each segment.

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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- 6">TIME</div>
11 <div class="col-md-6"> AMOUNT  </div>
12         </div>
```

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```

        for class in
            class "card shadow
1 mb-2 bg-white rounded-bottom"

```

```

class "card-body "
class "row"
    "ttime"

class "col-md-6"
    0
    "tamount"

class "col-md-6"
    1

```

- `<section>`

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



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

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```
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-
```

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```
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">
```

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```
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')
```

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```
    ).innerHTML
93  let business =
    document.getElementById('tbusiness').inn
    erHTML
94          let rent =

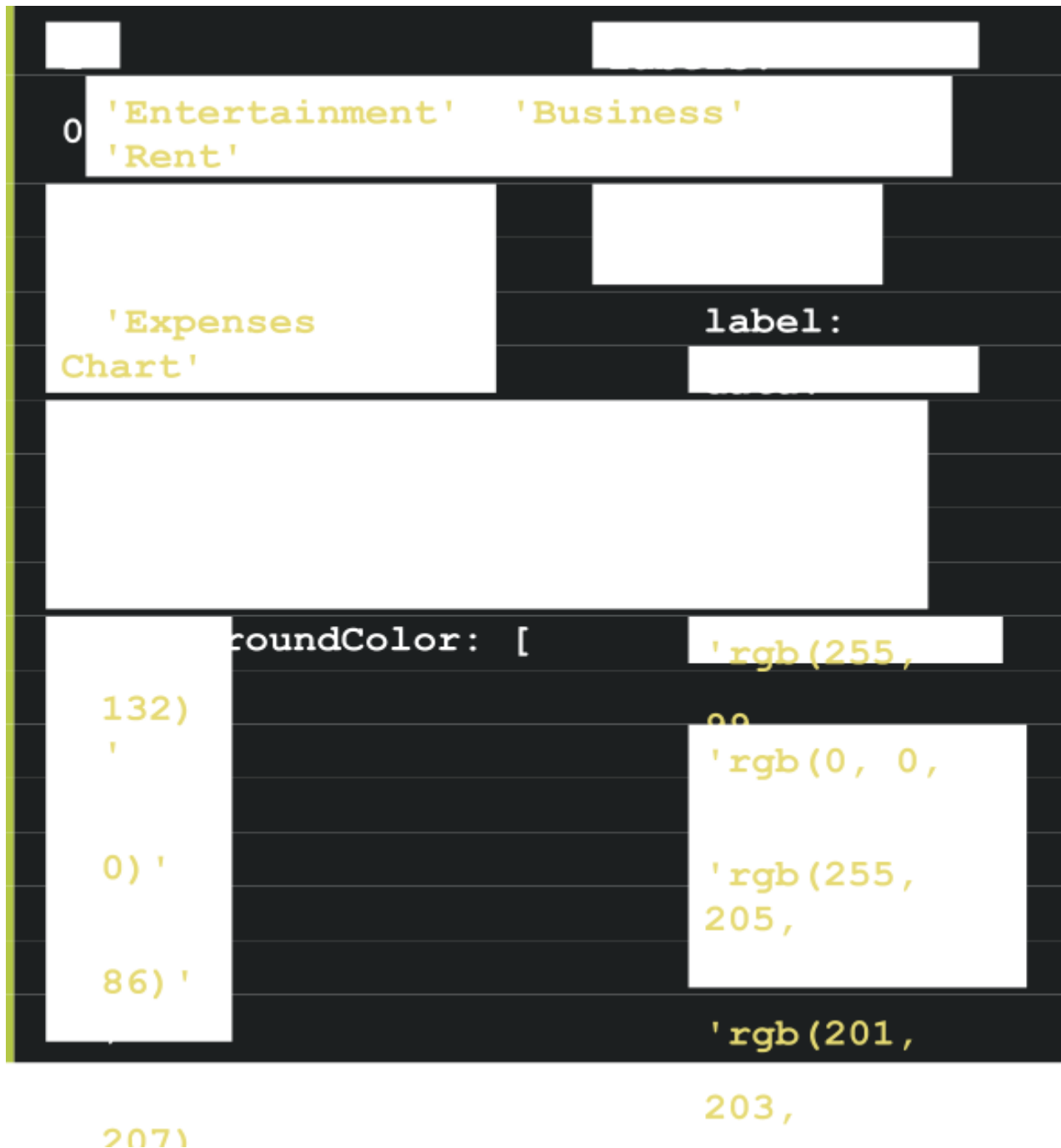
    document.getElementById('trent').innerHT
    ML
95          let emi =

    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          'doughnut'
100
```

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```
110             'rgb(54,  
111             162, 235) '  
112             ,  
113             'rgb(215,  
114             159, 64) '  
115             ],  
116             },  
117             options: {  
118                 responsive: true,  
119                 plugins: {  
120                     legend: {  
121                         position: 'bottom',  
122                         },  
123                         title: {  
124                             display: true,  
125                             text: 'EXPENSE BREAKDOWN'  
126                         }  
127                     }  
128                 }  
129             }
```

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```
• @app.route("/today")
  """
• def get_expenses(user_id):
    """SELECT TIME(date) as tn, amount FROM
4   expenses WHERE userid = " + user_id + " AND
    DATE(date) = DATE(current timestamp) ORDER BY date DESC"""
    expense = []
    while True:
        temp.append(dictionary["TN"]
        """
```



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```

                                "AMOUNT"

print
dictionary1 =
ibm_db.fetch_assoc(res1)

1      "SELECT * FROM expenses WHERE userid = "
5      'id'      " AND DATE(date) = DATE(current
timestamp) ORDER BY date DESC"

while      False

                                "ID"
                                "USERID"
                                "DATE"
                                "EXPENSENAME"
                                "AMOUNT"
                                "PAYMODE"
                                "CATEGORY"

print
dictionary = ibm_db.fetch_assoc(res)

0
0
0
t_business=0
t_rent=0
0
0
```

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```
for i in range(1, len(x)):
    if x[i] == ' ':
        continue
    elif x[i] == '[':
        "bu"
    elif x[i] == ']':
        "re"
    elif x[i] == ',':
        "EM"
    elif x[i] == ' ':
        continue
    x[i] = x[i].lower()
print(x)
print(x)
print(x)
print(x)
print(x)
print(x)

4 expense,
expense,
8 t food,t entertainment =
6 nt,
7 nt,
```

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## 7.2 Feature 2

Email notifications will be sent to the users once they cross the expenditure limit through a grid mailing 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.

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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)
```

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## **7.3 Database Schema**

Tables :

1) REGISTER

id INT NOT NULL GENERATED  
ALWAYS AS IDENTITY,  
username VARCHAR(255) NOT  
NULL,  
email  
VARC  
HAR(2  
55)  
NOT  
NULL,  
passw  
ord  
VARC  
HAR(2  
55)  
NOT  
NULL

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## 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

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## **8.TESTING**

### 8.1 Test Cases

<b>Test Case ID</b>	<b>Purpose</b>	<b>TestCases</b>	<b>Result</b>
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

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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



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## 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

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## **9.RESULTS**

### **9.1 Performance 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.

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- 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.
- In-depth insights and analytics: Provides in-built tools to generate

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reports with easy-to-understand visuals and graphics to gain insights about the performance of your business.

- 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.

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5. Open **direct marketing channels** with no extra costs with methods such as push notifications.
6. **Boost the productivity** of all the processes within the organization.
7. Increase **efficiency** and **customer satisfaction** with an app aligned to their needs.
8. **Seamlessly integrate** with existing infrastructure.
9. Ability to provide **valuable insights**.
10. Optimize sales processes to generate **more revenue** through enhanced data collection.

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## **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 unpredictable problems and we enjoyed a lot solving them as a team. We adopted things like video tutorials, text tutorials, internet and learning materials to make our project complete.

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## **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.

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## **13.APPENDIX**

### **Source Code Github Link :**

<https://github.com/IBM-EPBL/IBM-Project-17328-1659634188>

### **Project Demo Link :**

[https://drive.google.com/file/d/1N60hTvw2IC-OweKhPqdnCpKM032QBHpN/view?usp=share\\_link](https://drive.google.com/file/d/1N60hTvw2IC-OweKhPqdnCpKM032QBHpN/view?usp=share_link)