Exposure Java	Lab 04a
The Mortgage Payment Program	**80, 90 & 100 Point Versions**

Assignment Purpose:

The purpose of this lab assignment is give students practice using **Math** class methods in a complicated formula for a practical program. A secondary purpose is to help students appreciate the effect of interest on a mortgage payment.

Write a program that will compute a monthly mortgage payment. A monthly mortgage payment is the same as a monthly loan payment. Normally, real estate loans are called mortgage loans. In this case you know the amount of the loan, called the **principal**, the annual **interest** paid, and the length of **time** to pay back the loan. The program needs to take that information and compute the monthly payment. Use the information and the provided formula below:

The letters in the formula below represent the following values:

      P - - **P**rincipal amount borrowed, or loan amount
      R - - **R**ate of interest computed for each month
      N - - **N**umber of months to pay back the loan or mortgage

$$\text{Monthly Payment} = \left[\frac{R \times (1+R)^N}{(1+R)^N - 1} \right] * P$$

Lab04avst Student Version	**Do not copy this file, which is provided.**

```
// Lab04avst.java
// The Mortgage Payment Program
// This the student, starting version of the Lab04a assignment.

public class Lab04ast
{
    public static void main(String[] args)
    {
        System.out.println("Lab04a, Student Version\n");
        double principal  = 250000;
        double annualRate = 4.85;
        double numYears   = 30;



        System.out.println();
    }
}
```
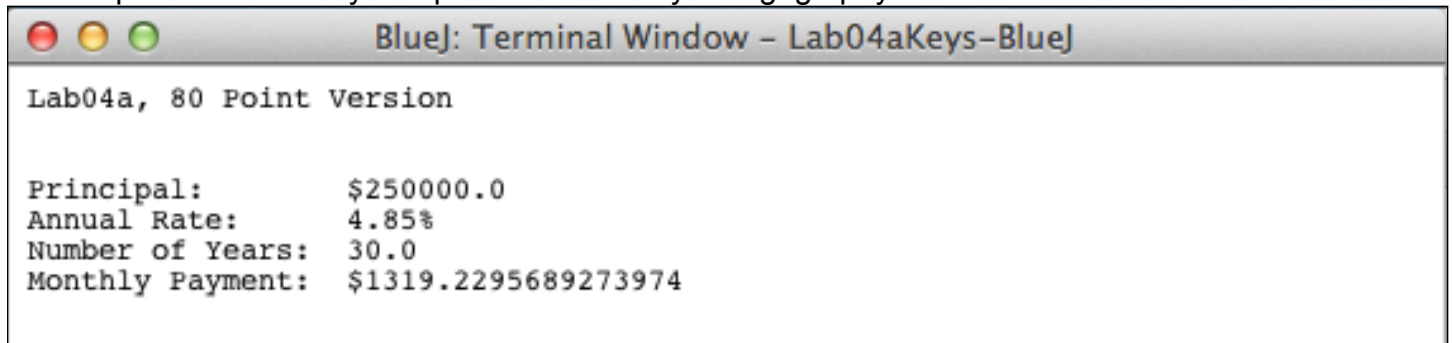
Important Note

Since you have not learned program input yet, the values of the principal, the annual rate of interest and the numbers of years to pay back the loan are hard coded in the provided program… however the formula requires the number of <u>months</u> to pay back the loan, not the number of <u>years</u>. There are also two issues with the interest. The number is written as 5.75, but 5.75% = 0.0575. On top of that you are provided with <u>annual</u> interest, but the formula requires <u>monthly</u> interest. In all of these cases, you need to make the program do the necessary conversions so the formula will work.

Hard Coding Warning

The only things hard coded in this program are the principal, the annual rate of interest and the numbers of years to pay back the loan. **Everything else must be computed by the program**. For example, a command like **numMonths = 360;** or worse **monthlyPayment = 1319.23** will cause you to earn a 0 on this lab. The program must do its own calculations.

80 Point Version

The 80 point version only computes the monthly mortgage payment.

```
● ● ●              BlueJ: Terminal Window – Lab04aKeys–BlueJ

Lab04a, 80 Point Version


Principal:          $250000.0
Annual Rate:        4.85%
Number of Years:    30.0
Monthly Payment:    $1319.2295689273974

```
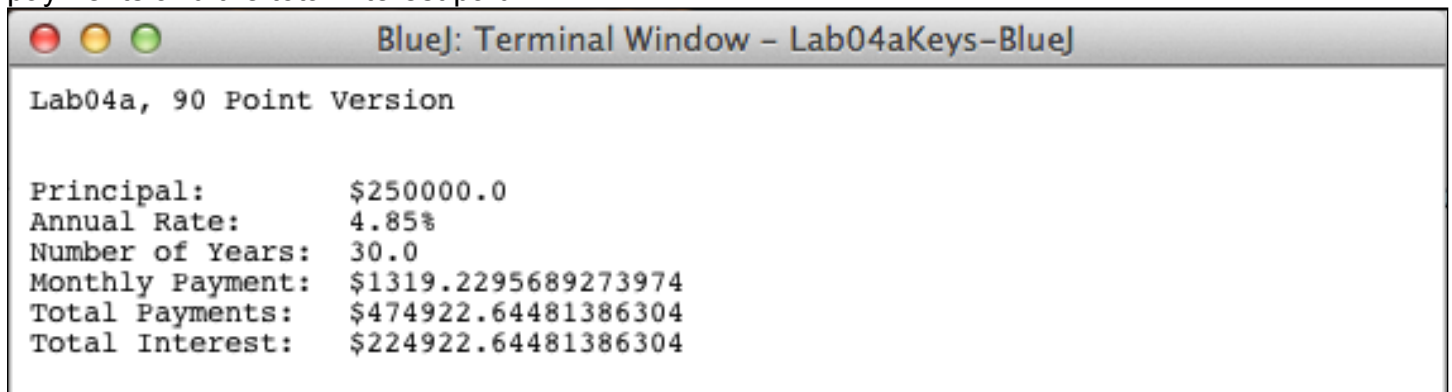
<mark>NOTE: For each version of the assignment, your output needs to be accurate to the penny as shown here. If you are off by a few cents, it does not mean the computer "just got a little off on its calculations". It means your program was not written correctly.</mark>

90 Point Version

The 90 point version computes the monthly mortgage payment, and also computes the total payments and the total interest paid.
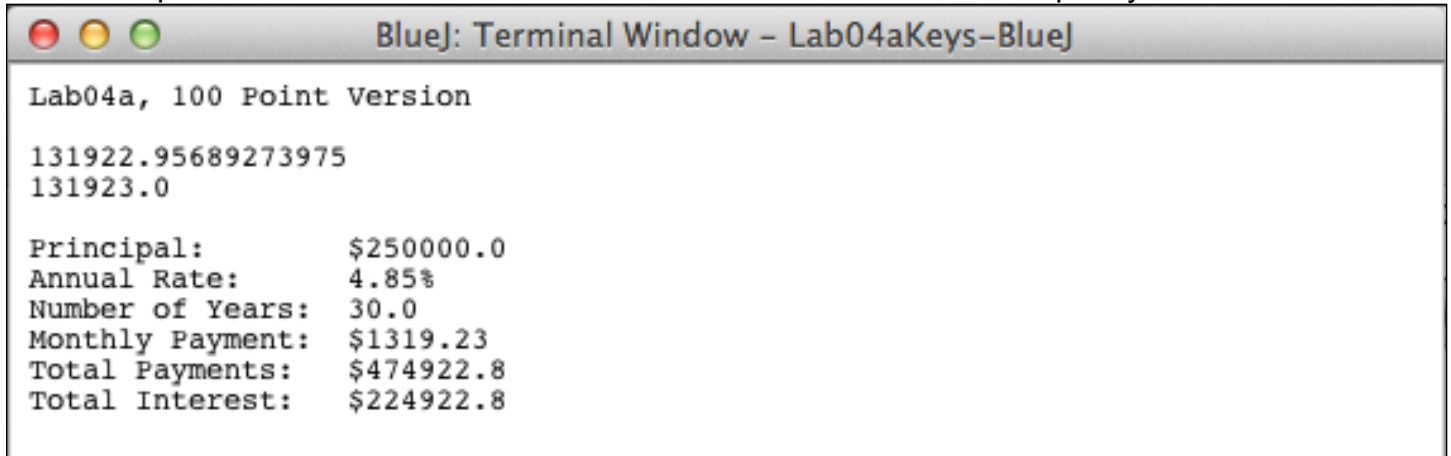
```
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Lab04a, 90 Point Version


Principal:          $250000.0
Annual Rate:        4.85%
Number of Years:    30.0
Monthly Payment:    $1319.2295689273974
Total Payments:     $474922.64481386304
Total Interest:     $224922.64481386304

```

100 Point Version

In the 100 point version all calculations need to be rounded to the nearest penny.

```
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Lab04a, 100 Point Version

131922.95689273975
131923.0

Principal:          $250000.0
Annual Rate:        4.85%
Number of Years:    30.0
Monthly Payment:    $1319.23
Total Payments:     $474922.8
Total Interest:     $224922.8
```