



**RAJALAKSHMI  
ENGINEERING COLLEGE**

An AUTONOMOUS Institution  
Affiliated to ANNA UNIVERSITY, Chennai

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**ACADEMIC YEAR 2024 – 2025**

**EVEN SEMESTER**



**CS23432 SOFTWARE ENGINEERING LAB**

**LAB MANUAL**

**FOURTH SEMESTER 2024-2025**

## **TEAM DETAILS:**

- **PROJECT NAME :** EXPENSE TRACKER APP
- **MEMBER 1 :** ANIKETH J
- **MEMBER 2 :** DHIVAKAR S
- **MEMBER 3 :** HARISH KUMAR V

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**EXP NO: 1**  
**DATE:**

## **AZURE DEVOPS ENVIRONMENT SETUP**

### **Aim:**

To set up and access the Azure DevOps environment by creating an organization through the Azure portal.

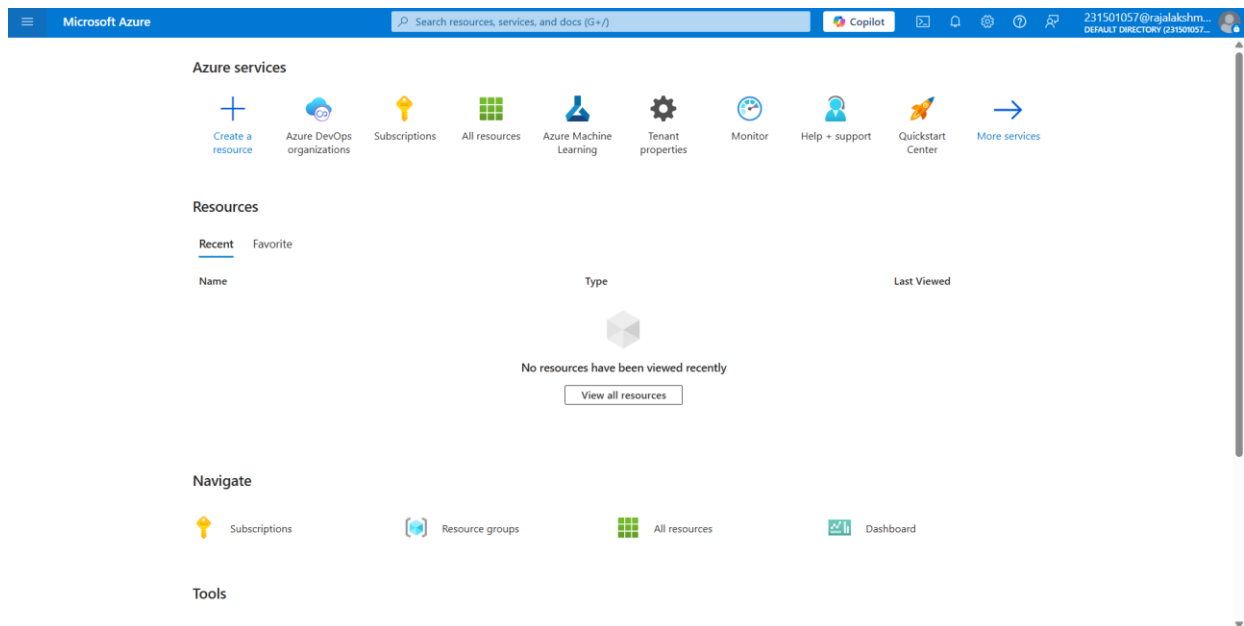
### **INSTALLATION**

1. Open your web browser and go to the Azure website: <https://azure.microsoft.com/en-us/get-started/azure-portal>.

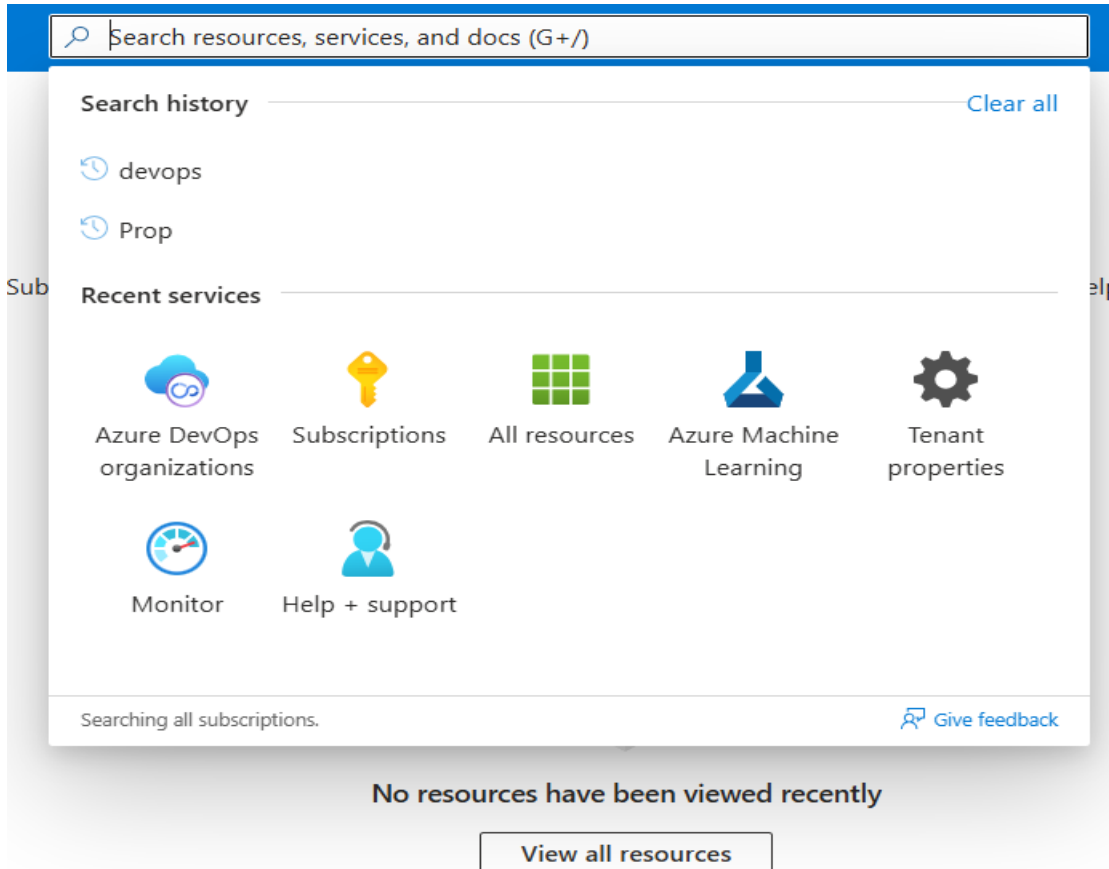
Sign in using your Microsoft account credentials.

If you don't have a Microsoft account, you can create one here: <https://signup.live.com/?lic=1>

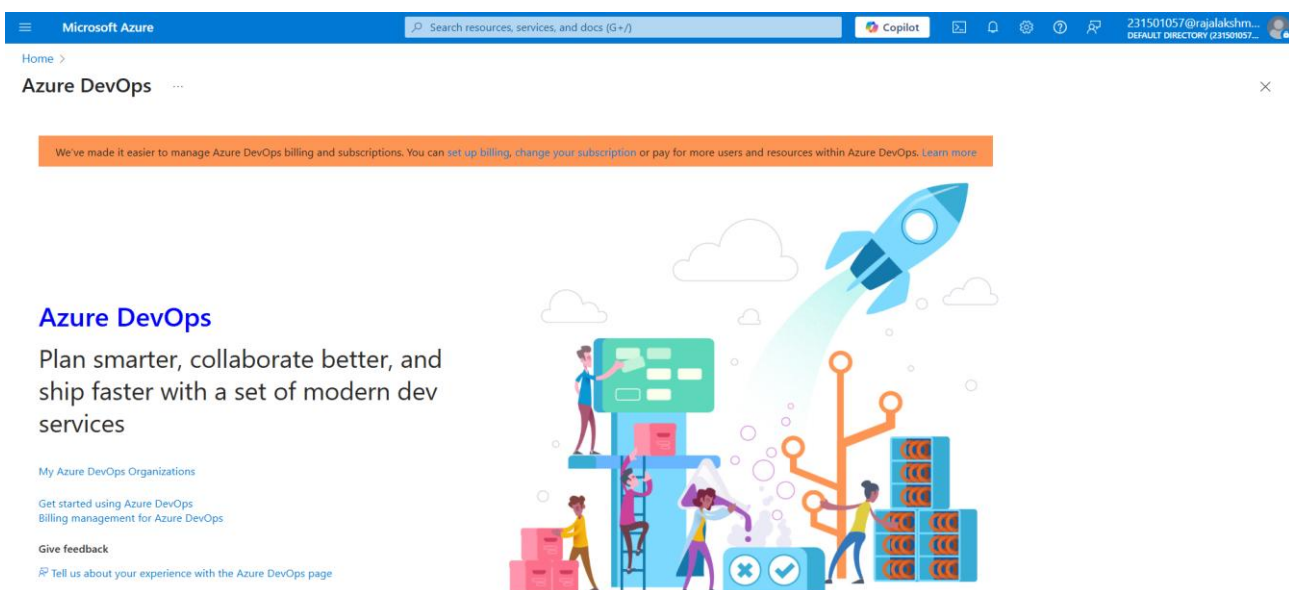
## 2. Azure home page



3. Open DevOps environment in the Azure platform by typing *Azure DevOps Organizations* in the search bar.



4. Click on the **My Azure DevOps Organization** link and create an organization and you should be taken to the Azure DevOps Organization Home page.



**Result:**

Successfully accessed the Azure DevOps environment and created a new organization through the Azure portal.

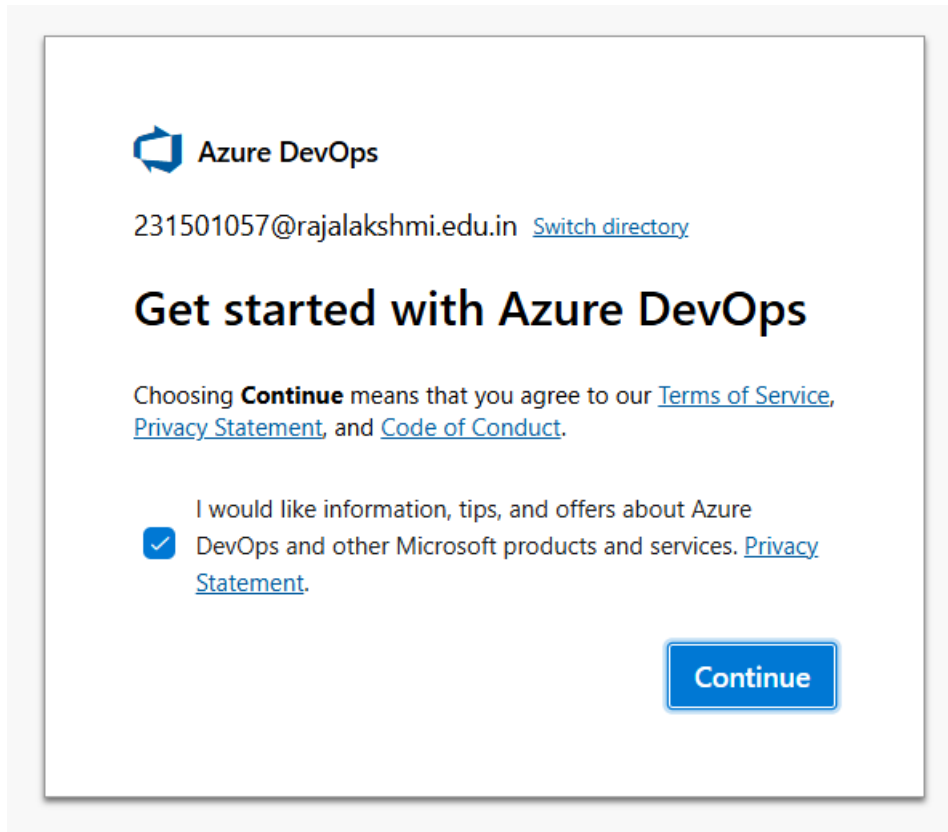
EXP NO: 2


## AZURE DEVOPS PROJECT SETUP AND USER STORY MANAGEMENT

**Aim:**

To set up an Azure DevOps project for efficient collaboration and agile work management.

1. Create An Azure Account



 Azure DevOps

231501057@rajalakshmi.edu.in [Switch directory](#)

### Get started with Azure DevOps

Choosing **Continue** means that you agree to our [Terms of Service](#), [Privacy Statement](#), and [Code of Conduct](#).

☒ I would like information, tips, and offers about Azure DevOps and other Microsoft products and services. [Privacy Statement](#).

[Continue](#)

2. Create the First Project in Your Organization

- a. After the organization is set up, you'll need to create your first **project**. This is where you'll begin to manage code, pipelines, work items, and more.
- b. On the organization's **Home page**, click on the **New Project** button.
- c. Enter the project name, description, and visibility options:
  - Name:** Choose a name for the project (e.g., **LMS**).
  - Description:** Optionally, add a description to provide more context about the project.
  - Visibility:** Choose whether you want the project to be **Private** (accessible only to those invited) or **Public** (accessible to anyone).
- d. Once you've filled out the details, click **Create** to set up your first project.



# Create a project to get started

Project name \*

Expense Tracker

Description

Expense Tracker App is a simple and powerful tool designed to help you manage your daily spending and take control of your finances. With an intuitive interface, you can easily log expenses, categorize transactions, and track your income versus expenses in real time.

Visibility



Public

Anyone on the internet can view the project. Certain features like TFVC are not supported.



Private

Only people you give access to will be able to view this project.



Public projects are disabled for your organization. You can turn on public visibility with [organization policies](#).

^ Advanced

Version control ?

Git



Work item process ?

Agile



+ Create project

3. Once logged in, ensure you are in the correct organization. If you're part of multiple organizations, you can switch between them from the top left corner (next to your user profile). Click on the Organization name, and you should be taken to the Azure DevOps Organization Home page.

231501057

Projects My work items My pull requests



Expense Tracker



#### 4. Project dashboard



EXPENSE-TRACKER

Private

Invite



##### About this project

♥ Liked 1



Project Summary: Expense Tracker App

The Expense Tracker App is a user-friendly financial management tool developed to help individuals monitor and manage their personal expenses efficiently. The core objective of the app is to provide users with a seamless platform to record daily income and expenditures, categorize transactions, and gain insights into their financial habits through interactive charts and summaries.

Key features include income/expense entry, category-wise classification, monthly budget planning, and real-time visualization of financial data. The application aims to promote financial awareness and encourage better budgeting decisions. Developed using [mention tech stack, e.g., React Native, Firebase, etc.], the app ensures a responsive and secure user experience across devices.

This project highlights the practical application of software development and UI/UX design in solving real-world financial challenges and demonstrates effective use of modern technologies to build scalable personal finance solutions.

##### Project stats

Period: Last 7 days

Boards

1 Work items created

0 Work items completed

##### Members

3



5. To manage user stories:

a. From the **left-hand navigation menu**, click on **Boards**. This will take you to the main **Boards** page, where you can manage work items, backlogs, and sprints.

b. On the **work items** page, you'll see the option to **Add a work item** at the top. Alternatively, you can find a + button or **Add New Work Item** depending on the view you're in. From the **Add a work item** dropdown, select **User Story**. This will open a form to enter details for the new User Story.

Did you notice Azure Boards has a new look and awesome new features? [Learn more.](#)

Work items

Recently updated ▾ | + New Work Item ▾ | → Open filtered view in Queries | Column Options | ↑ Import Work Items | Recycle Bin |

Filter by keyword

Feature (+1) ▾ | Assigned to ▾ | States ▾ | Area ▾ | Tags ▾ | X

ID	Title	Assigned To	State	Area Path	Tags
4	Password	HARISH KUMAR V	Active	EXPENSE-TRACKER	
3	The user should chose a unique name with mix and max length of 5:1!	Dhivakar S	New	EXPENSE-TRACKER	
5	Email	Aniketh J	New	EXPENSE-TRACKER	
6	Transaction Management	Dhivakar S	New	EXPENSE-TRACKER	
7	Budgeting	Aniketh J	New	EXPENSE-TRACKER	
26	Generate Spending Reports	Dhivakar S	New	EXPENSE-TRACKER	
27	Visualization of Spending Trends	Aniketh J	New	EXPENSE-TRACKER	
28	Filterable Reports	HARISH KUMAR V	New	EXPENSE-TRACKER	
23	Add Budgeting Feature	HARISH KUMAR V	New	EXPENSE-TRACKER	
25	Budget Alerts	HARISH KUMAR V	New	EXPENSE-TRACKER	
24	Track Progress Towards Budgets	Aniketh J	New	EXPENSE-TRACKER	
22	Quick Add Transaction	Aniketh J	New	EXPENSE-TRACKER	

## Result:

Successfully created an Azure DevOps project with user story management and agile workflow setup.

EXP NO: 3	SETTING UP EPICS, FEATURES, AND USER STORIES FOR PROJECT PLANNING
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**Aim:**  
To learn about how to create epics, user story, features, backlogs for your assigned project.

**Create Epic, Features, User Stories, Task**

Work Item Type	Title	State	Effort	Busin...	Value Area
Feature	Login Page	Active	12	1	Business
User Story	Username	Closed			Business
User Story	The user should chose a unique name with mix and max ...	New			Business

**1.Fill in Epics**

EPIC 31\*

31 Build a Mobile Application to Track Expenses, Set Budgets, and Visualize Spending Trends

Dhivakar S

0 Comments

Add Tag

StateActive

AreaEXPENSE-TRACKER

ReasonImplementation started

IterationEXPENSE-TRACKER\Iteration 1

Description

This project involves building a **mobile application** that enables users to **track daily expenses**, **set monthly budgets**, and **visualize spending trends** through interactive charts and summaries. The app is designed to promote financial awareness by allowing users to categorize transactions, monitor their budget limits, and identify overspending patterns. With a user-friendly interface and real-time data updates, the application serves as a personal finance assistant, helping individuals manage their money more effectively and make informed financial decisions.

Discussion

Add a comment. Use # to link a work item, @ to mention a person, or ! to link a pull request.

switch to Markdown editor

Planning

Priority2

Risk2 - Medium

Effort13

Business Value1

Time Criticality1

Start Date4/16/2025 12:00 AM

Target Date4/30/2025 12:00 AM

Classification

Value areaBusiness

## 2.Fill in Features

FEATURE 6\*

6 Transaction Management

HV HARISH KUMAR V

0 Comments Add Tag

StateActive

AreaEXPENSE-TRACKER

ReasonImplementation startedIterationEXPENSE-TRACKER\Iteration 1

Description

**Transaction Management** refers to the core functionality of recording, updating, categorizing, and deleting financial transactions within the app. Users can log their income and expenses, assign them to specific categories (like food, travel, bills), add notes, and view transaction history. This feature ensures accurate tracking of financial activities, supports real-time updates, and provides the foundation for generating budgets, summaries, and spending analysis. It helps users stay organized and in control of their personal finances.

HV

Add a comment. Use # to link a work item, @ to mention a person, or ! to link a pull request.

switch to Markdown editor

Planning

Priority2

Risk2 - Medium

Effort12

Business Value1

Time Criticality1

Start Date4/18/2025 12:00 AM

Target Date4/22/2025 12:00 AM

Classification

## 3. Fill in User Story Details

USER STORY 24

24 Track Progress Towards Budgets

AJ Aniketh J

0 Comments Add Tag

StateNew

AreaEXPENSE-TRACKER

ReasonNewIterationEXPENSE-TRACKER\Iteration 1

Description

**As a user,**  
**I want to** see how much of my budget I have used and how much remains,  
**So that I can** manage my spending efficiently.

Acceptance Criteria

1.Users Can View Budget Progress

2.Budget Progress Updates in Real Time

3.Notifications for Budget Limits

4.Monthly & Weekly Budget Tracking

5.Insights & Reports

Planning

Story Points

Priority2

Risk

Classification

Value area

Business

### Result:

Thus, the creation of epics, features, user story and task has been created successfully.

EXP NO: 4





# SPRINT PLANNING

**Aim:**


To assign user story to specific sprint for the Expense Tracker Application Project.


## Sprint Planning


### Sprint 1

 **EXPENSE-TRACKER Team**   



Taskboard Backlog Capacity Analytics


Iteration 1 


Person: All 


 Collapse all


New


  Username





 3 The user should chose a unique name with mix and max length of 5:15


 New


 Dhivakar S








 4 Password


 Active


 HARISH KUMAR V








 5 Email


 New


 Aniketh J






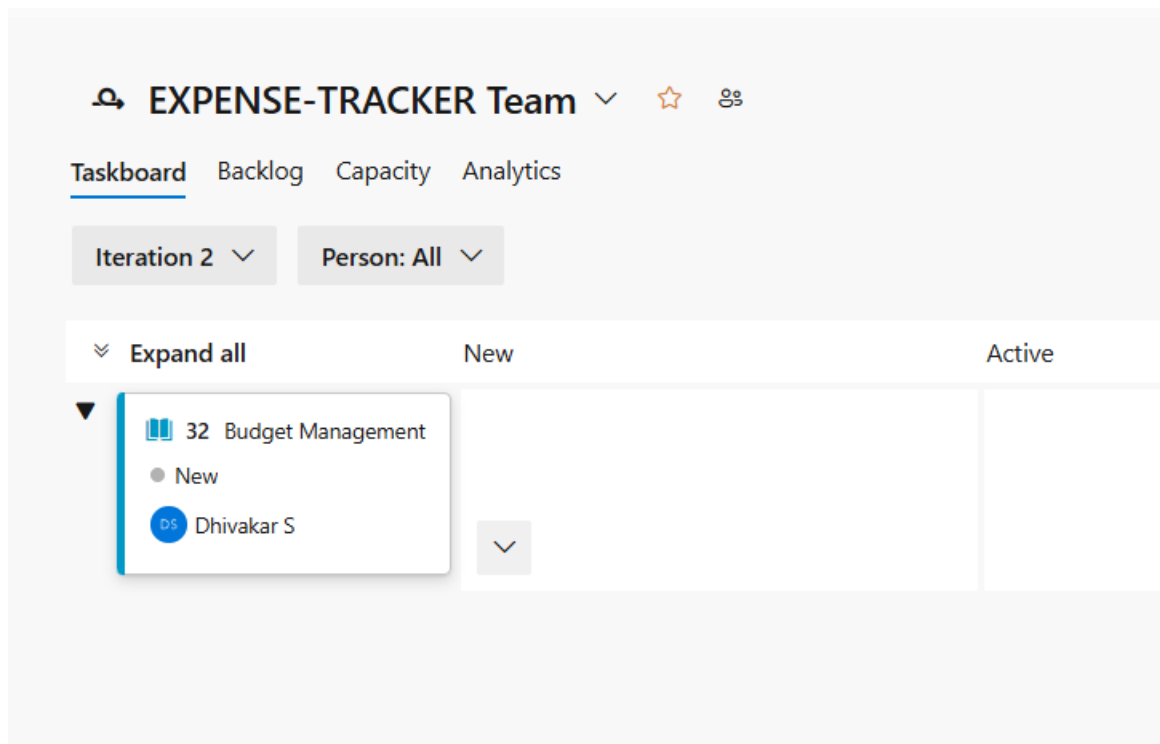
 11 Categories for Expenses

 New

 Unassigned



## Sprint 2



### Result:

The Sprints are created for Expense Tracker App Project

EXP NO: 5

# POKER ESTIMATION

## Aim:

Create Poker Estimation for the user stories Expense Tracker App Project.

## Poker Estimation

USER STORY 15\*

15 User Authentication

Aniketh J

0 Comments Add Tag

StateActive

AreaEXPENSE-TRACKER

ReasonImplementation started

IterationEXPENSE-TRACKER\Iteration 1

Description

**As a** user,

**I want** to securely sign up, log in, and log out of the application,

**So that** my personal financial data is protected and accessible only to me.

Acceptance Criteria

- The user must be able to create an account using email/password or social media login (Google, Facebook).
- The app should support multi-factor authentication (optional).
- The user should be able to log in and log out securely.
- Passwords should be encrypted, and sensitive data should be stored securely.

Planning

Story Points

10

Priority

2

Risk

2 - Medium

Classification

## Result:

The Estimation/Story Points is created for the project using Poker Estimation.



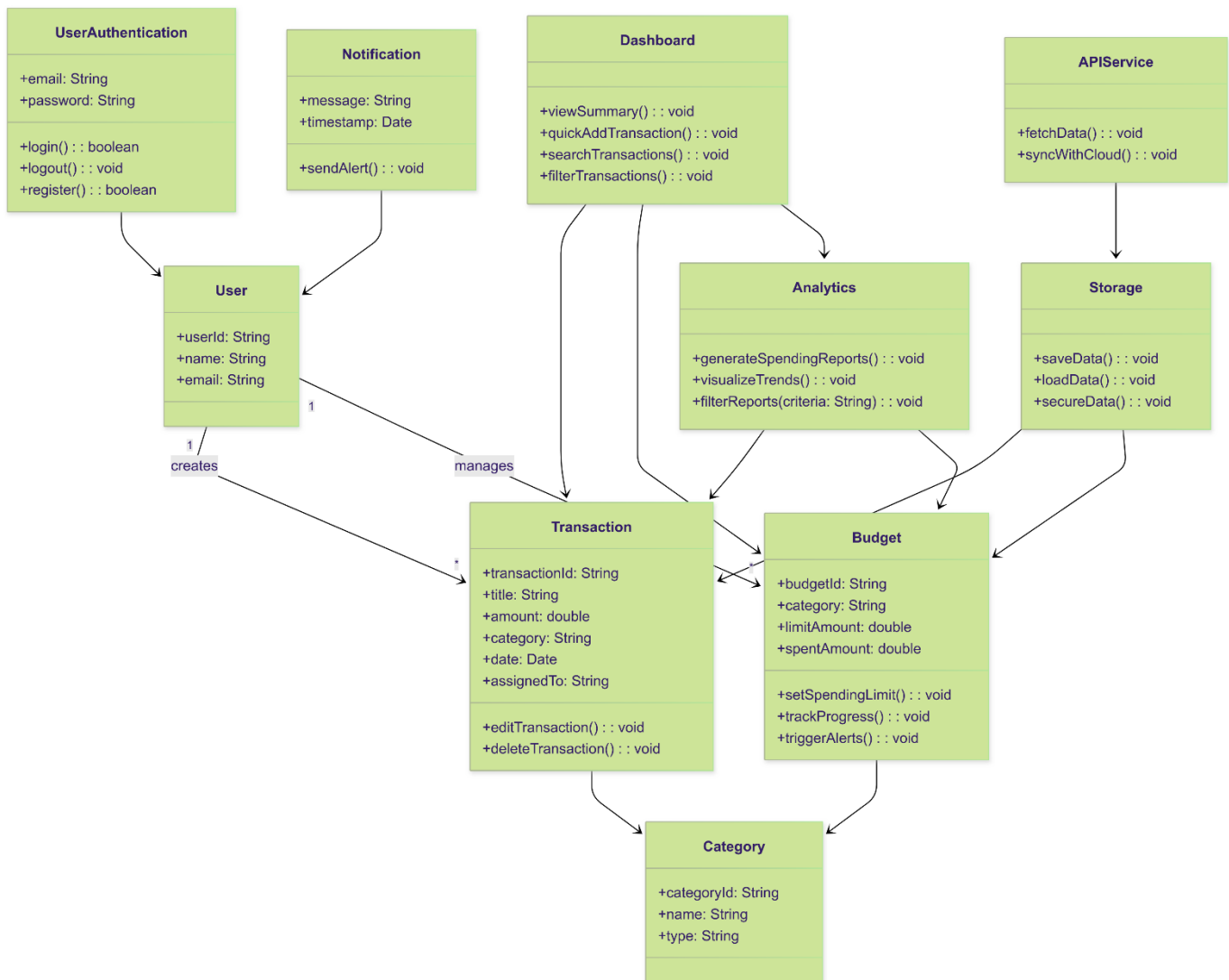
EXP NO: 6

## DESIGNING CLASS AND SEQUENCE DIAGRAMS FOR PROJECT ARCHITECTURE

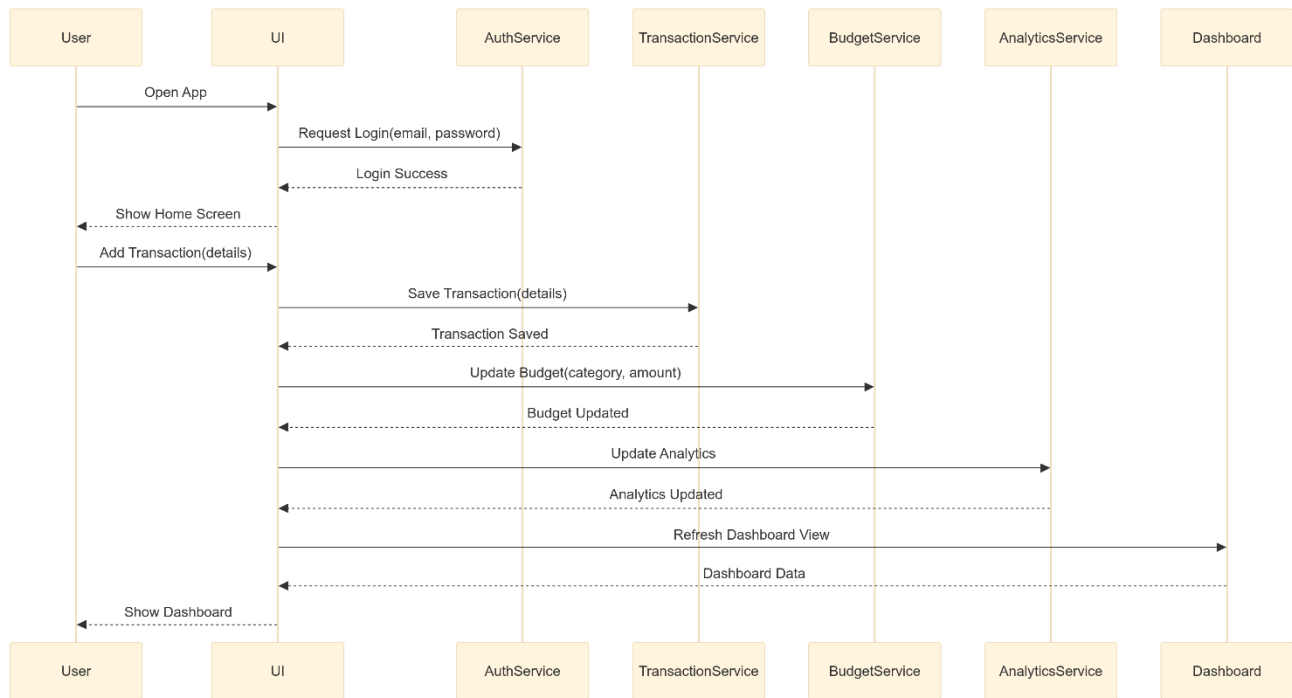
### Aim:

To Design a Class Diagram and Sequence Diagram for the given Project.

### 6A. Class Diagram



## 6B. Sequence Diagram



### Result:

The Class Diagram and Sequence Diagram is designed Successfully for the SMS/MMS Sending Project

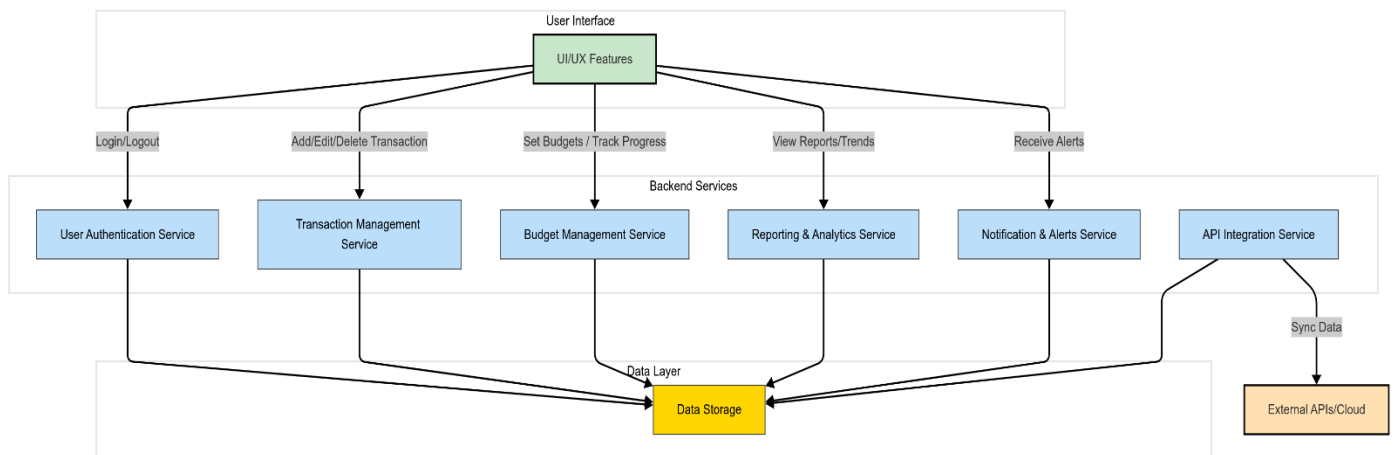
EXP NO: 7

## DESIGNING ARCHITECTURAL AND ER DIAGRAMS FOR PROJECT STRUCTURE

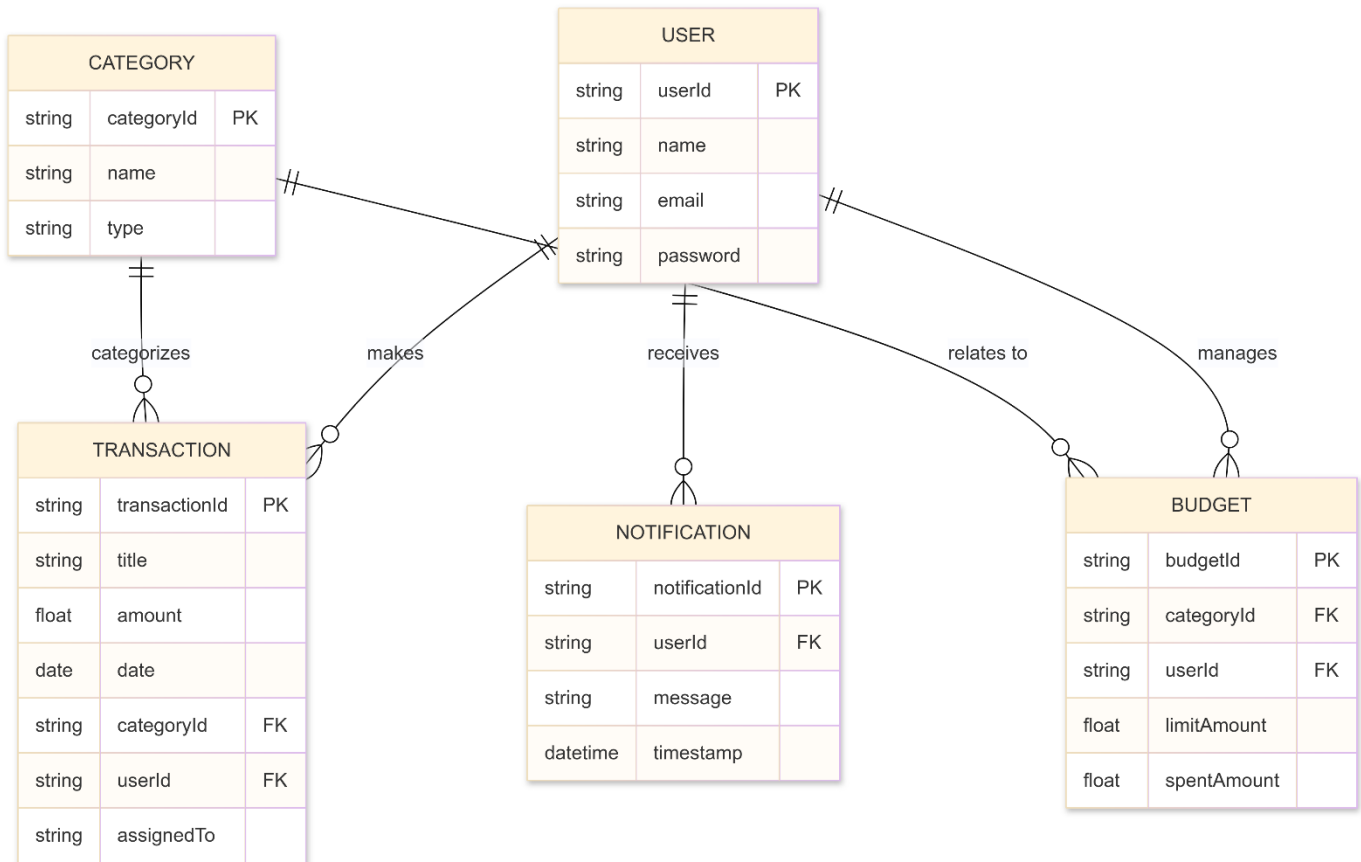
### Aim:

To Design an Architectural Diagram and ER Diagram for the given Project.

### 7A. Architectural Diagram



## 7B.ER Diagram



### Result:

The Architecture Diagram and ER Diagram is designed Successfully for the Music Playlist Batch Creator

<b>EXP NO: 8</b>	<b>TESTING – TEST PLANS AND TEST CASES</b>
------------------	--

**Aim:**

Test Plans and Test Case and write two test cases for at least five user stories showcasing the happy path and error scenarios in azure DevOps platform.

## **Expense Tracker App - Test Plan**

### **USER STORIES**

- As a user, I want to add, edit, and delete expense transactions (ID: EXP01).
- Users can view categorized transactions and search/filter them by date or category (ID: EXP02).
- Users can set monthly budgets and get alerts when nearing or exceeding limits (ID: EXP03).
- Users can view spending reports and visualize trends via charts (ID: EXP04).
- Users receive notifications for budget limits and important reminders (ID: EXP05).
- Users can manually enter transactions and quick add frequently used expenses (ID: EXP06).
- The app securely stores user data and supports login/logout features (ID: EXP07).
- Users can sync data across devices using API integration (ID: EXP08).

---

### **TEST SUITES**

- TS01 - Transaction Management (Add/Edit/Delete) (ID: 201)
- TS02 - Search and Filter Transactions (ID: 202)
- TS03 - Budget Management and Alerts (ID: 203)
- TS04 - Reporting and Analytics Visualization (ID: 204)
- TS05 - Notifications and Reminders (ID: 205)
- TS06 - User Authentication and Data Security (ID: 206)
- TS07 - API Integration and Data Sync (ID: 207)

---

### **TEST CASES**

**Test Suite: TS01 - Transaction Management (ID: 201)**

### 1. TC01 - Add a New Transaction (ID: 301)

- **Action:**
  - Log in as User A.
  - Navigate to "Add Transaction."
  - Enter valid details (title, amount, category, date).
  - Save the transaction.
- **Expected Results:**
  - Transaction is saved and displayed in the transaction list.
  - Type: Happy Path

### 2. TC02 - Edit Existing Transaction (ID: 302)

- **Action:**
  - Log in as User A.
  - Select an existing transaction.
  - Modify the amount and save.
- **Expected Results:**
  - Changes are saved and updated correctly in the list.
  - Type: Happy Path

### 3. TC03 - Delete a Transaction (ID: 303)

- **Action:**
  - Log in as User A.
  - Select a transaction and choose "Delete."
  - Confirm deletion.
- **Expected Results:**
  - Transaction is removed from the list.
  - Type: Happy Path

---

## Test Suite: TS03 - Budget Management and Alerts (ID: 203)

### 1. TC04 - Set Monthly Budget (ID: 304)

- **Action:**
  - Log in as User B.
  - Navigate to "Budget Settings."
  - Set a budget for the "Food" category.
  - Save the budget.

- **Expected Results:**
  - Budget is saved and reflected in dashboard progress.
  - Type: Happy Path

## 2. **TC05 - Alert When Budget Approaching Limit (ID: 305)**

- **Action:**
  - Log in as User B.
  - Add transactions to reach 90% of the set budget in "Food."
- **Expected Results:**
  - User receives a notification alert about nearing budget limit.
  - Type: Happy Path

## 3. **TC06 - Prevent Budget Exceeding (ID: 306)**

- **Action:**
    - Add a transaction that will exceed the set budget.
  - **Expected Results:**
    - Warning message appears: "Budget exceeded for this category."
    - Transaction can be saved but flagged.
    - Type: Error Path
- 

## **Test Suite: TS04 - Reporting and Analytics Visualization (ID: 204)**

### 1. **TC07 - Generate Spending Report (ID: 307)**

- **Action:**
  - Log in as User C.
  - Navigate to Reports.
  - Select "Monthly Spending" report.
- **Expected Results:**
  - Report is generated showing categorized expenses with charts.
  - Type: Happy Path

### 2. **TC08 - Filter Reports by Date Range (ID: 308)**

- **Action:**

- Choose a custom date range for report generation.
  - **Expected Results:**
    - Report accurately reflects transactions within the selected date range.
    - Type: Happy Path
    -
- 

## **Test Suite: TS05 - Notifications and Reminders (ID: 205)**

### **1. TC09 - Receive Budget Alert Notification (ID: 309)**

- **Action:**
  - User has set budget and reaches limit.
- **Expected Results:**
  - Notification is pushed to user's device/app.
  - Type: Happy Path

### **2. TC10 - Notification Settings Disabled (ID: 310)**

- **Action:**
  - User disables notifications in settings.
  - Budget limit is reached.
- **Expected Results:**
  - No push notification is received.
  - User can still see alerts in the app dashboard.
  - Type: Error Path

## **Result:**

The test plans and test cases for the user stories is created in Azure DevOps with Happy Path and Error Path



**EXP NO: 9**

## **LOAD TESTING AND PERFORMANCE TESTING**

**Aim:**

To create an Azure Load Testing resource and run a load test to evaluate the performance of a target endpoint.

**Load Testing**

**Steps to Create an Azure Load Testing Resource:**

Before you run your first test, you need to create the Azure Load Testing resource:

1. Sign in to Azure Portal  
Go to <https://portal.azure.com> and log in.
2. Create the Resource
  - Go to *Create a resource* → Search for “Azure Load Testing”.
  - Select Azure Load Testing and click Create.
3. Fill in the Configuration Details
  - *Subscription*: Choose your Azure subscription.
  - *Resource Group*: Create new or select an existing one.
  - *Name*: Provide a unique name (no special characters).
  - *Location*: Choose the region for hosting the resource.
4. (Optional) Configure tags for categorization and billing.
5. Click Review + Create, then Create.
6. Once deployment is complete, click Go to resource.

**Steps to Create and Run a Load Test:**

Once your resource is ready:

1. Go to your Azure Load Testing resource and click Add HTTP requests > Create.
2. Basics Tab
  - *Test Name*: Provide a unique name.
  - *Description*: (Optional) Add test purpose.
  - *Run After Creation*: Keep checked.
3. Load Settings
  - *Test URL*: Enter the target endpoint (e.g., <https://yourapi.com/products>).
4. Click Review + Create → Create to start the test.

Load Testing

# Create a load testing resource

Validation passed.

Basics

Encryption

Tags

Review + create

Basics

Subscription

Resource group

Name

Region

Encryption

Encryption type

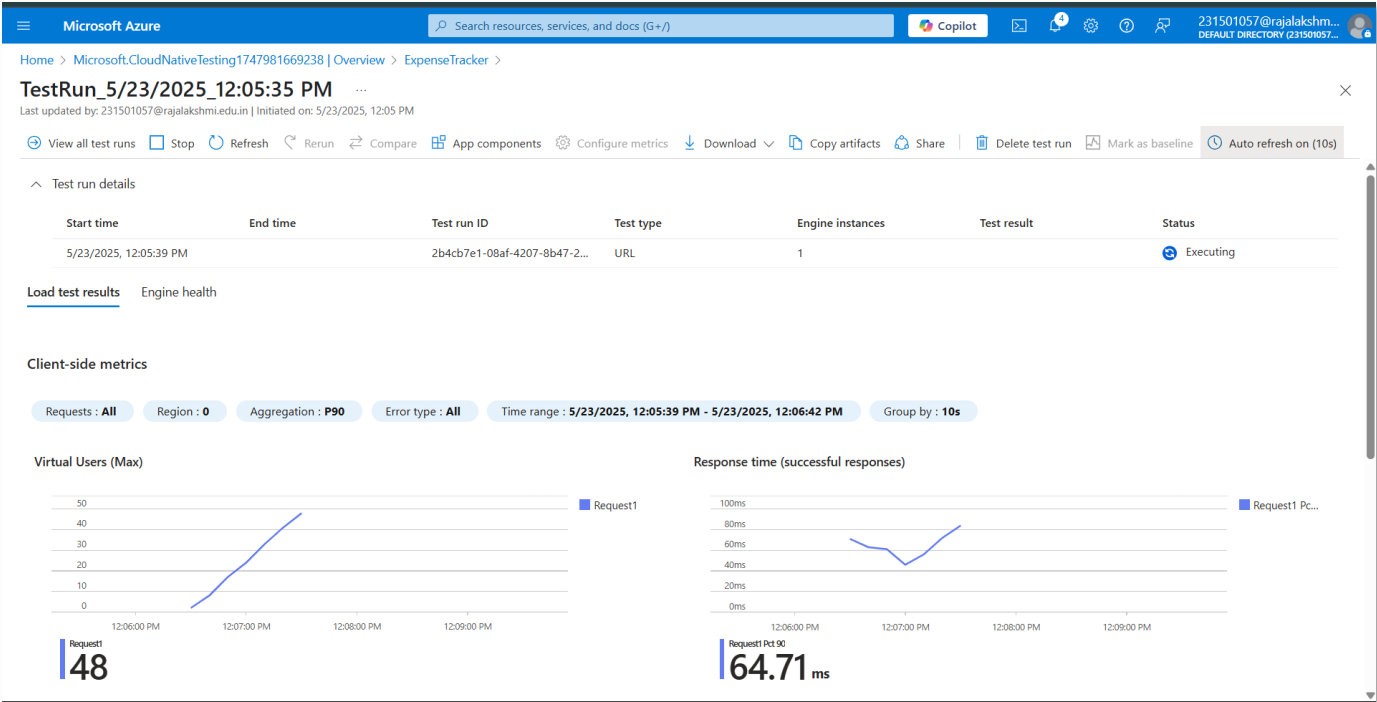
Azure for Students

231501057

ExpenseTracker

Central India

MMK



**Result:**

Successfully created the Azure Load Testing resource and executed a load test to assess the performance of the specified endpoint.

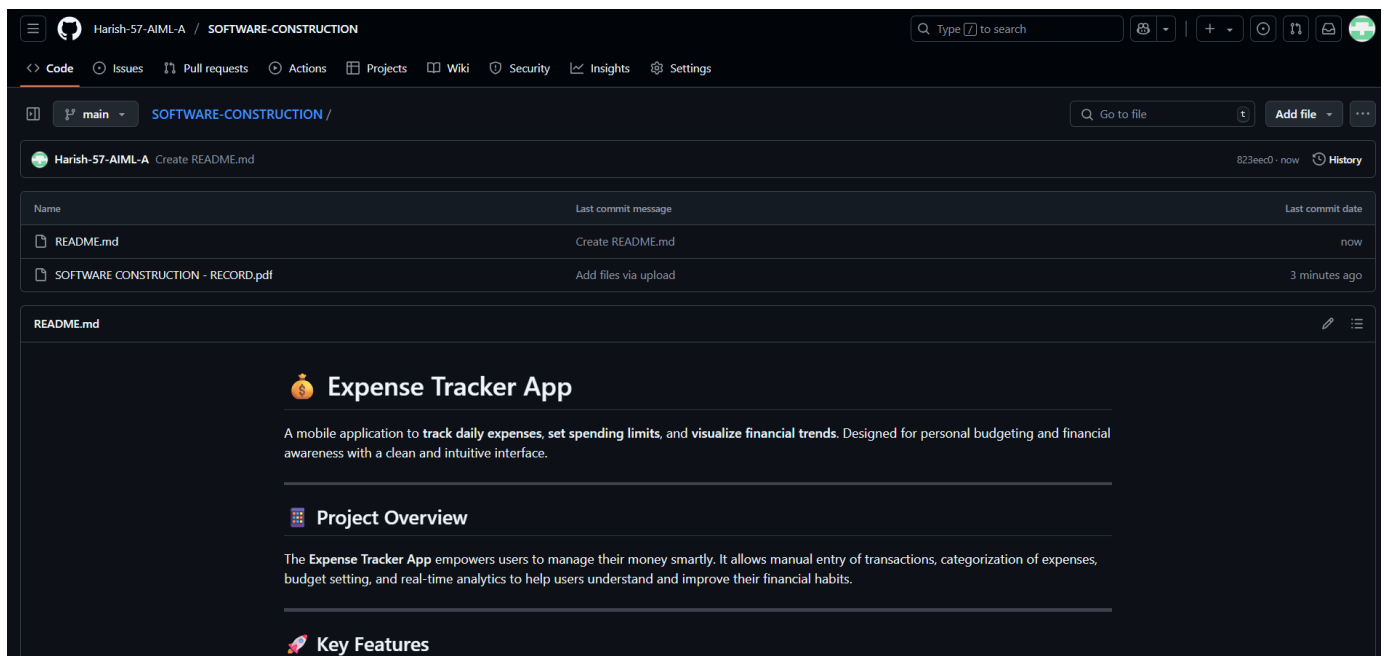
EXP NO: 10

## GITHUB: PROJECT STRUCTURE & NAMING CONVENTIONS

### Aim:

To provide a clear and organized view of the project's folder structure and file naming conventions, helping contributors and users easily understand, navigate, and extend the Expense Tracker App Project.

### GitHub Project Structure



### Result:

The GitHub repository clearly displays the organized project structure and consistent naming conventions, making it easy for users and contributors to understand and navigate the codebase.