



CSC 135, Spring 2020
Dr. Urska Cvek
Midterm Project

Assigned: 02-13-2020
Due: 02-29-2020 by 7 am

You are allowed to work on this as a pair project. If you choose to work in a pair, please, send me an email with both student names (cc-ing both of your LSUS emails).

I need to approve you before you can start working on it.

By submitting this work you testify that all work is your own!

MORTGAGE COMPARATOR

Write an application that compares loans with various interest rates. You can assume that the rate is compounded monthly. You will need the following:

- Prompt the user for a *double* value representing the annual interest rate, for example, 5 would represent 5%, 7.3 would represent 7.3%
- Prompt the user for the number of years the mortgage will be held (typical sample input here is 10, 15 or 30 or something else)
- Prompt the user for a number representing the mortgage amount borrowed from the bank
- Calculate the monthly payment using the following formulas:

$$\text{MonthlyPayment} = (mIR * M) / \left(1 - \left(1 / (1 + mIR)^{(12 * nOY)}\right)\right), \text{ where}$$

mIR = monthly interest rate = annual interest rate / 12

nOY = number of years

M = mortgage amount (borrowed)

Your program is going to take the annual interest rate that was read from the user, and add and subtract 1% to/from it. For example, if the user entered 5%, the span of annual interest rates would be 4% to 6%.

Your program should compare loans with various interest rates, for the span of the 2% interest rates, with increments of 0.5%. Your program should first calculate the *MonthlyPayment* as per the above formula, following with the total pay. You are to output a summary of the mortgage problem, as follows:

- The mortgage amount in dollars
- The number of years a mortgage will be held

Following in tabular format with

- The annual interest rate in percent notation
- The monthly payment in dollars, with only two significant digits after the decimal point
- The total payment over the years, with only two significant digits after the decimal point

- The overpayment, i.e. the difference between the total payment over the years and the mortgage amount, with only two significant digits after the decimal point
 - The overpayment as a percentage (in percent notation) of the mortgage amount
- The following example output would be provided if the user entered \$10,000 for loan amount, 6% for the interest rate and 5 years as the mortgage length, with all cells in the table filled out (this is only an example based on user's input):

Loan Amount: \$10,000

Number of years: 5

Range of interest rates: 5.0% - %7.0

Interest Rate	Monthly Payment	Total Payment	\$ Overpayment	% Overpayment
5.0%	\$188.71	\$11,322.74	\$1,322.74	13.22%
5.5%
6.0%
6.5%
7.0%

Make sure that you appropriately format the percentage and dollar values whenever they appear (see above example). They should also be indented to format something like the above, with all the values filled out whenever periods appear here.

Make sure to verify the correctness of your program by using a web site, such as <http://www.bankrate.com/brm/mortgage-calculator.asp>.

Spend some time to think about the algorithm that has to be implemented to achieve this task, as well as the variables and output formats.

I. MORTGAGE CALCULATOR – VERSION 1

Write a NetBeans project named *MidtermV1-Last-First* to achieve the above Mortgage Calculator, using the **Scanner** class to read in the input from the user, and the printout statements from `System.out.println`.

II. MORTGAGE CALCULATOR – VERSION 2

Write a NetBeans project named *MidtermV2-Last-First* to achieve the above Mortgage Calculator, using **dialog boxes** for input and output.

III. MORTGAGE CALCULATOR – Extra Credit (10% of your Midterm Project Grade)

After you have submitted the required version, write a NetBeans project named *Midterm-Extra1-Last-First* to achieve the above Mortgage Calculator, creating a **GUI** application for input and output. Please, note that the GUI has to be designed from scratch (not using a designer of any sort) and be implemented in JavaFX.

**Have fun creating your midterm project and
do not hesitate to ask if you have any questions!**