

LOAN PAYMENTS REVISITED

Write a program similar to project 3, but use C++ functions as necessary. The input file fields are still the same: a loan amount (in dollars), monthly interest rate (in percent), monthly salary (in dollars), salary proportion allocated for loan payments (as a percentage of salary), and a maximum term length (in number of months). The program will take in several “loan plans” described by these parameters and then output an assessment on the feasibility of each loan plan (no monthly interest and payment report this time).

As before, the input file will be named “Amounts.txt” and the first line in that file will be header information which your program should ignore. The file will continue with a list of loan plan data, one loan plan per line. Each line will contain **tab**-separated (`\t`) values, in the following order:

- name of the plan (a string value), for example: Plan One
- loan amount (a double value), for example: 5000.00
- monthly interest rate (a double value, followed by a % character), for example: 1.2%
- monthly salary (a double value), for example: 3600.00
- salary proportion (an int value, followed by a % character), for example: 25%
- maximum term length (an int value), for example: 12

Monthly interest is computed by multiplying the beginning balance for that month by the monthly interest rate. Monthly payments are fixed for each month and this fixed amount is computed by multiplying the salary amount by the specified proportion. There is one possible exception: the last monthly payment may be less than this fixed amount if the beginning balance plus interest for that month is less than the amount. Ending balance for the month is simply the beginning balance plus the interest minus the payment, and is the beginning balance for the next month.

The output file should be named “Results.txt” and should contain a one-line message for each plan. There are three possible cases:

- the plan is feasible; the number of months required to pay off the loan is less than the indicated maximum term length,
- the loan can be paid off but the maximum term length indicated is not sufficient,
- the loan cannot be paid off because the monthly interest exceeds the monthly payment allocated.

The example provided in the next section describes exactly what should be printed out, for each of these cases.

You may still assume that the input file has no format errors but it may contain *logical* errors, based on particular rules. Check for the following cases:

- loan amount should be at least \$500
- monthly interest rate should be positive and be at most 10%
- monthly salary should be at least \$1000
- salary proportion should be positive and be at most 50%
- maximum term length should be positive and be at most 60 months

Print an error message instead of an assessment for a loan plan that violates any of the above rules. In the event that multiple rules are violated, issue an error message for the first violated rule only. The example provided in the next section describes the error message that you should print out, for each case.

This program is primarily an exercise in C++ functions. You are required to have a function that returns the number of months required to pay off a loan given loan and salary parameters. In addition, you are expected to have separate functions that handle input and output (see calculator example in the course notes). Individual functions should generally be no more than a page of code (50 lines) long, and often occupy much less than a page.

Sample input and corresponding output:

Plan Name	Loan Amount	Interest	Salary	Proportion	Month Limit
Big Loan	50000.00	0.5%	5000	20%	12
Small Loan	500.00	1%	3000	15%	3
Low Salary	5555.00	2%	1000	10%	5
Bad Plan 1	200.00	1%	1000	50%	20
Bad Plan 2	5000.00	12%	10000	20%	5
Bad Plan 3	5000.00	0.1%	800	5%	65
Bad Plan 4	2000.00	0.25%	2000	60%	50
Bad Plan 5	1000.00	0.25%	8000	3%	70
A Good Plan	1000.00	0.25%	8000	3%	5

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Programmer: <put your name here>
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Big Loan:      58 months are required to pay off this loan; 12 months insufficient.
Small Loan:    2 months are required to pay off this loan; loan plan is feasible
Low Salary:    It is impossible to pay off this loan; monthly interest > monthly payment
Bad Plan 1:    Loan amount should be at least $500
Bad Plan 2:    Interest should be positive and not exceed 10%
Bad Plan 3:    Monthly salary should be at least $1000
Bad Plan 4:    Salary proportion should be positive and not exceed 50%
Bad Plan 5:    Term limit should be positive and not exceed 60 months
A Good Plan:   5 months are required to pay off this loan; loan plan is feasible
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Submitting your program:

Your program should follow the usual documentation and submission standards: each function must include a header comment and helpful inline comments explaining key portions of your code. Include the pledge statement in your program header. Refer to “Elements of Programming Style” available in the course website for some guidelines. As usual, submissions will be handled and auto-graded through the curator system, but will be hand-graded for compliance and documentation by the GTA.