Assignment #4 – Larry’s Loans

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**The Math:**

**Constants:**

Given:

Credit rating table:

A – 3.5%

B – 4%

C- 6.5%

D-8%

E-10%

**Questions:**

1. Calculate per period interest rate (r):

Per period interest rate (Monthly) = (Rate / 100) \* 12

Per period interest rate (Bi-weekly) = ( (Rate / 100) \* 26

1. Calculate total number of periods (n):

# of periods (monthly) = 12 \* number of years

# of periods (bi-weekly) = 26 \* number of years

1. Calculate and loan payment using formula:

A=P((r(1+r)^n) / ((1+r)^n -1))

Where:

A = payment amount per period

P = initial principle (loan amount) – From step 1

r = interest rate per period

n = total number of payments or periods

1. Calculate per period interest payment:

Interest payment per period = ((new\_balance/# of Payments) \*Interest rate per period )

**Pseudocode:**

1. Have user enter loan amount.
2. Have user enter the client credit rating (a-e) – as per table.
3. Have user enter number of years for the loan.
4. Have user enter monthly or bi-weekly payments.
5. display interest rate in % - as per table and calculate per period rate (r).

Per period interest rate (r):

(Rate / 100) \* 12 – Monthly

(Rate / 100) \* 26 – Bi-weekly

1. Calculate and display appropriate loan payment using formula:

A=P((r(1+r)^n) / ((1+r)^n -1))

Where:

A = payment amount per period

P = initial principle (loan amount) – From step 1

r = interest rate per period

n = total number of payments or periods

Calculate total number of periods (n):

12 \* number of years – Monthly

26 \* number of years – Bi-weekly

1. Display payment schedule including: Payment number, Current Balance, Interest for the period, Payment amount, New balance.
2. Display the total interest.

**Code:**

#Program: Assignment #4

#Written By: Andrew McDonald (W0426368)

#Date written: Started - 25 Feb 2019

#Purpose: Create a program to accurately do loan calculations for Larry's Loan

#Interest rate calculation function

def interest\_rate(Credit\_Rating):

#Take credit rating input and output interest rate

if Credit\_Rating == 'a':

Int\_rate = 0.035

elif Credit\_Rating == 'b':

Int\_rate = 0.04

elif Credit\_Rating == 'c':

Int\_rate = 0.065

elif Credit\_Rating == 'd':

Int\_rate = 0.08

elif Credit\_Rating == 'e':

Int\_rate = 0.1

#Calculate percent rate from interest rate

Pct\_rate = Int\_rate \* 100

#Display Interest rate

print('Interest rate:', format(Pct\_rate, ',.2f'), '%')

return Int\_rate

#Loan payment calculation function

def loan\_payment(principle, years, freq, rate):

#Loan payment formula: A=P((r(1+r)^n) / ((1+r)^n -1))

#Where:

#A = payment amount per period

#P = initial principle (loan amount)

#r = interest rate per period

#n = total number of payments or periods

#calculate r and n

if freq == 'm': #monthly

rate\_perperiod = float(rate/100) / 12

payments = float(round(12 \* years))

elif freq == 'b': #bi-weekly

rate\_perperiod = float(rate/100) / 26

payments = float(round(26 \* years))

#The formula in action

Loan\_Payment = float((principle\*((rate\_perperiod\*(1+rate\_perperiod)\*\*payments) / ((1+rate\_perperiod)\*\*payments -1))))

return Loan\_Payment, payments

#Payment Schedule Function

def payment\_schedule(Principle, period\_rate, payment, Num\_Payments):

line = chr(124) #vertical line

#Set variables to baseline

Payment\_Number = 1

balance = Principle

period\_interest = float((balance/Num\_Payments) \* period\_rate)

initpayment = payment

new\_balance = balance - payment

total\_interest = period\_interest

#Display payment schedule

print()

print('----------------------------- Payment Schedule ---------------------------')

print('==========================================================================')

print(line, 'Payment:', line, 'Current Balance:\t', line, 'Interest:', line, 'Payment:\t', line, ' Balance:\t', line)

print('==========================================================================')

print(line, Payment\_Number, '\t ', line, '$', format(balance, ',.2f'), '\t', line, '$', format(period\_interest, ',.2f'), ' ', line, '$', format(initpayment, ',.2f'), '\t', line, '$', format(new\_balance, ',.2f'), '\t', line)

print('--------------------------------------------------------------------------')

#Loop until balance = 0

while new\_balance >= 0:

#increment payment number

Payment\_Number += 1

#reset balance to previous new balance

balance = new\_balance

#calculate new balance after payment

new\_balance = balance - payment

#calculate period interest

interestpp = ((new\_balance/Num\_Payments) \* period\_rate)

#increment total interest

total\_interest += interestpp

print(line, Payment\_Number, '\t ', line, '$', format(balance, ',.2f'), '\t\t', line, '$', format(interestpp, ',.2f'), ' ', line, '$', format(initpayment, ',.2f'), '\t', line, '$', format(new\_balance, ',.2f'), '\t', line)

print('--------------------------------------------------------------------------')

#End loop

#Add initial interest to looped interest amounts

total\_interest += period\_interest

#Display total interest on the loan

print()

print()

print('Total interest on the loan is: $', format(total\_interest, ',.2f'))

#Main function

def main():

print('Larry\'s Loans')

print()

print()

#Request inputs from user

Principle = float(input('Enter the principle amount of the loan:'))

Credit\_Rating = input('Enter the client credit rating (a-e):')

Years = int(input('Enter the number of years for the loan'))

Payment\_Freq = input('Select \'m\' for monthly payments -or- \'b\' for bi-weekly payments')

print()

#Call interest rate function

Int\_rate = interest\_rate(Credit\_Rating)

print()

#Display Loan Payment

Loan\_Payment, Payments = (loan\_payment(Principle, Years, Payment\_Freq, Int\_rate))

print('The loan payments will be $', format(Loan\_Payment, ',.2f'))

#Display Payment Schedule

payment\_schedule(Principle, Int\_rate, Loan\_Payment, Payments)

#display end of program

print()

print('End of program')

#Call the main

main()