**Technical Design Document Exercise 3**

**Name:** Logan Flynn

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**Program Description:** This program asks ​​the user to enter a list of their monthly expenses. Each expense consists of a type like rent, groceries, or utilities and an amount. The program stores these expenses in a list of tuples. Using the reduce function, the program calculates the total of all expenses, determines the highest expense, and the lowest expense. The program then displays the total expense, and clearly labels the highest and lowest expense by type and amount.

**Functions used in the Program (list in order as they are called):**

### **1. Function Name:** main

**Description:** Handles user input for expense type and amount, stores expenses, and calls the calculations using **reduce.**

**Parameters:** None

**Variables:**

1. expenses (list of tuples) - stores expense name and amount entered by the user.
2. total (float) - The sum of all expense amounts.
3. highest (tuple) - The tuple representing the highest expense.
4. lowest (tuple) - The Tuple representing the lowest expense.

**Logical Steps:**

1. Ask the user to input expense types and amounts until they type “done”.
2. Append each (expense\_type, amount) to the expenses list.
3. Use reduce with a **lambda** function to calculate:
4. The total of all amounts.
5. The highest expense.
6. The Lowest Expense.

4. Display the total, highest, and lowest expenses with labels.

**Returns:** None, prints results to screen

**Link to your repository:**

[loganflynnn (Logan Flynn)](https://github.com/loganflynnn)

**Output Screenshot:**

# Program: Monthly Expense Analyzer

# Author: Logan Flynn

# Description:

# This program asks the user for their monthly expenses.

# The user enters both the type of expense and the amount.

# Using the reduce() function, the program calculates:

# 1. The total of all expenses

# 2. The highest expense

# 3. The lowest expense

# Import reduce from functools module.

from functools import reduce

def main():

# List to store expenses as tuples.

expenses = []

print("Enter your monthly expenses.")

print("Type 'done' when finished.\n")

# Input loop

while True:

expense\_type = input("Enter the type of expense (or 'done' to finish): ")

# If user types exit keyword, break out of loop.

if expense\_type.lower() == "done":

break

# Convert input amount to float and store as tuple.

amount = float(input(f"Enter the amount for {expense\_type}: "))

expenses.append((expense\_type, amount))

# If no expenses entered, just exit program.

if not expenses:

print("No expenses entered.")

return

# Total expenses Calculations using reduce.

total = reduce(lambda acc, item: acc + item[1], expenses, 0)

# Highest expense

highest = reduce(lambda a, b: a if a[1] > b[1] else b, expenses)

# Lowest expense

lowest = reduce(lambda a, b: a if a[1] < b[1] else b, expenses)

# Output

print("\n----- Expense Report -----")

print(f"Total Expenses: ${total:.2f}")

print(f"Highest Expense: {highest[0]} (${highest[1]:.2f})")

print(f"Lowest Expense: {lowest[0]} (${lowest[1]:.2f})")

# Run the program

main()