PERSONAL EXPENSES TRACKER

Team ID: PNT2022TMID03120

A PROJECT REPORT

Submitted by

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ABSTRACT

Tracking regular expense is a key factor to maintain a budget. People often track expense using pen and paper method or take notes in a mobile phone or a computer. These processes of storing expense require further computations and processing for these data to be used as a trackable record. In this work, we are proposing an automated system to store and calculate these data. It is an application that runs on Android smartphones. By using this application, users can save their expense by simply scanning the bills or receipt copies. This application extracts the textual information from the receipts and saves the amount and description for further processing. It also monitors user's income by tracking the received SMS's from the user's saving accounts. By calculating income and expense it produces the user's balance in monthly and yearly basis. Overall, this is a smart automated solution for tracking expense.

1 INTRODUCTION

1.1 PROJECT OVERVIEW:

When it comes to tracking expenses, you can make your system as simple as collecting receipts and organizing them once a month.

You might get a little more information from other expense tracking systems (listing them in a spreadsheet, using money management software or even choosing an online application), but all methods have one thing in common: you have to get in the habit of thinking about your expenses.

It’s very easy to misplace a receipt or forget about any cash you spent. You may even think that a cup of coffee or a trip to the vending machine isn’t worth tracking — although those little expenses can add up amazingly fast.

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

This project will request the clients to add their expenses and in view of their costs, wallet status will be refreshed which will be noticeable to the client.

- The user interacts with the application.
- Application 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.

- Setting up Application Environment
- Create Flask project
- Work with IBM Cloud CLI, Docker CLI, Sendgrid
- Implementation of Web Application
- Create UI to Interact with the application
- Connect IBM DB2 with Python
- Integration of Sendgrid Service with Python
- Deployment of Cloud Application
- Containerize the application
- Upload Image in IBM container directory
- Deploy on Kubernetes Cluster

1.2 PURPOSE :

- Help the people to track their expenses.
- Alert users when they exceed the limit of their budget.
- A personal finance app will not only help you with budgeting and accounting but also give you helpful insights about financial management

2 LITERATURE SURVEY :

2.1 EXISTING PROBLEM :

- Lack of visual analytics for visual data.
- Lack of support for splitting up group expenses.
- Most of the applications are used only for personal use.
- Most of the applications does not incorporate shared group expenses.
- Efforts has to be made to include each and every transactions into the input field.

2.2 REFERENCES :

SPENDING TRACKER :
A Smart Approach to Track Daily Expenses
Authors:
UP Singh, AK Gupta, Dr. B. Balamurugan
Description:

In this paper, a Java GUI based application was proposed to assure that it will Help its users to manage the cost of their daily expenditure. It will guide them and aware them of their daily expenses. The proposed design contained the basic modules for Adding and viewing expenses, managing expense categories. Supports CRUD Operations on expense data.
Year: 2021
Technologies: Java

EXPENSE TRACKER APPLICATION
Authors: Velmurugan.R, Mrs.P.Usha

Description:
This is an android based application that allows users to maintain a computerized Diary to track expenses on a day-to-day basis to stay on budget and know expenses That are represented via a graphical representation with special features of distributing Expenses in different categories suitable for the user.
Year: 2021
Technologies: Java, XML, and MySQL

STUDENT EXPENSE TRACKING APPLICATION
Authors: Saumya Dubey , Pragya Dubey , Rigved Rishabh Kumar , Aaisha Khatoon
Description:
This is an android application which is used to track the daily expenses of a Student. It is like a digital diary that keeps a record of expenses done by a student. The Application keeps track of money spent and the earnings of both of the students on a Day-to-day basis. It also has the feature that it gives warning messages if we are Exceeding our expenses and hence, we can limit our expenses and avoid Overspending. If you spend less money than the daily expense allowed amount, the Money left after spending is added into the user's savings.
Year: 2022
Technologies: Java

EXPENSE TRACKER USING STATISTICAL ANALYSIS

Authors: Muskaan Sharma, Ayush Bansal, Dr. Raju Ranjan, Shivam Sethi
Description:
In this paper, an approach has been proposed on how to efficiently manage house-old budget. This application will allow users to keep track of their expenses. This novel expense tracker uses statistical analysis which is going to keep a track of your expenses and would even give you results accordingly.
Year: 2021
Technologies: Java

BUDGET ESTIMATOR ANDROID APPLICATION
Authors: Namita Jagtap, Priyanka Joshi, Aditya Kamble
Description:
The system known as Budget Estimator is designed to manage the application user ‘s daily expenses in a more efficient and manageable way. This project is about mobile application Expenses system with geo-location tracking, based on the location of the user, it using Google Places, to check, the available store in the area, provides a notification for offers purpose, In term of security design, this system may implement a login authentication such as OTP message to your mobile device, this function may bring more security confidence to user. To reduce manual calculations, we propose an application which is developed by android. This application allows users to maintain a digital automated diary.
Year: 2021
Technologies: Java

SAWANT-EXPENSE TRACKER
Authors: Atiya Kazi, Praphulla S. Kherade , Raj S. Vilankar , Parag M
Description:
In this approach, the application keeps track of the Income and Expenses of both users on a day-to-day basis. This application takes the income of a user and manages its daily expenses so that the user can save money. If you exceed the daily expense allowed amount it will give you a warning, so that you don’t spend much and that specific day. If you spend less money than the daily expense allowed amount, the money left after spending is added into the user's savings. The application generates report of the expenses of each end of the month.
Year: 2021
Technologies: Java

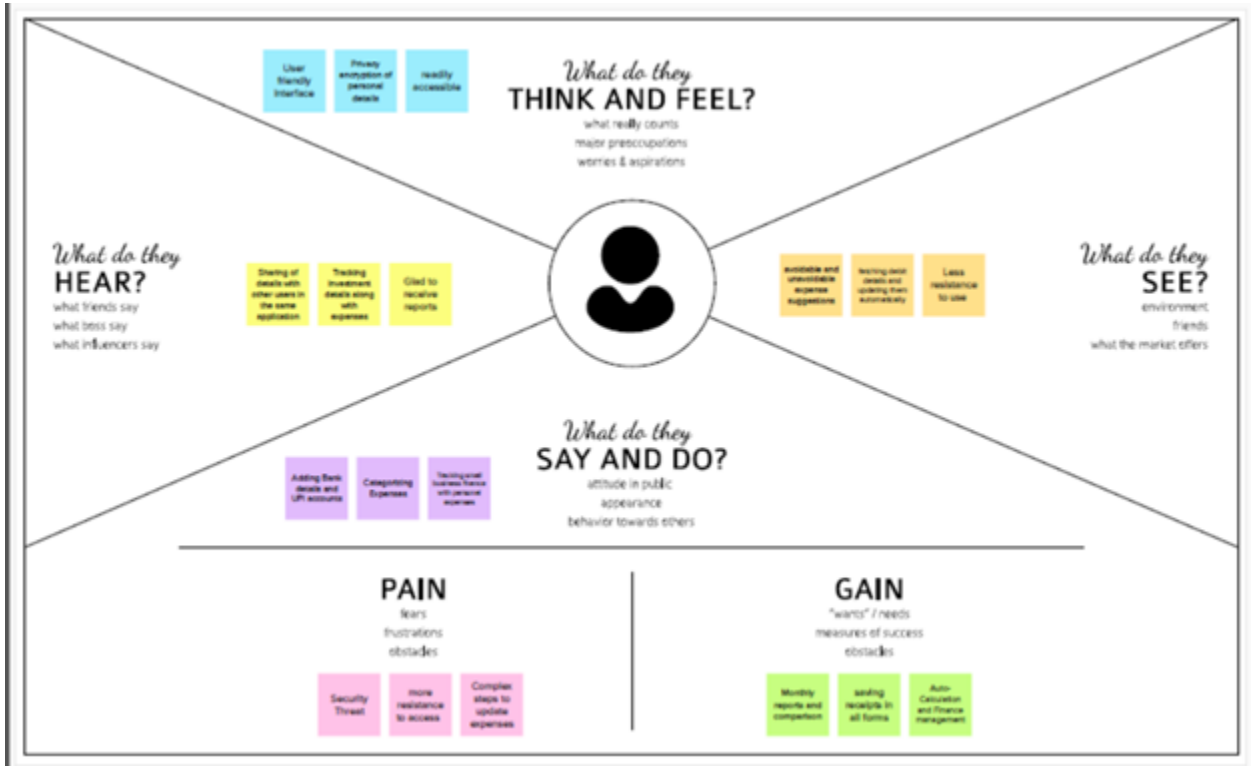
2.3 PROMBLEM STATEMENT :

Who doesthe problem affect?	Investors, savers, big spenders, debtors ,shoppers, budgetconscious consumers.
What are the boundaries of the problem?	Expense tracker for working individuals, students, commonpeople.
What is the issue?	To be vigilant aboutthe expense spent,increases financial stress. Being indecisive about the finances may result in less financial security and exceedthe budget.
When does this issueoccur?	When usingwrong budgeting techniques. When not tracking the expenses doesn't help you to know the amount that is actually spent.
Where is the issueoccurring?	Working individuals who find it difficult to track theirexpenses
Why is it important thatwe fix theproblem?	Fixing this issue, brings accountability and helps to be intentional with the income by assign it to spending, saving and giving. This leads to financial stability.

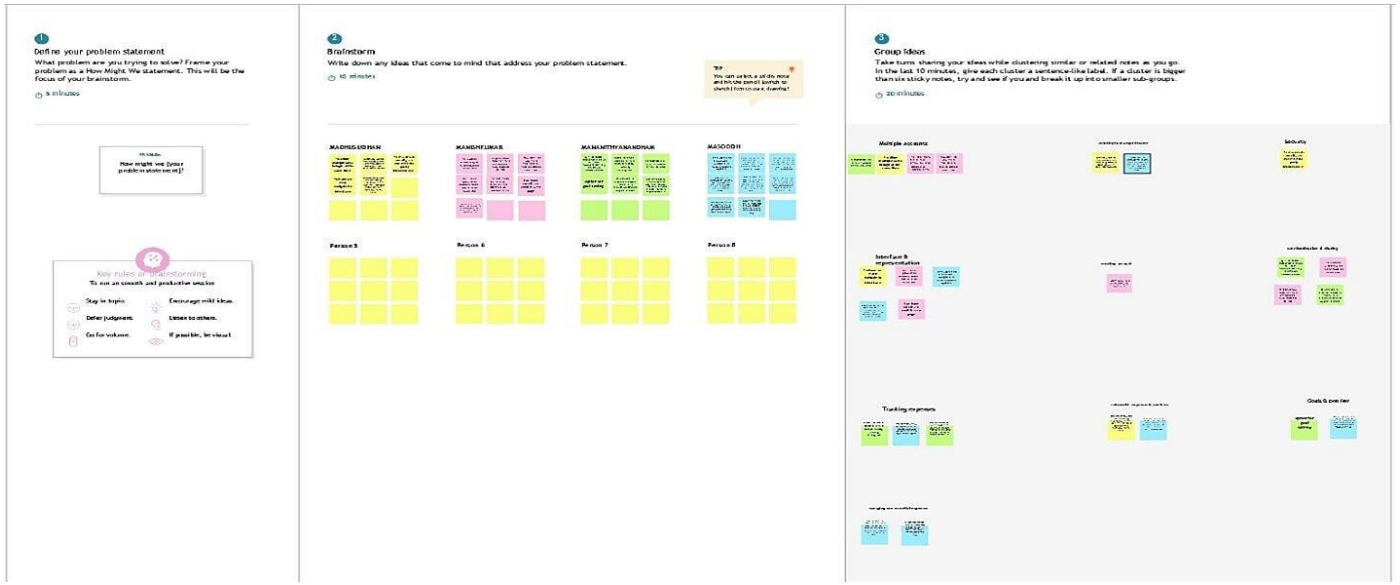
- Abella, who is a shopholic, finds it hard to control her desire to shop. To stop her fromoverindulging in impulsive purchases, she needs to track her expenses and hold herselfaccountable.
- John, who is interested to invest in stocks, finds itdifficult to figureout the expensethathe can spend on investing stocks. With the help of expense tracking, he can easily plan out the expensesfor investing in an efficient way.
- Akshay, is a high schoolstudent, who usuallygets a limited allowance from his parents.So tracking his expenses and good budgeting technique allows him to spend on his regularexpenses as well as on himself.
- Udhay, who is a novice budgeter, finds it tedious to track and manage the expensesamongst his busy schedule. Prioritizing his expenses will help him to curtail his unnecessary expenditures.

3. IDEATION & PROPOSED SOLUTION :

3.1 EMPATHY MAP CANVAS :



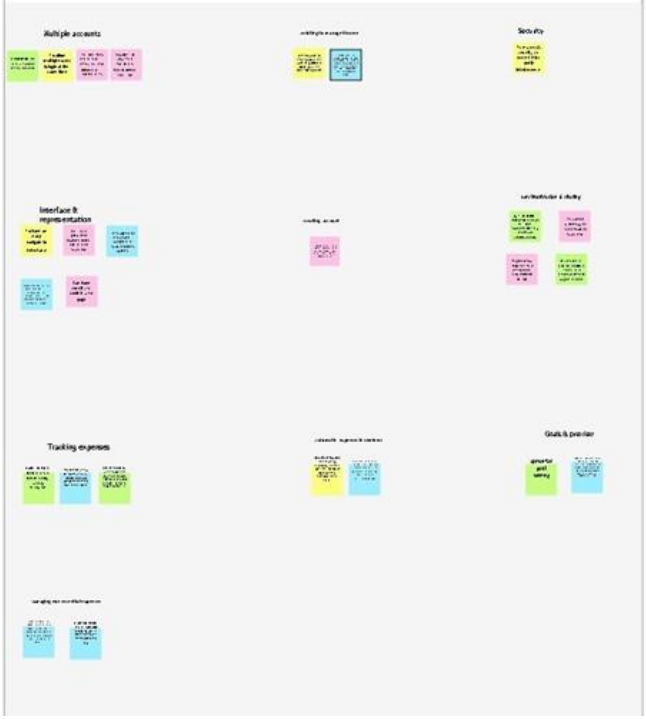
3.2 IDEATION & BRAINSTORMING:



Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

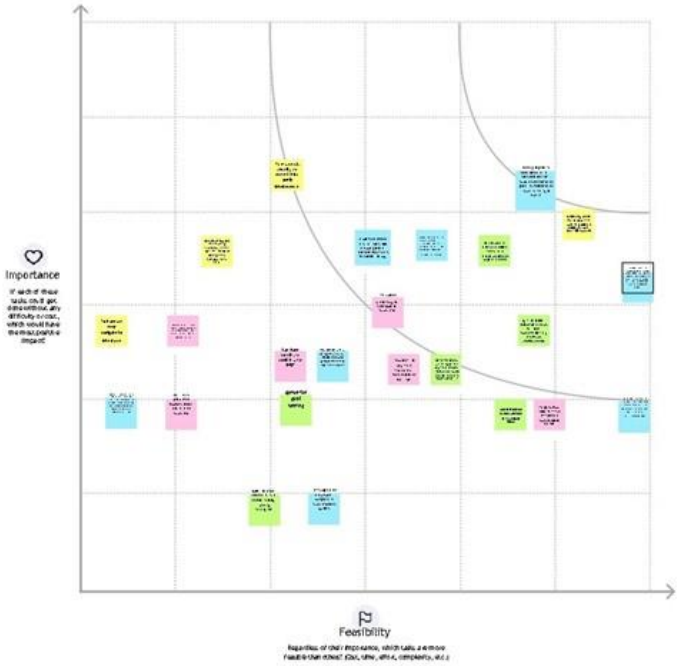
20 minutes



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.

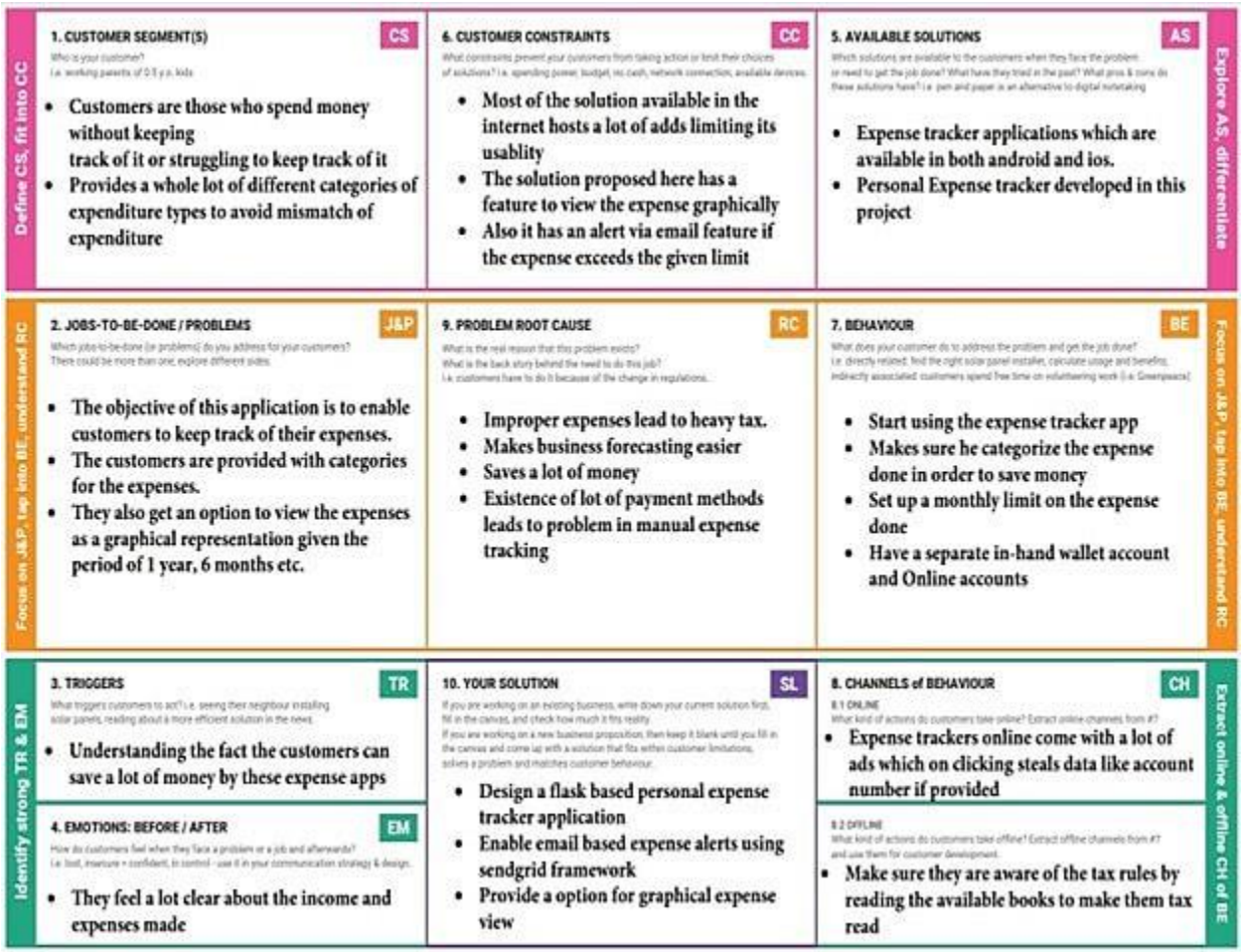
20 minutes



3.3 PROPOSED SOLUTION:

2.	Idea / Solution description	Due to the busy and hectic lifestyle people tend to overlook their budget and end up spending an excessive amount of money since they usually didn't plan their budget wisely. user cannot predict future expenses. While they can write down their expenses in a excel spreadsheet, their lack of knowledge in managing finances will be a problem
3.	Novelty / Uniqueness	This application tracks your every expenses anywhere and anytime without using the paper work. Just click and enter your expenditure. to avoid data loss, quick settlements and reduce human error. To provide the pie chart or graph lines in this application.
4.	Social Impact / Customer Satisfaction	Using this application one can track their personal expenses and frame a monthly/annual budget. If your expense exceeded than specified limit, the application will show you an alert message in form of a pie chart.
5.	Business Model (Revenue Model)	Business people can use subscription/premium feature of this application to gain revenue.
6.	Scalability of the Solution	IBM cloud will automatically allocate the storage for the users.

3.4 PROBLEM SOLUTION FIT:



4. REQUIREMENT ANALYSIS

4.1 REQUIREMENT ANALYSIS :

a. FUNCTIONAL REQUIREMENT :

FR No.	Functional Requirement (Epic)	Sub Requirement (Story/ Sub-Task)
FR-1	User Registration	Registration through Form Registration throughGmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Multiple login	Many userscan log in by usingseparate mail identities. Also,using the mail identity ,theuser can log into anydevice.
FR-4	Alerting the user	A limitmust be set on the amount of money to be spent.Whenever the user exceeds thel imit, he will benotified through mailor tex message.
FR-5	Reporting	An analysis on the expenses should be done.Based on theanalysis ,a detailed report (in any graphical form) must be generated to help the user in accounting and budgeting.

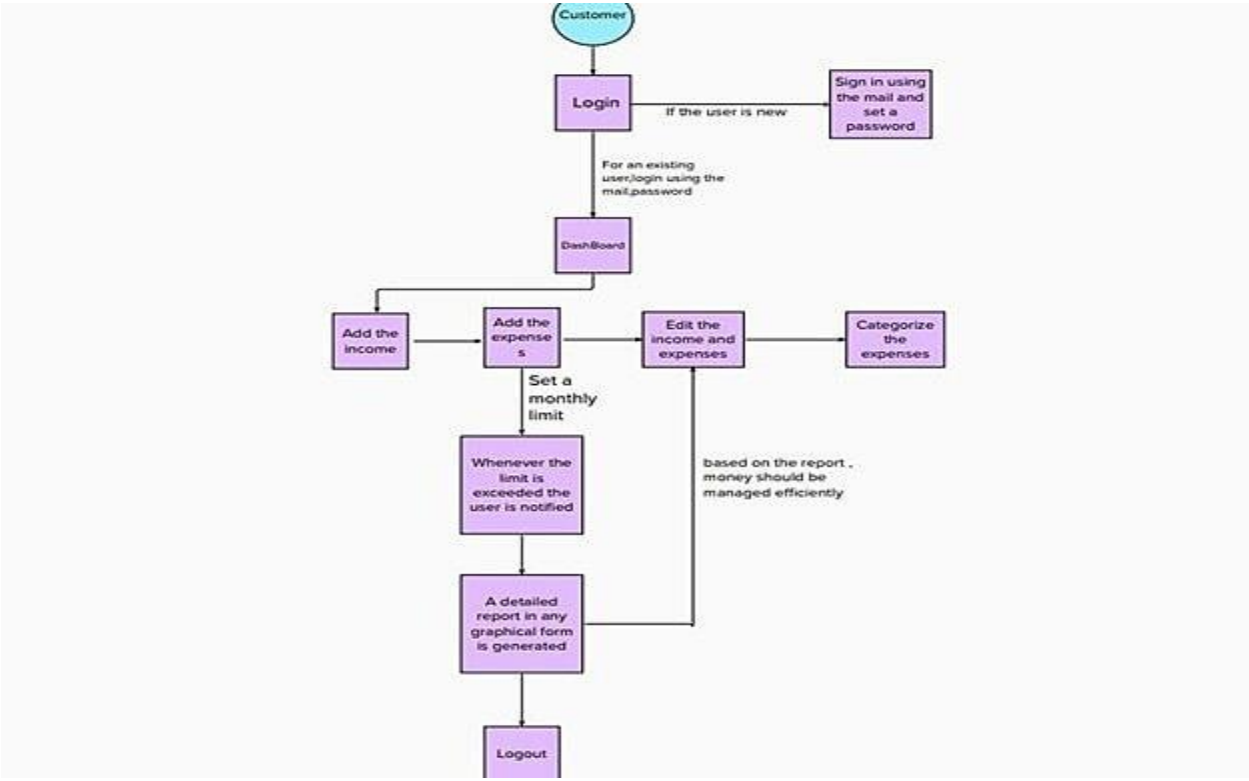
b. NON FUNCTIONAL REQUIREMENT :

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The interface must be user friendly that makes it easyto use for all types of users.The basicfeatures must be available free of cost to users.
NFR-2	**Security**	The application should have multi-factor authentication when logging in.Also, banking datamust be secured by some encryption technology.
NFR-3	**Reliability**	The transaction must rollback if there is any technical or network issue .The data must be savedwhen updation of data failsin between the process.Even if there is a failure,it should be restored within a few minutes.
NFR-4	**Performance**	The application must not take more than 30 seconds to load. The response time should be quick even when there is heavy traffic.
NFR-5	**Availability**	When the app is being updated,except for the module that is being updated,the rest can be used.
NFR-6	**Scalability**	The app must be designed to work efficiently even when there is heavy traffic.

5.PROJECT DESIGN :

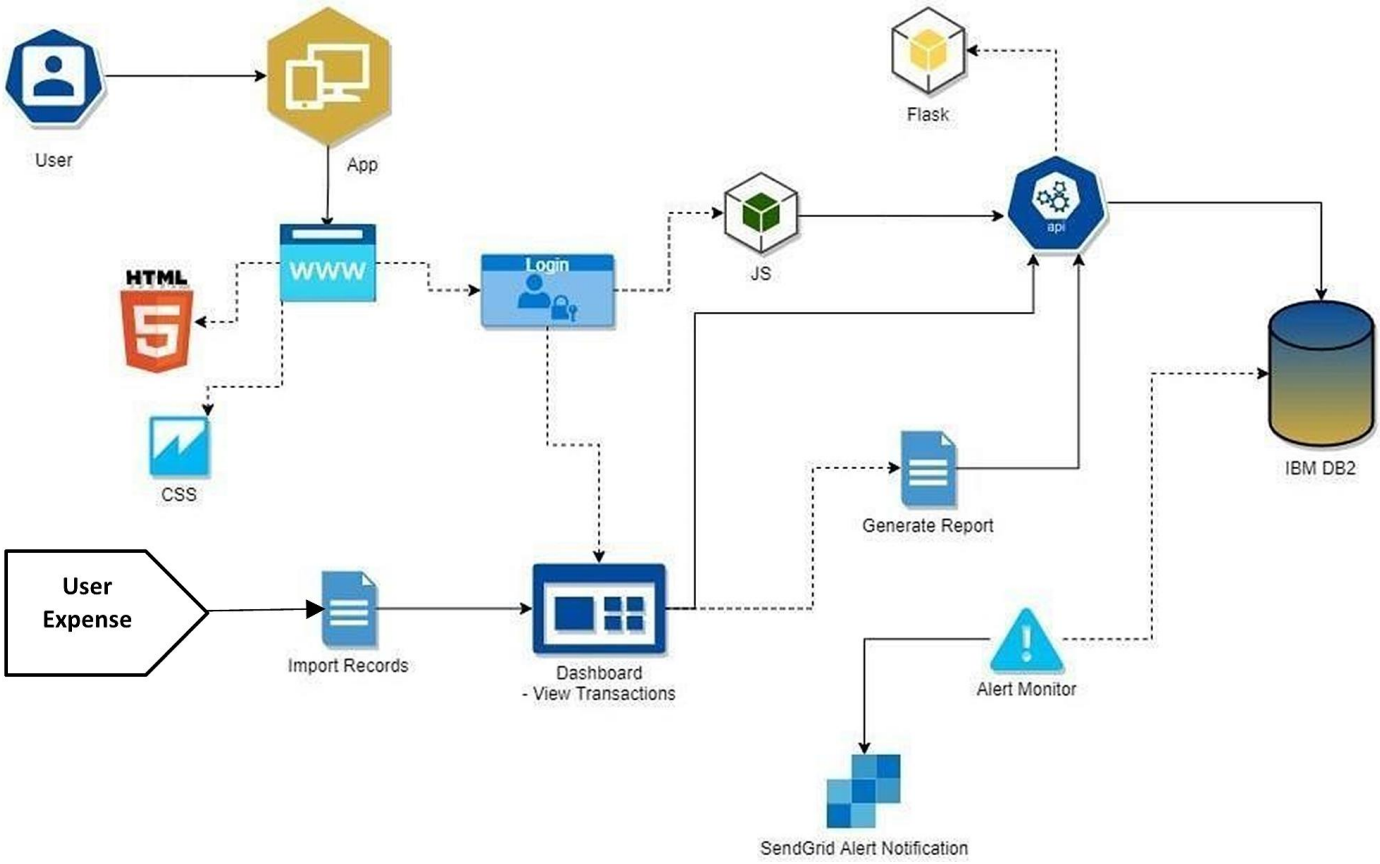
5.1 DATAFLOW DIAGRAM :

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



5.2 SOLUTION AND TECHNICAL ARCHITECTURE :

SOLUTION ARCHITECTURE:



TECHNICAL ARCHITECTURE :

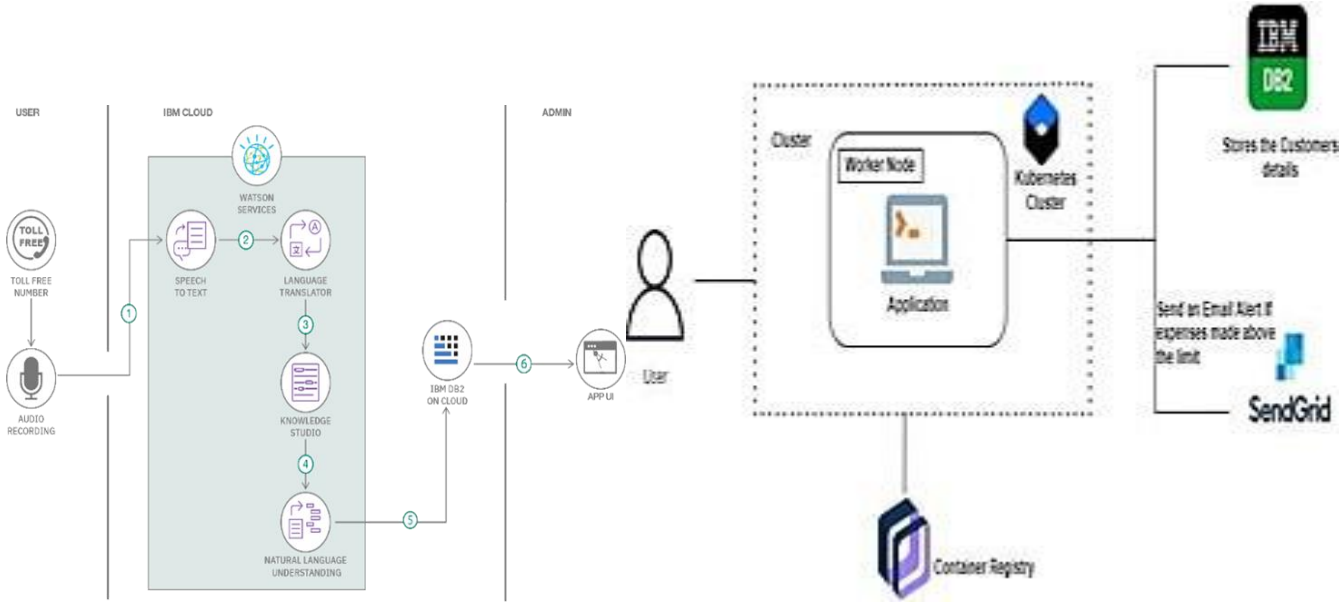


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	The usercan Interact withthe application with use of IBM WatsonChatbot.	HTML, CSS, JavaScript /Angular-js / React-js etc.
2.	Application Logic-1	The application contains the sign in/sign up where the userwill loginintothe main dashboard.	Java / Python
3.	Application Logic-2	Dashboard contains the fields like Add income, AddExpenses, SaveMoney, Add budget, Profileetc…	IBM Watson STT service
4.	Application Logic-3	The user will get the expense report in the Statistics formand get alertsif the expense limit exceeds.	IBM WatsonAssistant
5.	Database	TheIncome and Expensedata are stored in the IBM Cloud database.	MySQL, NoSQL,etc.
6.	Cloud Database	Database Service on Cloud	IBM DB2, IBM-Cloudant etc.
7.	File Storage	IBM CloudStorage used to store the financial dataof the user	IBM Block Storage or Other Storage Service or Local Filesystem
8.	External API-1	Purpose of External APIused in the application	IBM Weather API, etc.
9.	External API-2	Purpose of External API usedin the application	Aadhar API, etc.
10.	Machine Learning Model	Purpose of MachineLearning Model	Object Recognition Model, etc.

11.	Infrastructure (Server / Cloud)	Application Deployment on Local System/ CloudLocal Server Configuration: Cloud Server Configuration :	Local, CloudFoundry, Kubernetes, etc.

Table-2: Application Characteristics:

S. No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Flask Framework in Python is used to implement thisapplication to connect the UI and the Backend.	Flask
2.	Security Implementations	This Application Provides high security to the user financial data.It can be done by using the ContainerRegistry in IBM cloud	SHA-256, Encryptions, IAM Controls, OWASP etc.
3.	Scalable Architecture	Expense Tracker is a lifetime access webblication. Itsdemand willincrease when the user's increases.	Container Registry, KubernetesCluster.
4.	Availability	This application will be available to the user at any partof timeusing the Internet.	Container Registry, KubernetesCluster
5.	Performance	The performance willbe high because there will be nonetwork traffics in the application.	Container Registry, KubernetesCluster.

5.3 USER STORIES:

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

User Type	Functional Requirement (Epic)	User Story Number	UserStory / Task	Acceptance criteria	Priority	Release
Customer (Webuser)	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	Sprint-1
		USN-2	As a user, I will receive confirmation emailonce I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Gmail	I can accessmy account	Medium	Sprint-1
	Login	USN-4	As a user, I can log into the application by entering email& password	I can access the dashboard	High	Sprint-1
	Dashboard	USN-5	As a user, I can add incomeand	I can keep track of the expenses	high	Sprint-1

			expenses in theapplication			
		USN-6	As a user, I can changethe expenses as I spendand can evencategorise them	I can keep track, account and budget for the expense s	High	Sprint-
	Alerting	USN-7	As a user, I canset a limit on the amountofmoney thatcan be spent.	Whenever the limit is exceeded, the user gets notified through mail or text messages.	High	Sprint-1
	Reporting	USN-8	As a user,the expense that is spent can be categorised and a report (in any graphicalform) can be generated.	I can manage money efficiently from the report	High	Sprint-1
Customer(Mobileuser)	Accounting	USN-9	As a user, the income and expenses canbe added and categorised	From the report generated, money management could be done	Medium	Sprint-2
Administrator	Supervising and updating	USN-10	As an administrator, I supervise and updatefrom the user feedback	Updating the app makes itmore user friendly	Medium	Sprint-1

6. PROJECT PLANNING AND SCHEDULING:

6.1 SPRINT PLANNING & ESTIMATION

Use the below template to create product backlog and sprint schedule

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 mypassword.	2	High	Madhusudhan NS
Sprint-1		USN-2	As a user,I will receive confirmation email oncelhave registered for the application	1	High	Manish Kumar
Sprint-1	Login	USN-3	As a user, I can register for the application throughGmail	1	High	Mananithyanantham
Sprint-1	Dashboard	USN-4	As a user,I can log into the application by enteringemail& password	2	High	Masoodh
Sprint-2	Workspace	USN-1	Workspace for personal expensetracking	2	High	Madhusudhan NS
Sprint-2	Charts	USN-2	Creating various graphsand statistics ofcustomer's data	1	Medium	Manish Kumar
Sprint-2	Connecting to IBM DB2	USN-3	Linking database withdashboard	2	High	Mananithyanantham
Sprint-2		USN-4	Making dashboard interactive with JS	2	High	Masoodh
Sprint-3		USN-1	Wrapping up the server side works of frontend	1	Medium	Madhusudhan NS

Sprint-3	Watson Assistant	USN-2	Creating Chatbot for expense tracking and forcalrifying user's query	1	Medium	Manish Kumar
Sprint-3	SendGrid	USN-3	Using SendGrid to send mail to the user about	1	Low	Mananithyanantham
Sprint-3		USN-4	Integrating both frontend and backend	2	High	Masoodh
Sprint-4	Docker	USN-1	Creating image of website using docker	2	High	Madhusudhan NS
Sprint-4	Cloud Registry	USN-2	Uploading docker imageto IBM Cloud registry	2	High	Manish Kumar
Sprint-4	kubernetes	USN-3	Create container usingthe docker imageandhosting thesite	2	High	Mananithyanantham
Sprint-4	Exposing	USN-4	Exposing IP/Ports for the site	2	High	Masoodh

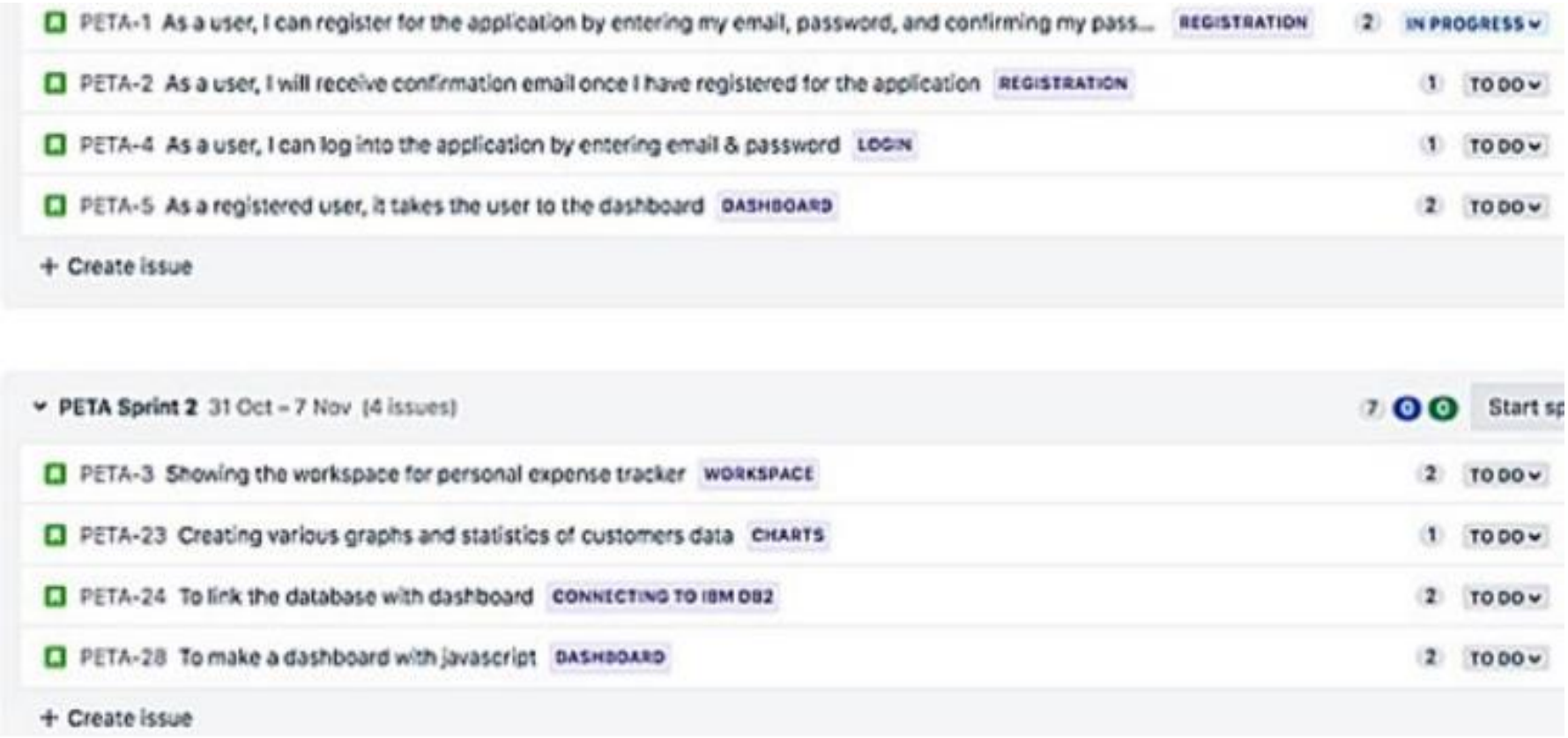
6.2 SPRINT DELIVERY SCHEDULE :

Project Tracker, Velocity & Burndown Chart:

Sprint	Total StoryPoints	Duration	Sprint StartDate	Sprint End Date (Planned)	Story PointsCompleted (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	2 Days	12 Nov 2022	14 Nov 2022	20	14 Nov 2022

6.3 REPORT FROM JIRA:

BACKLOG:



PETA Sprint 3 7 Nov – 14 Nov (4 issues) 5 0 0 Start sp

PETA-15 To wrap up the server side works of frontend FRONTEND	1	TO DO
PETA-29 Creating chatbot WATSON ASSISTANT	1	TO DO
PETA-31 Integrating SendGrid services SENDGRID	1	TO DO
PETA-32 Integrating both frontend and backend	2	TO DO

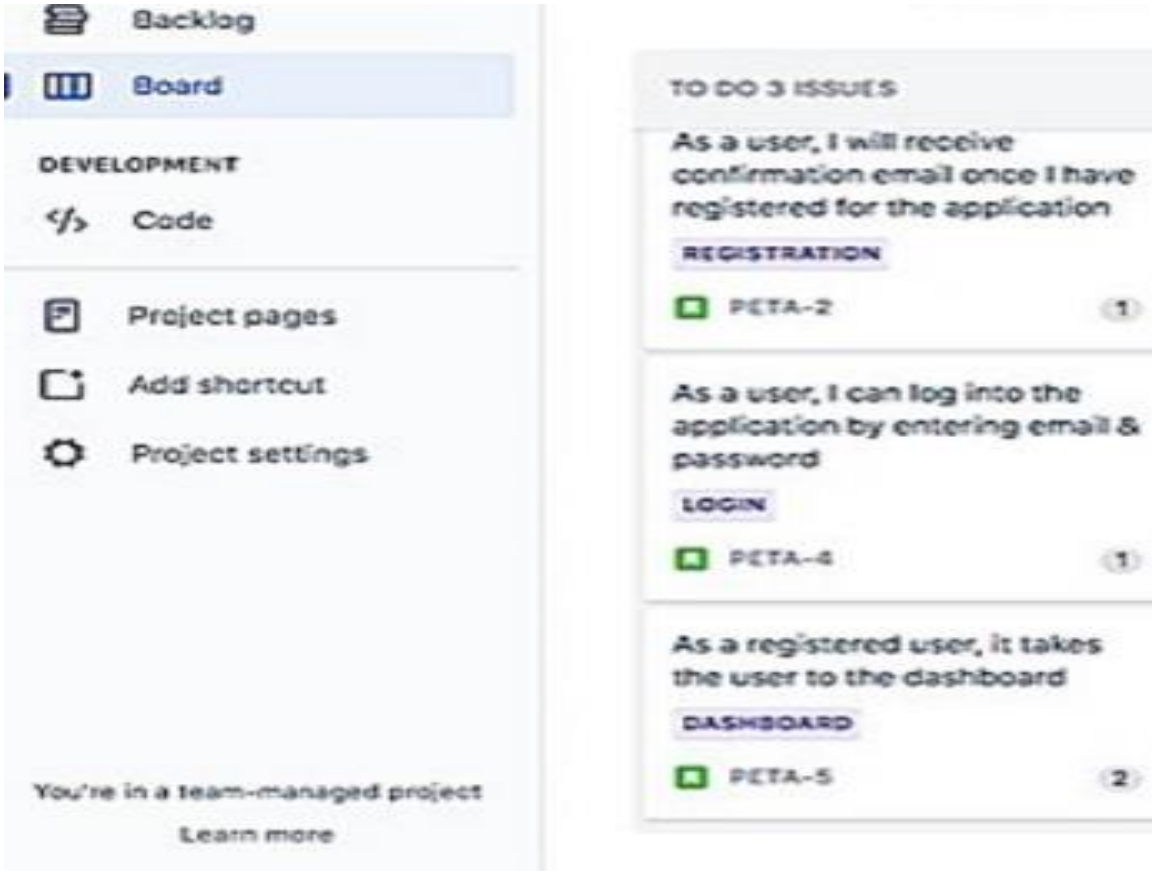
+ Create issue

PETA Sprint 4 14 Nov – 21 Nov (4 issues) 8 0 0 Start sp

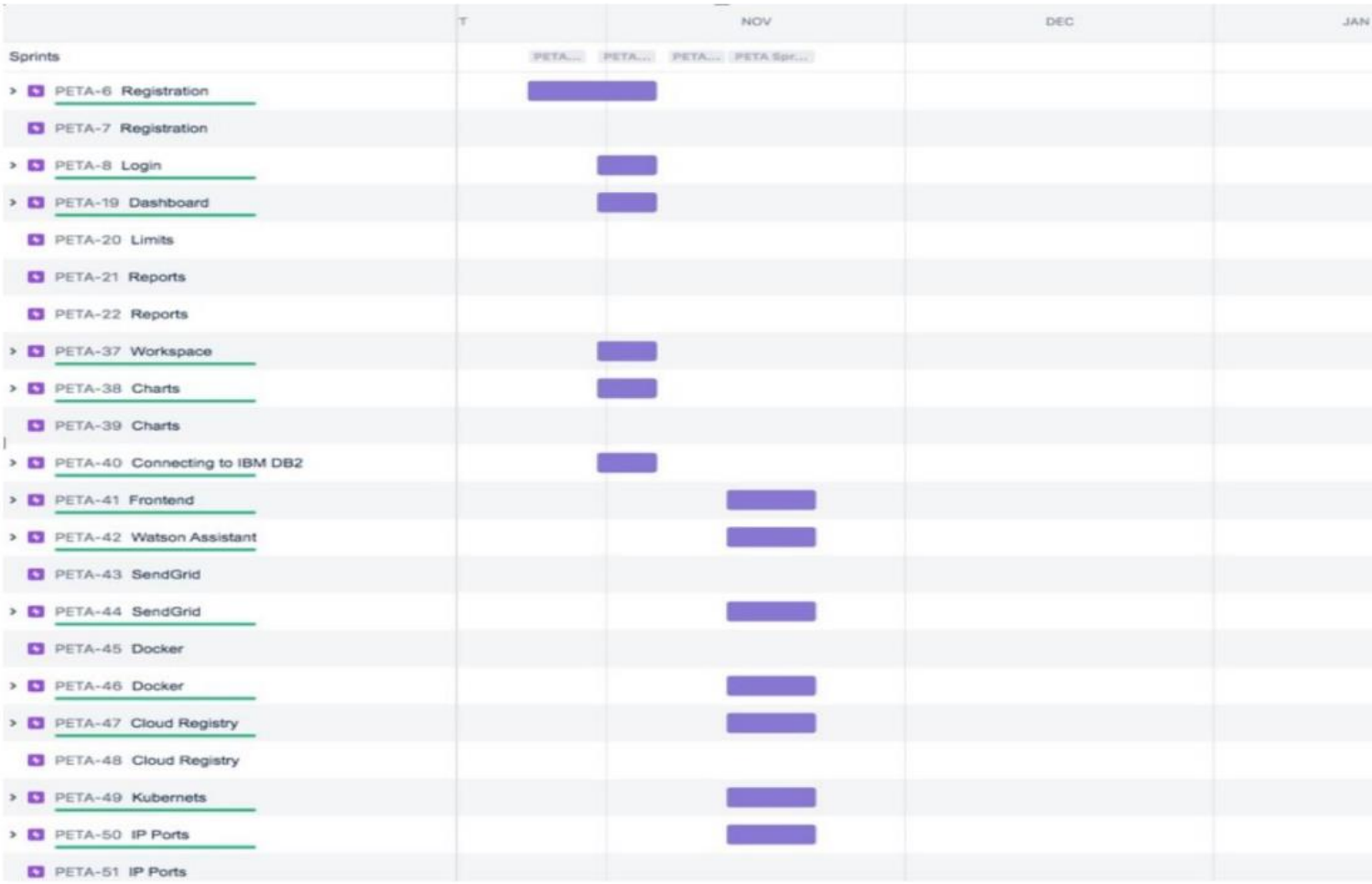
PETA-17 To create images of website using docker DOCKER	2	TO DO
PETA-33 To upload docker image to IBM Cloud Registry CLOUD REGISTRY	2	TO DO
PETA-34 To create a container using docker image and hosting the site KUBERNETS	2	TO DO
PETA-35 Exposing IP Ports for the site IP PORTS	2	TO DO

+ Create issue

BOARD:



ROAD MAP:



7. CODING & SOLUTIONING

7.1 Features

Feature 1: Add Expense
Feature 2: Update expense
Feature 3: Delete Expense
Feature 4: Set Limit
Feature 5: Send Alert Emails to users
Other Features: Track your expenses anywhere, anytime. Seamlessly manage your money and budget without any financial paperwork. Just click and submit your invoices and expenditures. Access, submit, and approve invoices irrespective of time and location. Avoid data loss by scanning your tickets and bills and saving in the app. Approval of bills and expenditures in real-time and get notified instantly. Quick settlement of claims and reduced human errors with an automated and streamlined billing process.

7.2 Codes:

app.py:

```
# -*- coding: utf-8 -*-
"""
Spyder Editor

This is a temporary script file.
"""
from flask import Flask, render_template, request, redirect, session
# from flask_mysqldb import MySQL # import MySQLdb.cursorsimport re

from flask_db2 import DB2 import ibm_dbimport ibm_db_dbi from sendemail import sendgridmail,sendmail

# from gevent.pywsgi import WSGIServer import os


app = Flask(__name__)

app.secret_key = 'a'

# app.config['MYSQL_HOST'] = 'remotemysql.com'
# app.config['MYSQL_USER'] = 'D2DxDUPBii'
# app.config['MYSQL_PASSWORD'] = 'r8XBO4GsMz'
# app.config['MYSQL_DB'] = 'D2DxDUPBii'
"""
dsn_hostname = "3883e7e4-18f5-4afe-be8c-
fa31c41761d2.bs2io90l08kqb1od8lcg.databases.appdomain.cloud"dsn_uid = "sbb93800" dsn_pwd =
"wobsVLm6ccFxcNLe" dsn_driver = "{IBM DB2 ODBC DRIVER}"dsn_database = "bludb"dsn_port =
"31498" dsn_protocol = "tcpip"

dsn = (
    "DRIVER={0};"
    "DATABASE={1};"
    "HOSTNAME={2};"
    "PORT={3};"
    "PROTOCOL={4};"
    "UID={5};"
    "PWD={6};"  ).format(dsn_driver, dsn_database, dsn_hostname, dsn_port, dsn_protocol, dsn_uid,
dsn_pwd)
"""
# app.config['DB2_DRIVER'] = '{IBM DB2 ODBC DRIVER}' app.config['database'] = 'bludb'
app.config['hostname'] = '3883e7e4-18f5-4afe-
be8cfa31c41761d2.bs2io90l08kqb1od8lcg.databases.appdomain.cloud'app.config['port'] = '31498'
app.config['protocol'] = 'tcpip' app.config['uid'] = 'sbb93800' app.config['pwd'] = 'wobsVLm6ccFxcNLe'
app.config['security'] = 'SSL' try:
    mysql = DB2(app)

    conn_str='database=bludb;hostname=3883e7e4-18f5-4afe-be8c-
fa31c41761d2.bs2io90l08kqb1od8lcg.databases.appdomain.cloud;port=31498;protocol=tcpi p;\
            uid=sbb93800;pwd=wobsVLm6ccFxcNLe;security=SSL'      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'])
def register():
msg = ''
 print("Break point1")
 if  request.method == 'POST' :         username = request.form['username']        email = request.form['email']
password = request.form['password']

        print("Break point2" + "name: " + username + "------" + email + "------" + password)
         try:
            print("Break point3")
connectionID = ibm_db_dbi.connect(conn_str, '', '')                    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)

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

        # while ibm_db.fetch_row(result) != False:
        #     # account = ibm_db.result(stmt)
        #     print(ibm_db.result(result, "username"))

        # print(dictionary["username"])             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 = ''


    if request.method == 'POST' :
        username = request.form['username']        password = request.form['password']
        # cursor = mysql.connection.cursor()
        # cursor.execute('SELECT * FROM register WHERE username = % s AND password = % s',
(username, password ),)
        # 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 sakthi","sivasakthisairam@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)

 #ADDING----DATA


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


@app.route('/addexpense',methods=['GET', 'POST']) def addexpense():

    date = request.form['date']     expensename = request.form['expensename']      amount =
request.form['amount']     paymode = request.form['paymode']      category = request.form['category']

    print(date)      p1 = date[0:10]     p2 = date[11:13]      p3 = date[14:]      p4 = p1 + "-" + p2 + ":" + p3 + ".00"
print(p4)
    # cursor = mysql.connection.cursor()
    # cursor.execute('INSERT INTO expenses VALUES (NULL,  % s, % s, % s, % s, % s, % s)', (session['id']
,date, expensename, amount, paymode, category))
    # mysql.connection.commit()
    # print(date + " " + expensename + " " + amount + " " + paymode + " " + category)

    sql = "INSERT INTO expenses (userid, date, expensename, amount, paymode, category) VALUES (?,
?, ?, ?, ?, ?)"
    stmt = ibm_db.prepare(ibm_db_conn, sql)      ibm_db.bind_param(stmt, 1,
session['id'])ibm_db.bind_param(stmt, 2, p4)
    ibm_db.bind_param(stmt, 3, expensename)     ibm_db.bind_param(stmt, 4, amount)
ibm_db.bind_param(stmt, 5, paymode)     ibm_db.bind_param(stmt, 6, category)     ibm_db.execute(stmt)

    print("Expenses added")

    # email part
```

```
    param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND MONTH(date) =
MONTH(current timestamp) AND YEAR(date) = YEAR(current timestamp)
ORDER BY date DESC"
    res = ibm_db.exec_immediate(ibm_db_conn, param)     dictionary = ibm_db.fetch_assoc(res)    expense
= []    while dictionary != False:
        temp = []         temp.append(dictionary["ID"])        temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])        temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])        temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])        expense.append(temp)        print(temp)
        dictionary = ibm_db.fetch_assoc(res)

    total=0     for x in expense:          total += x[4] param = "SELECT id, limitss FROM limits WHERE userid =
" + str(session['id']) + " ORDER BY id DESC LIMIT 1"
    res = ibm_db.exec_immediate(ibm_db_conn, param)     dictionary = ibm_db.fetch_assoc(res)    row = []
s = 0    while dictionary != False:
        temp = []         temp.append(dictionary["LIMITSS"])        row.append(temp)        dictionary =
ibm_db.fetch_assoc(res)
 s = temp[0]
      if total > int(s):
        msg = "Hello " + session['username'] + " , " + "you have crossed the monthly limit of Rs.
" + s + "/- !!!" + "\n" + "Thank you, " + "\n" + "Team Personal Expense Tracker."
sendmail(msg,session['email'])

    return redirect("/display")




#DISPLAY---graph

@app.route("/display")def display():
    print(session["username"],session['id'])

    # cursor = mysql.connection.cursor()
    # cursor.execute('SELECT * FROM expenses WHERE userid = % s AND date ORDER
BY `expenses`.`date` DESC',(str(session['id'])))
    # expense = cursor.fetchall()

    param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " ORDER BY date DESC"
res = ibm_db.exec_immediate(ibm_db_conn, param)
    dictionary =ibm_db.fetch_assoc(res)    expense = []
 while dictionary != False:
        temp = []         temp.append(dictionary["ID"])        temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])        temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])        temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])        expense.append(temp)        print(temp)
        dictionary = ibm_db.fetch_assoc(res)

    return render_template('display.html' ,expense = expense)
```

```
#delete---the--data

@app.route('/delete/<string:id>', methods = ['POST', 'GET' ]) def delete(id):
    #  cursor = mysql.connection.cursor()
    #  cursor.execute('DELETE FROM expenses WHERE  id = {0}'.format(id))
    #  mysql.connection.commit()

    param = "DELETE FROM expenses WHERE  id = " + id    res = ibm_db.exec_immediate(ibm_db_conn,
param)

    print('deleted successfully')
return redirect("/display")


#UPDATE---DATA

@app.route('/edit/<id>', methods = ['POST', 'GET' ]) def edit(id):
    # cursor = mysql.connection.cursor()
    # cursor.execute('SELECT * FROM expenses WHERE  id = %s', (id,))
    # row = cursor.fetchall()
 param = "SELECT * FROM expenses WHERE  id = " + id    res = ibm_db.exec_immediate(ibm_db_conn,
param)     dictionary = ibm_db.fetch_assoc(res)     row = []     while dictionary != False:
temp = []         temp.append(dictionary["ID"])         temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])         temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])         temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])         row.append(temp)         print(temp)
        dictionary = ibm_db.fetch_assoc(res)

    print(row[0])
    return render_template('edit.html', expenses = row[0]) @app.route('/update/<id>', methods = ['POST'])
def update(id):
  if request.method == 'POST' :

      date = request.form['date']      expensename = request.form['expensename']       amount =
request.form['amount']      paymode = request.form['paymode']       category = request.form['category']

    #   cursor = mysql.connection.cursor()
    #   cursor.execute("UPDATE `expenses` SET `date` = % s , `expensename` = % s , `amount` = % s,
`paymode` = % s, `category` = % s WHERE `expenses`.`id` = % s ",(date, expensename, amount,
str(paymode), str(category),id))
    #   mysql.connection.commit()

      p1 = date[0:10]       p2 = date[11:13]      p3 = date[14:]
      p4 = p1 + "-" + p2 + "." + p3 + ".00"

      sql = "UPDATE expenses SET date = ? , expensename = ? , amount = ?, paymode = ?, category = ?
WHERE id = ?"
```

```
    stmt = ibm_db.prepare(ibm_db_conn, sql)     ibm_db.bind_param(stmt, 1, p4)
ibm_db.bind_param(stmt, 2, expensename)      ibm_db.bind_param(stmt, 3, amount)
ibm_db.bind_param(stmt, 4, paymode)     ibm_db.bind_param(stmt, 5, category)
ibm_db.bind_param(stmt, 6, id)     ibm_db.execute(stmt)

    print('successfully updated')     return redirect("/display") #limit
@app.route("/limit" ) def limit():
     return redirect('/limitn')

@app.route("/limitnum" , methods = ['POST' ])def limitnum():     if request.method == "POST":
      number= request.form['number']       #  cursor = mysql.connection.cursor()
      #  cursor.execute('INSERT INTO limits VALUES (NULL, % s, % s) ',(session['id'], number))
      #  mysql.connection.commit()

       sql = "INSERT INTO limits (userid, limitss) VALUES (?, ?)"          stmt =
ibm_db.prepare(ibm_db_conn, sql)          ibm_db.bind_param(stmt, 1, session['id'])
ibm_db.bind_param(stmt, 2, number)         ibm_db.execute(stmt)

       return redirect('/limitn')


@app.route("/limitn")  def limitn():
   # cursor = mysql.connection.cursor()
   # cursor.execute('SELECT limitss FROM `limits` ORDER BY `limits`.`id` DESC LIMIT 1')
   # x= cursor.fetchone()
   # s = x[0]

   param = "SELECT id, limitss FROM limits WHERE userid = " + str(session['id']) + " ORDER BY id DESC
LIMIT 1"
   res = ibm_db.exec_immediate(ibm_db_conn, param)     dictionary = ibm_db.fetch_assoc(res)     row = []
s = " /-"     while dictionary != False:
      temp = []        temp.append(dictionary["LIMITSS"])       row.append(temp)       dictionary =
ibm_db.fetch_assoc(res)       s = temp[0]

   return render_template("limit.html" , y= s)

#REPORT

@app.route("/today")def today():
   #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT TIME(date)   , amount FROM expenses  WHERE userid =
%s AND DATE(date) = DATE(NOW()) ',(str(session['id'])))
   #   texpense = cursor.fetchall()
   #   print(texpense)

     param1 = "SELECT TIME(date) as tn, amount FROM expenses WHERE userid = " + str(session['id']) +
" AND DATE(date) = DATE(current timestamp) ORDER BY date DESC"     res1 =
ibm_db.exec_immediate(ibm_db_conn, param1)      dictionary1 = ibm_db.fetch_assoc(res1)      texpense
= []

     while dictionary1 != False:
```

```
        temp = []          temp.append(dictionary1["TN"])          temp.append(dictionary1["AMOUNT"])
texpense.append(temp)          print(temp)
        dictionary1 = ibm_db.fetch_assoc(res1)

   #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT * FROM expenses WHERE userid = % s AND DATE(date) =
DATE(NOW()) AND date ORDER BY `expenses`.`date` DESC',(str(session['id'])))     #   expense =
cursor.fetchall()

     param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND
DATE(date) = DATE(current timestamp) ORDER BY date DESC"       res =
ibm_db.exec_immediate(ibm_db_conn, param)       dictionary = ibm_db.fetch_assoc(res)       expense = []
while dictionary != False:
        temp = []          temp.append(dictionary["ID"])          temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])          temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])          temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])          expense.append(temp)          print(temp)
        dictionary = ibm_db.fetch_assoc(res)


     total=0
     t_food=0       t_entertainment=0      t_business=0       t_rent=0      t_EMI=0      t_other=0

     for x in expense:          total += x[4]          if x[6] == "food":              t_food += x[4]

        elif x[6] == "entertainment":              t_entertainment  += x[4]

        elif x[6] == "business":              t_business  += x[4]          elif x[6] == "rent":              t_rent  += x[4]

        elif x[6] == "EMI":             t_EMI  += x[4]

        elif x[6] == "other":              t_other  += x[4]
       print(total)

     print(t_food)       print(t_entertainment)      print(t_business)       print(t_rent)      print(t_EMI)
print(t_other)



     return render_template("today.html", texpense = texpense, expense = expense,  total = total ,
                    t_food = t_food,t_entertainment =  t_entertainment,                    t_business =
t_business,  t_rent =  t_rent,                    t_EMI =  t_EMI,  t_other =  t_other )


@app.route("/month")def month():
   #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT DATE(date), SUM(amount) FROM expenses WHERE
userid= %s AND MONTH(DATE(date))= MONTH(now()) GROUP BY DATE(date) ORDER
BY DATE(date) ',(str(session['id'])))
   #   texpense = cursor.fetchall()
   #   print(texpense)
```

```
    param1 = "SELECT DATE(date) as dt, SUM(amount) as tot FROM expenses WHERE userid = " +
str(session['id']) + " AND MONTH(date) = MONTH(current timestamp) AND YEAR(date) = YEAR(current
timestamp) GROUP BY DATE(date) ORDER BY DATE(date)"      res1 =
ibm_db.exec_immediate(ibm_db_conn, param1)       dictionary1 = ibm_db.fetch_assoc(res1)       texpense
= []

    while dictionary1 != False:
        temp = []
        temp.append(dictionary1["DT"])          temp.append(dictionary1["TOT"])
texpense.append(temp)          print(temp)
 dictionary1 = ibm_db.fetch_assoc(res1)
 #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT * FROM expenses WHERE userid = % s AND
MONTH(DATE(date))= MONTH(now()) AND date ORDER BY `expenses`.`date`
DESC',(str(session['id'])))
   #   expense = cursor.fetchall()

    param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND MONTH(date) =
MONTH(current timestamp) AND YEAR(date) = YEAR(current timestamp)
ORDER BY date DESC"
    res = ibm_db.exec_immediate(ibm_db_conn, param)       dictionary = ibm_db.fetch_assoc(res)
 expense = []
while dictionary != False:
        temp = []          temp.append(dictionary["ID"])          temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])          temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])          temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])          expense.append(temp)
  print(temp)
        dictionary = ibm_db.fetch_assoc(res)


  total=0       t_food=0      t_entertainment=0      t_business=0       t_rent=0      t_EMI=0      t_other=0

    for x in expense:          total += x[4]
  if x[6] == "food":             t_food += x[4]

        elif x[6] == "entertainment":              t_entertainment  += x[4]

        elif x[6] == "business":
          t_business  += x[4]
       elif x[6] == "rent":
      t_rent  += x[4]

  elif x[6] == "EMI":             t_EMI  += x[4]

 elif x[6] == "other":             t_other  += x[4]


    print(total)
print(t_food)      print(t_entertainment)      print(t_business)       print(t_rent)      print(t_EMI)       print(t_other)
```

```
    return render_template("today.html", texpense = texpense, expense = expense,  total = total,   t_food = t_food,t_entertainment =  t_entertainment,                    t_business = t_business,  t_rent =  t_rent,  t_EMI =  t_EMI,  t_other =  t_other )

@app.route("/year")def year():
   #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT MONTH(date), SUM(amount) FROM expenses WHERE userid= %s AND YEAR(DATE(date))= YEAR(now()) GROUP BY MONTH(date) ORDER BY MONTH(date) ',(str(session['id'])))
   #   texpense = cursor.fetchall()
   #   print(texpense)

    param1 = "SELECT MONTH(date) as mn, SUM(amount) as tot FROM expenses WHERE userid = " + str(session['id']) + " AND YEAR(date) = YEAR(current timestamp)
GROUP BY MONTH(date) ORDER BY MONTH(date)"
 res1 =ibm_db.exec_immediate(ibm_db_conn, param1)      dictionary1 = ibm_db.fetch_assoc(res1)
  texpense = []

    while dictionary1 != False:
        temp = []         temp.append(dictionary1["MN"])         temp.append(dictionary1["TOT"])
texpense.append(temp)         print(temp)
        dictionary1 = ibm_db.fetch_assoc(res1)



   #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT * FROM expenses WHERE userid = % s AND YEAR(DATE(date))= YEAR(now()) AND date ORDER BY `expenses`.`date` DESC',(str(session['id'])))
   #   expense = cursor.fetchall()

    param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND YEAR(date) = YEAR(current timestamp) ORDER BY date DESC"
  res = ibm_db.exec_immediate(ibm_db_conn, param)
dictionary = ibm_db.fetch_assoc(res)
expense = []
while dictionary != False:
        temp = []         temp.append(dictionary["ID"])         temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])         temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])         temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])         expense.append(temp)
   print(temp)
        dictionary = ibm_db.fetch_assoc(res)


  total=0
 t_food=0      t_entertainment=0      t_business=0      t_rent=0
  t_EMI=0
  t_other=0
```

```
    for x in expense:          total += x[4]
  if x[6] == "food":             t_food += x[4]

         elif x[6] == "entertainment":
            t_entertainment  += x[4]

  elif x[6] == "business":                                t_business  += x[4]
elif x[6] == "rent":              t_rent  += x[4]

    elif x[6] == "EMI":              t_EMI  += x[4]

  elif x[6] == "other":             t_other  += x[4]


      print(total)
print(t_food)      print(t_entertainment)      print(t_business)      print(t_rent)       print(t_EMI)      print(t_other)

 return render_template("today.html", texpense = texpense, expense = expense,  total = total ,
   t_food = t_food,t_entertainment =    t_entertainment,  t_business = t_business, t_rent =  t_rent, t_EMI =
t_EMI,  t_other =  t_other )

#log-out

@app.route('/logout')

def logout():
  session.pop('loggedin', None)   session.pop('id', None)   session.pop('username', None)
session.pop('email', None)   return render_template('home.html')


port = os.getenv('VCAP_APP_PORT', '8080') if __name__ == "__main__":
  app.secret_key = os.urandom(12)    app.run(debug=True, host='0.0.0.0', port=port)
```

deployment.yaml:apiVersion: apps/v1 kind: Deployment metadata:
```
   name: sakthi-flask-node-deploymentspec:    replicas: 1
 selector:
     matchLabels:
   app: flasknode
   template:     metadata:       labels:
         app: flasknode

 spec:
       containers:        - name: flasknode
         image: icr.io/sakthi_expense_tracker2/flask-template2          imagePullPolicy: Always
         ports:
containerPort: 5000
```

flask-service.yaml: apiVersion: v1 kind: Servicemetadata:
```
  name: flask-app-servicespec:   selector:
  app: flask-app   ports:  - name: http    protocol: TCP
```

port: 80 targetPort: 5000 type: LoadBalancer**manifest.yml:**applications:
name: Python Flask App IBCMR 2022-10-19 random-route: true memory: 512M disk_quota: 1.5G

sendemail.py: import smtplib import sendgrid as sgimport os
from sendgrid.helpers.mail
import Mail, Email, To, Content
SUBJECT = "expense tracker" s = smtplib.SMTP('smtp.gmail.com', 587)

```
def sendmail(TEXT,email):
    print("sorry we cant process your candidature")
    s = smtplib.SMTP('smtp.gmail.com', 587)
    s.starttls()
    # s.login("il.tproduct8080@gmail.com", "oms@1Ram")
    s.login("tproduct8080@gmail.com", "lxixbmpnexbkiemh")     message  = 'Subject:
{}\n\n{}'.format(SUBJECT, TEXT)     # s.sendmail("il.tproduct8080@gmail.com", email, message)
s.sendmail("il.tproduct8080@gmail.com", email, message)
    s.quit()
def sendgridmail(user,TEXT):

    # from_email = Email("abcd@gmail.com")    from_email = Email("tproduct8080@gmail.com")
to_email = To(user)
subject = "Sending with SendGrid is Fun"     content = Content("text/plain",TEXT)
mail = Mail(from_email, to_email, subject, content)

    # Get a JSON-ready representation of the Mail object     mail_json = mail.get()
    # Send an HTTP POST request to /mail/send    response =
sg.client.mail.send.post(request_body=mail_json)     print(response.status_code)    print(response.headers)
```

Database Schema

Tables :
1.Admin:
id INT NOT NULL GENERATED ALWAYS AS IDENTITY,username VARCHAR(32) NOT NULL, email
VARCHAR(32) NOT NULL,password VARCHAR(32)
NOT NULL

2.Expense:

id INT NOT NULL GENERATED ALWAYS AS IDENTITY,
userid INT NOT NULL, date TIMESTAMP(12) NOT NULL,expensename VARCHAR(32) NOT NULL,
amount
VARCHAR(32) NOT NULL, paymode VARCHAR(32) NOT NULL,
category VARCHAR(32) NOT NULL

3.LIMIT

id INT NOT NULL GENERATED ALWAYS AS IDENTITY,userid VARCHAR(32) NOT NULL, limit VARCHAR(32) NOT NULL

8. TESTING :

8.1 TEST CASES :

S.NO	**Test Cases**	**Result**
1	Verify the user is able to see the Sign up page when the user clicks the signup button in navigation bar	Positive
2	Verify the UI elements in the Sign up page	Positive
3	Verify the user is able to register into the application by providing valid details	Positive
4	Verify the user is able to see the sign in page when the user clicks the sign in button in navigation bar	Positive
5	Verify the UI elements in the Sign in page	Positive
6	Verify the user is able to login into the application by providing valid details	Positive
7	Verify the user is able to see the add expenses page when the user clicks the add expenses navigation bar	Positive
8	Verify the UI elements in the add expenses page	Positive
9	Verify the user is able to add expenses by providing valid details	Positive

10	Verify the user is able to see the home button in the add expenses page	Positive
11	Verify whether the expenses added can be deleted from the cloud	Positive
12	Verify whether the expenses added can be edited	Positive
13	Verify whether the date, month and year are valid while user entering the expenses	Positive
14	Verify whether the data types entered by the user in the add expenses page are float or integers	Positive
15	Verify whether expenses added previously still exist	Positive
16	Verify whether the expenses amount entered fits between in the range of integers or float datatypes	Positive

8.2 USER ACCEPTANCE TESTING :

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Test Data	Expected Result	Actual Result
LoginPage_TC_OO1	Functional	Home Page	Verify user is able to see the Login/Signup popup when	1. Click the my account button. 2. Check whether	-	Login/Signup popup should display	Working as expected

			user clicked on My account button	login/signup pop up appears			
LoginPage_TC_OO2	UI	Home Page	Verify the UI elements in Login/Signup popup	1. Visit the Signup/ Login page. 2. Verify the UI elements.	-	Application should show below UI elements: a.email text box b.password text box c.Login button with orange colour d.New customer? Create account link e.Last password? Recovery password link	Working as expected
LoginPage_TC_OO4	Functional	Login page	Verify user is able to log into application with Valid credentials	1. Visit the login page. 2. Enter right credientials.	User id: madhusudhans@gmail.com	Application should not show 'inorrect email or password ' validation message.	Working as expected

					Password: Keerthu		
LoginPage_TC_OO5	Functional	Login page	Verify user is able to log into application with InValid credentials	1. Visit the login page. 2. Enter wrong credientials	User id: madhusudhans@gmail.com Password: madhu	Application should show 'Incorrect email or password ' validation message.	Working as expected
Add_expense_page_TC_001	Functional	Add expense page	Verify the user could add the expenses & delete them	1. Visit the login page. 2.Enter right credientials. 3. Enter input data and delete them.	Input data: 25	Application should store the value on entering and deletes it on clicking delete button.	Working as expected
Add_expense_page_TC_002	Functional	Add expense page	Verify the user enters only numericals in add	1. Visit the login page. 2.Enter right credientials.	Input data 1: 50 Input data 2: m	Application should store numerical values and not strings.	Working as expected

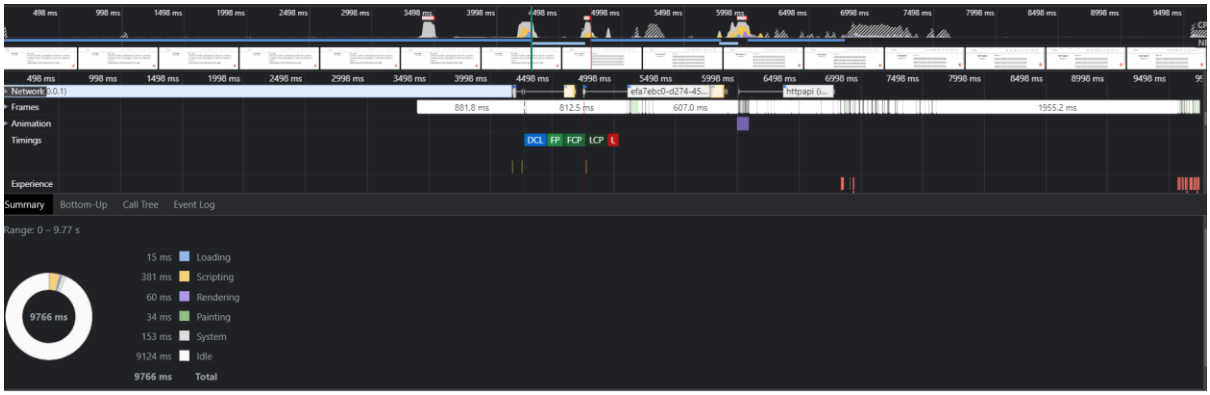
			expenses input.	3.Enter numerical values in input And not strings.			
Add_expense_page_TC_003	Functional	Add expense page	Verify the date, month and year are valid	1. Visit the login page. 2.Enter right credientials. 3. Check whether date, month and year are valid.	June 5, 1999	Application should display only valid date,month and year	Working as expected

9. RESULTS :

9.1 PERFORMANCE METRICS

The performance metrics include page speed, time to title, bounce rate, time to start render, time to interact, DNS lookup speed, Requests per second, error rate, time to first byte/last byte and conversion rate. The performance metrics of our application are efficient and are given below for reference.

Performance Metrics



10. ADVANTAGES & DISADVANTAGES :

ADVANTAGES :

- 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.
- In this day and age, when expenses are going through the roof, it has become crucial that you learn to make your money work for you so that you can create a nest egg for the future.
- Has various components of updating and viewing users expenditure
- User can track his expenses by choosing a day and using various filtering Options to study expenses
- Visualization using pie chart with percentage view shows graphical Representation.
- This approach effectively keeps away from the manual figuring for trying
- Not to ascertain the pay and cost each month.
- With a daily expense manager, you will be able to allocate money to different priorities and this will also help you cut down on unnecessary spending. As a result, you will be able to save and be able to keep worry at bay.
- A daily money tracker helps you budget your money so that you use it wisely. If you find that every month your expenses are more than what you earn, it is time to put your house in order and get a money manager app that keeps track of your money without any problem.

DISADVANTAGES :

- Lack of visual analytics for expense data
- Lack of support for splitting group expenses
- Suitable for only Personal use.
- Errors are another common problem expense reports drafted with Excel. As is the case with all tasks performed manually and based on paper, it is extremely likely that business travellers who report expenses make involuntary mistakes: numbers entered wrongly, duplicated expenses or expenses relating to a previous settlement period, misapplication of the expense policy, etc.
- Frequent tracking of cash spending can allow one to catch and correct errors so that the budget plan is still able to be adhered to despite the mistake.

11. CONCLUSION:

Tracking regular expense is a key factor to maintain a budget. People often track expense using pen and paper method or take notes in a mobile phone or a computer. These processes of storing expense require further computations and processing for these data to be used as a trackable record. In this work, we are proposing an automated system to store and calculate these data. It is an application that runs on Android smartphones. By using this application, users can save their expense by simply scanning the bills or receipt copies. This application extracts the textual information from the receipts and saves the amount and description for further processing. It also monitors user's income by tracking the received SMS's from the user's saving accounts. By calculating income and expense it produces the user's balance in monthly and yearly basis. Overall, this is a smart automated solution for tracking expense.

12. FUTURE SCOPE:

1. **Mobility**

Businesses are becoming increasingly global and employees are more mobile than ever.

According to the Certify Expense Management Trends Report 2018, 47 percent of organizations

felt that mobile applications and accessibility were a critical capability of expense reporting

software.

Expense management software will begin to respond to this change in the manner that people work by facilitating mobility. Employees will be able to submit reports and managers can approve the claims from a smartphone. Also, mobile applications will become more intuitive and responsive, encouraging greater adoption.

2. Travel booking

According to a 2018 study by Tripactions, 90 percent of respondents believe that travel is important for growth. However, 50 percent of employees don't use the corporate travel solution offered by their organization owing to difficulties and the time taken to book a trip. They prefer using consumer channels.

Using multiple external vendors and disjointed channels to book travel can become tedious and lead to a lot of last-minute chaos. Also, the expenses have to be recorded accurately in the expense management system. It's imperative to integrate the same into expense management software.

3. Integrated system

In 2019, expense management software will begin to consolidate currently disparate actions into a seamless system with credit cards, bank accounts, accounting, payroll, CRM, and more in one

place. All these systems share a lot of common information, and it makes perfect sense to connect all these to ensure data integrity.

When integrated with travel applications and travel management company (TMC) solutions, transactions can be entered directly into the system without the need for manual input. Corporate cards can also be linked to the software, which makes it easier to reconcile credit card statements with expense reports.

4. Optical character recognition

According to 66 percent of respondents from the Certify Expense Management Trends Report 2018, ease of use was the top-most feature needed. Traveling employees spend a lot of time filling out expense reports. By using expense management software, businesses brought down the time and cost of expense reporting. This will further go down with advancements in OCR technology.

Optical character recognition (OCR) will be one of the significant ways in which the ease-of-use of expense management tool will be enhanced. It eliminates the need to manually input data from receipts into forms. It will also facilitate mobility.

Employees could just snap a picture of a receipt and have the software extract all the necessary information from it to fill a report. OCR technology is accurate up to 95 percent and doesn't need too much human intervention to verify the information that's been uploaded.

5. Artificial intelligence

As machine learning and artificial intelligence (AI) evolve, they will add to the sophistication of expense management software. There will be improved ability to assign expense general ledger codes based on submissions and smarter categorization of expense types. Rudimentary versions of this exist in a few tools that use rule-based categorization.

AI-powered automation is also expected to minimize fraudulent expense reports. It can monitor, track, and approve expenses, and compliance-related issues will immediately be flagged and eliminated.

13. APPENDIX

SOURCE CODE:

app.py:

```
# -*- coding: utf-8 -*-
"""
Spyder Editor

This is a temporary script file.
"""
from flask import Flask, render_template, request, redirect, session
# from flask_mysqldb import MySQL # import MySQLdb.cursorsimport re

from flask_db2 import DB2 import ibm_dbimport ibm_db_dbi from sendemail import sendgridmail,sendmail

# from gevent.pywsgi import WSGIServer import os


app = Flask(__name__)

app.secret_key = 'a'
```

```
# app.config['MYSQL_HOST'] = 'remotemysql.com'
# app.config['MYSQL_USER'] = 'D2DxDUPBii'
# app.config['MYSQL_PASSWORD'] = 'r8XBO4GsMz'
# app.config['MYSQL_DB'] = 'D2DxDUPBii'
"""
dsn_hostname = "3883e7e4-18f5-4afe-be8c-
fa31c41761d2.bs2io90l08kqb1od8lcg.databases.appdomain.cloud"dsn_uid = "sbb93800" dsn_pwd =
"wobsVLm6ccFxcNLe" dsn_driver = "{IBM DB2 ODBC DRIVER}"dsn_database = "bludb"dsn_port =
"31498" dsn_protocol = "tcpip"

dsn = (
    "DRIVER={0};"
    "DATABASE={1};"
    "HOSTNAME={2};"
    "PORT={3};"
    "PROTOCOL={4};"
    "UID={5};"
    "PWD={6};"
).format(dsn_driver, dsn_database, dsn_hostname, dsn_port, dsn_protocol, dsn_uid, dsn_pwd)
"""
# app.config['DB2_DRIVER'] = '{IBM DB2 ODBC DRIVER}' app.config['database'] = 'bludb'
app.config['hostname'] = '3883e7e4-18f5-4afe-
be8cfa31c41761d2.bs2io90l08kqb1od8lcg.databases.appdomain.cloud'app.config['port'] = '31498'
app.config['protocol'] = 'tcpip' app.config['uid'] = 'sbb93800' app.config['pwd'] = 'wobsVLm6ccFxcNLe'
app.config['security'] = 'SSL' try:
    mysql = DB2(app)

    conn_str='database=bludb;hostname=3883e7e4-18f5-4afe-be8c-
fa31c41761d2.bs2io90l08kqb1od8lcg.databases.appdomain.cloud;port=31498;protocol=tcpi p;\
            uid=sbb93800;pwd=wobsVLm6ccFxcNLe;security=SSL'     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'])
def register():
msg = ''
 print("Break point1")
 if  request.method == 'POST' :         username = request.form['username']        email = request.form['email']
password = request.form['password']

        print("Break point2" + "name: " + username + "------" + email + "------" + password)
         try:
            print("Break point3")
connectionID = ibm_db_dbi.connect(conn_str, '', '')                    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)

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

        # while ibm_db.fetch_row(result) != False:
        #     # account = ibm_db.result(stmt)
        #     print(ibm_db.result(result, "username"))

        # print(dictionary["username"])             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 = ''


   if request.method == 'POST' :
      username = request.form['username']       password = request.form['password']
      # cursor = mysql.connection.cursor()
      # cursor.execute('SELECT * FROM register WHERE username = % s AND password = % s',
(username, password ),)
      # 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 sakthi","sivasakthisairam@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)

 #ADDING----DATA


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


@app.route('/addexpense',methods=['GET', 'POST']) def addexpense():

    date = request.form['date']    expensename = request.form['expensename']     amount =
request.form['amount']    paymode = request.form['paymode']     category = request.form['category']

    print(date)     p1 = date[0:10]    p2 = date[11:13]     p3 = date[14:]     p4 = p1 + "-" + p2 + "." + p3 + ".00"
print(p4)
    # cursor = mysql.connection.cursor()
    # cursor.execute('INSERT INTO expenses VALUES (NULL,  % s, % s, % s, % s, % s, % s)', (session['id']
,date, expensename, amount, paymode, category))
    # mysql.connection.commit()
    # print(date + " " + expensename + " " + amount + " " + paymode + " " + category)

    sql = "INSERT INTO expenses (userid, date, expensename, amount, paymode, category) VALUES (?,
?, ?, ?, ?, ?)"
    stmt = ibm_db.prepare(ibm_db_conn, sql)     ibm_db.bind_param(stmt, 1,
session['id'])ibm_db.bind_param(stmt, 2, p4)
    ibm_db.bind_param(stmt, 3, expensename)    ibm_db.bind_param(stmt, 4, amount)
ibm_db.bind_param(stmt, 5, paymode)    ibm_db.bind_param(stmt, 6, category)    ibm_db.execute(stmt)

    print("Expenses added")

    # email part

    param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND MONTH(date) =
MONTH(current timestamp) AND YEAR(date) = YEAR(current timestamp)
ORDER BY date DESC"
    res = ibm_db.exec_immediate(ibm_db_conn, param)     dictionary = ibm_db.fetch_assoc(res)    expense
= []    while dictionary != False:
        temp = []        temp.append(dictionary["ID"])        temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])        temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])        temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])        expense.append(temp)        print(temp)
        dictionary = ibm_db.fetch_assoc(res)

    total=0     for x in expense:          total += x[4] param = "SELECT id, limitss FROM limits WHERE userid =
" + str(session['id']) + " ORDER BY id DESC LIMIT 1"
    res = ibm_db.exec_immediate(ibm_db_conn, param)     dictionary = ibm_db.fetch_assoc(res)    row = []
s = 0    while dictionary != False:
        temp = []        temp.append(dictionary["LIMITSS"])        row.append(temp)        dictionary =
ibm_db.fetch_assoc(res)
 s = temp[0]
```

```
      if total > int(s):
        msg = "Hello " + session['username'] + " , " + "you have crossed the monthly limit of Rs.
" + s + "/- !!!" + "\n" + "Thank you, " + "\n" + "Team Personal Expense Tracker."
sendmail(msg,session['email'])

    return redirect("/display")




#DISPLAY---graph

@app.route("/display")def display():
    print(session["username"],session['id'])

    # cursor = mysql.connection.cursor()
    # cursor.execute('SELECT * FROM expenses WHERE userid = % s AND date ORDER
BY `expenses`.`date` DESC',(str(session['id'])))
    # expense = cursor.fetchall()

    param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " ORDER BY date DESC"
res = ibm_db.exec_immediate(ibm_db_conn, param)
    dictionary =ibm_db.fetch_assoc(res)    expense = []
 while dictionary != False:
        temp = []        temp.append(dictionary["ID"])        temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])        temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])        temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])        expense.append(temp)        print(temp)
        dictionary = ibm_db.fetch_assoc(res)

    return render_template('display.html' ,expense = expense)




#delete---the--data

@app.route('/delete/<string:id>', methods = ['POST', 'GET' ]) def delete(id):
    #  cursor = mysql.connection.cursor()
    #  cursor.execute('DELETE FROM expenses WHERE  id = {0}'.format(id))
    #  mysql.connection.commit()

    param = "DELETE FROM expenses WHERE  id = " + id    res = ibm_db.exec_immediate(ibm_db_conn,
param)

    print('deleted successfully')
return redirect("/display")


#UPDATE---DATA
```

```
@app.route('/edit/<id>', methods = ['POST', 'GET' ]) def edit(id):
   # cursor = mysql.connection.cursor()
   # cursor.execute('SELECT * FROM expenses WHERE  id = %s', (id,))
   # row = cursor.fetchall()
 param = "SELECT * FROM expenses WHERE  id = " + id    res = ibm_db.exec_immediate(ibm_db_conn,
param)     dictionary = ibm_db.fetch_assoc(res)     row = []     while dictionary != False:
temp = []         temp.append(dictionary["ID"])         temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])         temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])         temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])         row.append(temp)         print(temp)
        dictionary = ibm_db.fetch_assoc(res)

   print(row[0])
   return render_template('edit.html', expenses = row[0]) @app.route('/update/<id>', methods = ['POST'])
def update(id):
  if request.method == 'POST' :

      date = request.form['date']      expensename = request.form['expensename']       amount =
request.form['amount']      paymode = request.form['paymode']       category = request.form['category']

   #   cursor = mysql.connection.cursor()
   #   cursor.execute("UPDATE `expenses` SET `date` = % s , `expensename` = % s , `amount` = % s,
`paymode` = % s, `category` = % s WHERE `expenses`.`id` = % s ",(date, expensename, amount,
str(paymode), str(category),id))
   #   mysql.connection.commit()

      p1 = date[0:10]       p2 = date[11:13]      p3 = date[14:]
      p4 = p1 + "-" + p2 + "." + p3 + ".00"

      sql = "UPDATE expenses SET date = ? , expensename = ? , amount = ?, paymode = ?, category = ?
WHERE id = ?"
      stmt = ibm_db.prepare(ibm_db_conn, sql)      ibm_db.bind_param(stmt, 1, p4)
ibm_db.bind_param(stmt, 2, expensename)       ibm_db.bind_param(stmt, 3, amount)
ibm_db.bind_param(stmt, 4, paymode)      ibm_db.bind_param(stmt, 5, category)
ibm_db.bind_param(stmt, 6, id)      ibm_db.execute(stmt)

      print('successfully updated')      return redirect("/display") #limit
@app.route("/limit" ) def limit():
       return redirect('/limitn')

@app.route("/limitnum" , methods = ['POST' ])def limitnum():      if request.method == "POST":
        number= request.form['number']        #  cursor = mysql.connection.cursor()
        #  cursor.execute('INSERT INTO limits VALUES (NULL, % s, % s) ',(session['id'], number))
        #  mysql.connection.commit()

         sql = "INSERT INTO limits (userid, limitss) VALUES (?, ?)"          stmt =
ibm_db.prepare(ibm_db_conn, sql)          ibm_db.bind_param(stmt, 1, session['id'])
ibm_db.bind_param(stmt, 2, number)         ibm_db.execute(stmt)

         return redirect('/limitn')
```

```
@app.route("/limitn")  def limitn():
   # cursor = mysql.connection.cursor()
   # cursor.execute('SELECT limitss FROM `limits` ORDER BY `limits`.`id` DESC LIMIT 1')
   # x= cursor.fetchone()
   # s = x[0]

   param = "SELECT id, limitss FROM limits WHERE userid = " + str(session['id']) + " ORDER BY id DESC
LIMIT 1"
   res = ibm_db.exec_immediate(ibm_db_conn, param)     dictionary = ibm_db.fetch_assoc(res)    row = []
s = " /-"     while dictionary != False:
       temp = []        temp.append(dictionary["LIMITSS"])       row.append(temp)       dictionary =
ibm_db.fetch_assoc(res)       s = temp[0]

   return render_template("limit.html" , y= s)

#REPORT

@app.route("/today")def today():
   #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT TIME(date)   , amount FROM expenses  WHERE userid =
%s AND DATE(date) = DATE(NOW()) ',(str(session['id'])))
   #   texpense = cursor.fetchall()
   #   print(texpense)

     param1 = "SELECT TIME(date) as tn, amount FROM expenses WHERE userid = " + str(session['id']) +
" AND DATE(date) = DATE(current timestamp) ORDER BY date DESC"      res1 =
ibm_db.exec_immediate(ibm_db_conn, param1)       dictionary1 = ibm_db.fetch_assoc(res1)       texpense
= []

     while dictionary1 != False:
        temp = []          temp.append(dictionary1["TN"])         temp.append(dictionary1["AMOUNT"])
texpense.append(temp)          print(temp)
        dictionary1 = ibm_db.fetch_assoc(res1)

   #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT * FROM expenses WHERE userid = % s AND DATE(date) =
DATE(NOW()) AND date ORDER BY `expenses`.`date` DESC',(str(session['id'])))     #   expense =
cursor.fetchall()

     param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND
DATE(date) = DATE(current timestamp) ORDER BY date DESC"       res =
ibm_db.exec_immediate(ibm_db_conn, param)       dictionary = ibm_db.fetch_assoc(res)       expense = []
while dictionary != False:
        temp = []          temp.append(dictionary["ID"])         temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])         temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])         temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])         expense.append(temp)         print(temp)
        dictionary = ibm_db.fetch_assoc(res)
```

```
    total=0
    t_food=0       t_entertainment=0      t_business=0       t_rent=0      t_EMI=0      t_other=0

    for x in expense:          total += x[4]          if x[6] == "food":              t_food += x[4]

        elif x[6] == "entertainment":              t_entertainment  += x[4]

        elif x[6] == "business":              t_business  += x[4]          elif x[6] == "rent":              t_rent  += x[4]

        elif x[6] == "EMI":             t_EMI  += x[4]

        elif x[6] == "other":              t_other  += x[4]
      print(total)

    print(t_food)       print(t_entertainment)      print(t_business)       print(t_rent)      print(t_EMI)
print(t_other)



    return render_template("today.html", texpense = texpense, expense = expense,  total = total ,
                    t_food = t_food,t_entertainment =  t_entertainment,                        t_business =
t_business,  t_rent =  t_rent,                        t_EMI =  t_EMI,  t_other =  t_other )


@app.route("/month")def month():
   #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT DATE(date), SUM(amount) FROM expenses WHERE
userid= %s AND MONTH(DATE(date))= MONTH(now()) GROUP BY DATE(date) ORDER
BY DATE(date) ',(str(session['id'])))
   #   texpense = cursor.fetchall()
   #   print(texpense)

    param1 = "SELECT DATE(date) as dt, SUM(amount) as tot FROM expenses WHERE userid = " +
str(session['id']) + " AND MONTH(date) = MONTH(current timestamp) AND YEAR(date) = YEAR(current
timestamp) GROUP BY DATE(date) ORDER BY DATE(date)"      res1 =
ibm_db.exec_immediate(ibm_db_conn, param1)      dictionary1 = ibm_db.fetch_assoc(res1)      texpense
= []

    while dictionary1 != False:
        temp = []
        temp.append(dictionary1["DT"])          temp.append(dictionary1["TOT"])
texpense.append(temp)          print(temp)
 dictionary1 = ibm_db.fetch_assoc(res1)
 #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT * FROM expenses WHERE userid = % s AND
MONTH(DATE(date))= MONTH(now()) AND date ORDER BY `expenses`.`date`
DESC',(str(session['id'])))
   #   expense = cursor.fetchall()
```

```
    param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND MONTH(date) =
MONTH(current timestamp) AND YEAR(date) = YEAR(current timestamp)
ORDER BY date DESC"
    res = ibm_db.exec_immediate(ibm_db_conn, param)      dictionary = ibm_db.fetch_assoc(res)
 expense = []
while dictionary != False:
        temp = []         temp.append(dictionary["ID"])        temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])         temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])         temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])         expense.append(temp)
  print(temp)
        dictionary = ibm_db.fetch_assoc(res)


  total=0      t_food=0      t_entertainment=0      t_business=0      t_rent=0      t_EMI=0      t_other=0

    for x in expense:          total += x[4]
  if x[6] == "food":            t_food += x[4]

        elif x[6] == "entertainment":              t_entertainment  += x[4]

        elif x[6] == "business":
          t_business  += x[4]
       elif x[6] == "rent":
      t_rent  += x[4]

  elif x[6] == "EMI":             t_EMI  += x[4]

 elif x[6] == "other":             t_other  += x[4]


    print(total)
print(t_food)      print(t_entertainment)      print(t_business)      print(t_rent)      print(t_EMI)      print(t_other)



    return render_template("today.html", texpense = texpense, expense = expense,  total = total,   t_food =
t_food,t_entertainment =  t_entertainment,                    t_business = t_business,  t_rent =  t_rent,
t_EMI =  t_EMI,  t_other =  t_other )

@app.route("/year")def year():
   #   cursor = mysql.connection.cursor()
   #   cursor.execute('SELECT MONTH(date), SUM(amount) FROM expenses WHERE
userid= %s AND YEAR(DATE(date))= YEAR(now()) GROUP BY MONTH(date) ORDER BY
MONTH(date) ',(str(session['id'])))
   #   texpense = cursor.fetchall()
   #   print(texpense)

    param1 = "SELECT MONTH(date) as mn, SUM(amount) as tot FROM expenses WHERE userid = " +
str(session['id']) + " AND YEAR(date) = YEAR(current timestamp)
GROUP BY MONTH(date) ORDER BY MONTH(date)"
```

```
 res1 =ibm_db.exec_immediate(ibm_db_conn, param1)       dictionary1 = ibm_db.fetch_assoc(res1)
   texpense = []

      while dictionary1 != False:
         temp = []          temp.append(dictionary1["MN"])          temp.append(dictionary1["TOT"])
texpense.append(temp)          print(temp)
         dictionary1 = ibm_db.fetch_assoc(res1)


    #   cursor = mysql.connection.cursor()
    #   cursor.execute('SELECT * FROM expenses WHERE userid = % s AND
YEAR(DATE(date))= YEAR(now()) AND date ORDER BY `expenses`.`date`
DESC',(str(session['id'])))
    #   expense = cursor.fetchall()

      param = "SELECT * FROM expenses WHERE userid = " + str(session['id']) + " AND
YEAR(date) = YEAR(current timestamp) ORDER BY date DESC"
  res = ibm_db.exec_immediate(ibm_db_conn, param)
dictionary = ibm_db.fetch_assoc(res)
expense = []
while dictionary != False:
         temp = []          temp.append(dictionary["ID"])          temp.append(dictionary["USERID"])
temp.append(dictionary["DATE"])          temp.append(dictionary["EXPENSENAME"])
temp.append(dictionary["AMOUNT"])          temp.append(dictionary["PAYMODE"])
temp.append(dictionary["CATEGORY"])          expense.append(temp)
    print(temp)
         dictionary = ibm_db.fetch_assoc(res)


  total=0
 t_food=0       t_entertainment=0      t_business=0       t_rent=0
  t_EMI=0
  t_other=0

     for x in expense:           total += x[4]
  if x[6] == "food":             t_food += x[4]

         elif x[6] == "entertainment":
            t_entertainment  += x[4]

  elif x[6] == "business":                                  t_business  += x[4]
elif x[6] == "rent":              t_rent  += x[4]

    elif x[6] == "EMI":               t_EMI  += x[4]

  elif x[6] == "other":             t_other  += x[4]


      print(total)
print(t_food)      print(t_entertainment)      print(t_business)      print(t_rent)       print(t_EMI)      print(t_other)
```

```
 return render_template("today.html", texpense = texpense, expense = expense,  total = total ,
   t_food = t_food,t_entertainment =    t_entertainment,  t_business = t_business, t_rent =  t_rent, t_EMI =
t_EMI,  t_other =  t_other )

#log-out

@app.route('/logout')

def logout():
  session.pop('loggedin', None)   session.pop('id', None)   session.pop('username', None)
session.pop('email', None)   return render_template('home.html')


port = os.getenv('VCAP_APP_PORT', '8080') if __name__ == "__main__":
  app.secret_key = os.urandom(12)    app.run(debug=True, host='0.0.0.0', port=port)
```

deployment.yaml:

```
apiVersion: apps/v1 kind: Deployment metadata:
   name: sakthi-flask-node-deploymentspec:    replicas: 1
 selector:
     matchLabels:
   app: flasknode
   template:     metadata:       labels:
         app: flasknode

 spec:
       containers:        - name: flasknode
         image: icr.io/sakthi_expense_tracker2/flask-template2          imagePullPolicy: Always
         ports:
containerPort: 5000
```

flask-service.yaml:

```
apiVersion: v1 kind: Servicemetadata:
  name: flask-app-servicespec:   selector:
  app: flask-app   ports:  - name: http    protocol: TCP
   port: 80     targetPort: 5000   type: LoadBalancer
```

manifest.yml:

```
applications:
name: Python Flask App IBCMR 2022-10-19    random-route: true    memory: 512M   disk_quota: 1.5G
```

sendemail.py:

```
import smtplib import sendgrid as sgimport os
from sendgrid.helpers.mail
import Mail, Email, To, Content
 SUBJECT = "expense tracker" s = smtplib.SMTP('smtp.gmail.com', 587)

def sendmail(TEXT,email):
    print("sorry we cant process your candidature")
    s = smtplib.SMTP('smtp.gmail.com', 587)
    s.starttls()
    # s.login("il.tproduct8080@gmail.com", "oms@1Ram")
    s.login("tproduct8080@gmail.com", "lxixbmpnexbkiemh")     message  = 'Subject:
{}\n\n{}'.format(SUBJECT, TEXT)     # s.sendmail("il.tproduct8080@gmail.com", email, message)
s.sendmail("il.tproduct8080@gmail.com", email, message)
    s.quit()
def sendgridmail(user,TEXT):
```

```
   # from_email = Email("abcd@gmail.com")    from_email = Email("tproduct8080@gmail.com")
to_email = To(user)
subject = "Sending with SendGrid is Fun"     content = Content("text/plain",TEXT)
mail = Mail(from_email, to_email, subject, content)

   # Get a JSON-ready representation of the Mail object     mail_json = mail.get()
   # Send an HTTP POST request to /mail/send    response =
sg.client.mail.send.post(request_body=mail_json)     print(response.status_code)    print(response.headers)
```

Database Schema

Tables :
1.Admin:
id INT NOT NULL GENERATED ALWAYS AS IDENTITY,username VARCHAR(32) NOT NULL, email VARCHAR(32) NOT NULL,password VARCHAR(32)
NOT NULL

2.Expense:

id INT NOT NULL GENERATED ALWAYS AS IDENTITY,
userid INT NOT NULL, date TIMESTAMP(12) NOT NULL,expensename VARCHAR(32) NOT NULL, amount VARCHAR(32) NOT NULL, paymode VARCHAR(32) NOT NULL,
category VARCHAR(32) NOT NULL

3.LIMIT

id INT NOT NULL GENERATED ALWAYS AS IDENTITY,userid VARCHAR(32) NOT NULL, limit VARCHAR(32) NOT NULL

GITHUB LINK:

https://github.com/IBM-EPBL/IBM-Project-18040-1659678602

DEMO VIDEO LINK:

https://drive.google.com/drive/folders/1NP5on-kHKpS15ij9cP3Sn_QaZisHGA2k