Bank Loan

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Problem statement:

Create a program to calculate EMI based home loan.

Introduction:

This application designed to calculate the Equated Monthly Instalment (EMI) for a home loan. The EMI is a fixed payment made by a borrower to a lender at a specified date each calendar month. It includes both the principal and the interest amount.

The program leverages the power of Python to create a user-friendly interaction where the user inputs essential loan details such as the loan amount (principal), annual interest rate, and loan duration. It then computes the monthly EMI using a mathematical formula, providing accurate and quick results.

Implementation:

```
def calculate_emi(principal, annual_interest_rate, time_in_years):
  rate_per_month = (annual_interest_rate / 100) / 12  # Convert annual rate to monthly rate and divide by 100 for percentage
  total_months = time_in_years * 12
   emi = (principal * rate_per_month * (1 + rate_per_month) ** total_months) / ((1 + rate_per_month) ** total_months - 1)
  return emi
print("WELCOME TO HAHA BANK")
print("enter information needed for your HOME LOAN")
principal = int(input("Enter principal: "))
annual_interest_rate = float(input("Enter annual interest rate (in percentage): "))
loan_duration_years = int(input("Enter loan duration in years: "))

monthly_emi = calculate_emi(principal, annual_interest_rate, loan_duration_years)
print(f"Your monthly EMI is: {monthly_emi:.2f}")
print("THANK YOU FOR TAKING LOAN AT OUR BANK")
print("VISIT AGAIN")
```

Explanation:

Formula Used for EMI Calculation:
The formula used to calculate EMI is:

$$EMI = \frac{P \cdot r \cdot (1+r)^n}{(1+r)^n - 1}$$

- P: Principal loan amount
- r: Monthly interest rate, derived from annual interest rate
- n: Total number of monthly instalments (loan duration in years multiplied by 12)

 Components of the Code:

- Function Definition:
  The calculate_emi function encapsulates the logic for EMI calculation. It ensures that the formula is applied correctly to calculate the monthly instalment.
- User Input:
  The program collects the principal amount, annual interest rate, and loan duration from the user, ensuring a dynamic and customizable experience.
- Result Display:
  The calculated EMI is displayed with two decimal precisions, making it easier to understand the result.

 Workflow:

- Greet the user and explain the purpose of the program.
- Collect input values.
- Calculate the EMI using the provided inputs.
- Display the EMI with an appropriate message.

Result:

```
WELCOME TO HAHA BANK
enter information needed for your HOME LOAN
Enter principal: 100000
Enter annual interest rate (in percentage): 5
Enter loan duration in years: 4
Your monthly EMI is: 2302.93
THANK YOU FOR TAKING LOAN AT OUR BANK
VISIT AGAIN
```

Takeaways from the Project:

1. **Understanding**:
   This project provides insights into how loan EMIs are calculated in financial institutions.
2. **Python Programming Skills**:
   - Use of functions to encapsulate logic.
   - Input handling for dynamic user interaction.
   - Mathematical operations and the use of exponents in Python.
3. **Real-world_Applications:**
   The program is a practical example of how programming can simplify financial calculations and enhance user experience.
4. Adding user-friendly messages like greetings and a thank-you note improves the overall interaction.

Conclusion:

This project showcases how Python can be used to create a simple yet effective tool for calculating home loan EMIs. It highlights the importance of structured programming and accurate computations in solving real-world problems. The program enhances user experience with interactive inputs and clear results, making financial planning more accessible.