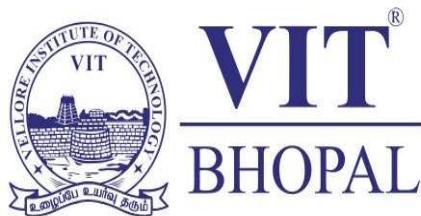


VITYARTHI – PROJECT



Project title : Personal Expense Tracker

Course title : Introduction to problem solving and programming

Course code : CSE 1021

Course type : Flipped course

Course credits : 4

Professor : Dr. G.Prabhu Kanna

Slot : C11+C12+C13

Submitted by : Bavesh.P

Registration number : 25BAI10093

Submission date : 23/11/25

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INTRODUCTION :

Personal Expense Tracker is made to provide you with a clear ,fair view of your spending day to day habits. By entering every transaction,you will effortlessly transform unclear financial worries into specific, actionable data .

Personal expense tracker is more than just a file of accounts ; it's your daily co-pilot on the journey to financial freedom. We believe that mindful spending is the foundation of a successful financial life by making the simple commitment to track your expenses.

This personal expense tracker is a tool or a system designed to help individuals monitor,record, and analyse their daily spending and income to better manage their personal finances .

PROBLEM STATEMENT :

The core problem a personal expense tracker addresses is the difficulty many individuals face in understanding and controlling their spending habits using traditional manual methods without this personal expense tracker we can't able look or track our daily expenses and the complexity in maintaining the paper based expense tracker increases beyond the time complexity so I have created this “Personal expense tracker” as the solution for this trouble

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PROJECT OBJECTIVES:

- Creating a personal expense tracker provide users with a clear and centralised record of all income and expenditure
- It is used to enable users to set spending limits,track their progress against those limits in real time
- Tracking for active working towards long term financial objectives (e.g.,saving for medical usage ,paying loan ,)
- It helps as supporter in major financial goal achievement
- It gives a great plan to secure data storage handling practices to protect user financial information

FUNCTIONAL REQUIREMENTS:

1.Expense management:

- Add New Expenses: This code allows the user to input and store details for a new expense
Details required: item name
- View all expense : The system must display a list of all currently recorded expenses

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- Calculate total expenses: The system must be able to sum the amounts of all recorded expenses and display the total

2.User Interface and Navigation :

- Display main menu :The code must present a clear navigable text -based menu
- Process user choice: The code must accept user input
- Handle invalid input:The system must recognise and handle invalid menu choices
- Exit programm:The code must provide a defined mechanism to terminate the program

3.Data Handling:

- Store expenses:The system must use a list to hold expense record stored as a dictionary

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NON-FUNCTIONAL REQUIREMENTS :

1. Performance:

- The system should respond to user actions within 1 seconds
- The application should load and present the main menu within 2 seconds

2. Security:

- Since the tracker deals with sensitive personal financial data, the data stored must be protected from unauthorised access

3. Usability:

- The user interface must be intuitive and easy to understand
- The process for adding a new expense should be quick and require minimal number of inputs

4. Reliability:

- The system must accurately calculate and report the totals
- The tracker should be available for use whenever the user launches the application

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- The data entered should not be lost during operation

5.Maintanability:

- The code base should be well organised and use clear function names and comments to allow a developer to easily understand, debug and modify the code

6. Error handling :

- If the system detects any error in the inputs entered by the user it displays an error message and requests' the user to try entering the inputs again.

7.Resource efficiency :

- The system is designed to minimise power consumption and optimize battery life.
- The system shall require less than 10MB of storage space for optimised running.
- The system doesn't require any network bandwidth so it can be accessed even in places without proper internet connection.

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SYSTEM ARCHITECTURE :

- Presentation layer is built using Python IDLE where the inputs are accepted from the user.
- Application layer is where the input data is processed and the calculations are performed then the outputs are stored and displayed later.
- Data layer is a storage space where the user inputs and the output values are stored.
- Output renderer is a dynamic area that shows all results including detailed personal expenses on each day and alerts on errors.

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DESIGN DIAGRAM :

1. Workflow :

User input → Data validation → Mark calculation(MTE, TEE, Internals, Attendance) → Grade mapping → GPA Calculation → CGPA aggregation → Result display.

2. Data flow Diagram :

- Course details :

The system allows the user to enter type, credits and marks (MTE, TEE, Internals, Attendance) for each course.

- Validation :

The system after entering the inputs checks for the correctness of inputs such as : “marks within possible ranges”, “Attendance below 100%”.

- Computation:

The system calculates total marks, then marks to the respective grade and grade points for each course separately.

- Result aggregation :

For semester's GPA = $\frac{\sum(\text{Grade points} \times \text{Credits})}{\text{Total credits for current semester}}$

And CGPA is calculated using,

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$$\text{CGPA} = \frac{\sum(\text{GPA} \times \text{Total credits of that semester})}{\text{Total semester completed till date}}$$

- Output :

Displays the processed data, the results and then allows the user to calculate GPA and CGPA for the consecutive semesters.

3. Component diagram :

- Input form : Collects course details from the user
- Validation module : Checks all input ranges and types
- Calculation core : Computes grade, GPA, CGPA
- Output display : Presents the results

DESIGN DECISIONS & RATIONALE :

1. Programming language : Python

- Rationale : Python is a simple, easy to learn language with large number of libraries and frameworks, making it idle for small projects like this.

2. User interface ; Jupyter Notebook

- Rationale : A simple UI is sufficient for this program so Jupyter is chosen which provides an interactive environment for user to input data and view results.

3. Data storage : In-memory data storage

- Rationale : Since the project doesn't require any explicit data storage, in-memory storage is sufficient and efficient.

4. Calculation Algorithm : Simple formula-based calculation

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- Rationale :The GPA and CGPA calculation formula is straight forward and is simple to use.
5. Error handling :
- Rationale : Basic error handling is sufficient for the small project like this and the user is expected to enter valid data.

IMPLEMENTATION DETAILS :

1. Language : Python
2. Development environment : Python IDLE
3. Module : IPSP_Project_Personal_expense_tracker
4. Function :
5. Implementation steps :
 - Implement the GPA_calculator function to calculate GPA and CGPA based on input marks and attendance.
 - Once after it is implemented the function itself prints the GPA and CGPA of the user without being called again.
 - And it allows user to calculate for multiple semesters.
 - Test the program with sample inputs and verify the results.

TESTING APPROACH :

1. Unit tests :
Manually validated the system's logic using known correct GPAs from academic records and mock data.
2. System Integration :
Tested with full semester data for all possible scenarios such as Highest(S), lowest(F) grade performance and 0 attendance.
3. Validation :

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Entered the values at the boundary, the values such as exactly at grade breakpoints.

4. User flow testing :

Ensure that an error message display if any of the input it wrong.

5. Peer view :

Verified among my peer group on calculations and reliability.

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SCREENSHOTS / RESULTS :

The screenshots show three separate executions of a Python script in a Jupyter Notebook. The script prompts the user for course details and calculates GPA and CGPA based on those inputs.

```
Enter 1 if the course is a Theory course(LTP/LT) else if the course is a Laboratory/Project(PJ) based enter 2 :  
1  
Enter the course credits : 4  
Enter your Mid-term marks of this course out of 50 : 45  
Enter your Term-end marks of this course out of 100 : 98  
Enter your internal marks out of 35: 34  
Enter your attendance percentage : 100  
Enter your class Average out of 100: 88  
Enter the standard deviation of the class : 9  
  
Enter 1 if the course is a Theory course(LTP/LT) else if the course is a Laboratory/Project(PJ) based enter 2 :  
1  
Enter the course credits : 4  
Enter your Mid-term marks of this course out of 50 : 39  
Enter your Term-end marks of this course out of 100 : 87  
Enter your internal marks out of 35: 32  
Enter your attendance percentage : 100  
Enter your class Average out of 100: 75  
Enter the standard deviation of the class : 11  
The course credits along with their Grade and Grade points are displayed below  
  
[4, 'C', 7, 4, 'S', 10, 4, 'A', 9]  
The GPA of the current semester is : 8.66  
  
Your CGPA is : 8.2  
Enter 1 to calculate the Semester's GPA and CGPA, Enter 2 to exit :  
2  
Thank you for using VIT'ian CGPA Calculator
```



```
Enter the standard deviation of the class : 10  
The course credits along with their Grade and Grade points are displayed below  
  
[4, 'C', 7, 4, 'B', 8]  
The GPA of the current semester is : 7.5  
  
Your CGPA is : 7.5  
Enter 1 to calculate the Semester's GPA and CGPA, Enter 2 to exit :  
1  
Enter the Total credits for the current semester : 12  
Enter the total number of course for the current semester : 3  
Now Enter the required details of the courses completed to calculate the GPA of the first semester  
  
Enter 1 if the course is a Theory course(LTP/LT) else if the course is a Laboratory/Project(PJ) based enter 2 :  
1  
Enter the course credits : 4  
Enter your Mid-term marks of this course out of 50 : 24  
Enter your Term-end marks of this course out of 100 : 70  
Enter your internal marks out of 35: 32  
Enter your attendance percentage : 100  
Enter your class Average out of 100: 78  
Enter the standard deviation of the class : 10  
  
Enter 1 if the course is a Theory course(LTP/LT) else if the course is a Laboratory/Project(PJ) based enter 2 :  
1  
Enter the course credits : 4  
Enter your Mid-term marks of this course out of 50 : 45  
Enter your Term-end marks of this course out of 100 : 98  
Enter your internal marks out of 35: 34
```



```
Enter 1 if the course is a Theory course(LTP/LT) else if the course is a Laboratory/Project(PJ) based enter 2 :  
1  
Enter the course credits : 4  
Enter your Mid-term marks of this course out of 50 : 45  
Enter your Term-end marks of this course out of 100 : 98  
Enter your internal marks out of 35: 34  
Enter your attendance percentage : 100  
Enter your class Average out of 100: 88  
Enter the standard deviation of the class : 9  
  
Enter 1 if the course is a Theory course(LTP/LT) else if the course is a Laboratory/Project(PJ) based enter 2 :  
1  
Enter the course credits : 4  
Enter your Mid-term marks of this course out of 50 : 39  
Enter your Term-end marks of this course out of 100 : 87  
Enter your internal marks out of 35: 32  
Enter your attendance percentage : 100  
Enter your class Average out of 100: 75  
Enter the standard deviation of the class : 11  
The course credits along with their Grade and Grade points are displayed below  
  
[4, 'C', 7, 4, 'S', 10, 4, 'A', 9]  
The GPA of the current semester is : 8.66  
  
Your CGPA is : 8.2  
Enter 1 to calculate the Semester's GPA and CGPA, Enter 2 to exit :  
2  
Thank you for using VIT'ian CGPA Calculator
```

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CHALLENGES FACED :

1. Relative grading :

VIT's relative grading for theory courses took me a long time to understand but I researched a lot on it then found the logic behind it and applied it in my program.

2. User error handling :

Invalid inputs such as marks > 100, attendance percentage above 100 always makes the calculation so wrong so checking on them was quite a hard task.

3. Dynamic update :

Managing the current session CGPA calculation as the semester are added one by one required great care and attention for proper management

4. Transparency :

Providing the user with the clear step by step Calculations and not just their final results.

LEARNING AND KEY TAKEAWAYS :

1. Implementation :

Learnt how to implement the acquired knowledge to solve the real-world problems, acquired a lot of practical skills in shape-shifting the academics into a key for locks of problem in today's world.

2. Automation value :

This would have took a lot of time and energy if it was done manually but now within seconds with the help of this calculator we can get the results automatically in a few seconds.

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3. Testing :

Coding part is easy if we know the logic behind it but we can only know our code is correct when it test run it with multiple values, so I understood that testing a system is as important as designing a system.

4. Communication :

The system's ability of guidance has been improved and error messages are directly displayed in the output UI for optimal user support.

FUTURE ENHANCEMENTS :

1. Data persistence :

Add a support for local storage, so that the user can store his previous session data and prevent it from losing in the next session.

2. User Interface :

Separately designing a new User Interface (App / Webpage) for better conditions and presentation and instant access of the system rather than running it in Python IDLE

3. Analytics :

With the help of the previous data entered by the user predicting their next most probable Investment and choice and creating graphical dashboards for easier access.

4. Export :

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Enabling exporting reports as in the form of PDF or EXCEL or Direct email share formats for the daily use for everyone's personal expense

REFERENCE :

1. VITYARTHI and CSE1021 course for Python coding skills.
2. Google for learning about Documentation.
3. Peer and mentor feedbacks from,
 - Dr. G.Prabhu Kanna
 - Gokul – 22BCG10045,
 - Gopi – 23BSA10162,
 - Gokul Prasad. K - 25BAI10148,
 - Rahul – 25BAI10288
 - Sudharshan. SG – 25BAI10706,
 - Dilip. S – 25BAI10590.