Report: Testing for 20232667_SD1_CW1

To   :IIT Lectures for SD1 23/24 - Level 04
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Subject   : Software development 1 for Level 04

Purpose Statement:

Purpose: The purpose of this testing phase is to ensure the functionality and reliability of the newly implemented functions in the codebase. Only the recently added functions will be subjected to testing to verify their correctness and effectiveness in handling various scenarios

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Executive Summary

In this testing phase, a total of 25 unique tests were conducted to verify the functionality of various functions within the financial tracker program. The program successfully passed all tests, demonstrating its robustness and reliability.

To avoid redundancy only the following functions were tested as they were the only functions that underwent significant change compared to the Coursework part A

1. `get_transaction` - A function responsible for getting transaction details from the user.
2. `get_transaction_info` - Used to retrieve transaction information based on user input.
3. `choose_transaction` - Allows the user to select a transaction from a list of options.
4. `update_transactions` - Enables users to update existing transaction details.
5. `read_transactions_from_file` - Reads transaction data from a text file and converts it into a dictionary.

Additionally, all **print functions** and **view transactions** were thoroughly tested as part of tests for the listed functions ensuring their correctness and proper functioning.

The testing process involved providing various inputs to the functions and verifying that the outputs matched the expected results. Input scenarios included valid and invalid transaction data, future dates, incorrect file paths, and different user choices for updating transactions.

Test Plan for `get_transactions` Function,

Dependencies

The function relies on the following dependencies:
- `get_amount`: To obtain the transaction amount from the user.
- `get_type`: To obtain the transaction type (income/expense) from the user.
- `get_date`: To obtain the transaction date from the user.

Test Cases

Test Case 1: Valid Input
- Input:
  - Category: "Groceries"
  - Amount: 100.50
  - Transaction Type: "expense"
  - Date: "2024-04-15"
- Expected Output:
  - The function should return a tuple containing the category ("groceries") and a dictionary representing the transaction details.

Test Case 2: Empty Category
- Input:
  - Category: ""
- Expected Output:
  - The function should display an error message indicating that the category must not be empty and prompt the user to enter the category again.

Test Case 3: Valid Input (Different Type)
- Input:
  - Category: "Salary"
  - Amount: 5000.00
  - Transaction Type: "income"
  - Date: "2024-04-20"
- Expected Output:
  - The function should return a tuple containing the category ("salary") and a dictionary representing the transaction details.

Test Case 4: Invalid Amount
- Input:

   - Amount: "abc"
- Expected Output:
   - The function should display an error message indicating that the amount must be a numeric value and prompt the user to enter the amount again.

 Test Case 5: Invalid Date
- Input:
   - Date: "2024-04-35"
- Expected Output:
   - The function should display an error message indicating that the date is invalid and prompt the user to enter the date again.

 Test Case 6: User Cancels Transaction
- Input:
   - Category: "none"
- Expected Output:
   - The function should return a tuple with the first element as `False` to indicate that no transaction was entered.

Test out comes and command line copies:

Command Line:

Enter the category of your transaction (example: Salary, Groceries): Groceries
Enter the amount of your transaction: 100.50
Enter the type of your transaction (Income or Expense): expense
Enter the year: 2024
Enter the Month: 04
Enter the day for 2024-4 (1-30): 15

- Outcome: The function successfully returns the tuple `('groceries', {'groceries': {'type': 'expense', 'transactions': [{'amount': 100.50, 'date': datetime.date(2024, 4, 15)}]}})`.

Command Line:

Enter the category of your transaction (example: Salary, Groceries):
Error: category must not be empty
Enter the category of your transaction (example: Salary, Groceries): Salary
Enter the amount of your transaction: 5000.00
Enter the type of your transaction (Income or Expense): income
Enter the year: 2024
Enter the Month: 04
Enter the day for 2024-4 (1-30): 20

- Outcome: The function successfully returns the tuple `('salary', {'salary': {'type': 'income', 'transactions': [{'amount': 5000.0, 'date': datetime.date(2024, 4, 20)}]}})`.

Command line:

Enter the category of your transaction (example: Salary, Groceries): Groceries
Enter the amount of your transaction: abc
Error: Invalid amount, Amount must be a number
Enter the amount of your transaction: 100.50
Enter the type of your transaction (Income or Expense): expense
Enter the year: 2024
Enter the Month: 04
Enter the day for 2024-4 (1-30): 15

- **Outcome:** The function displays the error message "Error: Invalid amount, Amount must be a number" and prompts the user to enter the amount again.

Command Line:

Enter the category of your transaction (example: Salary, Groceries): Groceries
Enter the amount of your transaction: 100.50
Enter the type of your transaction (Income or Expense): expense
Enter the year: 2024
Enter the Month: 04
Enter the day for 2024-4 (1-30): 35
Error: Day must be between 1 and 30.
Enter the day for 2024-4 (1-30): 15

- **Outcome:** The function successfully returns the tuple `('groceries', {'groceries': {'type': 'expense', 'transactions': [{'amount': 100.50, 'date': datetime.date(2024, 4, 15)}]}})` after prompting the user to enter the date again.

Command Line:

Enter the category of your transaction (example: Salary, Groceries): none

- **Outcome:** The function returns the tuple `(False, {})` indicating that no transaction was entered.

Summary:

Total tests carried out: 3
Total tests passed: 3
Total tests failed: 0

Test Plan for `get_transaction_info` Function

Test Cases:

1. Valid Transaction Category and Number:
  - Input:
    - Transaction Category: "groceries"
    - Transaction Number: 2
  - Expected Output:
    - (True, "groceries", 2)

2. Invalid Transaction Category:
  - Input:
    - Transaction Category: "invalid_category"
    - Transaction Number: (not applicable)
  - Expected Output:
    - "Error: Transaction Category Chosen is Not Valid. Choose a Category That Exists or Choose 'None'."
    - Retry input prompt for Transaction Category.

3. Invalid Transaction Number:
  - Input:
    - Transaction Category: "salary"
    - Transaction Number: 10
  - Expected Output:
    - "Error: Transaction number is out of range"
    - Retry input prompt for Transaction Number.

4. Transaction Category "None" (Exit):
  - Input:
    - Transaction Category: "none"
    - Transaction Number: (not applicable)
  - Expected Output:
    - (False, "none", 0)
    - Function returns indicating no transaction category was chosen.

Transactions list passed:

```
all_transactions = {
   "groceries": {"type": "expense", "transactions":[
        {'amount': 102.00, 'date': datetime.date(2024, 1,1)},
        {'amount': 102.00, 'date': datetime.date(2023, 2,1)},
        {'amount': 102.00, 'date': datetime.date(2022, 3,1)}
```

```
        ]},
    "salary": {'type': 'income', 'transactions': [
        {'amount': 1500.00, 'date': datetime.date(2024, 1, 1)},
        {'amount': 102.00, 'date': datetime.date(2023, 4,1)}
        ]},
    "bonus": {'type': 'income', 'transactions': [
        {'amount': 1500.70, 'date': datetime.date(2024, 1, 1)},
        {'amount': 100.79, 'date': datetime.date(2023, 4,1)}
        ]}
}
```

Total Test Cases: 6
Test cases passed: 6

Command Line Output:

Enter the Transaction Category (Example: "Groceries"): groceries
Enter the transaction number of your chosen transaction: 2
Enter the Transaction Category (Example: "Groceries"): invalid_category
Error: Transaction Category Chosen is Not Valid. Choose a Category That Exists or Choose 'None'.
Enter the Transaction Category (Example: "Groceries"): salary
Enter the transaction number of your chosen transaction: 10
Error: Transaction number is out of range
Enter the transaction number of your chosen transaction: none

Summary:

Total Test Cases: 6
Test cases passed: 6
Test cases Failed: 0

Test Plan for 'choose_transaction' and 'delete_transaction' Functions

To test this function we will use it in conjunction with the 'delete_transaction' function. Furthermore a JSON file containing 50 example transactions will be used. (see appendix one).

Test Cases:

Option 1: Find a Transaction using all transactions:

Input: Option choice 1
Expected Output:
User prompted to enter Transaction Category and Number.
Transaction Category and Number provided.
Chosen transaction displayed.

Option 2: Find a Transaction using date:

Input: Option choice 2
Expected Output:
User prompted to enter Transaction Category and Number.
Transaction Category and Number provided.
Chosen transaction displayed.

Option 3: Find a Transaction using type:

Input: Option choice 3
Expected Output:
User prompted to enter Transaction Category and Number.
Transaction Category and Number provided.
Chosen transaction displayed.

Option 4: Unable To Find Transaction (Exit Task):

Input: Option choice 4
Expected Output:
User prompted to enter Transaction Category and Number.
User chooses "None" for both inputs.
Function returns indicating no transaction was found.

Expected outcome: Choose the correct transaction using all available methods and successfully delete the chosen transaction from the main list.

Test result: Passed all tests.

Summary:

Total Test Cases: 5
Test cases passed: 5
Test cases Failed: 0

Command line output copy is available: see appendix B

Test Plan for add_transactions Function

Purpose:
The purpose of this test plan is to verify the functionality of the add_transactions function, which allows users to add transactions to the existing transaction dictionary.

The test environment will have 50 transactions already loaded in from the JSON file in Appendix A.

Test Cases:

Add New Transaction:

Input:
Provide a new transaction category and details.
Expected Output:
Transaction successfully added message is displayed.
New transaction is added to the transaction dictionary.

Add Existing Transaction:

Input:
Provide an existing transaction category and details.
Expected Output:
Error message indicating that the transaction already exists is displayed.
Transaction dictionary remains unchanged.

Add Transaction with Incorrect Type:

Input:
Provide a transaction with a type that doesn't match the existing type in the category.
Expected Output:
Error message indicating the incorrect transaction type is displayed.
User prompted to re-enter the transaction.

Add Transaction and Return to Menu:

Input:
Add a transaction and choose to return to the main menu.
Expected Output:
Transaction successfully added message is displayed.
User returns to the main menu.

Add Multiple Transactions:

Input:
Add multiple transactions in different categories.
Expected Output:
Each transaction is successfully added to the transaction dictionary.
Success message displayed for each transaction.

Test Results: Passed all Test Cases. Achieved Expected Outcomes.

Summary:

Total Test Cases: 5
Total Tests Passed: 5
Total Tests Failed: 0

Command Line Output available: See Appendix C.

Test Plan for update_transactions Function

Purpose:
The purpose of this test plan is to verify the functionality of the update_transactions function, which allows users to update existing transactions.

Test Cases:

Update Amount of Transaction:

Input:
Choose to update the amount of an existing transaction.
Provide a new amount.
Expected Output:
Transaction amount updated successfully message is displayed.
Transaction dictionary is updated with the new amount.

Update Date of Transaction:

Input:
Choose to update the date of an existing transaction.
Provide a new date.
Expected Output:
Transaction date updated successfully message is displayed.
Transaction dictionary is updated with the new date.

Update Type of Transaction:

Input:
Choose to update the type of an existing transaction.
Provide a new type.
Expected Output:
Warning message indicating the change will affect all transactions in the category.
Option to proceed or cancel the operation.
If proceed, transaction type updated successfully message is displayed.
Transaction dictionary is updated with the new type.

Update Category of Transaction:

Input:
Choose to update the category of an existing transaction.
Provide a new category.
Expected Output:
Warning message indicating the change will affect all transactions in the category.

Option to proceed or cancel the operation.
If proceed, transactions moved to the new category successfully message is displayed.
Transaction dictionary is updated with the new category.

Update Non-Existent Transaction:

Input:
Choose to update a non-existent transaction.
Expected Output:
Unable to find a transaction to update message is displayed.
Transaction dictionary remains unchanged.

Test Results: Passed all Test Cases. Achieved Expected Outcomes.

Summary:

Total Test Cases: 5
Total Tests Passed: 5
Total Tests Failed: 0

Command line output available: See Appendix D

Test Plan for read_transactions_from_file Function

Purpose:
The purpose of this test plan is to verify the functionality of the read_transactions_from_file function, which reads transaction data from a text file and converts it into a dictionary.

Test case: The test will involve loading all the valid transactions from the sample.txt file seen in Appendix E, this txt file will contain 65 transactions where some are not valid.

Expected outcome: To load only the valid transactions and inform the user about the transactions that were not loaded.

Test Outcome: Passed and achieved expected outcome.

Summary:

Total Test Cases: 1
Total Tests Passed: 1
Total Tests Failed: 0

Command line output available: See Appendix F

Conclusion

Through rigorous testing, it was confirmed that the financial management program is capable of handling various scenarios and inputs effectively. All functions, including those that underwent significant changes from the coursework part A, were thoroughly tested and passed without any issues.

The successful completion of 25 unique tests demonstrates the program's robustness and ability to manage financial transactions accurately. Users can rely on the program to handle their financial data efficiently, providing a seamless experience for managing transactions and financial records.

Appendixes

Appendix A - Example JSON file with 50 transactions

```json
{
    "groceries": {
        "type": "expense",
        "transactions": [
            {
                "amount": 50.25,
                "date": "2023-10-15"
            },
            {
                "amount": 25.5,
                "date": "2022-07-12"
            },
            {
                "amount": 75.8,
                "date": "2022-06-15"
            },
            {
                "amount": 50.25,
                "date": "2023-10-15"
            },
            {
                "amount": 25.5,
                "date": "2022-07-12"
            },
            {
                "amount": 35.6,
                "date": "2023-08-20"
            },
            {
                "amount": 75.8,
                "date": "2022-06-15"
            },
            {
                "amount": 70.0,
```

```json
            "date": "2023-07-22"
        },
        {

            "amount": 80.25,
            "date": "2022-12-12"
        },
        {

            "amount": 100.25,
            "date": "2023-04-14"
        },
        {

            "amount": 30.8,
            "date": "2022-11-20"
        },
        {

            "amount": 50.0,
            "date": "2023-08-18"
        }
    ]
},
"bonus": {
    "type": "income",
    "transactions": [
        {
            "amount": 200.5,
            "date": "2023-12-30"
        },
        {

            "amount": 500.0,
            "date": "2023-12-28"
        },
        {

            "amount": 500.0,
            "date": "2023-12-28"
        },
        {

            "amount": 600.0,
            "date": "2023-09-18"
        }
```

```json
            ]
    },
    "utilities": {
        "type": "income",
        "transactions": [
            {
                "amount": 250.75,
                "date": "2021-06-08"
            },
            {
                "amount": 250.75,
                "date": "2021-06-08"
            },
            {
                "amount": 300.5,
                "date": "2021-08-03"
            }
        ]
    },
    "tuition": {
        "type": "expense",
        "transactions": [
            {
                "amount": 500.0,
                "date": "2023-03-10"
            },
            {
                "amount": 500.0,
                "date": "2023-03-10"
            }
        ]
    },
    "rent": {
        "type": "expense",
        "transactions": [
            {
                "amount": 800.0,
                "date": "2023-11-01"
            },
```

```json
            {
                "amount": 800.0,
                "date": "2023-11-01"
            },
            {
                "amount": 750.0,
                "date": "2023-09-01"
            }
        ]
    },
    "salary": {
        "type": "income",
        "transactions": [
            {
                "amount": 1700.0,
                "date": "2022-09-05"
            },
            {
                "amount": 1700.0,
                "date": "2022-09-05"
            },
            {
                "amount": 1800.0,
                "date": "2022-07-05"
            },
            {
                "amount": 1600.0,
                "date": "2022-11-25"
            }
        ]
    },
    "fuel": {
        "type": "expense",
        "transactions": [
            {
                "amount": 40.0,
                "date": "2023-03-15"
            },
            {
```

```
                "amount": 30.0,
                "date": "2023-05-14"
            }
        ]
    },
    "internet bill": {
        "type": "expense",
        "transactions": [
            {
                "amount": 85.0,
                "date": "2022-04-18"
            },
            {
                "amount": 90.0,
                "date": "2023-02-07"
            }
        ]
    },
    "car insurance": {
        "type": "expense",
        "transactions": [
            {
                "amount": 150.0,
                "date": "2022-02-08"
            }
        ]
    },
    "medical bill": {
        "type": "expense",
        "transactions": [
            {
                "amount": 120.0,
                "date": "2022-05-09"
            }
        ]
    },
    "vacation": {
        "type": "expense",
        "transactions": [
```

```
            {
                "amount": 900.0,
                "date": "2023-06-10"
            }
        ]
    }
}
```

Appendix B - Command line output for Test Plan for 'choose_transasction' and 'delete_transaction' functions.

```
All transactions loaded successfully.
Program successfully initialized

Main Menu
-------------
  No.  Option Description
-----  ------------------------------------
    1  Load Bulk Transactions from txt File.
    2  View Transactions
    3  Add Transaction
    4  Update Transaction
    5  Delete Transaction
    6  Save and Exit Program

Enter the option number to select option: 5

Find a Transaction to Update
  No.  Option Description
-----  ----------------------------------------
    1  Find a Transaction using all transactions
    2  Find a transaction using date
    3  Find a transaction using type
    4  Unable To Find Transaction, Exit Task.

Enter the option number to select option: 1

Enter the Transaction Category and the Transaction Number to Choose a Transaction.
If the transaction you are looking for is not here enter 'None' for any field.

Transaction: groceries
Type: expense
  No.    Amount (LKR)  Date
-----  ---------------  ----------
    1   75.80          2022-06-15
    2   75.80          2022-06-15
    3   25.50          2022-07-12
```

```
4    25.50        2022-07-12
5    30.80        2022-11-20
6    80.25        2022-12-12
7    100.25        2023-04-14
8    70.00        2023-07-22
9    50.00        2023-08-18
10    35.60        2023-08-20
11    50.25        2023-10-15
12    50.25        2023-10-15
13    45.60        2024-03-26
```

Transaction: bonus
Type: income
```
 No.    Amount (LKR)  Date
-----  --------------  ----------
1    600.00        2023-09-18
2    700.00        2023-10-28
3    500.00        2023-12-28
4    500.00        2023-12-28
5    200.50        2023-12-30
```

Transaction: utilities
Type: income
```
 No.    Amount (LKR)  Date
-----  --------------  ----------
1    250.75        2021-06-08
2    250.75        2021-06-08
3    300.50        2021-08-03
```

Transaction: tuition
Type: expense
```
 No.    Amount (LKR)  Date
-----  --------------  ----------
1    500.00        2023-03-10
2    500.00        2023-03-10
```

Transaction: rent
Type: expense
```
 No.    Amount (LKR)  Date
-----  --------------  ----------
1    750.00        2023-09-01
2    800.00        2023-11-01
3    800.00        2023-11-01
```

Transaction: salary
Type: income
```
 No.    Amount (LKR)  Date
-----  --------------  ----------
1    1,800.00        2022-07-05
```

```
 2    1,700.00       2022-09-05
 3    1,700.00       2022-09-05
 4    1,600.00       2022-11-25
```

Transaction: fuel
Type: expense

```
 No.    Amount (LKR)  Date
-----  --------------  ----------
 1    40.00          2023-03-15
 2    30.00          2023-05-14
```

Transaction: internet bill
Type: expense

```
 No.    Amount (LKR)  Date
-----  --------------  ----------
 1    85.00          2022-04-18
 2    80.00          2022-10-19
 3    90.00          2023-02-07
```

Transaction: car insurance
Type: expense

```
 No.    Amount (LKR)  Date
-----  --------------  ----------
 1    150.00         2022-02-08
```

Transaction: medical bill
Type: expense

```
 No.    Amount (LKR)  Date
-----  --------------  ----------
 1    120.00         2022-05-09
```

Transaction: vacation
Type: expense

```
 No.    Amount (LKR)  Date
-----  --------------  ----------
 1    900.00         2023-06-10
```

Enter the Transaction Category (Example: "Groceries"): internet purchase
Error: Transaction Category Chosen is Not Valid. Choose a Category That Exists or Choose "None".
Enter the Transaction Category (Example: "Groceries"): internet bill
Enter the transaction number of your chosen transaction: 5
Error: Transaction number is out of range
Enter the transaction number of your chosen transaction: 2
The chosen transaction is:

Transaction Category: internet bill
Type: expense

```
 Amount (LKR)  Date
--------------  ----------
```

80.00   2022-10-19

Total LKR spent on internet bill: 80.00

Transaction deleted successfully
Do you wish to repeat task (yes/no): yes

Find a Transaction to Update
  No. Option Description
----- --
    1 Find a Transaction using all transactions
    2 Find a transaction using date
    3 Find a transaction using type
    4 Unable To Find Transaction, Exit Task.

Enter the option number to select option: 2
Enter the year: 2023
Enter the Month: 10
Enter the day for 2023-10 (1-31): 28

Enter the Transaction Category and the Transaction Number to Choose a Transaction.
If the transaction you are looking for is not here enter 'None' for any field.

Transaction: bonus
Type: income
  No.   Amount (LKR) Date
----- -------------- ----------
  1   700.00   2023-10-28

Enter the Transaction Category (Example: "Groceries"): bonus
Enter the transaction number of your chosen transaction: 1
The chosen transaction is:

Transaction Category: bonus
Type: income
   Amount (LKR) Date
--------------- ----------
700.00   2023-10-28

Total LKR received from bonus: 700.00

Transaction deleted successfully
Do you wish to repeat task (yes/no): yes

Find a Transaction to Update
  No. Option Description

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```
----- ----------------------------------------
   1  Find a Transaction using all transactions
   2  Find a transaction using date
   3  Find a transaction using type
   4  Unable To Find Transaction, Exit Task.

Enter the option number to select option: 3
Enter the type of your transaction (Income or Expense): human meat machine
Error: Invalid transaction, TransactionType must be either Income or Expense
Enter the type of your transaction (Income or Expense): expense

Enter the Transaction Category and the Transaction Number to Choose a Transaction.
If the transaction you are looking for is not here enter 'None' for any field.

Transaction: groceries
Type: expense
  No.    Amount (LKR)  Date
----- ---------------- ----------
  1    75.80          2022-06-15
  2    75.80          2022-06-15
  3    25.50          2022-07-12
  4    25.50          2022-07-12
  5    30.80          2022-11-20
  6    80.25          2022-12-12
  7    100.25          2023-04-14
  8    70.00          2023-07-22
  9    50.00          2023-08-18
  10    35.60          2023-08-20
  11   50.25          2023-10-15
  12   50.25           2023-10-15
  13   45.60           2024-03-26


Transaction: tuition
Type: expense
  No.    Amount (LKR)  Date
----- ---------------- ----------
  1    500.00          2023-03-10
  2    500.00          2023-03-10


Transaction: rent
Type: expense
  No.    Amount (LKR)  Date
----- ---------------- ----------
  1    750.00          2023-09-01
  2    800.00          2023-11-01
  3    800.00          2023-11-01


Transaction: fuel
Type: expense
  No.    Amount (LKR)  Date
----- ---------------- ----------
```

```
  1    40.00          2023-03-15
  2    30.00          2023-05-14
```

Transaction: internet bill
Type: expense
```
 No.    Amount (LKR)  Date
----- --------------- ----------
  1    85.00          2022-04-18
  2    90.00          2023-02-07
```

Transaction: car insurance
Type: expense
```
 No.    Amount (LKR)  Date
----- --------------- ----------
  1    150.00         2022-02-08
```

Transaction: medical bill
Type: expense
```
 No.    Amount (LKR)  Date
----- --------------- ----------
  1    120.00         2022-05-09
```

Transaction: vacation
Type: expense
```
 No.    Amount (LKR)  Date
----- --------------- ----------
  1    900.00         2023-06-10
```

Enter the Transaction Category (Example: "Groceries"): groceries
Enter the transaction number of your chosen transaction: 13
The chosen transaction is:

Transaction Category: groceries
Type: expense
```
  Amount (LKR)  Date
--------------- ----------
45.60           2024-03-26
```

Total LKR spent on groceries: 45.60

Transaction deleted successfully
Do you wish to repeat task (yes/no): yes

Find a Transaction to Update
```
 No.  Option Description
----- -----------------------------------------
```

    1 Find a Transaction using all transactions
    2 Find a transaction using date
    3 Find a transaction using type
    4 Unable To Find Transaction, Exit Task.

Enter the option number to select option: 1

Enter the Transaction Category and the Transaction Number to Choose a Transaction.
If the transaction you are looking for is not here enter 'None' for any field.

Transaction: groceries
Type: expense

No.	Amount (LKR)	Date
1	75.80	2022-06-15
2	75.80	2022-06-15
3	25.50	2022-07-12
4	25.50	2022-07-12
5	30.80	2022-11-20
6	80.25	2022-12-12
7	100.25	2023-04-14
8	70.00	2023-07-22
9	50.00	2023-08-18
10	35.60	2023-08-20
11	50.25	2023-10-15
12	50.25	2023-10-15

Transaction: bonus
Type: income

No.	Amount (LKR)	Date
1	600.00	2023-09-18
2	500.00	2023-12-28
3	500.00	2023-12-28
4	200.50	2023-12-30

Transaction: utilities
Type: income

No.	Amount (LKR)	Date
1	250.75	2021-06-08
2	250.75	2021-06-08
3	300.50	2021-08-03

Transaction: tuition
Type: expense

No.	Amount (LKR)	Date
1	500.00	2023-03-10
2	500.00	2023-03-10

Transaction: rent
Type: expense
```
  No.    Amount (LKR)  Date
 ----- --------------- ----------
  1    750.00       2023-09-01
  2    800.00       2023-11-01
  3    800.00       2023-11-01
```

Transaction: salary
Type: income
```
  No.    Amount (LKR)  Date
 ----- --------------- ----------
  1    1,800.00       2022-07-05
  2    1,700.00       2022-09-05
  3    1,700.00       2022-09-05
  4    1,600.00       2022-11-25
```

Transaction: fuel
Type: expense
```
  No.    Amount (LKR)  Date
 ----- --------------- ----------
  1    40.00         2023-03-15
  2    30.00         2023-05-14
```

Transaction: internet bill
Type: expense
```
  No.    Amount (LKR)  Date
 ----- --------------- ----------
  1    85.00         2022-04-18
  2    90.00         2023-02-07
```

Transaction: car insurance
Type: expense
```
  No.    Amount (LKR)  Date
 ----- --------------- ----------
  1    150.00        2022-02-08
```

Transaction: medical bill
Type: expense
```
  No.    Amount (LKR)  Date
 ----- --------------- ----------
  1    120.00        2022-05-09
```

Transaction: vacation
Type: expense
```
  No.    Amount (LKR)  Date
 ----- --------------- ----------
```

```
  1   900.00       2023-06-10
```

Enter the Transaction Category (Example: "Groceries"): none
Transaction not found!
No Transactions Found, Returning to Main Menu.

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 6

All Transactions Saved Successfully
Program Terminated Successfully

Appendix C - Command line output for test cases for 'add_transactions' function.

All transactions loaded successfully.
Program successfully initialized

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 2

How Do You Want to View Transaction summaries?
  No. Option Description
----- --------------------------
    1 View All Transactions
    2 View Transactions by Type
    3 View Transactions by year
    4 View Transactions by month
    5 View Transactions by date

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Enter the option number to select option: 1

Transaction Category: groceries
Type: expense
   Amount (LKR) Date
---------------- ----------
  75.80   2022-06-15
  75.80   2022-06-15
  25.50   2022-07-12
  25.50   2022-07-12
  30.80   2022-11-20
  80.25   2022-12-12
 100.25   2023-04-14
  70.00   2023-07-22
  50.00   2023-08-18
  35.60   2023-08-20
  50.25   2023-10-15
  50.25   2023-10-15

Total LKR spent on groceries: 670.00

Transaction Category: bonus
Type: income
   Amount (LKR) Date
--------------- ----------
600.00   2023-09-18
500.00   2023-12-28
500.00   2023-12-28
200.50   2023-12-30

Total LKR received from bonus: 1,800.50

Transaction Category: utilities
Type: income
   Amount (LKR) Date
--------------- ----------
250.75   2021-06-08
250.75   2021-06-08
300.50   2021-08-03

Total LKR received from utilities: 802.00

Transaction Category: tuition
Type: expense
   Amount (LKR) Date
--------------- ----------
500.00   2023-03-10
500.00   2023-03-10

Total LKR spent on tuition: 1,000.00

Transaction Category: rent
Type: expense
   Amount (LKR) Date
-------------- ----------
750.00   2023-09-01
800.00   2023-11-01
800.00   2023-11-01

Total LKR spent on rent: 2,350.00

Transaction Category: salary
Type: income
   Amount (LKR) Date
-------------- ----------
1,800.00   2022-07-05
1,700.00   2022-09-05
1,700.00   2022-09-05
1,600.00   2022-11-25

Total LKR received from salary: 6,800.00

Transaction Category: fuel
Type: expense
   Amount (LKR) Date
-------------- ----------
40.00   2023-03-15
30.00   2023-05-14

Total LKR spent on fuel: 70.00

Transaction Category: internet bill
Type: expense
   Amount (LKR) Date
-------------- ----------
85.00   2022-04-18
90.00   2023-02-07

Total LKR spent on internet bill: 175.00

Transaction Category: car insurance
Type: expense
   Amount (LKR) Date
-------------- ----------
150.00   2022-02-08

Total LKR spent on car insurance: 150.00

Transaction Category: medical bill
Type: expense
  Amount (LKR) Date
--------------- ----------
120.00   2022-05-09

Total LKR spent on medical bill: 120.00

Transaction Category: vacation
Type: expense
  Amount (LKR) Date
--------------- ----------
900.00   2023-06-10

Total LKR spent on vacation: 900.00

Do you wish to repeat task (yes/no): no

Returning to Main Menu

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 3

Enter the transaction information to add it to all transactions.
Enter the category of your transaction (example: Salary, Groceries): Golden Toilet
Enter the amount of your transaction: 15000000.99
Enter the type of your transaction (Income or Expense): generall ninja
Error: Invalid transaction, TransactionType must be either Income or Expense
Enter the type of your transaction (Income or Expense): expense
Enter the year: 2024
Enter the Month: 4
Enter the day for 2024-4 (1-30): 13
Transaction Successfully Added.

Do you wish to repeat task (yes/no): no

Returning to Main Menu

Main Menu

  No. Option Description

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```
-----  -------------------------------------
   1  Load Bulk Transactions from txt File.
   2  View Transactions
   3  Add Transaction
   4  Update Transaction
   5  Delete Transaction
   6  Save and Exit Program
```

Enter the option number to select option: 2

How Do You Want to View Transaction summaries?

```
  No.  Option Description
-----  --------------------------
   1  View All Transactions
   2  View Transactions by Type
   3  View Transactions by year
   4  View Transactions by month
   5  View Transactions by date
```

Enter the option number to select option: 1

Transaction Category: groceries
Type: expense

```
   Amount (LKR)  Date
---------------  ----------
 75.80          2022-06-15
 75.80          2022-06-15
 25.50          2022-07-12
 25.50          2022-07-12
 30.80          2022-11-20
 80.25          2022-12-12
100.25           2023-04-14
 70.00          2023-07-22
 50.00          2023-08-18
 35.60          2023-08-20
 50.25          2023-10-15
 50.25          2023-10-15
------------------------------------
```
Total LKR spent on groceries: 670.00

Transaction Category: bonus
Type: income

```
   Amount (LKR)  Date
---------------  ----------
600.00          2023-09-18
500.00          2023-12-28
500.00          2023-12-28
200.50          2023-12-30
------------------------------------
```
Total LKR received from bonus: 1,800.50

Transaction Category: utilities

33

Type: income
   Amount (LKR) Date
-------------- ----------
250.75   2021-06-08
250.75   2021-06-08
300.50   2021-08-03

Total LKR received from utilities: 802.00

Transaction Category: tuition
Type: expense
   Amount (LKR) Date
-------------- ----------
500.00   2023-03-10
500.00   2023-03-10

Total LKR spent on tuition: 1,000.00

Transaction Category: rent
Type: expense
   Amount (LKR) Date
-------------- ----------
750.00   2023-09-01
800.00   2023-11-01
800.00   2023-11-01

Total LKR spent on rent: 2,350.00

Transaction Category: salary
Type: income
   Amount (LKR) Date
-------------- ----------
1,800.00   2022-07-05
1,700.00   2022-09-05
1,700.00   2022-09-05
1,600.00   2022-11-25

Total LKR received from salary: 6,800.00

Transaction Category: fuel
Type: expense
   Amount (LKR) Date
-------------- ----------
40.00   2023-03-15
30.00   2023-05-14

Total LKR spent on fuel: 70.00

Transaction Category: internet bill

Type: expense
   Amount (LKR) Date
-------------- ----------
85.00   2022-04-18
90.00   2023-02-07

Total LKR spent on internet bill: 175.00

Transaction Category: car insurance
Type: expense
   Amount (LKR) Date
-------------- ----------
150.00   2022-02-08

Total LKR spent on car insurance: 150.00

Transaction Category: medical bill
Type: expense
   Amount (LKR) Date
-------------- ----------
120.00   2022-05-09

Total LKR spent on medical bill: 120.00

Transaction Category: vacation
Type: expense
   Amount (LKR) Date
-------------- ----------
900.00   2023-06-10

Total LKR spent on vacation: 900.00

Transaction Category: golden toilet
Type: expense
   Amount (LKR) Date
-------------- ----------
15,000,000.99 2024-04-13

Total LKR spent on golden toilet: 15,000,000.99

Do you wish to repeat task (yes/no): no

Returning to Main Menu

Main Menu

  No. Option Description
----- ------------------------------------
   1 Load Bulk Transactions from txt File.

    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 3

Enter the transaction information to add it to all transactions.
Enter the category of your transaction (example: Salary, Groceries): golden toilet
Enter the amount of your transaction: 15000000.99
Enter the type of your transaction (Income or Expense): expense
Enter the year: 2024
Enter the Month: 4
Enter the day for 2024-4 (1-30): 13
Error: Transaction already exists.
Do you wish to repeat task (yes/no): no

Returning to Main Menu

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 3

Enter the transaction information to add it to all transactions.
Enter the category of your transaction (example: Salary, Groceries): grindr subscription
Enter the amount of your transaction: 3.99
Enter the type of your transaction (Income or Expense): income
Enter the year: 2023
Enter the Month: 1
Enter the day for 2023-1 (1-31): 19
Transaction Successfully Added.

Do you wish to repeat task (yes/no): yes

Enter the category of your transaction (example: Salary, Groceries): r34 commissions
Enter the amount of your transaction: 15000.00
Enter the type of your transaction (Income or Expense): income
Enter the year: 2024
Enter the Month: 4
Enter the day for 2024-4 (1-30): 12
Transaction Successfully Added.

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Do you wish to repeat task (yes/no): no

Returning to Main Menu

Main Menu

  No. Option Description
----- -------------------------------------
     1 Load Bulk Transactions from txt File.
     2 View Transactions
     3 Add Transaction
     4 Update Transaction
     5 Delete Transaction
     6 Save and Exit Program

Enter the option number to select option: 2

How Do You Want to View Transaction summaries?
  No. Option Description
----- --------------------------
     1 View All Transactions
     2 View Transactions by Type
     3 View Transactions by year
     4 View Transactions by month
     5 View Transactions by date

Enter the option number to select option: 1

Transaction Category: groceries
Type: expense
    Amount (LKR) Date
--------------- ----------
  75.80   2022-06-15
  75.80   2022-06-15
  25.50   2022-07-12
  25.50   2022-07-12
  30.80   2022-11-20
  80.25   2022-12-12
  100.25   2023-04-14
  70.00   2023-07-22
  50.00   2023-08-18
  35.60   2023-08-20
  50.25   2023-10-15
  50.25   2023-10-15

Total LKR spent on groceries: 670.00

Transaction Category: bonus
Type: income
   Amount (LKR) Date
-------------- ----------
600.00   2023-09-18

```
500.00       2023-12-28
500.00       2023-12-28
200.50       2023-12-30
------------------------------------
```
Total LKR received from bonus: 1,800.50

Transaction Category: utilities
Type: income
   Amount (LKR) Date
```
--------------  ----------
250.75       2021-06-08
250.75       2021-06-08
300.50       2021-08-03
------------------------------------
```
Total LKR received from utilities: 802.00

Transaction Category: tuition
Type: expense
   Amount (LKR) Date
```
--------------  ----------
500.00       2023-03-10
500.00       2023-03-10
------------------------------------
```
Total LKR spent on tuition: 1,000.00

Transaction Category: rent
Type: expense
   Amount (LKR) Date
```
--------------  ----------
750.00       2023-09-01
800.00       2023-11-01
800.00       2023-11-01
------------------------------------
```
Total LKR spent on rent: 2,350.00

Transaction Category: salary
Type: income
   Amount (LKR) Date
```
--------------  ----------
1,800.00      2022-07-05
1,700.00      2022-09-05
1,700.00      2022-09-05
1,600.00      2022-11-25
------------------------------------
```
Total LKR received from salary: 6,800.00

Transaction Category: fuel
Type: expense
   Amount (LKR) Date

```
--------------  ----------
40.00        2023-03-15
30.00        2023-05-14
------------------------------------
```
Total LKR spent on fuel: 70.00

Transaction Category: internet bill
Type: expense
```
   Amount (LKR)  Date
--------------  ----------
85.00        2022-04-18
90.00        2023-02-07
------------------------------------
```
Total LKR spent on internet bill: 175.00

Transaction Category: car insurance
Type: expense
```
   Amount (LKR)  Date
--------------  ----------
150.00       2022-02-08
------------------------------------
```
Total LKR spent on car insurance: 150.00

Transaction Category: medical bill
Type: expense
```
   Amount (LKR)  Date
--------------  ----------
120.00       2022-05-09
------------------------------------
```
Total LKR spent on medical bill: 120.00

Transaction Category: vacation
Type: expense
```
   Amount (LKR)  Date
--------------  ----------
900.00       2023-06-10
------------------------------------
```
Total LKR spent on vacation: 900.00

Transaction Category: golden toilet
Type: expense
```
   Amount (LKR)  Date
--------------  ----------
15,000,000.99   2024-04-13
------------------------------------
```
Total LKR spent on golden toilet: 15,000,000.99

Transaction Category: grindr subscription

Type: income
   Amount (LKR) Date
-------------- ----------
3.99   2023-01-19

Total LKR received from grindr subscription: 3.99

Transaction Category: r34 commissions
Type: income
   Amount (LKR) Date
-------------- ----------
15,000.00   2024-04-12

Total LKR received from r34 commissions: 15,000.00

Do you wish to repeat task (yes/no): no

Returning to Main Menu

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 6

All Transactions Saved Successfully
Program Terminated Successfully

Appendix D - Command Line Output for 'update_transations' function.

All transactions loaded successfully.
Program successfully initialized

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction

    6 Save and Exit Program

Enter the option number to select option: 4

Find a transaction to update.
  No. Option Description
----- --
    1 Find a Transaction using all transactions
    2 Find a transaction using date
    3 Find a transaction using type
    4 Unable To Find Transaction, Exit Task.

Enter the option number to select option: 1

Enter the Transaction Category and the Transaction Number to Choose a Transaction.
If the transaction you are looking for is not here enter 'None' for any field.

Transaction: groceries
Type: expense
  No.   Amount (LKR) Date
----- ---------------- ----------
  1   75.80   2022-06-15
  2   75.80   2022-06-15
  3   25.50   2022-07-12
  4   25.50   2022-07-12
  5   30.80   2022-11-20
  6   80.25   2022-12-12
  7   100.25   2023-04-14
  8   70.00   2023-07-22
  9   50.00   2023-08-18
  10   35.60   2023-08-20
  11   50.25   2023-10-15
  12   50.25   2023-10-15

Transaction: bonus
Type: income
  No.   Amount (LKR) Date
----- --------------- ----------
  1   600.00   2023-09-18
  2   500.00   2023-12-28
  3   500.00   2023-12-28
  4   200.50   2023-12-30

Transaction: utilities
Type: income
  No.   Amount (LKR) Date
----- --------------- ----------
  1   250.75   2021-06-08
  2   250.75   2021-06-08
  3   300.50   2021-08-03

Transaction: tuition
Type: expense
```
  No.    Amount (LKR)  Date
----- --------------- ----------
  1    500.00          2023-03-10
  2    500.00          2023-03-10
```

Transaction: rent
Type: expense
```
  No.    Amount (LKR)  Date
----- --------------- ----------
  1    750.00          2023-09-01
  2    800.00          2023-11-01
  3    800.00          2023-11-01
```

Transaction: salary
Type: income
```
  No.    Amount (LKR)  Date
----- --------------- ----------
  1    1,800.00        2022-07-05
  2    1,700.00        2022-09-05
  3    1,700.00        2022-09-05
  4    1,600.00        2022-11-25
```

Transaction: fuel
Type: expense
```
  No.    Amount (LKR)  Date
----- --------------- ----------
  1    40.00           2023-03-15
  2    30.00           2023-05-14
```

Transaction: internet bill
Type: expense
```
  No.    Amount (LKR)  Date
----- --------------- ----------
  1    85.00           2022-04-18
  2    90.00           2023-02-07
```

Transaction: car insurance
Type: expense
```
  No.    Amount (LKR)  Date
----- --------------- ----------
  1    150.00          2022-02-08
```

Transaction: medical bill
Type: expense
```
  No.    Amount (LKR)  Date
----- --------------- ----------
```

```
  1    120.00        2022-05-09


Transaction: vacation
Type: expense
  No.    Amount (LKR)  Date
-----  --------------- ----------
  1    900.00         2023-06-10


Transaction: golden toilet
Type: expense
  No.    Amount (LKR)  Date
-----  --------------- ----------
  1    15,000,000.99   2024-04-13


Transaction: grindr subscription
Type: income
  No.    Amount (LKR)  Date
-----  --------------- ----------
  1    3.99            2023-01-19


Transaction: r34 commissions
Type: income
  No.    Amount (LKR)  Date
-----  --------------- ----------
  1    15,000.00       2024-04-12

Enter the Transaction Category (Example: "Groceries"): vacation
Enter the transaction number of your chosen transaction: 1
The chosen transaction is:

Transaction Category: vacation
Type: expense
  Amount (LKR)  Date
--------------- ----------
900.00         2023-06-10
------------------------------------
Total LKR spent on vacation: 900.00



How do you wish to update the transaction?
  No.  Option Description
-----  ------------------------------
    1  Update Amount of Transaction
    2  Update Date of Transaction
    3  Update Type of Transaction
    4  Update Category of Transaction

Enter the option number to select option: 1
Enter the amount of your transaction: 2000000
```

Transaction amount updated successfully.
Do you wish to repeat task (yes/no): no

Returning to Main Menu

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 2

How Do You Want to View Transaction summaries?
  No. Option Description
----- --------------------------
    1 View All Transactions
    2 View Transactions by Type
    3 View Transactions by year
    4 View Transactions by month
    5 View Transactions by date

Enter the option number to select option: 2
Enter the type of your transaction (Income or Expense): expense

Transaction Category: groceries
Type: expense
   Amount (LKR) Date
--------------- ----------
  75.80   2022-06-15
  75.80   2022-06-15
  25.50   2022-07-12
  25.50   2022-07-12
  30.80   2022-11-20
  80.25   2022-12-12
 100.25   2023-04-14
  70.00   2023-07-22
  50.00   2023-08-18
  35.60   2023-08-20
  50.25   2023-10-15
  50.25   2023-10-15

Total LKR spent on groceries: 670.00

Transaction Category: tuition
Type: expense
   Amount (LKR) Date

```
--------------  ----------
500.00         2023-03-10
500.00         2023-03-10
------------------------------------
Total LKR spent on tuition: 1,000.00
```

Transaction Category: rent
Type: expense

```
   Amount (LKR)  Date
--------------  ----------
750.00         2023-09-01
800.00         2023-11-01
800.00         2023-11-01
------------------------------------
Total LKR spent on rent: 2,350.00
```

Transaction Category: fuel
Type: expense

```
   Amount (LKR)  Date
--------------  ----------
40.00          2023-03-15
30.00          2023-05-14
------------------------------------
Total LKR spent on fuel: 70.00
```

Transaction Category: internet bill
Type: expense

```
   Amount (LKR)  Date
--------------  ----------
85.00          2022-04-18
90.00          2023-02-07
------------------------------------
Total LKR spent on internet bill: 175.00
```

Transaction Category: car insurance
Type: expense

```
   Amount (LKR)  Date
--------------  ----------
150.00         2022-02-08
------------------------------------
Total LKR spent on car insurance: 150.00
```

Transaction Category: medical bill
Type: expense

```
   Amount (LKR)  Date
--------------  ----------
120.00         2022-05-09
------------------------------------
Total LKR spent on medical bill: 120.00
```

Transaction Category: vacation
Type: expense
  Amount (LKR) Date
-------------- ----------
2,000,000.00   2023-06-10

Total LKR spent on vacation: 2,000,000.00

Transaction Category: golden toilet
Type: expense
  Amount (LKR) Date
-------------- ----------
15,000,000.99   2024-04-13

Total LKR spent on golden toilet: 15,000,000.99

Do you wish to repeat task (yes/no): no

Returning to Main Menu

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 4

Find a transaction to update.
  No. Option Description
----- ---
    1 Find a Transaction using all transactions
    2 Find a transaction using date
    3 Find a transaction using type
    4 Unable To Find Transaction, Exit Task.

Enter the option number to select option: 2
Enter the year: 2023
Enter the Month: 2
Enter the day for 2023-2 (1-28): 7

Enter the Transaction Category and the Transaction Number to Choose a Transaction.
If the transaction you are looking for is not here enter 'None' for any field.

Transaction: internet bill

Type: expense
  No.   Amount (LKR) Date
----- --------------- ----------
  1   90.00   2023-02-07

Enter the Transaction Category (Example: "Groceries"): internet bill
Enter the transaction number of your chosen transaction: 1
The chosen transaction is:

Transaction Category: internet bill
Type: expense
   Amount (LKR) Date
--------------- ----------
90.00   2023-02-07

Total LKR spent on internet bill: 90.00

How do you wish to update the transaction?
  No. Option Description
----- -------------------------------
    1 Update Amount of Transaction
    2 Update Date of Transaction
    3 Update Type of Transaction
    4 Update Category of Transaction

Enter the option number to select option: 2
Enter the year: 2023
Enter the Month: 3
Enter the day for 2023-3 (1-31): 31
Transaction date updated successfully.
Do you wish to repeat task (yes/no): yes

Find a transaction to update.
  No. Option Description
----- ---
    1 Find a Transaction using all transactions
    2 Find a transaction using date
    3 Find a transaction using type
    4 Unable To Find Transaction, Exit Task.

Enter the option number to select option: 3
Enter the type of your transaction (Income or Expense): income

Enter the Transaction Category and the Transaction Number to Choose a Transaction.
If the transaction you are looking for is not here enter 'None' for any field.

Transaction: bonus
Type: income
  No.   Amount (LKR) Date
----- --------------- ----------

```
1    600.00       2023-09-18
2    500.00       2023-12-28
3    500.00       2023-12-28
4    200.50       2023-12-30
```

Transaction: utilities
Type: income

```
 No.    Amount (LKR)  Date
-----  --------------  ----------
1    250.75       2021-06-08
2    250.75       2021-06-08
3    300.50       2021-08-03
```

Transaction: salary
Type: income

```
 No.    Amount (LKR)  Date
-----  --------------  ----------
1    1,800.00     2022-07-05
2    1,700.00     2022-09-05
3    1,700.00     2022-09-05
4    1,600.00     2022-11-25
```

Transaction: grindr subscription
Type: income

```
 No.    Amount (LKR)  Date
-----  --------------  ----------
1    3.99         2023-01-19
```

Transaction: r34 commissions
Type: income

```
 No.    Amount (LKR)  Date
-----  --------------  ----------
1    15,000.00    2024-04-12
```

Enter the Transaction Category (Example: "Groceries"): grindr subscription
Enter the transaction number of your chosen transaction: 1
The chosen transaction is:

Transaction Category: grindr subscription
Type: income

```
  Amount (LKR)  Date
--------------  ----------
3.99         2023-01-19
```

Total LKR received from grindr subscription: 3.99

How do you wish to update the transaction?
 No. Option Description

```
-----  ------------------------------
   1  Update Amount of Transaction
   2  Update Date of Transaction
   3  Update Type of Transaction
   4  Update Category of Transaction
```

Enter the option number to select option: 3
Enter the type of your transaction (Income or Expense): expense
Warning: Changing the transaction type will affect all transactions in grindr subscription.
Do you want to proceed? (y/n): y
Transactions updated successfully.
Do you wish to repeat task (yes/no): yes

Find a transaction to update.
```
  No.  Option Description
-----  ----------------------------------------
   1  Find a Transaction using all transactions
   2  Find a transaction using date
   3  Find a transaction using type
   4  Unable To Find Transaction, Exit Task.
```

Enter the option number to select option: 3
Enter the type of your transaction (Income or Expense): expense

Enter the Transaction Category and the Transaction Number to Choose a Transaction.
If the transaction you are looking for is not here enter 'None' for any field.

Transaction: groceries
Type: expense
```
  No.    Amount (LKR)  Date
-----  ----------------  ----------
   1    75.80          2022-06-15
   2    75.80          2022-06-15
   3    25.50          2022-07-12
   4    25.50          2022-07-12
   5    30.80          2022-11-20
   6    80.25          2022-12-12
   7    100.25          2023-04-14
   8    70.00          2023-07-22
   9    50.00          2023-08-18
  10    35.60           2023-08-20
  11    50.25          2023-10-15
  12    50.25           2023-10-15
```

Transaction: tuition
Type: expense
```
  No.    Amount (LKR)  Date
-----  ---------------  ----------
   1    500.00          2023-03-10
   2    500.00          2023-03-10
```

```
Transaction: rent
Type: expense
 No.    Amount (LKR)  Date
----- --------------- ----------
 1   750.00        2023-09-01
 2   800.00        2023-11-01
 3   800.00        2023-11-01


Transaction: fuel
Type: expense
 No.    Amount (LKR)  Date
----- --------------- ----------
 1   40.00         2023-03-15
 2   30.00         2023-05-14


Transaction: internet bill
Type: expense
 No.    Amount (LKR)  Date
----- --------------- ----------
 1   85.00         2022-04-18
 2   90.00         2023-03-31


Transaction: car insurance
Type: expense
 No.    Amount (LKR)  Date
----- --------------- ----------
 1   150.00        2022-02-08


Transaction: medical bill
Type: expense
 No.    Amount (LKR)  Date
----- --------------- ----------
 1   120.00        2022-05-09


Transaction: vacation
Type: expense
 No.    Amount (LKR)  Date
----- --------------- ----------
 1   2,000,000.00    2023-06-10


Transaction: golden toilet
Type: expense
 No.    Amount (LKR)  Date
----- --------------- ----------
 1   15,000,000.99   2024-04-13
```

Transaction: grindr subscription
Type: expense
  No.   Amount (LKR) Date
----- --------------- ----------
  1   3.99   2023-01-19

Enter the Transaction Category (Example: "Groceries"): grindr subscription
Enter the transaction number of your chosen transaction: 1
The chosen transaction is:

Transaction Category: grindr subscription
Type: expense
   Amount (LKR) Date
--------------- ----------
3.99   2023-01-19

Total LKR spent on grindr subscription: 3.99

How do you wish to update the transaction?
  No. Option Description
----- ------------------------------
    1 Update Amount of Transaction
    2 Update Date of Transaction
    3 Update Type of Transaction
    4 Update Category of Transaction

Enter the option number to select option: 4
Warning: Changing the category will affect all transactions in grindr subscription.
Do you want to proceed? (y/n): y
Enter the new category for the transactions: feet finder subscription
Transactions updated successfully
Do you wish to repeat task (yes/no): no

Returning to Main Menu

Main Menu

  No. Option Description
----- --------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 2

How Do You Want to View Transaction summaries?
  No. Option Description
----- --------------------------

   1 View All Transactions
   2 View Transactions by Type
   3 View Transactions by year
   4 View Transactions by month
   5 View Transactions by date

Enter the option number to select option: 2
Enter the type of your transaction (Income or Expense): expense

Transaction Category: groceries
Type: expense
   Amount (LKR) Date
--------------- ----------
 75.80   2022-06-15
 75.80   2022-06-15
 25.50   2022-07-12
 25.50   2022-07-12
 30.80   2022-11-20
 80.25   2022-12-12
100.25   2023-04-14
 70.00   2023-07-22
 50.00   2023-08-18
 35.60   2023-08-20
 50.25   2023-10-15
 50.25   2023-10-15

Total LKR spent on groceries: 670.00

Transaction Category: tuition
Type: expense
   Amount (LKR) Date
--------------- ----------
500.00   2023-03-10
500.00   2023-03-10

Total LKR spent on tuition: 1,000.00

Transaction Category: rent
Type: expense
   Amount (LKR) Date
--------------- ----------
750.00   2023-09-01
800.00   2023-11-01
800.00   2023-11-01

Total LKR spent on rent: 2,350.00

Transaction Category: fuel
Type: expense
   Amount (LKR) Date
--------------- ----------

```
40.00        2023-03-15
30.00        2023-05-14
-----------------------------------
Total LKR spent on fuel: 70.00
```

Transaction Category: internet bill
Type: expense
```
  Amount (LKR)  Date
--------------  ----------
85.00        2022-04-18
90.00        2023-03-31
-----------------------------------
Total LKR spent on internet bill: 175.00
```

Transaction Category: car insurance
Type: expense
```
  Amount (LKR)  Date
--------------  ----------
150.00       2022-02-08
-----------------------------------
Total LKR spent on car insurance: 150.00
```

Transaction Category: medical bill
Type: expense
```
  Amount (LKR)  Date
--------------  ----------
120.00       2022-05-09
-----------------------------------
Total LKR spent on medical bill: 120.00
```

Transaction Category: vacation
Type: expense
```
  Amount (LKR)  Date
--------------  ----------
2,000,000.00    2023-06-10
-----------------------------------
Total LKR spent on vacation: 2,000,000.00
```

Transaction Category: golden toilet
Type: expense
```
  Amount (LKR)  Date
--------------  ----------
15,000,000.99   2024-04-13
-----------------------------------
Total LKR spent on golden toilet: 15,000,000.99
```

Transaction Category: feet finder subscription
Type: expense

```
   Amount (LKR)  Date
--------------- ----------
3.99           2023-01-19
-----------------------------------
Total LKR spent on feet finder subscription: 3.99

Do you wish to repeat task (yes/no): no


Returning to Main Menu

Main Menu
-------------
  No.  Option Description
-----  ------------------------------------
    1  Load Bulk Transactions from txt File.
    2  View Transactions
    3  Add Transaction
    4  Update Transaction
    5  Delete Transaction
    6  Save and Exit Program

Enter the option number to select option: 6

All Transactions Saved Successfully
Program Terminated Successfully
```

Appendix E - Sample.txt file used for testing.

```
Groceries, expense, 50.25, 2023, 10, 15
Salary, income, 1500.00, 2024, 4, 25
Groceries, expense, 25.50, 2022, 7, 12
Bonus, income, 200.50, 2023, 12, 30
Utilities, income, 250.75, 2021, 6, 8
Groceries, expense, 35.60, 2023, 8, 20
Vacation, expense, 1200.00, 2024, 9, 5
Groceries, expense, 75.80, 2022, 6, 15
Tuition, expense, 500.00, 2023, 3, 10
Groceries, expense, 40.00, 2025, 2, 28
Rent, expense, 800.00, 2023, 11, 1
Groceries, expense, 20.50, 2024, 10, 10
Salary, income, 1700.00, 2022, 9, 5
Groceries, expense, 60.30, 2024, 8, 16
Bonus, income, 500.00, 2023, 12, 28
Phone Bill, expense, 75.00, 2025, 7, 20
Groceries, expense, 90.25, 2024, 5, 11
Groceries, expense, 50.25, 2023, 10, 15
Salary, income, 1500.00, 2024, 4, 25
Groceries, expense, 25.50, 2022, 7, 12
Bonus, expense, 200.50, 2023, 12, 30
Utilities, income, 250.75, 2021, 6, 8
Groceries, expense, 35.60, 2023, 8, 20
```

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Vacation, expense, 1200.00, 2024, 9, 5
Groceries, expense, 75.80, 2022, 6, 15
Tuition, expense, 500.00, 2023, 3, 10
Groceries, expense, 40.00, 2025, 2, 28
Rent, expense, 800.00, 2023, 11, 1
Groceries, expense, 20.50, 2024, 10, 10
Salary, income, 1700.00, 2022, 9, 5
Groceries, expense, 60.30, 2024, 8, 16
Bonus, income, 500.00, 2023, 12, 28
Phone Bill, expense, 75.00, 2025, 7, 20
Groceries, expense, 90.25, 2024, 5, 11
Fuel, expense, 40.00, 2023, 3, 15
Internet Bill, expense, 85.00, 2022, 4, 18
Groceries, expense, 55.60, 2024, 9, 30
Car Insurance, expense, 150.00, 2022, 2, 8
Groceries, expense, 70.00, 2023, 7, 22
Entertainment, expense, 200.00, 2024, 11, 7
Groceries, expense, 80.25, 2022, 12, 12
Utilities, income, 300.50, 2021, 8, 3
Groceries, expense, 65.30, 2024, 6, 18
Bonus, income, 700.00, 2023, 10, 28
Water Bill, expense, 50.00, 2025, 1, 25
Groceries, expense, 100.25, 2023, 4, 14
Medical Bill, expense, 120.00, 2022, 5, 9
Groceries, expense, 45.60, 2024, 3, 26
Vacation, expense, 900.00, 2023, 6, 10
Groceries, expense, 30.80, 2022, 11, 20
Bonus, income, 300.00, 2024, 12, 12
Internet Bill, expense, 90.00, 2023, 2, 7
Groceries, expense, 85.25, 2025, 5, 16
Rent, expense, 750.00, 2023, 9, 1
Groceries, expense, 75.30, 2024, 10, 22
Salary, income, 1800.00, 2022, 7, 5
Groceries, expense, 50.00, 2023, 8, 18
Bonus, income, 400.00, 2024, 12, 28
Phone Bill, expense, 60.00, 2025, 3, 12
Groceries, expense, 95.25, 2024, 6, 8
Fuel, expense, 30.00, 2023, 5, 14
Internet Bill, expense, 80.00, 2022, 10, 19
Groceries, expense, 75.60, 2024, 9, 30
Salary, income, 1600.00, 2022, 11, 25
Groceries, expense, 65.30, 2024, 4, 17

Appendix F - Command line output for testing 'read_bulk_transactions_from_file' function.

Original transaction file not found
New Trasaction file successfully created
Program succcessfully initialized

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 2
No Transactions to View
Returning to main menue

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 1
WARNING: This function will read transactions from a text file and add them to the current database.

The file must be in the same directory as the main program, and named 'bulk_transactions.txt' and adhere to the following format:
Each line represents one transaction and must have the following six elements separated by commas:
Transaction category, Transaction type (income or expense only), Amount (numeric form), Year (numeric), Month (numeric), Day (numeric)

Do you want to proceed? (y/n): y

Loading all transactions from file: bulk transactions.txt
Skipped Transaction at line 2: Transaction date is in the future.
Skipped Transaction at line 7: Transaction date is in the future.
Skipped Transaction at line 10: Transaction date is in the future.
Skipped Transaction at line 12: Transaction date is in the future.
Skipped Transaction at line 14: Transaction date is in the future.
Skipped Transaction at line 16: Transaction date is in the future.
Skipped Transaction at line 17: Transaction date is in the future.
Skipped Transaction at line 19: Transaction date is in the future.

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Skipped Transaction at line 21: Transaction type does not match existing type for category 'bonus'.
Skipped Transaction at line 24: Transaction date is in the future.
Skipped Transaction at line 27: Transaction date is in the future.
Skipped Transaction at line 29: Transaction date is in the future.
Skipped Transaction at line 31: Transaction date is in the future.
Skipped Transaction at line 33: Transaction date is in the future.
Skipped Transaction at line 34: Transaction date is in the future.
Skipped Transaction at line 37: Transaction date is in the future.
Skipped Transaction at line 40: Transaction date is in the future.
Skipped Transaction at line 43: Transaction date is in the future.
Skipped Transaction at line 45: Transaction date is in the future.
Skipped Transaction at line 51: Transaction date is in the future.
Skipped Transaction at line 53: Transaction date is in the future.
Skipped Transaction at line 55: Transaction date is in the future.
Skipped Transaction at line 58: Transaction date is in the future.
Skipped Transaction at line 59: Transaction date is in the future.
Skipped Transaction at line 60: Transaction date is in the future.
Skipped Transaction at line 63: Transaction date is in the future.
Skipped Transaction at line 65: Transaction date is in the future.

Loading Complete

Transactions at the Following Lines Were Not Loaded Successfully:
2,7,10,12,14,16,17,19,21,24,27,29,31,33,34,37,40,43,45,51,53,55,58,59,60,63,65,

Returning to Main Menu

Main Menu

  No. Option Description
----- ------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 2

How Do You Want to View Transaction summaries?
  No. Option Description
----- -------------------------
    1 View All Transactions
    2 View Transactions by Type
    3 View Transactions by year
    4 View Transactions by month
    5 View Transactions by date

Enter the option number to select option: 1

Transaction Category: groceries
Type: expense
    Amount (LKR) Date

```
--------------  ----------
75.80          2022-06-15
75.80          2022-06-15
25.50          2022-07-12
25.50          2022-07-12
30.80          2022-11-20
80.25          2022-12-12
100.25          2023-04-14
70.00          2023-07-22
50.00          2023-08-18
35.60          2023-08-20
35.60          2023-08-20
50.25          2023-10-15
50.25          2023-10-15
45.60          2024-03-26
------------------------------------
```

Total LKR spent on groceries: 751.20

Transaction Category: bonus
Type: income

```
   Amount (LKR)  Date
--------------  ----------
700.00          2023-10-28
500.00          2023-12-28
500.00          2023-12-28
200.50          2023-12-30
------------------------------------
```

Total LKR received from bonus: 1,900.50

Transaction Category: utilities
Type: income

```
   Amount (LKR)  Date
--------------  ----------
250.75          2021-06-08
250.75          2021-06-08
300.50          2021-08-03
------------------------------------
```

Total LKR received from utilities: 802.00

Transaction Category: tuition
Type: expense

```
   Amount (LKR)  Date
--------------  ----------
500.00          2023-03-10
500.00          2023-03-10
------------------------------------
```

Total LKR spent on tuition: 1,000.00

Transaction Category: rent
Type: expense

```
   Amount (LKR)  Date
--------------  ----------
750.00          2023-09-01
800.00          2023-11-01
800.00          2023-11-01
------------------------------------
```
Total LKR spent on rent: 2,350.00

Transaction Category: salary
Type: income
```
   Amount (LKR)  Date
--------------  ----------
1,800.00        2022-07-05
1,700.00        2022-09-05
1,700.00        2022-09-05
1,600.00        2022-11-25
------------------------------------
```
Total LKR received from salary: 6,800.00

Transaction Category: fuel
Type: expense
```
   Amount (LKR)  Date
--------------  ----------
40.00           2023-03-15
30.00           2023-05-14
------------------------------------
```
Total LKR spent on fuel: 70.00

Transaction Category: internet bill
Type: expense
```
   Amount (LKR)  Date
--------------  ----------
85.00           2022-04-18
80.00           2022-10-19
90.00           2023-02-07
------------------------------------
```
Total LKR spent on internet bill: 255.00

Transaction Category: car insurance
Type: expense
```
   Amount (LKR)  Date
--------------  ----------
150.00          2022-02-08
------------------------------------
```
Total LKR spent on car insurance: 150.00

Transaction Category: medical bill
Type: expense
```
   Amount (LKR)  Date
```

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--------------   ----------
120.00   2022-05-09

Total LKR spent on medical bill: 120.00

Transaction Category: vacation
Type: expense
  Amount (LKR) Date
--------------   ----------
900.00   2023-06-10

Total LKR spent on vacation: 900.00

Do you wish to repeat task (yes/no): no

Returning to Main Menu

Main Menu

  No. Option Description
----- -------------------------------------
    1 Load Bulk Transactions from txt File.
    2 View Transactions
    3 Add Transaction
    4 Update Transaction
    5 Delete Transaction
    6 Save and Exit Program

Enter the option number to select option: 6

All Transactions Saved Successfully
Program Terminated Successfully