

Personal Expense Tracker Application

IBM-Project-PNT2022TMID34039

NALAIYA THIRAN PROJECT BASED LEARNING ON

**PROFESSIONAL READINESS FOR INNOVATION,
EMPLOYMENT AND ENTREPRENEURSHIP**

A PROJECT REPORT

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**BACHELOR OF ENGINEERING IN COMPUTER SCIENCE
AND ENGINEERING**

ARUNACHALA COLLEGE OF ENGINEERING FOR WOMEN

INDEX

1. INTRODUCTION

1. Project Overview
2. Purpose

2. LITERATURE SURVEY

1. Existing problem
2. References
3. Problem Statement Definition

3. IDEATION & PROPOSED SOLUTION

1. Empathy Map Canvas
2. Ideation & Brainstorming
3. Proposed Solution
4. Problem Solution fit

4. REQUIREMENT ANALYSIS

1. Functional requirement
2. Non-Functional requirements

5. PROJECT DESIGN

1. Data Flow Diagrams
2. Solution & Technical Architecture
3. User Stories

6. PROJECT PLANNING & SCHEDULING

1. Sprint Planning & Estimation
2. Sprint Delivery Schedule
3. Reports from JIRA

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

1. Feature 1
2. Feature 2
3. Database Schema (if Applicable)

8. TESTING

1. Test Cases
2. User Acceptance Testing

9. RESULTS

1. Performance Metrics

10. ADVANTAGES & DISADVANTAGES

11. CONCLUSION

12. FUTURE SCOPE

13. APPENDIX

Source Code

GitHub & Project Demo Link

1.INTRODUCTION

1.1 Project Overview

Category: Cloud App Development

Team ID : PNT2022TMID34039

◆◆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.

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 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

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 References

S.No	TITLE	PROPOSED WORK	TOOLS USED/ ALGORITHM	TECHNOLOGY	ADVANTAGES/ DISADVANTAGES
1.	EXPENSE MANAGER APPLICATION. (2020)	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.	A NOVEL EXPENSE TRACKER USING STATISTICAL ANALYSIS. (2021)	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.

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

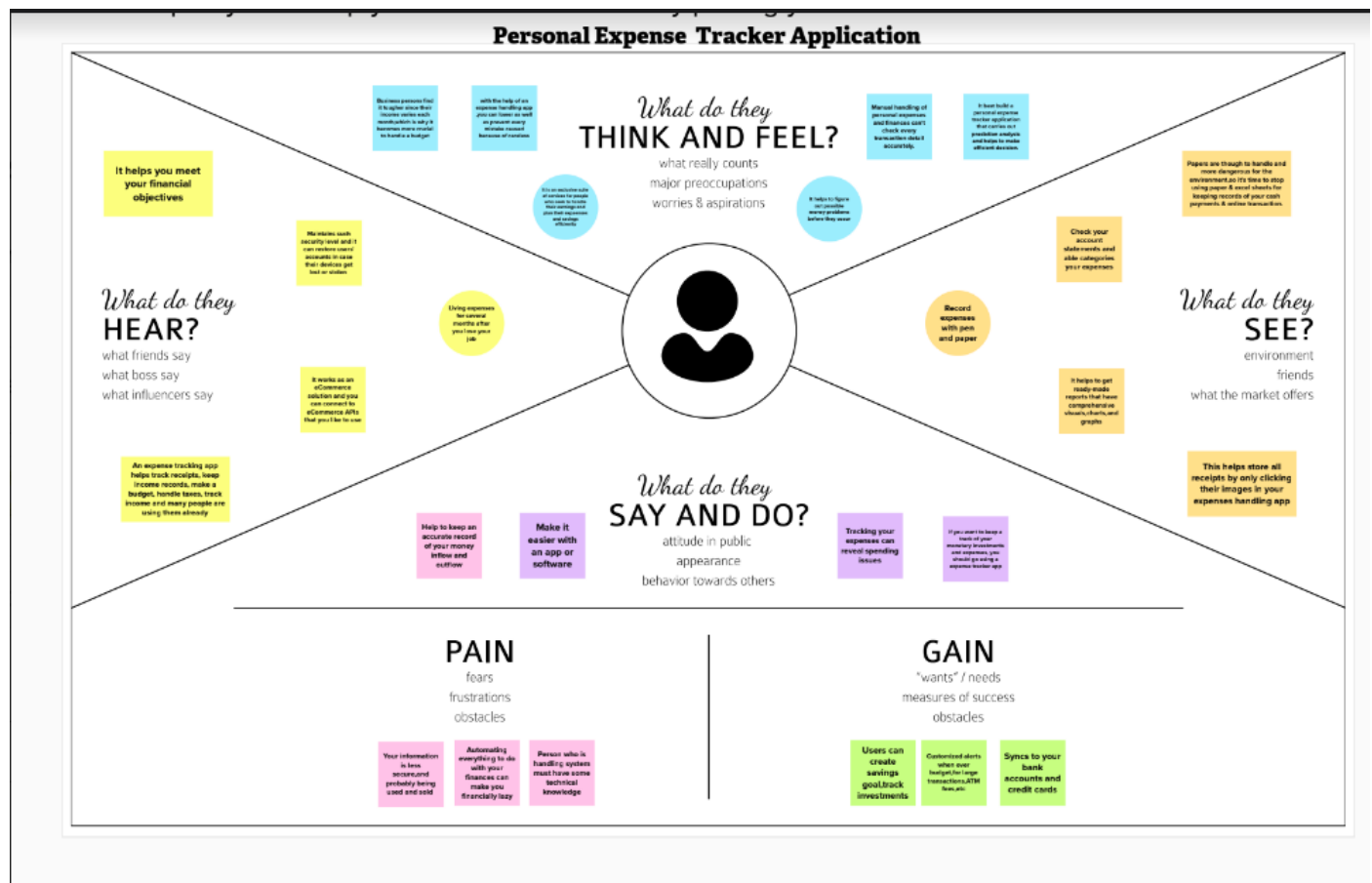
Customer Problem Statement :

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.

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

 Adirondack
Adirondack

Student Forum

Civic Engagement Workshop

4

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

Due to lack of basic financial education, people have poor spending habits, & poor control over finances. Most of the young people are not aware and they are often misled by many factors. I buy & spend on things that are not important for their lifestyle.

2

Key rules of brainstorming

To get around and grab the 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

Brainstorm
Write down any ideas that come to mind that address your problem statement.
[10 minutes](#)

Goal: Reduce Budget

1. Reduce staff costs by 10%
2. Eliminate redundant departments
3. Outsource non-core functions
4. Negotiate better rates with suppliers
5. Consolidate facilities
6. Implement energy-saving measures
7. Review and optimize IT infrastructure
8. Streamline procurement process
9. Reduce travel and entertainment expenses
10. Optimize fleet management

Goal: Increase Revenue

1. Launch new product lines
2. Expand into new markets
3. Offer premium services
4. Implement dynamic pricing
5. Enhance customer loyalty programs
6. Develop strategic partnerships
7. Optimize marketing spend
8. Improve operational efficiency
9. Diversify revenue streams
10. Invest in R&D for innovation

Goal: Improve Efficiency

1. Automate repetitive tasks
2. Implement lean manufacturing principles
3. Optimize supply chain management
4. Streamline internal processes
5. Invest in employee training
6. Implement performance metrics
7. Optimize inventory levels
8. Enhance communication channels
9. Implement time management techniques
10. Regularly review and update processes

Goal: Enhance Customer Satisfaction

1. Improve product quality
2. Enhance customer service training
3. Implement feedback loops
4. Offer personalized experiences
5. Streamline the customer journey
6. Invest in customer support technology
7. Monitor and respond to reviews
8. Offer flexible return policies
9. Enhance website and app usability
10. Provide exceptional after-sales service

2

Group ideas
Use this space to group similar ideas from the brainstorm. Each group should have a title that describes what the ideas have in common. If a group is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.
[20 minutes](#)

Budget Plan

1. Reduce staff costs by 10%
2. Eliminate redundant departments
3. Outsource non-core functions
4. Negotiate better rates with suppliers
5. Consolidate facilities
6. Implement energy-saving measures
7. Review and optimize IT infrastructure
8. Streamline procurement process
9. Reduce travel and entertainment expenses
10. Optimize fleet management

Analyze Expenses

1. Identify areas for cost reduction
2. Compare current vs. target expenses
3. Prioritize high-impact areas
4. Implement cost-saving measures
5. Monitor and report progress
6. Adjust plan as needed

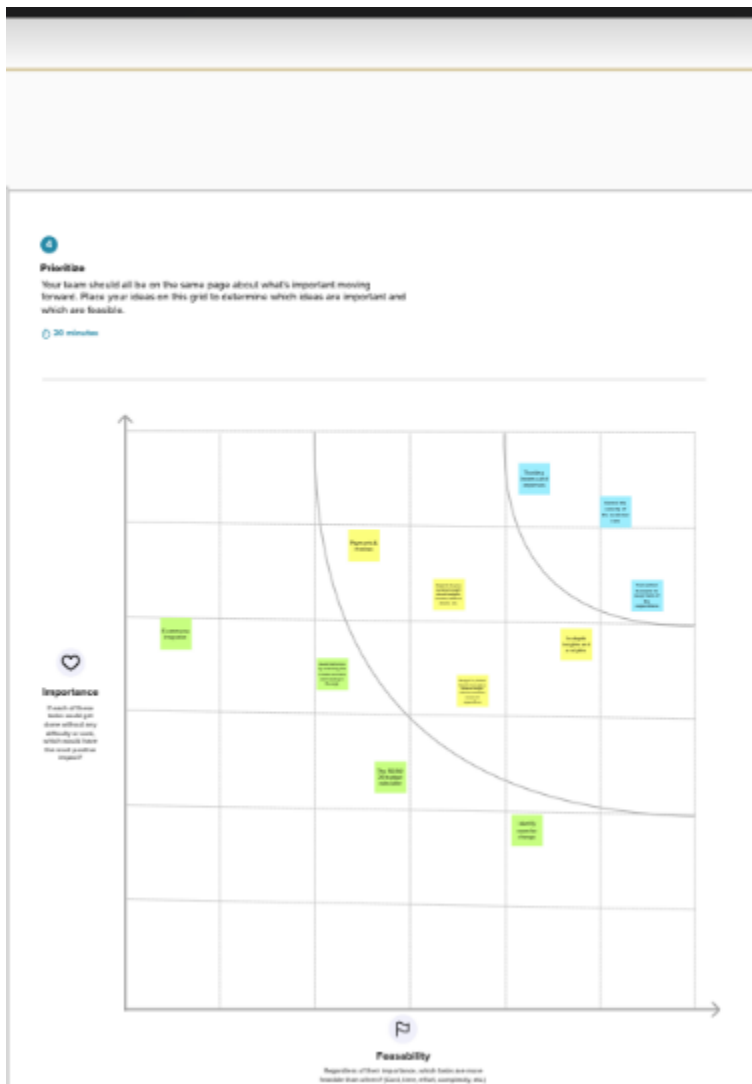
Spending & Save Money

1. Track all expenses
2. Set a budget
3. Prioritize spending
4. Find ways to save
5. Review and adjust
6. Celebrate successes

Verify Income Plan

1. Review current income sources
2. Identify potential new income streams
3. Evaluate the feasibility of new ideas
4. Implement the chosen plan
5. Monitor and report progress
6. Adjust plan as needed

Step-3: Idea Prioritization



3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<ul style="list-style-type: none">→ Expense Tracker at the instant, enables a person to keep a track of it's daily expenditure easily.→ To do so, a person has 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 error leading to losses.→ Due to lack of a complete tracking system, there is a constant overload to rely on the daily entry of the expenditure & total estimation till the end of the month.→ This project is an attempt to manage our daily expenses in a more efficient way.→ The system attempts to free the user with as much as possible the burden of manual calculation & keep track of the expenditure.

2.	Ideas / Solution description	<ul style="list-style-type: none"> → It is an exclusive suite of services for people who seek to handle their earnings and plan their expenses and savings efficiently. → It helps you track all transactions like bills, payrolls, receipts, taxes, etc., on a daily, weekly, and monthly basis. → It will help you make payments quickly against the invoices.
3.	Novelty / Uniqueness	<ul style="list-style-type: none"> → Offering facilities to add portfolio information, tracking investments, know about your performance and buy. → And a way of linking itself to bank account and credit cards synchronizes all the data, further categorizing them into required categories and also notification as a remainder of our pending expenses and payments. → Backup on Google Drive or Dropbox.
4.	Social impact/Customer Satisfaction	<ul style="list-style-type: none"> → Automated tools can help people manage money proactively and make important decisions without having to be bogged down by the details. → This app gives people the ability to be more proactive when it comes to their financial lives. → This technology makes it easier to automate important behaviors such as paying bills, saving and investing, which can ultimately improve outcomes. → The users wishes it had more cash flow projection capabilities to see estimated future account balances.

5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> → Save time and money: Failing to track business expenses effectively could destroy your business. → Get real-time visibility over their financials: You shouldn't have to wait until the books are closed or your accountant has delivered their report to make changes. → Optimize cash flow: It leads you optimize budgets,maximize cash deductions, manage cash flow effectively, and quickly identify any expense anomalies.
6.	Scalability of the Solution	<ul style="list-style-type: none"> → A custom mobile app gives you the ability to: → Achieve your business goals with a tailored mobile app that perfectly fits your business. → Deliver outstanding customer experience through additional control over the app. → Increase efficiency and customer satisfaction with an app aligned to their needs.

3.4 Problem Solution fit

PROJECT DESIGN PHASE- I

PROJECT NAME: Personal Expense Tracker Application

TEAM ID:PNT2022TMID34039

Define the business system	1. CUSTOMER SEGMENT(S) Man, who needs to manage finances effectively.	6. CUSTOMER CONSTRAINTS No control over spending, not reviewing financial plan regularly, lack of priorities, not saving enough.	5. AVAILABLE SOLUTIONS When Expense is out of control, The Personal Expense tracker is the solution to control the Expenses according to their needs as this application track the expense & generate the monthly Expense report.	Expense will influence more
	2. JOBS-TO-BE-DONE / PROBLEMS Expense Tracker system keep a track of Income Expenses on a day to day basis, this need to take income and divide in daily expense, If exceeds cut if firm the income and if expense is less it need to add in the savings. This system needs to generate report at the end of every month to show income Expense curve.	9. PROBLEM ROOT CAUSE Not living on a budget, Not knowing the priorities in spending, Lacking a financial purpose.	7. BEHAVIOUR Customer should set their budget and spend accordingly. He can make use of management tips given by the system to save his money effectively.	
Identify the business system	3. TRIGGERS Customer finds that at the end of the month they don't have sufficient money to meet their needs which urges them to use Expense tracker.	10. YOUR SOLUTION A Personal Expense tracker application, with which will be able to allocate money to different priorities and this will also help to cutdown on unnecessary spending and helps to budget money so that can use it wisely	8.CHANNELS of BEHAVIOUR Customer needs to input their monthly income and expense to manage their finance. Can view their generated report. Can view their Previous spending.	Monthly income TN & RM
	4. EMOTIONS: BEFORE / AFTER Before: Less financial security, a higher likelihood of going into dept, and more financial stress. After: More financial security, stress free financial control.			

4.REQUIREMENT ANALYSIS

4.1 Functional requirement

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR NO.	FUNCTIONAL REQUIREMENTS (EPIC)	SUB REQUIREMENT (STORY/SUB-TASK)
FR-1	User Registration	Registration through form. Registration through email.
FR-2	User Confirmation	Confirmation via email. Confirmation via OTP.
FR-3	Monthly budget	Tracking through graphical representation.
FR-4	Input data	Manual filling
FR-5	Notification	Send through email.

4.2 Non-Functional requirements

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

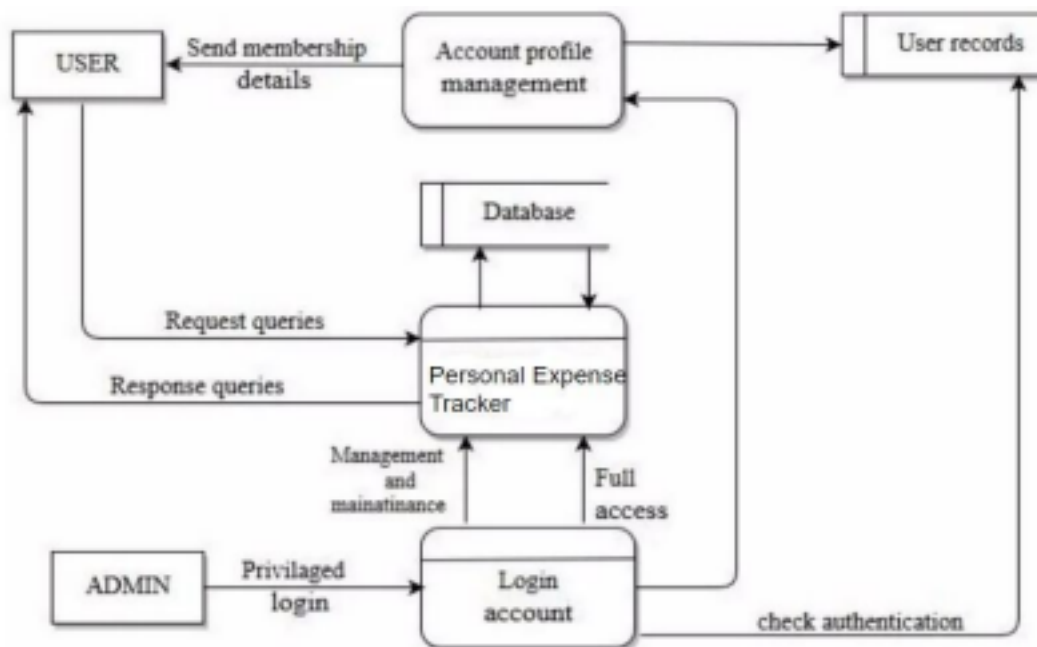
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	This application is really usable for the user for their budget tracking. It makes the user much easier because they can track their expenditures in day, weekly, monthly wise. Expenditure and the savings are shown in a graphical representation.
NFR-2	Security	The personal information of the users are in a secure manner.
NFR-3	Reliability	The performance of the system would be really good. Probability of giving false information is very low. Because everything is set by an algorithm for the budget calculation.
NFR-4	Performance	The performance mostly depends on the user hand because if the user fills the data correctly the application shows the accurate information about the budget tracking.
NFR-5	Availability	The availability of the solution is effective and it should be helpful for the user.
NFR-6	Scalability	It is scalability which decreases the budget planning of the user.

5.PROJECT DESIGN

5.1 Data Flow Diagrams

Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



5.2 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer	Registration	USN-1	As a user, I can register for the application by entering my email password.	I can access my account	High	Sprint-1
		USN-2	As a user, I will receive a confirmation email once I have registered for the application.	I can receive confirmation email	High	Sprint-1
	Login	USN-3	As a user, I can log into the application by entering email & password.	I can access my account with Login	High	Sprint-1
		USN-4	As a user, I can give forgot password and verify through my email.	I can login even when password is unknown	Medium	Sprint-1
	Input	USN-5 USN-6	As a user, I can give my Income and expense details regularly. As a user, I can give my budget limit.	I can enter my income, expense. I can set budget	High High	Sprint-1 Sprint-2
		USN-7	As a user, I can enter my bills.	I can input bills.	Low	Sprint-2
	Dashboard	USN-8	As a user, once I logged in Graphical representation of my expenses was achieved.	I can view my updated dashboard	Medium	Sprint-2
		USN-9	As a user, I can track my expenses daily, monthly.	I can track my expenses.	High	Sprint-2

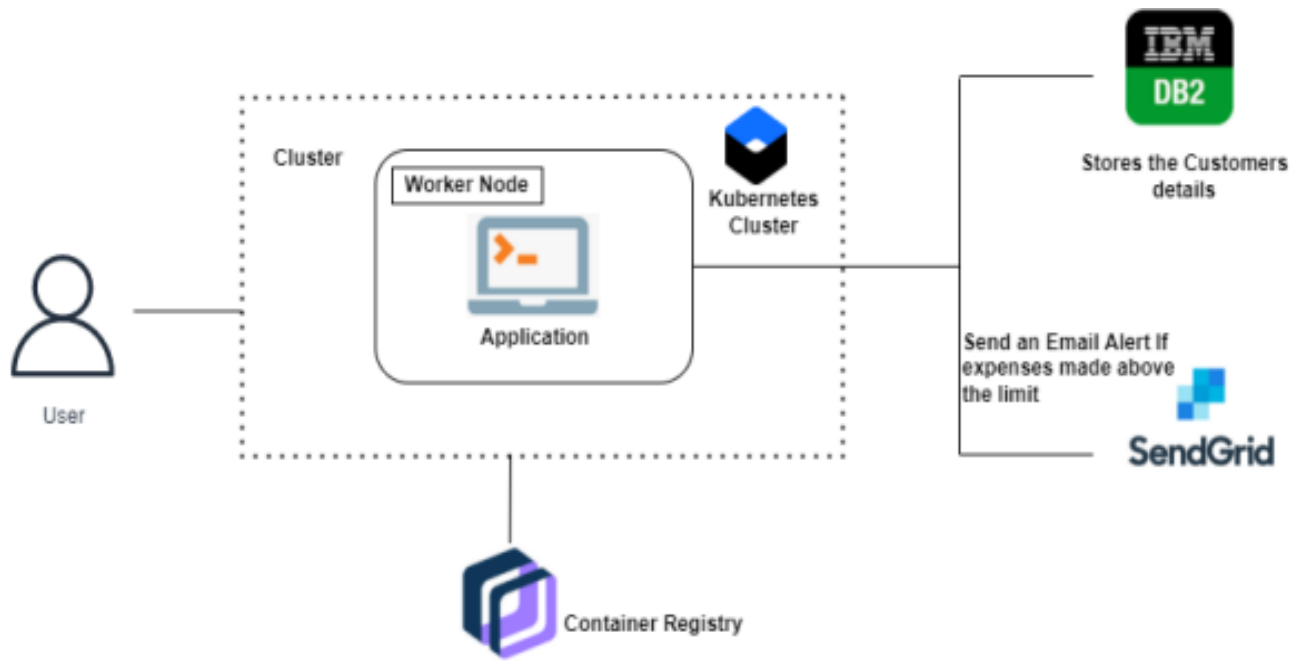
		USN-10	As a user, I can revisit my expenses on a specific day.	I can revisit my expenses	Low	Sprint-2
	Remove	USN-11	As a user , I can remove previously added expenses.	I can remove previous data	High	Sprint-3

	Add	USN-12	As a user , I can add in new expenses	I can add new expenses	High	Sprint-3
	Notifications	USN-13	As a user, I can receive alert messages on exceeding my budget.	I can be notified for exceeding budget.	High	Sprint-3
Administrator	Add/Remove user	USN-14	As admin , I can add or remove user details on db2 manually.	I can Add/Remove any user	Medium	Sprint-4
		USN-15	As admin , I can add or remove user details on sendgrid.	I can delete users data	Low	Sprint-4
	Feedback	USN-16	As admin,I can ask feedbacks from user	Getting feedbacks	High	Sprint-4

5.3 Solution & Technical Architecture

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2



Solution Architecture Diagram:

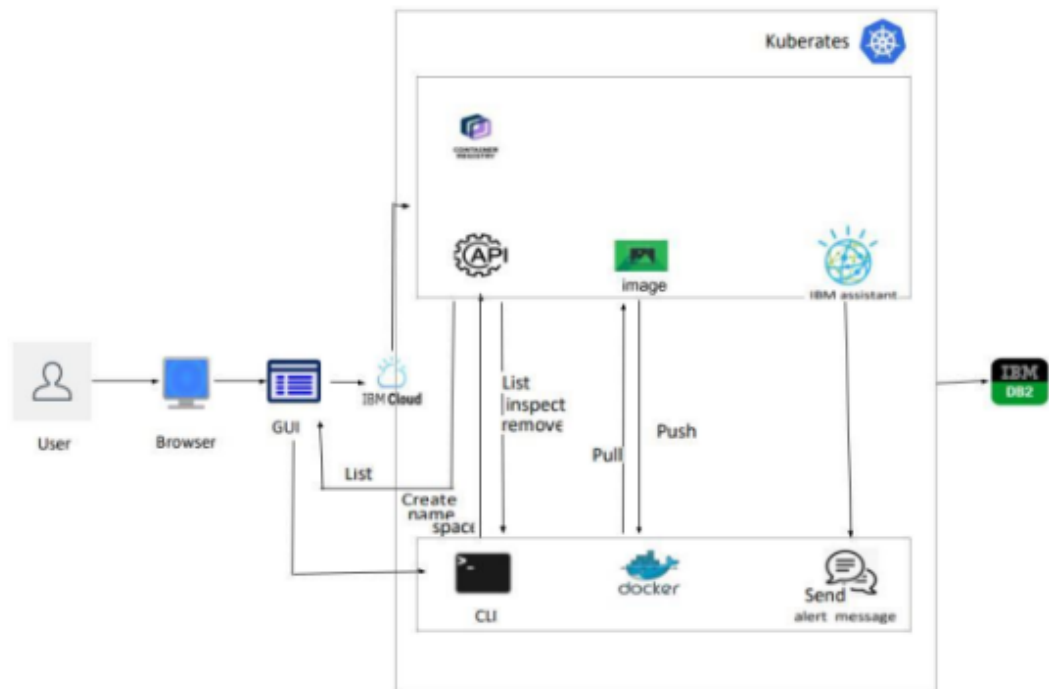


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript in Python Flask
2.	User Login	The user can login either through their gmail account or an account in the app server	Google Oauth for Google Signin. Hashed password in DB
3.	Graph Visualization	Rendering plots and graphs based on the user spending data	Seaborn, Mathplotlib
4.	Database	Data Type, Configurations etc.	NoSQL database can be used as it promotes flexible structuring of data
5.	Cloud Database	Database Service on Cloud	IBM DB2 is used to store the user details and the data entries
6.	SendGrid	a cloud-based SMTP provider that allows you to send email without having to maintain email servers	SendGrid is used to trigger mail to user emails when a particular condition is met
7.	Google OAuth	OAuth 2.0 allows users to share specific data with an application while keeping their usernames, passwords, and other information private.	Enables login through gmail account, thus making the application accessible
8.	Cloud Deployment	Application Deployment onCloud Server	Docker and Kubernetes is used for deployment as it promises scalability and high availability

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
------	-----------------	-------------	------------

1.	Open-Source Frameworks	Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries.	Python Flask Framework
2.	Security Implementations	Passwords cant be stored as plaintext so it is hashed and salted	BCrypt
3.	Scalable Architecture	Containerized application is deployed to rapidly increase scale on demand	Docker
4.	Availability, Performance	<p>Kubernetes is an open-source container orchestration system for automating software deployment, scaling, and management.</p> <p>Availability and Performance enhances user experience</p>	Kubernetes

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.	2	High	Shafeeka Begum, Reshma
		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Sneha, Shalini, Shafeeka Begum, Reshma
		USN-3	As a user, I can register for the application through the gmail	1	Medium	Sneha, Shalini
	Login	USN-4	As a user, I can log into the application by entering email & password	1	High	Shafeeka Begum, Reshma
	Dashboard	USN-5	Logging in takes to the dashboard for the logged user.	2	High	Shafeeka Begum, Shalini, Reshma,

						Snekha
	Workspace	USN-1	Workspace for personal expense tracking	2	High	Reshma, Shafeeka Begum, Sneha, Shalini
	Charts	USN-2	Creating various graphs and statistics of customer's data	1	Medium	Snekha, Shalini

Sprint 2	Connecting to IBM DB2	USN-3	Linking database with dashboard	2	High	Shafeeka Begum
		USN-4	Making dashboard interactive with JS	2	High	Snekha, Shafeeka Begum, Shalini, Reshma
Sprint-3		USN-1	Wrapping up the server side works of frontend	1	Medium	Shalini, Snekha
	Watson Assistant	USN-2	Creating Chatbot for expense tracking and for clarifying user's query	1	Medium	Shafeeka Begum, Shalini
	SendGrid	USN-3	Using SendGrid to send mail to the user about their expenses	1	Low	Reshma, Shafeeka Begum
		USN-4	Integrating both frontend and backend	2	High	Shafeeka Begum, Reshma, Shalini, Snekha
Sprint-4	Docker	USN-1	Creating image of website using docker/	2	High	Reshma, Snekha

	Cloud Registry	USN-2	Uploading docker image to IBM Cloud registry	2	High	Reshma
	Kubernetes	USN-3	Create container using the docker image and hosting the site	2	High	Shafeeka Begum, Shalini
	Exposing	USN-4	Exposing IP/Ports for the site	2	High	Shalini, Reshma, Shafeeka Begum, snekha

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

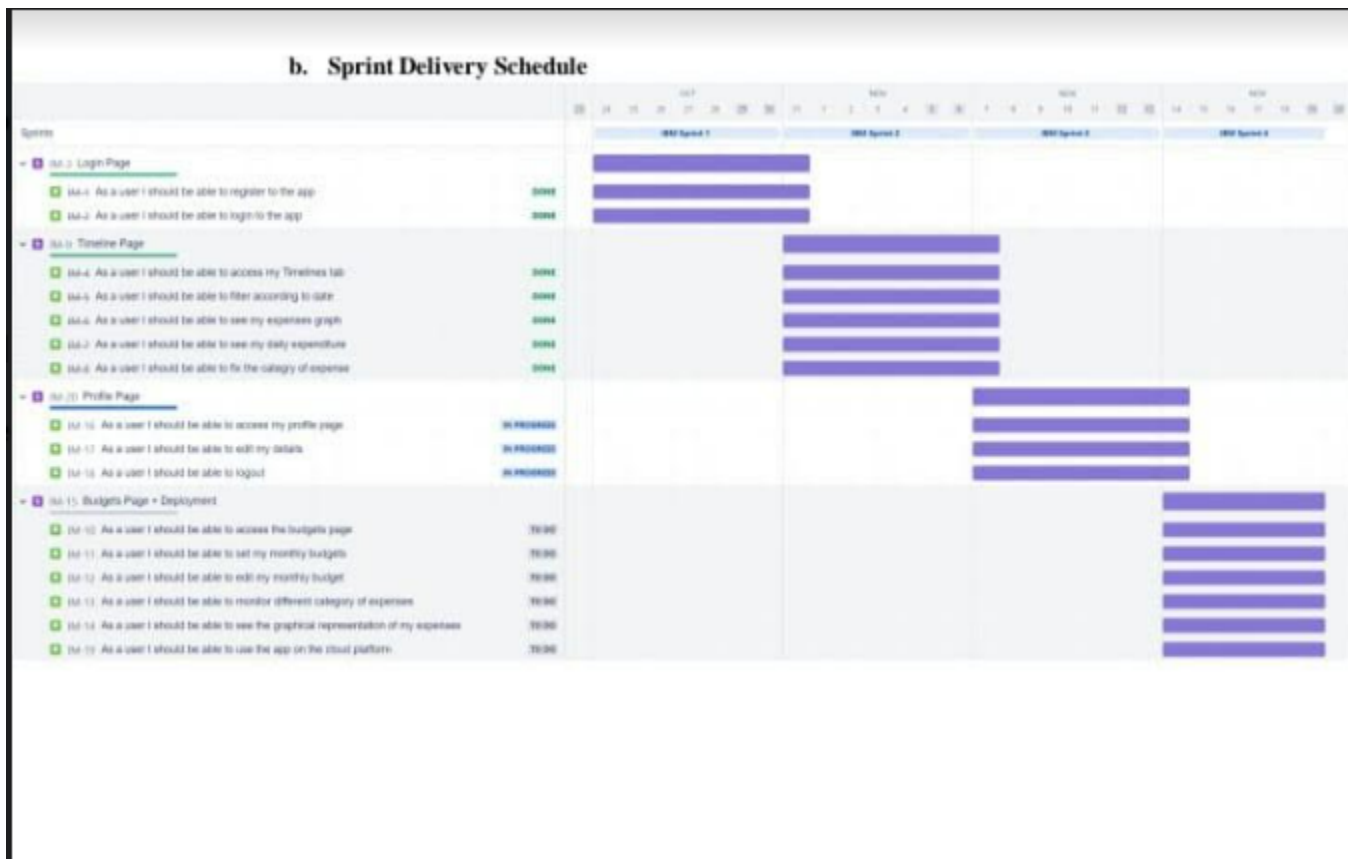
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	27 Oct 2022	06 Nov 2022	20	17 Nov 2022
Sprint-2	20	6 Days	03 Nov 2022	12 Nov 2022	20	18 Nov 2022
Sprint-3	20	6 Days	10 Nov 2022	16 Nov 2022	20	19 Nov 2022
Sprint-4	20	6 Days	16 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity

We have a 6-day sprint duration, and the velocity of the team is 20 (points per sprint). Calculating the team's average velocity (AV).

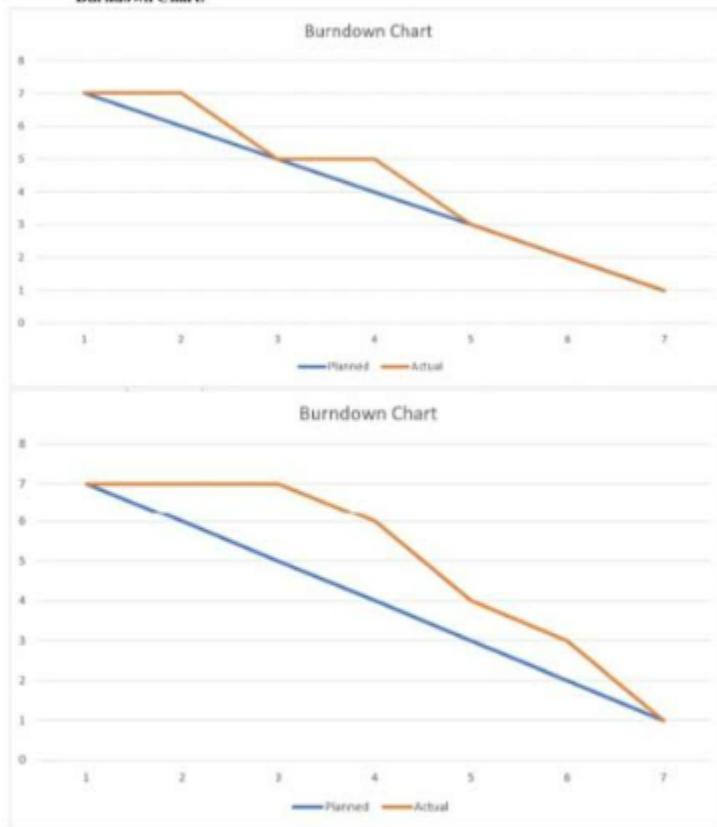
$$AV = \frac{\text{sprint duration}}{\text{velocity}} = \frac{20}{6} = 3.33$$

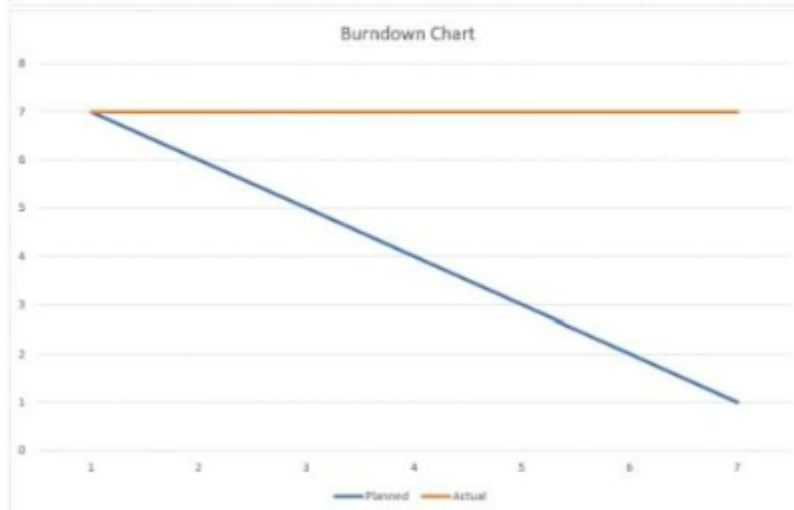
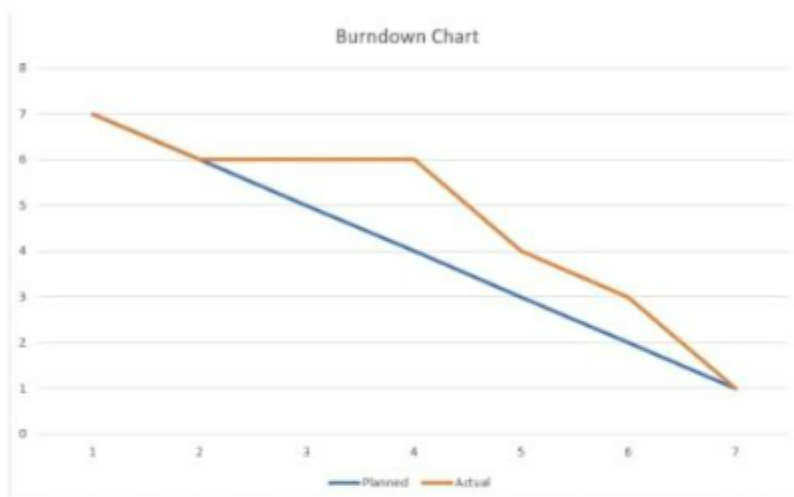
6.2 Sprint Delivery Schedule



6.3 Reports from JIRA

c. Reports from JIRA
Burndown Chart:





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. ●
- You only have positive values.
- You have less than seven categories since a larger number can make it

difficult to perceive each segment.

CODE :

Home.html & app.py

```
templates / home.html / html / head / title

<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">

  <link rel="stylesheet" href="../static/css/home.css">
  <title>My Website</title>
</head>

<body>
  <!-- Header -->
  <section id="header">
    <div class="header container">
      <div class="nav-bar">
        <div class="brand">
          <a href="#hero">
            <h1><span>E</span>xperiences Tracker</h1>
          </a>
        </div>
        <div class="nav-list">
          <div class="hamburger">
            <div class="bar"></div>
          </div>
          <ul>
            <li><a href="#hero" data-after="Home">Home</a></li>
            <li><a href="#services" data-after="Service">Services</a></li>

            <li><a href="#about" data-after="About">About</a></li>
            <li><a href="#contact" data-after="Contact">Contact</a></li>
            <li><a href="/signin" data-after="Login">Login</a></li>
          </ul>
        </div>
      </div>
    </div>
  </section>
</body>
</html>
```

```

    </ul>
  </div>
</div>
</div>
</section>
<!-- End Header -->

<!-- Hero Section -->
<section id="hero">
  <div class="hero container">
    <div>
      <h1>Hello !!! <span></span></h1>
      <h1>Welcome To <span></span></h1>
      <h1>Personal Expense Tracker Application <span></span></h1>
      <a href="/signup" type="button" class="cta">Sign-up</a>
    </div>
  </div>
</section>
<!-- End Hero Section -->

<!-- Service Section -->
<section id="services">
  <div class="services container">
    <div class="service-top">
      <h1 class="section-title">Serv<span>i</span></h1>
      <p>My Expenses provides a many services to the customer and industries. Financial solutions to meet your ne
    </div>
    <div class="service-bottom">
      <div class="service-item">
        <div class="icon"></div>
        <h2>Personal Expenses</h2>
        <p>Budgeting is more than paying bills and setting aside savings.it's about creating a money plan for the
      </div>
      <div class="service-item">
        <div class="icon"></div>
        <h2>Investments</h2>

```

```

templates > home.html > html > head > title


</div>
<h2>Personal Expenses</h2>
<p>Budgeting is more than paying bills and setting aside savings.it's about creating a money plan for the life you want</p>
</div>
<div class="service-item">
  <div class="icon"></div>
  <h2>Investments</h2>
  <p>Follow your investments and bring your portfolio into focus with support for stocks,bonds,CDs,mutual funds and more</p>
</div>
<div class="service-item">
  <div class="icon"></div>
  <h2>Online Banking</h2>
  <p>Expense Tracker application can automatically download transactions and send payments online from many financial institutions</p>
</div>
<div class="service-item">
  <div class="icon"></div>
  <h2>Financial Life</h2>
  <p>Get your Complete financial picture at a glance. With EXPENSES TRACKER application you can view your all the financial activities
  </p>
</div>
</div>
</section>
<!-- End Service Section -->

<!-- About Section -->
<section id="about">
  <div class="about container">
    <div class="col-left">

</div>


```

```

        ibm_db_conn = ibm_db.connect(conn_str, '', '')

        print("Database connected without any error !!")
    except:
        print("IBM DB Connection error : " + DB2.conn_errormsg())

# app.config['']

# mysql = MySQL(app)

#HOME--PAGE
@app.route("/home")
def home():
    return render_template("homepage.html")

@app.route("/")
def add():
    return render_template("home.html")

#SIGN--UP--OR--REGISTER

@app.route("/signup")
def signup():
    return render_template("signup.html")

@app.route('/register', methods=['GET', 'POST'])

```

```

        cursor = connectionID.cursor()
        print("Break point4")
    except:
        print("No connection Established")

# cursor = mysql.connection.cursor()
# with app.app_context():
#     print("Break point3")
#     cursor = ibm_db_conn.cursor()
#     print("Break point4")

print("Break point5")
sql = "SELECT * FROM register WHERE username = ?"
stmt = ibm_db.prepare(ibm_db_conn, sql)
ibm_db.bind_param(stmt, 1, username)
ibm_db.execute(stmt)
result = ibm_db.execute(stmt)
print(result)
account = ibm_db.fetch_row(stmt)
print(account)

param = "SELECT * FROM register WHERE username = " + "'" + username + "'"
res = ibm_db.exec_immediate(ibm_db_conn, param)
print("---- ")
dictionary = ibm_db.fetch_assoc(res)
while dictionary != False:
    print("The ID is : ", dictionary["USERNAME"])
    dictionary = ibm_db.fetch_assoc(res)

# dictionary = ibm_db.fetch_assoc(result)
# cursor.execute(stmt)

```

```

# print(connectionID.cursor().cursorname)
print("break point 6")
if account:
    msg = 'Username already exists !'
elif not re.match(r'^@+@[^@]+\.[^@]+', email):
    msg = 'Invalid email address !'
elif not re.match(r'[A-Za-z0-9]+', username):
    msg = 'name must contain only characters and numbers !'
else:
    sql2 = "INSERT INTO register (username, email,password) VALUES (?, ?, ?)"
    stmt2 = ibm_db.prepare(ibm_db_conn, sql2)
    ibm_db.bind_param(stmt2, 1, username)
    ibm_db.bind_param(stmt2, 2, email)
    ibm_db.bind_param(stmt2, 3, password)
    ibm_db.execute(stmt2)
    # cursor.execute('INSERT INTO register VALUES (NULL, % s, % s, % s)', (username, email,password))
    # mysql.connection.commit()
    msg = 'You have successfully registered !'
return render_template('signup.html', msg = msg)

#LOGIN--PAGE

@app.route("/signin")
def signin():
    return render_template("login.html")

@app.route('/login',methods=['GET', 'POST'])
def login():
    global userid
    msg = ''

```



```

# account = cursor.fetchone()
# print (account)

sql = "SELECT * FROM register WHERE username = ? and password = ?"
stmt = ibm_db.prepare(ibm_db_conn, sql)
ibm_db.bind_param(stmt, 1, username)
ibm_db.bind_param(stmt, 2, password)
result = ibm_db.execute(stmt)
print(result)
account = ibm_db.fetch_row(stmt)
print(account)

param = "SELECT * FROM register WHERE username = " + "\"" + username + "\"" + " and password = " + "\"" + password + "\""
res = ibm_db.exec_immediate(ibm_db_conn, param)
dictionary = ibm_db.fetch_assoc(res)

# sendmail("hello reshmma", "reshmma123@gmail.com")

if account:
    session['loggedin'] = True
    session['id'] = dictionary["ID"]
    userid = dictionary["ID"]
    session['username'] = dictionary["USERNAME"]
    session['email'] = dictionary["EMAIL"]

    return redirect('/home')
else:
    msg = 'Incorrect username / password !'

return render_template('login.html', msg = msg)

```

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

```

> sendmail.py > sendmail
1 import smtplib
2 import sendgrid as sg
3 import os
4 from sendgrid.helpers.mail import Mail, Email, To, Content
5 SUBJECT = "expense tracker"
6 s = smtplib.SMTP('smtp.gmail.com', 587)
7
8 def sendmail(TEXT,email):
9     print("sorry we cant process your candidature")
10    s = smtplib.SMTP('smtp.gmail.com', 587)
11    s.starttls()
12    # s.login("reshmma@gmail.com", "sjsnekh123@gmail.com")
13    s.login("tproduct8080@gmail.com", "lxixbmpnexbkiemh")
14    message = 'Subject: {}\n\n{}'.format(SUBJECT, TEXT)
15    # s.sendmail("reshmma23@gmail.com", email, message)
16    s.sendmail("il.tproduct8080@gmail.com", email, message)
17    s.quit()
18 def sendgridmail(user,TEXT):
19
20    # from_email = Email("sjsnekh123@gmail.com")
21    from_email = Email("tproduct8080@gmail.com")
22    to_email = To(user)
23    subject = "Sending with SendGrid is Fun"
24    content = Content("text/plain",TEXT)
25    mail = Mail(from_email, to_email, subject, content)
26
27    # Get a JSON-ready representation of the Mail object
28    mail_json = mail.get()
29    # Send an HTTP POST request to /mail/send
30    response = sg.client.mail.send.post(request_body=mail_json)
31    print(response.status_code)
32    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,
limitless VARCHAR(255) NOT NULL

8.TESTING

8.1 Test Cases

Test Case ID	Purpose	TestCases	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

9.1 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.

- 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 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.
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

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 solving them a lot as a team. We adopted things like video tutorials, text tutorials, internet and learning materials to make our 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 interfaces.
- Provide backup and recovery of data.
- Provide a better user interface for user.
- Mobile apps advantage.

13.APPENDIX

Source Code Github Link :

<https://github.com/IBM-EPBL/IBM-Project-40642-1660632524>

Project Demo Link :

https://drive.google.com/file/d/1kn6E-4CBpNiIzolpYgMjvK_bMlGsQSiZ/view?usp=share_link