Lab # 06

Task 01:

```
/*Basic Calculator

You are creating a basic calculator program for students to practice arithmetic
operations. The calculator should allow users to perform addition, subtraction,
multiplication, division, and power on two numbers entered via user input. Each
operation will be executed using separate functions*/

#include<iostream>
using namespace std;

void addition(float a, float b){
    cout << "Result: "<<a<<" + "<<b<<" = "<<(a+b)<<endl;
}
void subtraction(float a, float b){
    cout << "Result: "<<a<<" - "<<b<<" = "<<(a-b)<<endl;
}
void multiply(float a, float b){
    cout << "Result: "<<a<<" * "<<b<<" = "<<(a*b)<<endl;
}
void divide(float a, float b){
    if(b==0){
        cout << "Error: division by zero is not possible."<<endl;
    }
    else{
        cout << "Result: "<<a<<" / "<<b<<" = "<<(a/b)<<endl;
    }
}
void power(float a, float b){
    float result = 1;
    float temp = b; //b will ultimately become 0, but i have to write actual
value of b in result statement
    while(b != 0){
        result = result*a;
        b--;
    }
    cout << "Result: "<<a<<" ^ "<<temp<<" = "<<result<<endl;
}

int main(){
    float num1 = 0, num2 = 0;
    char op;
    cout << "***Simple Calculator***"<<endl;
```

```
    cout << "Enter first number: ";
    cin >> num1;
    cout << "Enter second number: ";
    cin >> num2;
    cout << "Enter operator (+, -, *, /, ^) ";
    cin >> op;
    if(op == '+'){
        addition(num1, num2);
    }
    else if(op == '-'){
        subtraction(num1, num2);
    }
    else if(op == '*'){
        multiply(num1, num2);
    }
    else if(op == '/'){
        divide(num1, num2);
    }
    else if(op == '^'){
        power(num1, num2);
    }
    else{
        cout << "invalid Operator!"<<endl;
    }
}
```

Output:


PROBLEMS
OUTPUT
TERMINAL
powershell
PS D:\Hasan\cpp\university\lab06> g++ task01.cpp
PS D:\Hasan\cpp\university\lab06> ./a.exe
Simple Calculator
Enter first number: 2.5
Enter second number: 2.5
Enter operator (+, -, *, /, ^) +
Result: 2.5 + 2.5 = 5
PS D:\Hasan\cpp\university\lab06> g++ task01.cpp
PS D:\Hasan\cpp\university\lab06> ./a.exe
Simple Calculator
Enter first number: 67
Enter second number: 60
Enter operator (+, -, *, /, ^) -
Result: 67 - 60 = 7
PS D:\Hasan\cpp\university\lab06> ./a.exe
Simple Calculator
Enter first number: 50.9
Enter second number: 2
Enter operator (+, -, *, /, ^) *
Result: 50.9 * 2 = 101.8
PS D:\Hasan\cpp\university\lab06> ./a.exe
Simple Calculator
Enter first number: 2
Enter second number: 2
Enter operator (+, -, *, /, ^) ^
Result: 2 ^ 2 = 4
PS D:\Hasan\cpp\university\lab06> 6
6
PS D:\Hasan\cpp\university\lab06> ./a.exe
Simple Calculator
Enter first number: 6
Enter second number: 0
Enter operator (+, -, *, /, ^) /
Error: division by zero is not possible.
PS D:\Hasan\cpp\university\lab06>
Ln 26, Col 22
Spaces: 4
UTF-8
CRLF
C++
Go Live
windows-gcc-x86

Task 02:

```
/*ATM System

Create a simple ATM system that allows users to check their balance, deposit
funds, and withdraw funds. Use functions to perform each operation and use if-
else ladders to validate user input and ensure that withdrawals do not exceed the
available balance. Use loops to allow multiple transactions until the user
chooses to exit.*/

#include<iostream>
using namespace std;

void deposit(float &totalBalance){
    float amount = 0.00;
    cout << "Enter amount you want to deposit: ";
    cin >> amount;
    totalBalance += amount;
    cout << endl;
    cout << "Your new balanace is: "<<totalBalance<<endl;
    cout << endl;
}

void withdraw(float &totalBalance){
    float amount = 0.00;
    cout << "Enter amount you want to withdraw: ";
    cin >> amount;
    if(amount>totalBalance){
        cout << endl;
        cout << "Insufficient balance."<<endl;
        cout << endl;
    }
    else{
        totalBalance -= amount;
        cout << endl;
        cout << "Your new balance is: "<<totalBalance<<endl;
        cout << endl;
    }
}

void checkbalance(float &totalBalance){
    cout << endl;
    cout << "Your total balance is: "<<totalBalance<<endl;
    cout << endl;
}
```

```
int main(){
    float totalBalance = 0.00;
    int choice = 0;
    cout << "Welcome to Bank"<<endl;
    do{
        cout << "*****Menu*****"<<endl;
        cout << "To deposit amount, press '1' "<<endl;
        cout << "To withdraw amount, press '2' "<<endl;
        cout << "To check balance, press '3' "<<endl;
        cout << "To exit, press '4' "<<endl;
        cout << "Enter choice: ";
        cin >> choice;
        if(choice == 1){
            deposit(totalBalance);
        }
        else if(choice == 2){
            withdraw(totalBalance);
        }
        else if(choice == 3){
            checkbalance(totalBalance);
        }
        else if(choice == 4){
            cout << endl;
            cout << "Ending program with total balance: "<<totalBalance<<endl;
        }
        else{
            cout << "invalid choice."<<endl;
        }
    }while(choice!=4);
}
```

Output:

```
PS D:\Hasan\cpp\university\lab06> g++ task02.cpp
PS D:\Hasan\cpp\university\lab06> ./a.exe
Welcome to Bank
*****Menu*****
To deposit amount, press '1'
To withdraw amount, press '2'
To check balance, press '3'
To exit, press '4'
Enter choice: 3

Your total balance is: 0

*****Menu*****
To deposit amount, press '1'
To withdraw amount, press '2'
To check balance, press '3'
To exit, press '4'
Enter choice: 1
Enter amount you want to deposit: 100

Your new balanace is: 100

*****Menu*****
To deposit amount, press '1'
To withdraw amount, press '2'
To check balance, press '3'
To exit, press '4'
Enter choice: 2
Enter amount you want to withdraw: 80

Your new balance is: 20
```

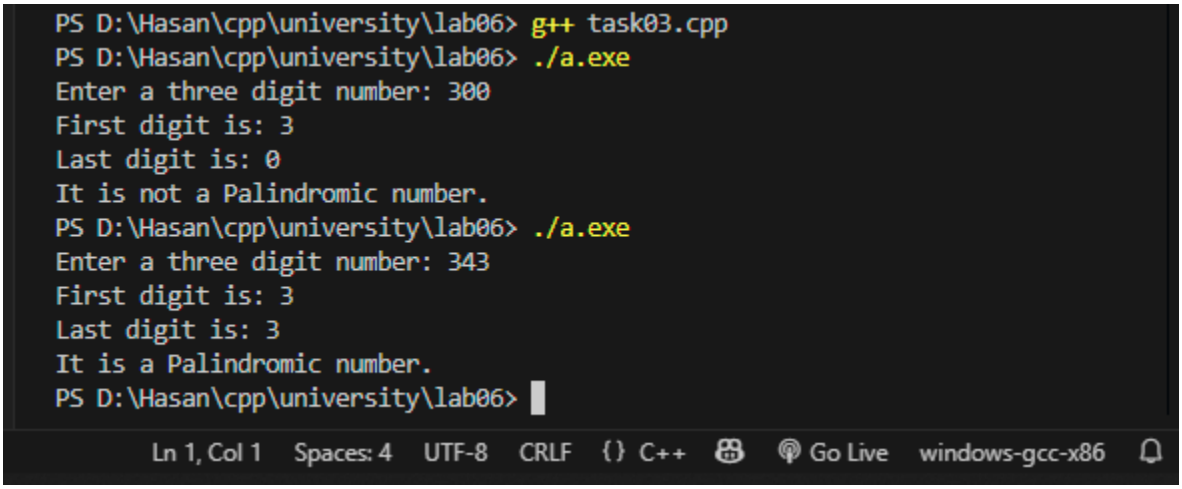
```
Your new balance is: 20

*****Menu*****
To deposit amount, press '1'
To withdraw amount, press '2'
To check balance, press '3'
To exit, press '4'
Enter choice: 2
Enter amount you want to withdraw: 100

Insufficient balance.

*****Menu*****
To deposit amount, press '1'
To withdraw amount, press '2'
To check balance, press '3'
To exit, press '4'
Enter choice: 3

Your total balance is: 20

*****Menu*****
To deposit amount, press '1'
To withdraw amount, press '2'
To check balance, press '3'
To exit, press '4'
Enter choice: 4

Ending program with total balance: 20
PS D:\Hasan\cpp\university\lab06>
```

Ln 1, Col 1 Spaces: 4 UTF-8 CRLF {} C++ Go Live windows-gcc-x86

Task 03:

```cpp
/* Number Analysis

Write a C++ program that includes functions to find the least significant digit
and most significant digit of a three-digit number. Additionally, implement
functions to calculate the sum of digits and determine whether the number is a
palindrome*/

#include<iostream>
#include<string>
using namespace std;

void plaindrome(char a, char c){
    if(a == c){
        cout << "It is a Palindromic number."<<endl;
    }
    else{
        cout << "It is not a Palindromic number."<<endl;
    }
}
int main(){
    int num = 0; //user will input an integer
    string numStr; //we will convert it into string
    char first, last;//to store first and last digit

    cout << "Enter a three digit number: ";
    cin >> num;

    numStr = to_string(num);//converting into string
    first = numStr[0];//extracting
    last = numStr[2];
    cout << "First digit is: "<<first<<endl;
    cout << "Last digit is: "<<last<<endl;

    plaindrome(first, last);
}
```

Output:


PS D:\Hasan\cpp\university\lab06> g++ task03.cpp
PS D:\Hasan\cpp\university\lab06> ./a.exe
Enter a three digit number: 300
First digit is: 3
Last digit is: 0
It is not a Palindromic number.
PS D:\Hasan\cpp\university\lab06> ./a.exe
Enter a three digit number: 343
First digit is: 3
Last digit is: 3
It is a Palindromic number.
PS D:\Hasan\cpp\university\lab06>
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF {} C++ Go Live windows-gcc-x86

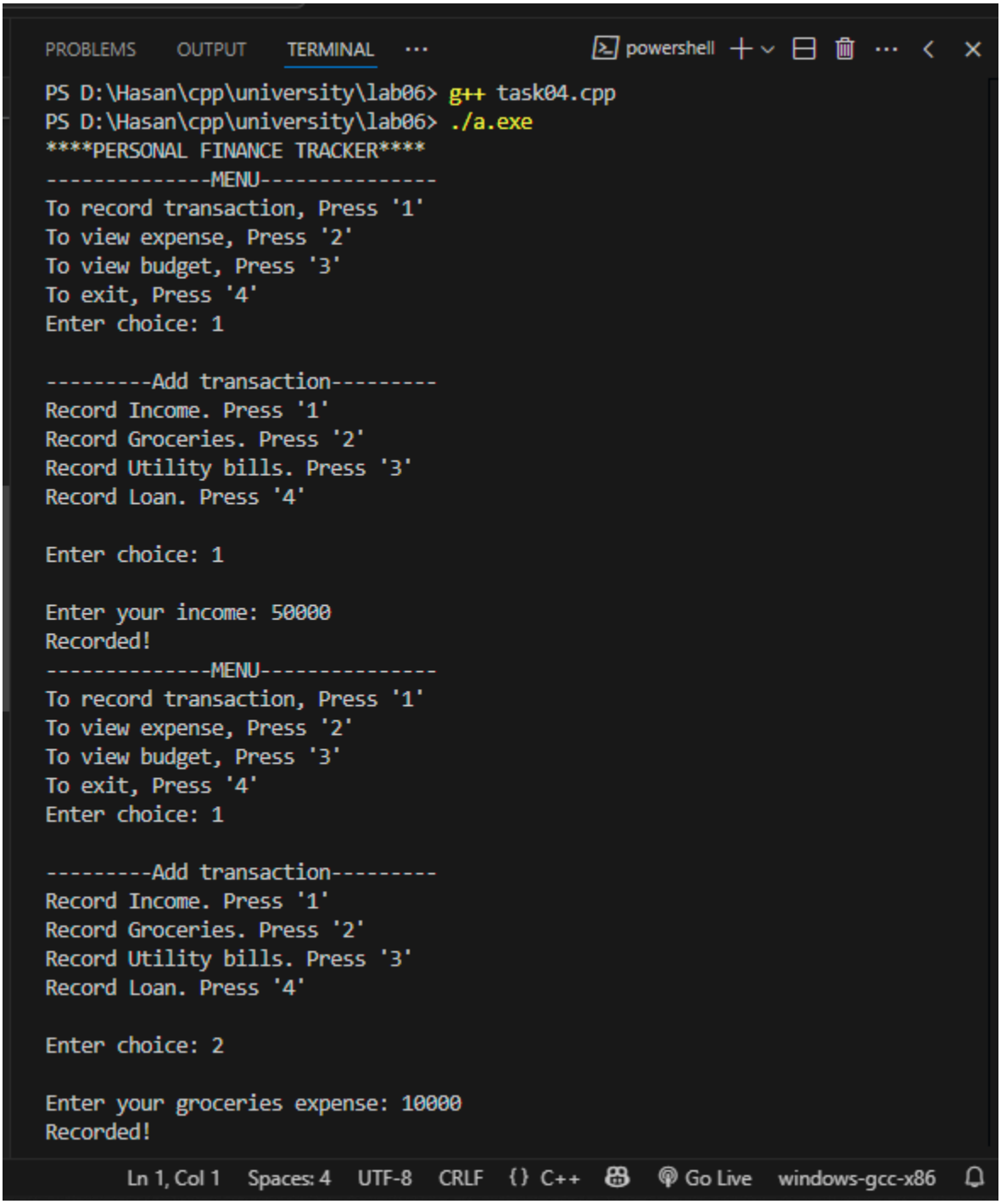
Task 04:

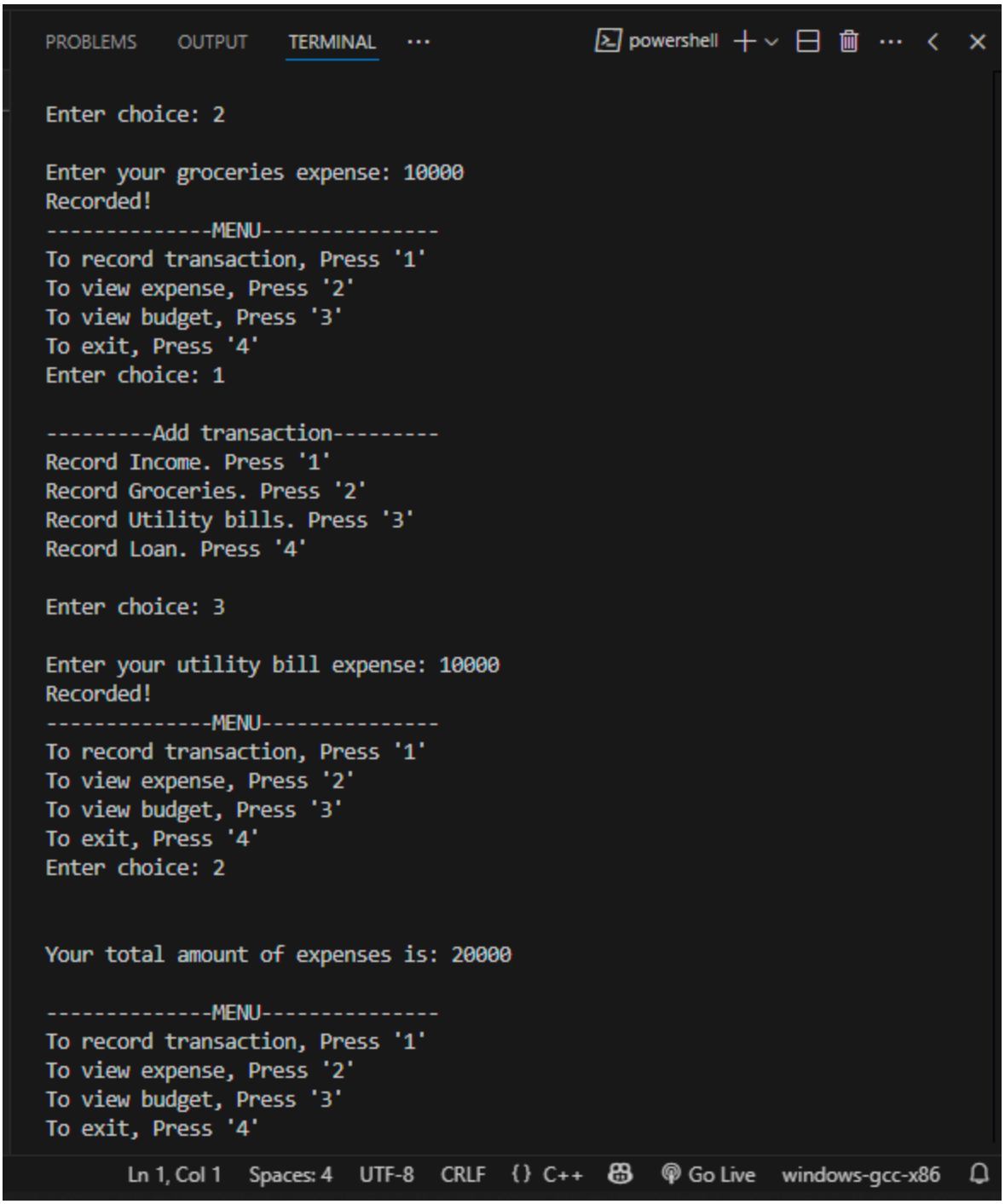
```
/*Personal Finance Tracker

Develop a C++ program for personal finance tracking. The program should allow
users to record financial transactions, categorize expenses, calculate total
expenses and income, and view their budget.
Instructions:
Present a menu with the following options:
1.  Record Transaction: Users can record a transaction by entering the category
and amount.
2.  View Expenses: Display the total expenses recorded.
3.  View Income: Display the total income recorded.
4.  View Budget: Display the budget, calculated as the difference between total
income and total expenses.
5.  Exit: Terminate the program.
When recording a transaction, prompt the user to input the category and amount.
Positive amounts denote income, while negative amounts denote expenses.
Categorize each transaction as income or expense based on the amount entered.
Display the category and amount of each transaction. Calculate and display the
total expenses and income. Calculate and display the budget, which is the
difference between total income and total expenses. Continue displaying the menu
and prompting for options until the user chooses to exit.*/

#include<iostream>
using namespace std;

//function to add and subtract money
void addTransactions(float &income, float &expense){
    float groceries = 0.00, utility = 0.00, loan = 0.00, temp_income = 0.00;
    int choice = 0;
    cout << "---------Add transaction---------"<<endl;
    cout << "Record Income. Press '1' "<<endl;
    cout << "Record Groceries. Press '2' "<<endl;
    cout << "Record Utility bills. Press '3' "<<endl;
    cout << "Record Loan. Press '4' "<<endl;
    cout << endl;
    cout << "Enter choice: ";
    cin >> choice;
    cout << endl;
    if(choice == 1){
        cout << "Enter your income: ";
        cin >> temp_income;
        cout << "Recorded!"<<endl;
    }
```

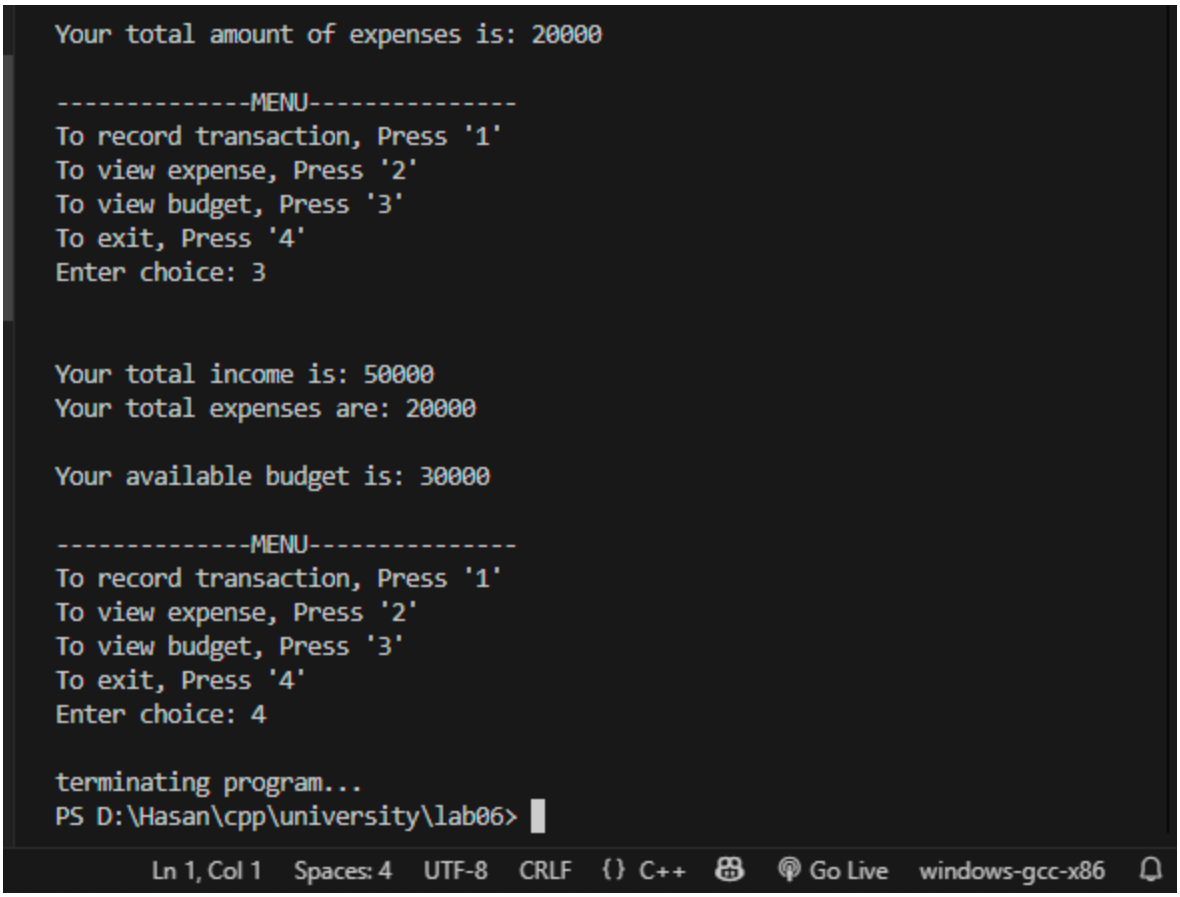
```
    else if(choice == 2){
        cout << "Enter your groceries expense: ";
        cin >> groceries;
        cout << "Recorded!"<<endl;
    }
    else if(choice == 3){
        cout << "Enter your utility bill expense: ";
        cin >> utility;
        cout << "Recorded!"<<endl;
    }
    else if(choice == 4){
        cout << "Enter your loan amount: ";
        cin >> loan;
        cout << "Recorded!"<<endl;
    }
    else{
        cout << "Invalid choice."<<endl;
    }
    income += temp_income;
    expense += (groceries + utility + loan);
}

void viewExpense(float expense){
    cout << endl;
    cout << "Your total amount of expenses is: "<<expense<<endl;
    cout << endl;
}

void viewBudget(float income, float expense){
    float budget = income - expense;
    cout << endl;
    cout << "Your total income is: "<<income<<endl;
    cout << "Your total expenses are: "<<expense<<endl;
    cout << endl;
    cout << "Your available budget is: "<<budget<<endl;
    cout << endl;
}

int main(){
    float income = 0.00, expense = 0.00;
    int choice = 0;
    cout << "****PERSONAL FINANCE TRACKER****"<<endl;
    do{
        cout << "--------------MENU---------------"<<endl;
        cout << "To record transaction, Press '1' "<<endl;
```

```
        cout << "To view expense, Press '2' "<<endl;
        cout << "To view budget, Press '3' "<<endl;
        cout << "To exit, Press '4' "<<endl;
        cout << "Enter choice: ";
        cin >> choice;
        cout << endl;
        if(choice == 1){
            addTransactions(income, expense);
        }
        else if(choice == 2){
            viewExpense(expense);
        }
        else if(choice == 3){
            viewBudget(income, expense);
        }
        else if(choice == 4){
            cout << "terminating program..."<<endl;
        }
        else{
            cout << "Invalid choice"<<endl;
        }
    }while(choice != 4);
}
```

Output:


PROBLEMS
OUTPUT
TERMINAL
powershell
PS D:\Hasan\cpp\university\lab06> g++ task04.cpp
PS D:\Hasan\cpp\university\lab06> ./a.exe
****PERSONAL FINANCE TRACKER****
--------------MENU---------------
To record transaction, Press '1'
To view expense, Press '2'
To view budget, Press '3'
To exit, Press '4'
Enter choice: 1
---------Add transaction---------
Record Income. Press '1'
Record Groceries. Press '2'
Record Utility bills. Press '3'
Record Loan. Press '4'
Enter choice: 1
Enter your income: 50000
Recorded!
--------------MENU---------------
To record transaction, Press '1'
To view expense, Press '2'
To view budget, Press '3'
To exit, Press '4'
Enter choice: 1
---------Add transaction---------
Record Income. Press '1'
Record Groceries. Press '2'
Record Utility bills. Press '3'
Record Loan. Press '4'
Enter choice: 2
Enter your groceries expense: 10000
Recorded!
Ln 1, Col 1
Spaces: 4
UTF-8
CRLF
{} C++
Go Live
windows-gcc-x86


PROBLEMS
OUTPUT
TERMINAL
powershell
Enter choice: 2
Enter your groceries expense: 10000
Recorded!
--------------MENU---------------
To record transaction, Press '1'
To view expense, Press '2'
To view budget, Press '3'
To exit, Press '4'
Enter choice: 1
---------Add transaction---------
Record Income. Press '1'
Record Groceries. Press '2'
Record Utility bills. Press '3'
Record Loan. Press '4'
Enter choice: 3
Enter your utility bill expense: 10000
Recorded!
--------------MENU---------------
To record transaction, Press '1'
To view expense, Press '2'
To view budget, Press '3'
To exit, Press '4'
Enter choice: 2
Your total amount of expenses is: 20000
--------------MENU---------------
To record transaction, Press '1'
To view expense, Press '2'
To view budget, Press '3'
To exit, Press '4'
Ln 1, Col 1
Spaces: 4
UTF-8
CRLF
{} C++
Go Live
windows-gcc-x86


Your total amount of expenses is: 20000
--------------MENU---------------
To record transaction, Press '1'
To view expense, Press '2'
To view budget, Press '3'
To exit, Press '4'
Enter choice: 3
Your total income is: 50000
Your total expenses are: 20000
Your available budget is: 30000
--------------MENU---------------
To record transaction, Press '1'
To view expense, Press '2'
To view budget, Press '3'
To exit, Press '4'
Enter choice: 4
terminating program...
PS D:\Hasan\cpp\university\lab06>
Ln 1, Col 1 Spaces: 4 UTF-8 CRLF {} C++ Go Live windows-gcc-x86