Problem 1

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Problem Set due Sep 15, 2022 16:30 PDT Completed

Problem 1 - Paying Debt off in a Year

10.0/10.0 points (graded)

Write a program to calculate the credit card balance after one year if a person only pays the minimum monthly payment required by the credit card company each month.

The following variables contain values as described below:

1. `balance` - the outstanding balance on the credit card
2. `annualInterestRate` - annual interest rate as a decimal
3. `monthlyPaymentRate` - minimum monthly payment rate as a decimal

For each month, calculate statements on the monthly payment and remaining balance. At the end of 12 months, print out the remaining balance. Be sure to print out no more than two decimal digits of accuracy - so print

```
Remaining balance: 813.41
```

instead of

```
Remaining balance: 813.4141998135
```

So your program only prints out one thing: the remaining balance at the end of the year in the format:

```
Remaining balance: 4784.0
```

A summary of the required math is found below:

Monthly interest rate= (Annual interest rate) / 12.0
Minimum monthly payment = (Minimum monthly payment rate) x (Previous balance)
Monthly unpaid balance = (Previous balance) - (Minimum monthly payment)
Updated balance each month = (Monthly unpaid balance) + (Monthly interest rate x Monthly unpaid balance)

We provide sample test cases below. We suggest you develop your code on your own machine, and make sure your code passes the sample test cases, before you paste it into the box below.

Test Cases to Test Your Code With. Be sure to test these on your own machine - and that you get the same output! - before running your code on this webpage!

Problem 1 Test Cases

Note: Depending on where you round in this problem, your answers may be off by a few cents in either direction. Do not worry if your solution is within +/- 0.05 of the correct answer. Be sure to test these on your own machine - and that you get the same output! - before running your code on this webpage!

Test Cases:

```
              # Test Case 1:
              balance = 42
              annualInterestRate = 0.2
              monthlyPaymentRate = 0.04

              # Result Your Code Should Generate Below:
              Remaining balance: 31.38

          # To make sure you are doing calculation correctly, this is the
          # remaining balance you should be getting at each month for this example
            Month 1 Remaining balance: 40.99
            Month 2 Remaining balance: 40.01
            Month 3 Remaining balance: 39.05
            Month 4 Remaining balance: 38.11
            Month 5 Remaining balance: 37.2
            Month 6 Remaining balance: 36.3
            Month 7 Remaining balance: 35.43
            Month 8 Remaining balance: 34.58
            Month 9 Remaining balance: 33.75
            Month 10 Remaining balance: 32.94
            Month 11 Remaining balance: 32.15
            Month 12 Remaining balance: 31.38
```

```
              Test Case 2:
              balance = 484
              annualInterestRate = 0.2
              monthlyPaymentRate = 0.04

              Result Your Code Should Generate Below:
              Remaining balance: 361.61
```

```
# Paste your code into this box
i = 1

while i <= 12:
    monthlyInterestRate = annualInterestRate/12.0
    minimumMonthlyPayment = balance * monthlyPaymentRate
    unpaidBalance = balance - minimumMonthlyPayment
    updatedBalance = unpaidBalance + monthlyInterestRate * unpai
    balance = updatedBalance
    i += 1
print("The Remaining Balance is:" + " " + str(round(balance,2)))
```

Press ESC then TAB or click outside of the code editor to exit

Correct

Test results

See full output

CORRECT

See full output

Hints

Only two decimal digits of accuracy?

Use the `round` function at the end of your code!

How to think about this problem?

To help you get started, here is a rough outline of the stages you should probably follow in writing your code:

- For each month:
  - Compute the monthly payment, based on the previous month's balance.
  - Update the outstanding balance by removing the payment, then charging interest on the result.
  - Output the month, the minimum monthly payment and the remaining balance.
  - Keep track of the total amount of paid over all the past months so far.
- Print out the result statement with the total amount paid and the remaining balance.

Use these ideas to guide the creation of your code.

Important

Only hit "Check" once per submission. You only get 30 checks per problem.

** Our automatic grader may take a few minutes to respond with feedback. If you hit "Check" multiple times, you will lose a check for every press of the button.

** If you're unfamiliar with how our autograder works, first try out one of the infinite check problems in the Functions lecture sequence.

** Please be judicious with your checks, as we are unable to give you more than 30 checks. However this should be more than sufficient: if you do your code development in your local environment, and ensure you can pass our test cases, you should not require more than a few checks once you paste your working, tested code into our code box.

If you believe you have correct code but it is marked incorrect after clicking "Check"...

** After you submit your code, you can see every test case the graders runs on your code. They compare what your code outputs with what our answer code is supposed to output. Click the small link titled "See Full Output" below the Test Results header.

"Staff Debug: L397 Error" means your code has an infinite loop...

** Clicking Check may give you the error:
`There was a problem running your solution (Staff debug: L379).` `We couldn't run your solution (Staff debug: L397).` .
This means your code is taking too long or has an infinite loop. Test your code with more unique test cases, such as very large or very small values.

Do not define your own values

** For problems such as these, do not include `input` statements or define variables we told you would be given. Our automated testing will provide values for you - so write your code in the following box assuming those variables are already defined. The code you paste into the following box **should not** specify the values for the variables `balance` , `annualInterestRate` , or `monthlyPaymentRate`

Submit You have used 1 of 30 attempts Save Show answer

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- *** SPOILER *** Question 1 — Please see my code below. It works on both examples with the exception of the ro... — 8
- test cases are correct but the answer is not — Good day. Two test cases gavw the correct output, but the answer is not correct, ... — 2
- ***SPOILER*** It's possible to solve this without recursion or iteration **SPOILER*** — It's possible to solve this questions without iteration OR recursion if we do some al... — 2
- Are we not allow to solve problem using a recursive function? — I keep getting this error message. The test will NOT be able to call any functions t... — 3
- Output Clarification — The test solutions show different outputs. The first shows a balance at the end of ... — 3
- If anyone using f-strings: it seems they are not supported in the grader. — Title self explanatory. I tried with f-strings but it seems they are available just in P... — 5