



*School of Mechanical & Manufacturing Engineering (SMME),  
National University of Science and Technology (NUST)*

## **Fundamentals Of Programming (CS-223)**

### **Lab Project Report:**

### ***Personal Budget Calculator***

**Program:** BE-Aerospace

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## INTRODUCTION

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This code serves as a personal budgeting tool designed to help users track their monthly expenses effectively. By prompting users to input their monthly budget and categorize their expenses, the program calculates total spending and visualizes the data through pie and bar charts. The tool not only provides a clear breakdown of expenses by category but also assesses the user's financial health by comparing total expenses against the monthly budget. This straightforward approach empowers users to make informed financial decisions and manage their budgets more efficiently.

### Working Principle

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- 1. Input Monthly Budget:** The code begins by prompting the user to enter their monthly budget. It ensures the input is a positive number, handling invalid inputs with error messages.
- 2. User Input for Categories and Amounts:** The user is then asked to input different expense categories and their corresponding amounts. This loop continues until the user types 'done'. It also checks for valid numeric input and prevents negative amounts.
- 3. Create a Data Frame:** Once the user has finished entering data, the code creates a Pandas DataFrame to organize the categories and amounts into a structured format.
- 4. Calculate Percentages:** The code calculates the total expenses and determines the percentage of each category relative to the total, allowing for a better understanding of spending distribution.
- 5. Visualizations:** Two visualizations are generated using Matplotlib: a pie chart to show the expense distribution and a bar chart to illustrate spending by category. These visuals help users quickly grasp their financial situation.
- 6. Display Summary:** Finally, the code calculates the remaining budget (or over budget amount) and prints a summary of the expenses, including a detailed

DataFrame, total expenses, monthly budget, and remaining funds. This summary provides users with a clear overview of their financial standing.

## CODE:

```

1  import pandas as pd
2  import matplotlib.pyplot as plt
3
4  while True:
5      try:
6          monthly_budget = float(input("Enter your monthly budget: "))
7          if monthly_budget <= 0:
8              print("Please enter a positive number.")
9              continue
10         break
11     except ValueError:
12         print("Invalid input. Please enter a valid number.")
13
14     categories = []
15     amounts = []
16     print("\nEnter your expense details. Type 'done' to finish.")
17     while True:
18         category = input("Enter category (or 'done' to finish): ")
19         if category.lower() == 'done':
20             break
21         try:
22             amount = float(input(f"Enter amount for {category}: "))
23             if amount < 0:
24                 print("Amount cannot be negative. Please enter a positive value.")
25                 continue
26             categories.append(category)
27             amounts.append(amount)
28         except ValueError:
29             print("Invalid amount. Please enter a number.")
30
31     data = {'Category': categories, 'Amount': amounts}
32     df = pd.DataFrame(data)
33
34     total_expenses = df['Amount'].sum()
35     df['Percentage'] = (df['Amount'] / total_expenses) * 100
36
37     # Pie Chart
38     plt.pie(df['Amount'], labels=df['Category'], autopct='%1.1f%%', startangle=140)
39     plt.title('Expense Distribution')
40     plt.show()
41
42     # Bar Chart
43     plt.bar(df['Category'], df['Amount'], color='skyblue')
44     plt.title('Spending by Category')
45     plt.xlabel('Category')
46     plt.ylabel('Amount')
47     plt.show()
48
49     # Summary
50     remaining_budget = monthly_budget - total_expenses
51
52     print("\nBudget Summary:")
53     print(df)
54     print(f"\nTotal Expenses: ${total_expenses:.2f}")
55     print(f"Monthly Budget: ${monthly_budget:.2f}")
56     if remaining_budget >= 0:
57         print(f"Unused Budget (Savings): ${remaining_budget:.2f}")
58     else:
59         print(f"Over Budget by: ${-remaining_budget:.2f}")

```

Figure 1 Main Code

## Output:

```

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  SEARCH ERROR

Enter category (or 'done' to finish): Transport
Enter amount for Transport: 100
Enter category (or 'done' to finish): Entertainment
Enter amount for Entertainment: 50
Enter category (or 'done' to finish): Food
Enter amount for Food : 100
Enter category (or 'done' to finish): Bills
Enter amount for Bills: 50
Enter category (or 'done' to finish): done

Budget Summary:
  Category  Amount  Percentage
0      Fees   500.0     50.0
1      Rent   200.0     20.0
2  Transport  100.0     10.0
3 Entertainment  50.0      5.0
4      Food   100.0     10.0
5      Bills   50.0      5.0

Total Expenses: $1000.00
Monthly Budget: $1000.00
Unused Budget (Savings): $0.00

```

Figure 2 Output

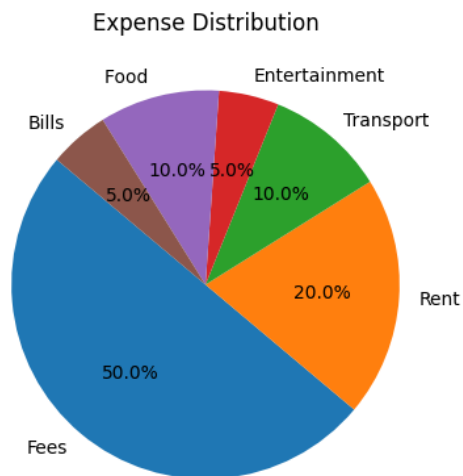
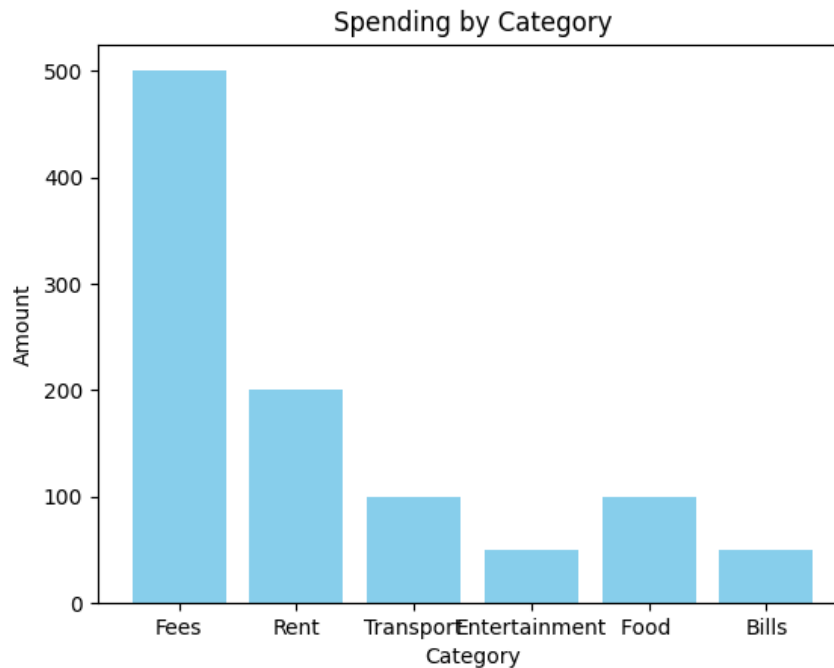


Figure 3 Expense Distribution



*Figure 4 Spending by Category*

## APPLICATIONS

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- 1. Financial Awareness:** Tracking expenses allows individuals to understand their spending habits, identify areas where they can cut back, and make informed financial decisions
  - 2. Goal Setting:** By setting specific financial goals, such as saving for a vacation or paying off debt, individuals can use budgeting tools to monitor their progress and stay motivated.
  - 3. Debt Management:** Budgeting helps in managing debts by allocating funds towards repayments, ensuring that individuals can meet their obligations without falling behind.
-

- 4. Emergency Preparedness:** Maintaining a budget can facilitate the establishment of an emergency fund, providing a financial cushion for unexpected expenses like medical emergencies or car repairs.
- 5. Investment Planning:** Understanding cash flow through budgeting can help individuals allocate funds for investments, contributing to long-term financial growth and security.
- 6. Improved Savings:** Regularly tracking income and expenses encourages individuals to save more effectively, whether for short-term needs or long-term goals like retirement.
- 7. Spending Control:** Budgeting apps can alert users to overspending in certain categories, helping them to adjust their habits and avoid financial pitfalls.
- 8. Tax Preparation:** Keeping detailed records of income and expenses simplifies the tax preparation process, making it easier to identify deductible expenses and ensure compliance with tax regulations.
- 9. Family Financial Management:** Budgeting tools can be shared among family members, promoting collective financial responsibility and teaching children about money management.