# *Credit Card Payoff*

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## *Problem.*

You are going to create a program to calculate how long it will take to payoff a credit card. Prompt for the current credit card balance, the Annual Percentage Rate (APR), and the amount of money you can pay monthly. Return the number of months to pay off the card with these parameters. See below for the formula for the payoff.

This is the basic homework problem for you to solve. This is the minimum set of specifications in order to obtain a 'C' or higher grade (This is before any late penalty).

## *Constraints.*

- Enter the APR, but convert it to daily rate internally.
- Keep the Input, Transformation, and Output sections of your code separate.
- Use one of the C/C++ libraries for the `log()` function.

These are additional requirements on how you are to do the assignment. These are also required, but they apply to more then one specification task - and are included here to stand out.

## *Bonus Features.*

- Add a novel programmer defined feature you have devised (counts as 2 bonuses!).
- Put the calculation in a function and return months to `main()` for output.
- Input the client's name and print this along with the results.

This is how you can go after higher grades. These are additional features you can add to the program. Adding 1 bonus is required to get you to a Highly Competent solution, 4 are necessary for a Sophisticated solution.

## *Sample Run.*

```
What is your balance? 5000
What is the APR on the card (as a percent)? 12
What is the monthly payment you can make? 100

It will take you 70 months to pay off this card.
```

## *Due Date and Turn In.*

This assignment is due on Saturday by 11:59 PM on the week it appears under Hw Due in your syllabus. Remember, online classes run from the Sunday shown on the Class Schedule to the following Saturday.

Turn homework in by uploading to the appropriate D2L Dropbox folder. You do not need to put your name in the **filename**; Homework1, 2 whatever will be just fine. D2L appends student information to the files when I download them, so I will see all this information automatically. I will review your work using the rubric at the end of the assignment.

Do NOT save your code as a .cpp file! Save it as a .txt file instead. Don't zip or otherwise compress your files. I will be able to read them once you get them on D2L. I have a script which converts the files to .cpp and automatically executes them. this script also runs other tests with them as well.

*Using the Work of Others.*

This is an individual assignment, you may use the Internet and your text to research it, but I expect you to work alone. Copying code from someone else and turning it in as your own is plagiarism. However, you **may** discuss code and the assignment. I have opened discussion groups in D2L to do this. I will monitor this, but not interfere. D2L will check your code against a database of other assignments. It tells me how similar your code is to someone else's. I consider isomorphic homework to be plagiarism. Do your own work.

*Discussion.*

The hardest part of this assignment is getting the formula right. Take your time and break it up into parts - don't try to fit the formula on one line. This will make it easier to debug as well.

The formula for this is

$$n = -\frac{1}{30} \times \frac{\log\left(1 + \frac{b}{p}\left(1 - (1+i)^{30}\right)\right)}{\log(1+i)}$$

where

- $n$ is the number of months.
- $i$ is the daily rate (APR divided by 365).
- $b$ is the balance.
- $p$ is the monthly payment.

*Rubric for Evaluating this Assignment.*

| Grading Rubric | | | | | |
|---|---|---|---|---|---|
| | Sophisticated | Highly Competent | Competent | Not Yet Competent | Unacceptable |
| Solution Fit with Client Needs | As Highly Competent, but also successfully performs 3 bonus features (for a total of 4). | As Competent but also successfully performs 1 bonus feature also | Successfully accomplishes all specifications and constraints with the test data set. | Accomplishes some specifications and/or constraints with test data set. May have logic errors. | Does not meet any specifications or constraints. May not compile. |
| User Friendliness | ~ Code has program greeting to introduce itself.<br>~ Program identified input expected from user. | ~ Code has program greeting to introduce itself.<br>~ Program identified input expected from user. | ~ Code has program greeting to introduce itself.<br>~ Program identified input expected from user. | Program requires omniscient users to divine expected input(s). | Input prompts are just a blinking cursor. |
| Comments and Documentation | ~ Proper program header.<br>~ Function's properly commented.<br>~ Comments identify blocks of logically different code, and/or, modifications to formula's are noted.<br>~ Good use of whitespace. | ~ Proper program header.<br>~ Function's properly commented. | ~ Proper program header. | 1 Line comment header and/or comments don't match code. | Missing program header, and/or, missing or incoherent comments. |