Problem 2

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Problem 2 - Paying Debt Off in a Year

15.0 points possible (graded)

Now write a program that calculates the minimum **fixed** monthly payment needed in order pay off a credit card balance within 12 months. By a fixed monthly payment, we mean a single number which does not change each month, but instead is a constant amount that will be paid each month.

In this problem, we will *not* be dealing with a minimum monthly payment rate.

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

The program should print out one line: the lowest monthly payment that will pay off all debt in under 1 year, for example:

```
Lowest Payment: 180
```

Assume that the interest is compounded monthly according to the balance at the end of the month (after the payment for that month is made). The monthly payment must be a multiple of $10 and is the same for all months. Notice that it is possible for the balance to become negative using this payment scheme, which is okay. A summary of the required math is found below:

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

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!

Click to See Problem 2 Test Cases

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 = 3329
annualInterestRate = 0.2

Result Your Code Should Generate:
-------------------
Lowest Payment: 310
```

```
Test Case 2:
balance = 4773
annualInterestRate = 0.2

Result Your Code Should Generate:
-------------------
Lowest Payment: 440
```

```
Test Case 3:
balance = 3926
annualInterestRate = 0.2

Result Your Code Should Generate:
-------------------
Lowest Payment: 360
```

```
# Paste your code into this box

```

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

Unanswered

Hints

Hint: How to think about this problem?

- Start with $10 payments per month and calculate whether the balance will be paid off in a year this way (be sure to take into account the interest accrued each month).
- If $10 monthly payments are insufficient to pay off the debt within a year, increase the monthly payment by $10 and repeat.

Hint: A way of structuring your code

- If you are struggling with how to structure your code, think about the following:
  - Given an initial balance, what code would compute the balance at the end of the year?
  - Now imagine that we try our initial balance with a monthly payment of $10. If there is a balance remaining at the end of the year, how could we write code that would reset the balance to the initial balance, increase the payment by $10, and try again (using the same code!) to compute the balance at the end of the year, to see if this new payment value is large enough.
  - I'm still confused!

    A good way to implement this problem will be to use a loop structure. You may want to refresh your understanding of **while** loops. Think hard about how the program will know when it has found a good minimum monthly payment value - when a good value is found, the loop can terminate.

- Be careful - you don't want to overwrite the original value of `balance`. You'll need to save that value somehow for later reference!