

CS108 Assignment 3: Loan Payment Calculator

DUE DATE: TUESDAY 5 OCTOBER 2004

Learning Objective

This assignment will help you practice writing a java application. Specifically, you will use input and output, control statements for repetition, and some simple arithmetic. (There is one "difficult" algebraic operation, for which I'll provide the code if you want it.)

Problem Statement

Consumers often buy large-ticket items (such as cars) on credit (e.g. a car loan). The payments on the loan are the same every month, and are calculated based on the initial purchase amount, the interest rate (in percentage points) and the length of the loan (in years). The payment is calculated by the following financial equation:

$$payment = \frac{monthly_rate \times amount}{\left[1 - \frac{1}{(1 + monthly_rate)^{months}}\right]}$$

where *payment* is the equal monthly payment,
amount is the original loan amount,
monthly_rate = (annual interest rate / 100) / 12, and
months = years * 12.

(**This is the complicated calculation, and I'll give you the code for it if you ask.)

Each monthly payment includes both principal and interest. An amortization table shows how much of each payment is going to principal and how much is going to interest, and how much of the original loan amount is left over after the payment. At each month, the following calculations are used to find the portion of the payment which is interest, and to update the loan balance:

interest = *balance* * *monthly_rate*
balance = *balance* + *interest* - *payment*

Your application should:

- prompt the user for the 3 required inputs (loan amount, annual interest rate, and loan term in years)
- calculate the monthly loan payment
- use a loop to print out an amortization table with one line for each month; the table must show the month number, the interest amount for the month, the payment amount (always the same), and the updated balance after the payment is made. See other side for a sample amortization table.

You should do all the work in one class. You must create separate methods for each of the above 3 operations, and all variables should be members of the class. Think carefully about which type of variable to use for dollars, percentages, and months/years.

Deliverables

Just the java code file(s) (*.java).

QUESTIONS: EMAIL ME: azs@aaronestevens.net

Loan Payment and Amortization Table

Amount	\$10,000.00
Term (years)	2
Annual interest rate	4.90%
Monthly payment	\$ 438.27

Period	Interest	Payment	Balance
1	\$ 40.83	\$(438.27)	\$9,602.57
2	\$ 39.21	\$(438.27)	\$9,203.51
3	\$ 37.58	\$(438.27)	\$8,802.83
4	\$ 35.94	\$(438.27)	\$8,400.50
5	\$ 34.30	\$(438.27)	\$7,996.54
6	\$ 32.65	\$(438.27)	\$7,590.93
7	\$ 31.00	\$(438.27)	\$7,183.66
8	\$ 29.33	\$(438.27)	\$6,774.72
9	\$ 27.66	\$(438.27)	\$6,364.12
10	\$ 25.99	\$(438.27)	\$5,951.84
11	\$ 24.30	\$(438.27)	\$5,537.88
12	\$ 22.61	\$(438.27)	\$5,122.23
13	\$ 20.92	\$(438.27)	\$4,704.88
14	\$ 19.21	\$(438.27)	\$4,285.82
15	\$ 17.50	\$(438.27)	\$3,865.06
16	\$ 15.78	\$(438.27)	\$3,442.57
17	\$ 14.06	\$(438.27)	\$3,018.36
18	\$ 12.32	\$(438.27)	\$2,592.42
19	\$ 10.59	\$(438.27)	\$2,164.74
20	\$ 8.84	\$(438.27)	\$1,735.31
21	\$ 7.09	\$(438.27)	\$1,304.13
22	\$ 5.33	\$(438.27)	\$ 871.19
23	\$ 3.56	\$(438.27)	\$ 436.48
24	\$ 1.78	\$(438.27)	\$ 0.00