

EXPENSE TRACKER REPORT

PYTHON PROJECT

VITyarthi PROJECT

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1. Introduction

Managing day-to-day expenses is an essential task for individuals and businesses alike. Most people struggle to track their spending habits due to manual methods such as notebooks or basic spreadsheets. To overcome these challenges, a computer-based solution offers a more efficient, organized, and error-free approach.

This project presents a Python-based Expense Tracker Application built using Tkinter for the graphical user interface, SQLite as the database for storing expense records, and tkcalendar to facilitate date selection. The application enables users to add, update, view, and delete expenses in a user-friendly manner while maintaining a persistent database.

2. Problem Statement

Many individuals lack a systematic way to track their daily expenditures. Manual tracking methods are time-consuming, prone to errors, and often lack proper organization and retrieval features. Without proper tracking, users cannot analyze their spending patterns or maintain financial discipline.

The main problem addressed by this project is the absence of an easy-to-use, computerized system that allows users to record, edit, and manage expenses efficiently, ensuring accuracy and quick access to financial records.

3. Functional Requirements

Functional requirements describe what the system should do.

3.1 Add Expense

The user must be able to enter details such as date, payee, description, amount, and mode of payment.

The application should store this data in an SQLite database.

3.2 View Expense

The system must display all stored expenses in a tabular Tree View.

The user must be able to select an expense to view its detailed information.

3.3 Edit Expense

The user must be able to update previously stored expense information.

Updated records must be saved in the database.

3.4 Delete Expense

The user must be able to delete a selected expense.

The system must also offer an option to delete all expenses at once.

3.5 Clear Fields

The input form should reset to default values when the "Clear Fields" action is triggered.

3.6 Convert Expense to Words

The system allows users to convert a selected expense into a readable sentence.

This helps users understand the record linguistically.

3.7 Date Selection

The calendar widget must allow easy date picking to avoid format errors.

4. Non-Functional Requirements

Non-functional requirements define the system's quality attributes.

4.1 Usability

The interface should be simple and intuitive.

Font style, button size, and layout should support easy navigation.

4.2 Performance

The system should quickly load, retrieve, and update expense data.

Operations like database read/write must be fast.

4.3 Reliability

Data stored in SQLite must be persistent.

The system should not crash during common operations such as adding or editing entries.

4.4 Maintainability

The source code should be modular, with separate functions handling specific tasks.

Clear naming conventions and comments should help future developers modify the system.

4.5 Portability

As the system uses Python and SQLite, it can run on multiple operating systems (Windows, macOS, Linux).

4.6 Security

Data integrity must be preserved by preventing invalid or incomplete fields when saving.

The system prompts users before deleting records to avoid accidental loss.

5. System Architecture

The system follows a simple three-layer architecture:

5.1 Presentation Layer (User Interface Layer)

Built using Tkinter.

Includes widgets such as Labels, Entry fields, Buttons, OptionMenu, DateEntry, and TreeView.

Supports user interaction for adding, viewing, editing, and deleting expenses.

5.2 Application Logic Layer

Consists of Python functions handling operations:

`add_another_expense()` – Adds new expenses

`edit_expense()` – Updates selected records

`remove_expense()` – Deletes a record

`remove_all_expenses()` – Clears all data

`list_all_expenses()` – Loads all data from database

`view_expense_details()` – Displays details of selected entry

Ensures validation, message prompts, and linking UI with backend.

5.3 Data Layer (Database Layer)

Uses SQLite database named Expense Tracker.db.

Table: ExpenseTracker

Columns: ID, Date, Payee, Description, Amount, ModeOfPayment

Stores all expenses securely and persistently.

DESIGN DIAGRAMs

Use Case Diagrams



Work Flow Diagram

```

+-----+ | ExpenseTracker | +-----+ | - ID:
Integer | | - Date: Date | | - Payee: String | | - Description: String | | - Amount:
Float | | - ModeOfPayment: String | +-----+ | + addExpense() | | +
deleteExpense() | | + updateExpense() | | + fetchAll() | | + fetchOne() |
+-----+ +-----+ | Database |
+-----+ | + connect() | | + executeQuery() | | + commit() |
+-----+ +-----+ | GUI |
+-----+ | + renderForm() | | + renderTable() | | + clearFields() | |
+ showMessage() | +-----+

```

DFD Level 0

```

+-----+ | USER | +-----+ | v
+-----+ | Expense Tracker | +-----+ | v
+-----+ | Database (SQLite) | +-----+

```

DFD Level 1

```

+-----+ | USER | +-----+ | 
+-----+ +-----+ +-----+ | Add Exp | | Edit Exp | | Delete Exp | |
View Expense | +-----+ +-----+ +-----+ +-----+ +-----+ | | | | |
----- Write/Read ----- | v +-----+ | | | |
SQLite Database | +-----+

```

ERD Diagram

```

+-----+ | ExpenseTracker | 
+-----+ | ID (PK) INTEGER | | Date DATETIME |
| Payee TEXT | | Description TEXT | | Amount FLOAT | | ModeOfPayment TEXT |
+-----+

```

GUI Layout Diagram

```

----- | EXPENSE TRACKER (Title
Bar) | -----
| TABLE PANEL | | -----
| [DateEntry] | +-----+ | Payee: [Textbox] | | ID | Date | Payee
| ... | | Description: [Textbox] | | -----
| [Textbox] | | Data Rows... | | Mode: [Dropdown] | +-----+ | |
| [Add Button] | | [Convert to Words] | | -----
----- | BUTTONS PANEL (Delete,
Edit, Clear, etc.) | -----

```


1. Design Decisions

The following design choices were made to ensure that the Expense Tracker is simple, efficient, and user-friendly:

1.1 Choice of Programming Language

Python was chosen because:

It offers strong GUI support through Tkinter.

It integrates easily with SQLite for backend storage.

It is simple to learn and widely used in software development.

1.2 GUI Framework (Tkinter)

Tkinter was selected as the GUI framework because:

It comes built-in with Python (no additional installation needed).

It supports widgets like buttons, forms, tables, dropdowns, and message boxes.

It is ideal for desktop applications with moderate complexity.

1.3 Database (SQLite)

SQLite was preferred due to:

Lightweight storage in a single .db file.

No server installation required.

Fast read/write operations for small applications.

1.4 TkCalendar Widget

The DateEntry widget from tkcalendar was used to:

Avoid incorrect date formatting.

Provide a calendar-style selection.

1.5 Table Display (TreeView)

TreeView from Tkinter's ttk module was used for:

Structured representation of expenses.

Horizontal and vertical scrolling.

Easy selection of specific records.

1.6 Modular Function Design

Functions like add_another_expense(), edit_expense(), and remove_expense() were separated to:

Improve readability.

Make the code maintainable.

Allow reuse and easy debugging.

2. Implementation Details

Below is a summary of how the system is built internally:

2.1 Database Initialization

A table named ExpenseTracker is created with fields:

ID (Primary Key)

Date

Payee

Description

Amount

Mode of Payment

This ensures all expenses are stored permanently.

2.2 Main Functional Modules

- Add Expense

Takes form input values.

Validates empty fields.

Inserts values into database.

- View Expense

Loads all values from database into TreeView.

Allows selection to view details.

- Edit Expense

Retrieves selected record.

Updates fields in the form.

Saves modified data back to the database.

- Delete Expense

Deletes the selected item or all items.

Confirmation message ensures safety.

- Clear Fields

Resets the input form to default values.

- Convert Expense to Words

Converts numeric and textual details into a readable sentence.

2.3 GUI Layout

The window is divided into:

Data Entry Frame (left side)

Buttons Frame (top center)

TreeView Frame (right side listing the expenses)

2.4 Application Flow

1. User inputs expense details.
2. Data gets stored in the SQLite database.
3. Data is fetched and displayed in the TreeView.
4. User can edit, delete, or view details of each entry.

RESULT

The screenshot shows the Visual Studio Code interface with the file `vityarthifinal.py` open. The code defines a function `list_all_expenses()` which connects to a SQLite database and retrieves all expense records. A terminal window at the bottom shows the command `python vityarthifinal.py` being run, followed by a DeprecationWarning message about the default date adapter.

```
vityarthifinal.py
RUN AND DEBUG
RUN
Run and Debug
To customize Run and Debug
create a launch.json file.
Show automatic Python configurations
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py"
c:/Users/KASHISH ADLAK/OneDrive\csevit\vityarthifinal.py:102: DeprecationWarning: The default date adapter is deprecated as of Python 3.12; see the sqlite3 documentation for suggested replacement recipes
connector.execute(
PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py"
PS C:\Users\KASHISH ADLAK\OneDrive\csevit
Ln 277, Col 14 Spaces: 4 UFT-8 CRLF {} Python 3.14.0 02:02 23-11-2025
Cold warning
In effect
```

The screenshot shows the Visual Studio Code interface with the same file `vityarthifinal.py` open. The code now includes imports for `datetime`, `sqlite3`, `tkcalendar`, `tkinter.messagebox`, and `tkinter.ttk`. It defines functions to insert new expenses into the database and to view details of selected expenses using Tkinter windows and widgets. The terminal window shows the command `python vityarthifinal.py` running again, with the same DeprecationWarning message.

```
vityarthifinal.py
RUN AND DEBUG
RUN
Run and Debug
To customize Run and Debug
create a launch.json file.
Show automatic Python configurations
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py"
c:/Users/KASHISH ADLAK/OneDrive\csevit\vityarthifinal.py:102: DeprecationWarning: The default date adapter is deprecated as of Python 3.12; see the sqlite3 documentation for suggested replacement recipes
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PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py"
PS C:\Users\KASHISH ADLAK\OneDrive\csevit
Ln 277, Col 14 Spaces: 4 UFT-8 CRLF {} Python 3.14.0 02:03 23-11-2025
Cold warning
In effect
```

File Edit Selection View Go Run Terminal Help

RUN AND DEBUG

RUN

Run and Debug

To customize Run and Debug create a launch.json file.

Show automatic Python configurations

vityarthifinal.py

```
50 def clear_fields():
51     today_date = datetime.datetime.now().date()
52
53     desc.set('')
54     payee.set('')
55     amnt.set(0.0)
56     MoP.set('Cash')
57     date.set_date(today_date)
58     table.selection_remove(*table.selection())
59
60 def remove_expense():
61     if not table.selection():
62         mb.showerror('No record selected', 'Please select a record to delete!')
63         return
64
65     current_selected_expense = table.item(table.focus())
66     values_selected = current_selected_expense['values']
67
68     surely = mb.askyesno('Are you sure.', f'Are you sure that you want to delete the record of {values_selected[2]}?')
69
70     if surely:
71         connector.execute('DELETE FROM ExpenseTracker WHERE ID=%d' % values_selected[0])
72         connector.commit()
73
74     list_all_expenses()
75     mb.showinfo('Record deleted successfully!', 'The record you wanted to delete has been deleted successfully')
76
77
78
```

BREAKPOINTS

- Raised Exceptions
- Uncought Exceptions
- User Uncaught Exceptions

Cold warning In effect

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py"

c:\Users\KASHISH ADLAK\OneDrive\csevit\vityarthifinal.py:102: DeprecationWarning: The default date adapter is deprecated as of Python 3.12; see the sqlite3 documentation for suggested replacement recipes

connector.execute()

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PS C:\Users\KASHISH ADLAK\OneDrive\csevit

Ln 277, Col 14 Spaces: 4 UTF-8 CRLF {} Python 3.14.0 02:03 23-11-2025

File Edit Selection View Go Run Terminal Help

RUN AND DEBUG

RUN

Run and Debug

To customize Run and Debug create a launch.json file.

Show automatic Python configurations

vityarthifinal.py

```
79 def remove_all_expenses():
80     surely = mb.askyesno('Are you sure', 'Are you sure that you want to delete all the expense items from the database.', icon = 'warning')
81
82     if surely:
83         table.delete(*table.get_children())
84
85         connector.execute('DELETE FROM ExpenseTracker')
86         connector.commit()
87
88         clear_fields()
89         list_all_expenses()
90         mb.showinfo('All Expenses deleted', 'All the expenses were successfully deleted')
91     else:
92         mb.showinfo('Ok then', 'The task was aborted and no expense was deleted')
93
94 def add_another_expense():
95     global date, payee, desc, amnt, MoP
96     global connector
97
98     if not date.get() or not payee.get() or not desc.get() or not amnt.get() or not MoP.get():
99         mb.showerror('Fields empty!', 'Please fill all the missing fields before pressing the add button!')
100
101    else:
102        connector.execute(
103            'INSERT INTO ExpenseTracker (Date, Payee, Description, Amount, ModeOfPayment) VALUES (?, ?, ?, ?, ?)',
104            (date.get_date(), payee.get(), desc.get(), amnt.get(), MoP.get())
105        )
106
107
```

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Cold warning In effect

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c:\Users\KASHISH ADLAK\OneDrive\csevit\vityarthifinal.py:102: DeprecationWarning: The default date adapter is deprecated as of Python 3.12; see the sqlite3 documentation for suggested replacement recipes

connector.execute()

PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py"

PS C:\Users\KASHISH ADLAK\OneDrive\csevit

Ln 277, Col 14 Spaces: 4 UTF-8 CRLF {} Python 3.14.0 02:03 23-11-2025

The screenshot shows the PyCharm IDE interface. The left sidebar has icons for RUN, DEBUG, and LAUNCH JSON. A 'RUN AND DEBUG' section is expanded, showing 'RUN' and 'Run and Debug'. Below it, there's a note to 'customize Run and Debug' and a link to 'Show automatic Python configurations'. The main editor window displays a Python script named `vityarthfinal.py`. The code defines several functions: `add_another_expense()`, `edit_expense()`, `edit_existing_expense()`, and `list_all_expenses()`. It uses SQLite database operations via a connector and handles user input with `mb.showinfo` and `global table` statements. The bottom terminal shows command-line output for running the script.

```
File Edit Selection View Go Run Terminal Help ← → Q csevit
```

RUN AND DEBUG ...

RUN

Run and Debug

To customize Run and Debug
create a launch.json file.

Show automatic Python configurations

vityarthfinal.py x

```
94     def add_another_expense():
95         connector.commit()
96
97         clear_fields()
98         list_all_expenses()
99         mb.showinfo('Expense added', 'The expense whose details you just entered has been added to the database')
100
101    def edit_expense():
102        global table
103
104        def edit_existing_expense():
105            global date, amnt, desc, payee, MOP
106            global connector, table
107
108            current_selected_expense = table.item(table.focus())
109            contents = current_selected_expense['values']
110
111            connector.execute('UPDATE ExpenseTracker SET Date = ?, Description = ?, Amount = ?, ModeOfPayment = ? WHERE ID = ?',
112                             (date.get_date(), payee.get(), desc.get(), amnt.get(), MOP.get(), contents[0]))
113            connector.commit()
114
115            clear_fields()
116            list_all_expenses()
117
118            mb.showinfo('Data edited', 'We have updated the data and stored in the database as you wanted')
119            edit_btn.destroy()
120
121    return
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthfinal.py"
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PS C:\Users\KASHISH ADLAK\OneDrive\csevit
```

BREAKPOINTS

- Raised Exceptions
- Uncought Exceptions
- User Uncaught Exceptions

Cold warning
In effect

LN 277, Col 14 Spaces: 4 UTF-8 CRLF { Python 3.14.0 0:023

```
vityarthifinal.py
143 def selected_expense_to_words():
157     def expense_to_words_before_adding():
160         if not date or not desc or not amnt or not payee or not MOP:
161             mb.showerror('Incomplete data', 'The data is incomplete, meaning fill all the fields first!')
162
163             message= f'Your expense can be read like.\n "You paid {amnt.get()} to {payee.get()} for{desc.get()} on {date.get_date()} via {MOP.get()}' 
164
165             add_question = mb.askyesno('Read your record like .', f'{message}\n\nShould I add it to the database .')
166
167             if add_question:
168                 add_another_expense()
169             else:
170                 mb.showinfo('OK', 'Please take your time to add this record')
171
172     #This application specifies colors for backgrounds. It also sets fonts for various elements in the user interface.
173
174     dataentry_frame_bg = 'Red'
175     buttons_frame_bg = 'Tomato'
176     hlb_btn_bg = 'Indianred'
177
178     lbl_font = ('Georgia', 13)
179     entry_font = 'Times 13 bold'
180     btn_font = ('Gill Sans MT', 13)
181
182     #Initialization of GUI window occurs in this section. Basic properties receive assignment here.
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
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209
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211
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py"
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connector.execute()
PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py"
PS C:\Users\KASHISH ADLAK\OneDrive\csevit

Ln 142, Col 1 Spaces: 4 UTF-8 CRLF {} Python 3.14.0 02:04 23-11-2025

```
vityarthifinal.py
184 root = Tk()
185 root.title('PythonGeeks Expense Tracker')
186 root.geometry('1200x550')
187 root.resizable(0,0)
188
189 Label(root, text= 'EXPENSE TRACKER', font= ('Noto Sans CJK TC', 15, 'bold'), bg = hlb_btn_bg).pack(side = TOP, fill = X)
190
191 #Certain variables hold string values. Others hold double values. they support the interface components.
192
193 desc = StringVar()
194 amnt = DoubleVar()
195 payee = StringVar()
196 MOP = StringVar(value = 'Cash')
197
198 #Frames receive creation. Positioning follows within the primary window.
199
200 data_entry_frame = Frame(root, bg = dataentry_frame_bg)
201 data_entry_frame.place(x=0, y=0, relheight=0.95, relwidth=0.25)
202
203 buttons_frame = Frame(root, bg = buttons_frame_bg)
204 buttons_frame.place(relx=0.25, rely=0.05, relwidth=0.75, relheight=0.21)
205
206 tree_frame = Frame(root)
207 tree_frame.place(relx=0.25, rely=0.26, relwidth=0.75, relheight=0.74)
208
209 #Placement of elements happens inside the data entry frame. user input receives facilitation there.
210
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py"
c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py:102: DeprecationWarning: The default date adapter is deprecated as of Python 3.12; see the sqlite3 documentation for suggested replacement recipes
connector.execute()
PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit/vityarthifinal.py"
PS C:\Users\KASHISH ADLAK\OneDrive\csevit

Ln 142, Col 1 Spaces: 4 UTF-8 CRLF {} Python 3.14.0 02:04 23-11-2025

The screenshot shows a Windows desktop environment with a Python application running in Visual Studio Code. The application window title is 'vityarthifinal.py'. The code inside the editor is for a graphical user interface (GUI) application. It includes imports for Tkinter and PIL, and defines several frames and buttons. A terminal window at the bottom shows command-line output related to the application's execution. A Snipping Tool window is also visible, capturing a screenshot of the application's interface.

```
File Edit Selection View Go Run Terminal Help ← → Q csevit  
RUN AND DEBUG ...  
RUN  
Run and Debug  
To customize Run and Debug  
create a launch.json file.  
Show automatic Python configurations  
vityarthifinal.py > ...  
209 #Placement of elements happens inside the data entry frame. user input receives facilitation there.  
210 Label(data_entry_frame, text = 'Date (M/DD/YY) : ', font=lbl_font, bg=dataentry_frame_bg).place(x=10,y=230)  
211 Entry(data_entry_frame,font=entry_font,width=31,textvariable=payee).place(x=10,y=260)  
212 Label(data_entry_frame, text = 'Description : ', font=lbl_font, bg=dataentry_frame_bg).place(x=10,y=100)  
213 Entry(data_entry_frame,font=entry_font,width=31,textvariable=desc).place(x=10,y=130)  
214 Label(data_entry_frame, text = 'Amount : ', font=lbl_font, bg=dataentry_frame_bg).place(x=10,y=180)  
215 Entry(data_entry_frame,font=entry_font,width=14,textvariable=amt).place(x=10,y=180)  
216 Label(data_entry_frame, text = "Mode of payment: ", font=lbl_font, bg=dataentry_frame_bg).place(x=10,y=310)  
217 dd1=OptionMenu(data_entry_frame,MOP,['Cash','Cheque','Credit card','Debit card','Paytm','Google pay','Razor pay'])  
218 dd1.place(x=10,y=305)  
219 dd1.configure(width=10,font=entry_font)  
220  
221  
222  
223  
224  
225  
226 Button(data_entry_frame, text='Add expense', command=add_another_expense, font=btn_font, width=30,  
227 | | bg=hlb_btn_bg).place(x=10, y=395)  
228 Button(data_entry_frame, text='Convert to words before adding', font=btn_font, width=30, bg=hlb_btn_bg).place(x=10, y=395)  
229  
230 # Buttons reside in the buttons frame. They offer quick access to various functions.  
231 Button(buttons_frame, text='Delete Expense', font=btn_font, width=25, bg=hlb_btn_bg, command=remove_expense)  
232  
233 Button(buttons_frame, text='Clear Fields in DataEntry Frame', font=btn_font, width=25, bg=hlb_btn_bg,  
234 | | command=clear_fields).place(x=335, y=5)  
235  
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS  
PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe"  
csevit\vityarthifinal.py  
c:\Users\KASHISH ADLAK\OneDrive\csevit\vityarthifinal.py:102: DeprecationWarning: The default date adapter is deprecated as of Python 3.12; see the sqlite3 documentation for suggested replacement recipes  
connector.execute()  
PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit\vityarthifinal.py"  
PS C:\Users\KASHISH ADLAK\OneDrive\csevit  
14°C Clear  
Breakpoints  
■ Raised Exceptions  
■ Caught Exceptions  
■ User Caught Exceptions  
Ln 142 Col 1 Spaces: 4 UTF-8 CRLF { } Python 3.14.0 02:04 23-11-2025
```

The screenshot shows a Windows desktop environment with a Python application running in Visual Studio Code. The application window title is 'vityarthifinal.py'. The code inside the editor is for a graphical user interface (GUI) application. It includes imports for Tkinter and PIL, and defines several frames and buttons. A terminal window at the bottom shows command-line output related to the application's execution. A powershell icon is visible in the taskbar.

```
File Edit Selection View Go Run Terminal Help ← → Q csevit  
RUN AND DEBUG ...  
RUN  
Run and Debug  
To customize Run and Debug  
create a launch.json file.  
Show automatic Python configurations  
vityarthifinal.py > ...  
236 Button(buttons_frame, text='Delete All Expenses', font=btn_font, width=25, bg=hlb_btn_bg, command=remove_all_expenses).place(x=640, y=5)  
237  
238 Button(buttons_frame, text='View Selected Expense\'s Details', font=btn_font, width=25, bg=hlb_btn_bg,  
239 | | command=view_expense_details).place(x=30, y=65)  
240  
241 Button(buttons_frame, text='Edit Selected Expense', command=edit_expense, font=btn_font, width=25, bg=hlb_btn_bg).place(x=335,y=65)  
242  
243 Button(buttons_frame, text='Convert Expense to a sentence', font=btn_font, width=25, bg=hlb_btn_bg,  
244 | | command=selected_expense_to_words).place(x=640, y=65)  
245  
246 # The treeview frame holds the display of expenses. Presentation occurs in tabular form.  
247 table = ttk.Treeview(tree_frame, selectmode=BROWSE, columns=(ID, 'date', 'Payee', 'Description', 'Amount', 'Mode of Payment'))  
248  
249 X_Scroller = Scrollbar(tree_frame, orient=HORIZONTAL, command=table.xview)  
250 Y_Scroller = Scrollbar(tree_frame, orient=VERTICAL, command=table.yview)  
251 X_Scroller.pack(side=BOTTOM, fill=X)  
252 Y_Scroller.pack(side=RIGHT, fill=Y)  
253  
254 table.config(yscrollcommand=Y_Scroller.set, xscrollcommand=X_Scroller.set)  
255  
256 table.heading('ID', text='S No.', anchor= CENTER)  
257 table.heading('Date', text='Date', anchor= CENTER)  
258 table.heading('Payee', text='Payee', anchor= CENTER)  
259 table.heading('Description', text='Description', anchor= CENTER)  
260 table.heading('Amount', text='Amount', anchor= CENTER)  
261 table.heading('Mode of Payment', text='Mode of Payment', anchor= CENTER)  
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS  
PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit\vityarthifinal.py"  
c:\Users\KASHISH ADLAK\OneDrive\csevit\vityarthifinal.py:102: DeprecationWarning: The default date adapter is deprecated as of Python 3.12; see the sqlite3 documentation for suggested replacement recipes  
connector.execute()  
PS C:\Users\KASHISH ADLAK\OneDrive\csevit & "C:/Users/KASHISH ADLAK/AppData/Local/Programs/Python/Python314/python.exe" "c:/Users/KASHISH ADLAK/OneDrive/csevit\vityarthifinal.py"  
PS C:\Users\KASHISH ADLAK\OneDrive\csevit  
14°C Clear  
Breakpoints  
■ Raised Exceptions  
■ Caught Exceptions  
■ User Caught Exceptions  
Ln 142 Col 1 Spaces: 4 UTF-8 CRLF { } Python 3.14.0 02:04 23-11-2025
```

The screenshot shows a Windows desktop environment. In the foreground, a Microsoft Visual Studio Code window is open, displaying Python code for a GUI application named `vityarthifinal.py`. The code uses the Tkinter library to create a window with a table and lists expenses. A terminal tab in the VS Code interface shows command-line output related to the script. In the background, a Snipping Tool window is active, showing a screenshot of the VS Code interface. The Snipping Tool window has a message box that says "Screenshot copied to clipboard" and "Automatically saved to screenshots folder". The desktop taskbar at the bottom shows various pinned icons and the system tray.

```
263     table.column('#0', width=0, stretch=NO)
264     table.column('#1', width=50, stretch=NO)
265     table.column('#2', width=95, stretch=NO)
266     table.column('#3', width=150, stretch=NO)
267     table.column('#4', width=325, stretch=NO)
268     table.column('#5', width=135, stretch=NO)
269     table.column('#6', width=125, stretch=NO)
270
271     table.place(relx=0, y=0, relheight=1, relwidth=1)
272
273     list_all_expenses()
274
275     # Finalization of the GUI window takes place here. The main loop commences afterward.
276
277     root.update()
278     root.mainloop()
279
280
281
282
283
284
285
286
```

OUTPUT

https://youtu.be/dzEkYdu8B_c?si=2iyzs4YyTzuvhITA

3. Testing Approach

Several testing techniques were followed:

3.1 Manual Testing

GUI applications require manual interaction.

The following operations were tested:

Adding new expenses.

Editing existing entries.

Deleting expenses one by one and all at once.

Viewing selected record details.

Ensuring scrollbars work properly.

Checking date selection from the calendar.

3.2 Functional Testing

Each function was tested separately:

Input validation

Correct insertion into DB

Accurate fetching of data

Update and delete operations

3.3 Boundary Testing

Empty fields

Very large entries in description

Zero or negative amount values

Invalid mode of payment selection

3.4 Database Testing

Verified:

Data integrity

Auto-incrementing ID

Correct deletion and refresh in the TreeView

4. Challenges Faced

4.1 Handling Tkinter Layout

Managing multiple frames and widget positions required careful alignment to avoid overlapping.

4.2 Date Formatting Issues

Dates needed conversion between:

TkCalendar format

SQLite storage format

Python datetime object

4.3 Updating TreeView

Refreshing the list required:

Clearing previous entries

Re-fetching updated data

4.4 Editing an Existing Record

Identifying the selected row's ID and updating it correctly required proper mapping between:

TreeView selection

Database entry

4.5 Validations

Preventing empty field submissions and handling invalid input took multiple error checks.

5. Language and Key Takeaways

5.1 Programming Language Used

Python 3 with libraries:

Tkinter (GUI)

Tkcalendar (Date picker)

SQLite3 (Database)

ttk module (TreeView table)

5.2 Key Takeaways

Learned how to build a complete GUI application.

Understood database integration with front-end elements.

Improved program structuring using functions.

Learned how to handle form inputs and data validation.

Gained experience with CRUD operations (Create, Read, Update, Delete).

Enhanced understanding of event-driven programming in Tkinter.

6. Future Enhancements

The application can be improved by adding:

6.1 Expense Categories

Food, Travel, Rent, Shopping, Bills, etc.

6.2 Monthly and Yearly Reports

Automatically calculate:

Total spending

Category-wise breakdown

6.3 Graphs & Charts

Use matplotlib to display:

Pie charts

Bar graphs

Spending trends

6.4 Export Options

Allow user to export data to:

Excel

CSV

PDF

6.5 Authentication System

Add login/logout for user-specific expense tracking.

6.6 Cloud Backup

Sync data with Google Drive or cloud database.

6.7 Mobile App Version

Convert the project into a mobile application using Kivy or Flutter.

7. References

- Python Documentation – <https://docs.python.org>
- Tkinter Official Guide – <https://tkdocs.com>
- SQLite Documentation – <https://sqlite.org/docs.html>

- tkcalendar Library –
<https://github.com/j4321/tkcalendar>
- StackOverflow discussions on Tkinter and TreeView widgets.