**Program source Code:**

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#LAB\_03\_Loops and repetition - Bank Account Activity  
#A20526883  
#6/19/23 13:13 PM  
print("GURUTEJA\_KANDERI\nA20326883\nLAB\_03:BANK ACCOUNT ACTIVITY")  
  
# Define the correct PIN  
correct\_pin = "1234"  
max\_attempts = 3 # Allows the user to attempt to enter the PIN 3 times Max if it is wrong.  
print("WELCOME TO THE BANK OF IIT") # Display the welcome message  
  
# Prompt user to enter the PIN  
for attempt in range(max\_attempts, 0, -1):  
 pin = input("Enter your PIN: ")  
 if pin == correct\_pin:  
 print("PIN accepted. Access has been granted.") # Allows user to enter the Initial amount and interest rate.  
 break  
 else:  
 print(f"Invalid PIN, Please enter the correct PIN. {attempt-1} attempts remaining.")  
else:  
 print("Max attempts have been reached. Exiting program. Thank you!")  
  
# Prompt the user for the initial bank balance and annual interest rate  
bank\_balance = float(input("Enter an initial bank balance: "))  
  
interest\_rate\_input = input("Enter the annual interest rate: ")  
if "%" in interest\_rate\_input:  
 # Convert the percentage to a decimal so that it recognizes when a person enters "%" instead of decimals.  
 interest\_rate = float(interest\_rate\_input.strip("%")) / 100  
else:  
 # Assume the input is already a decimal  
 interest\_rate = float(interest\_rate\_input)  
  
# Calculate and display the new balance for each month over a 12-month period  
print("\nMonth #\tInterest Amt\tBalance")  
for month in range(1, 13):  
 interest = bank\_balance \* (interest\_rate / 12)  
 bank\_balance += interest  
 print(f"{month}\t\t{interest:.2f}\t\t\t{bank\_balance:.2f}")  
  
# Calculate and print the total amount after 12 months  
total\_amount = bank\_balance  
print(f"\nTotal amount after 12 months: {total\_amount:.2f}") #printing the final balance

**OUTPUT:**

**A screenshot of a computer

Description automatically generated**

**InvalidPIN:**

**A screenshot of a computer program

Description automatically generated with medium confidence**

**Entering the interest rate value in percentage (usually decimals) for better flexibility:**

**A screenshot of a computer

Description automatically generated**

1. **Explain how looping techniques (repetitive program control) are used in this program application.**

We usually use looping techniques where some tasks should be checked and executed multiple times in a program.

**Authentication:** In this program we used a loop to make sure the password or PIN entered is correct. To validate this, we used a looping technique. This loop runs until a desired condition is satisfied. If it is not satisfying it will execute the else loop.

**Balance Updating Loop after interest calculation:**

In the final loop, after calculating the interest rate the new balance should be updated using the for loop which is a repetitive program.

1. **Loops often incorporate accumulating variables which amass a sum that builds every time the loop is executed. Did your application include any accumulating variables? What amount(s) were accumulated?**

The program has the accumulating variable which is “bank\_balance”.

This accumulating variable is used while initiating the bank balance provided by user/customer.

Inside the FOR loop, it iterates 12 times, and takes the accumulating variable to calculate the each month interest rate. After each iteration it will successfully add the balance to the final value of bank\_balance.

This accumulating variable helps to track the bank balance and the interest will applied for each month successfully.

1. **Prior to their use in a looping structure, accumulating variables are often declared and initialized. For an accumulating sum variable, what is the typical value for which the variable is initialized?**

In our program the value for an accumulating sum variable is **zero**, but in our program it should be entered by the customer which is initial deposit. Where I entered 2000. The purpose of bank balance is to accumulate the balance over time by adding the calculated interest each month.

1. **Which datatype is the following variable associated with?**

**success = False**

The Boolean is used to check the condition is true or false.

The Boolean datatype represents a logical value and can have two possible values: True or False. It is commonly used to evaluate conditions and control the flow of a program based on the truth or falsity of those conditions.

In the given code, the success variable is initialized with the value False, indicating that the associated condition or operation is currently evaluated as false. The value of success can be updated or modified based on the program's logic and the outcome of certain operations.

1. **What have you learned from performing and coding for this lab assignment?**

I have learned about Looping techniques, Authentication or PIN Validation concept and Input Validation and Error handling.

**Looping Techniques:**

In this program we used for loop to iterate over the range of attempts to validate the PIN. The maximum permissible we allowed is three times.

While loop: It used to check the provided the PIN is matching with the existing user PIN.

**Authentication**: Authentication in the program involves verifying a user's identity through a PIN before granting access to the rest of the functionality.

**Exception/ Error Handling:**

In the console if user provides a wrong input like characters instead of integers , then the program should throw an message to enter the numerics instead of characters.