

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:

- M** = Monthly payment
- P** = **Principal** (total amount borrowed, or loan amount)
- i** = interest rate of loan computed for each month
- n** = number of months to pay back the loan or mortgage (total)
- ^ means n is an exponent

$$M = P [i(1 + i)^n] / [(1 + i)^n - 1]$$

Lab04a Student Version	Do not copy this file, which is provided.
<pre>// Lab04ast.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(); } }</pre>	

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 months to pay back the loan, not the number of years.

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 annual interest, but the formula requires monthly interest. In all of these cases, you need to make the program do the necessary conversions so the formula will work.

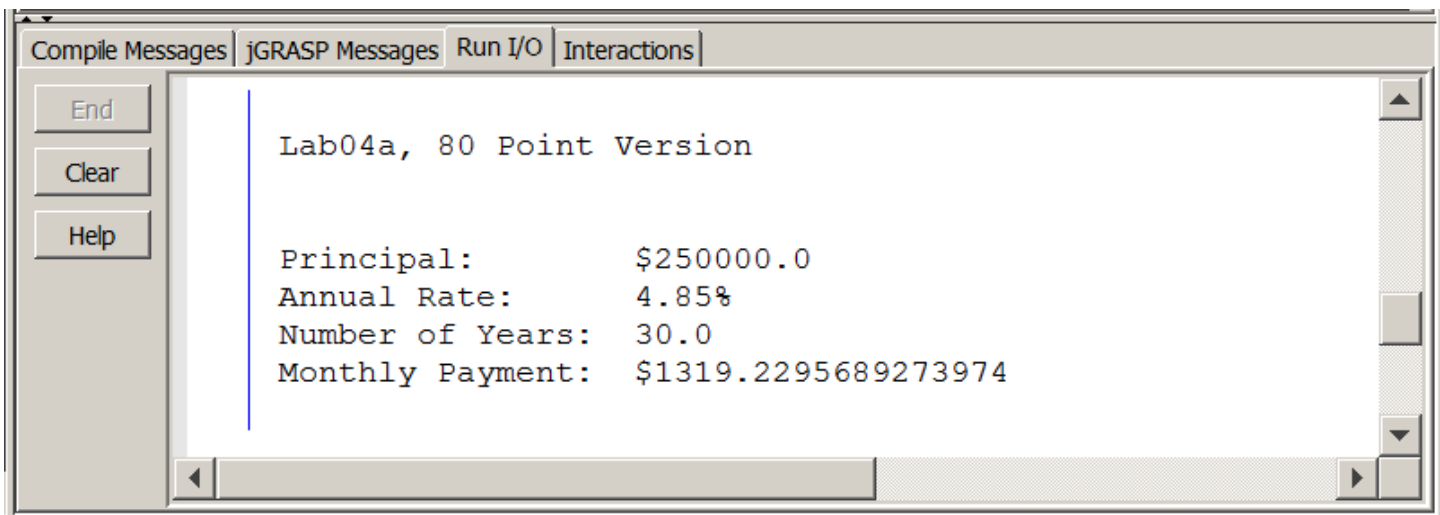
Hard Coding Warning

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

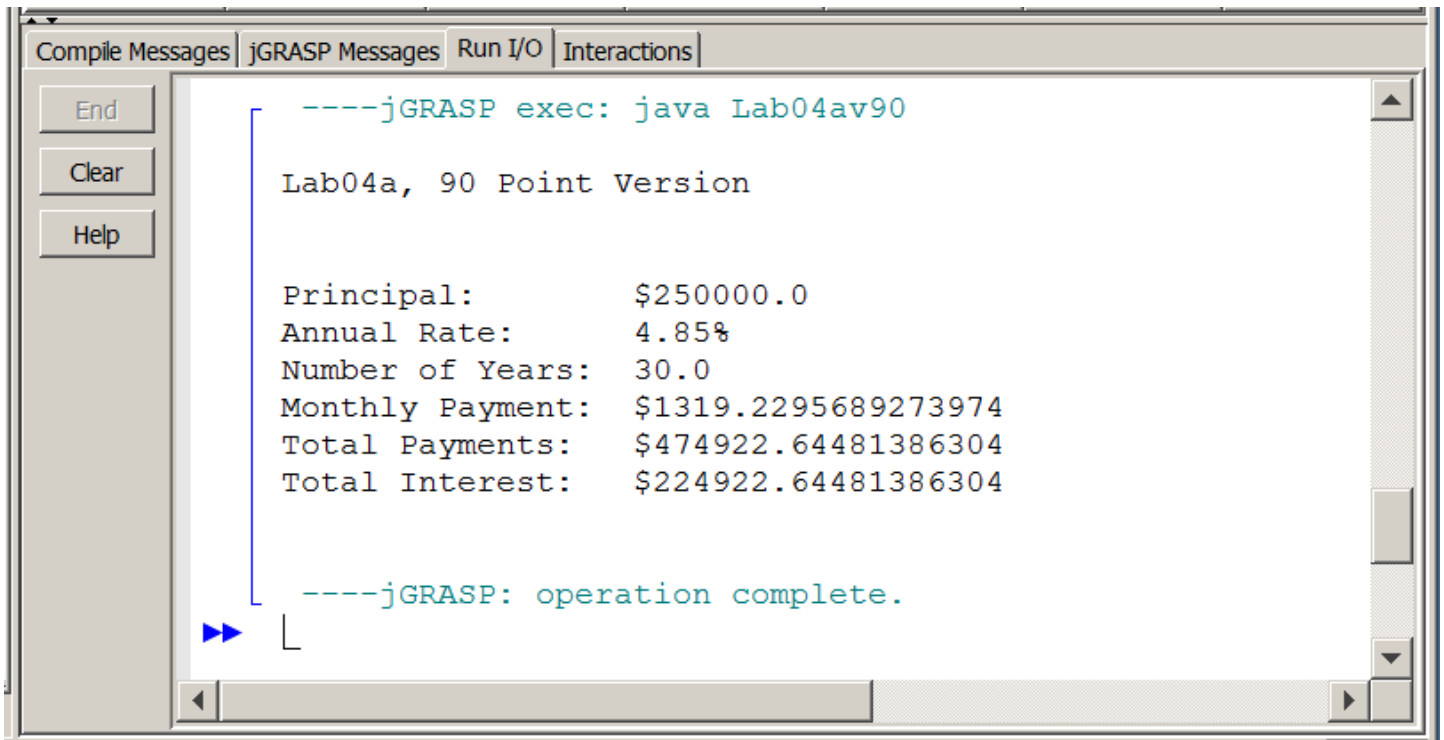
The 80 point version only computes the monthly mortgage payment.



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.

90 Point Version

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



```
-----jGRASP exec: java Lab04av90

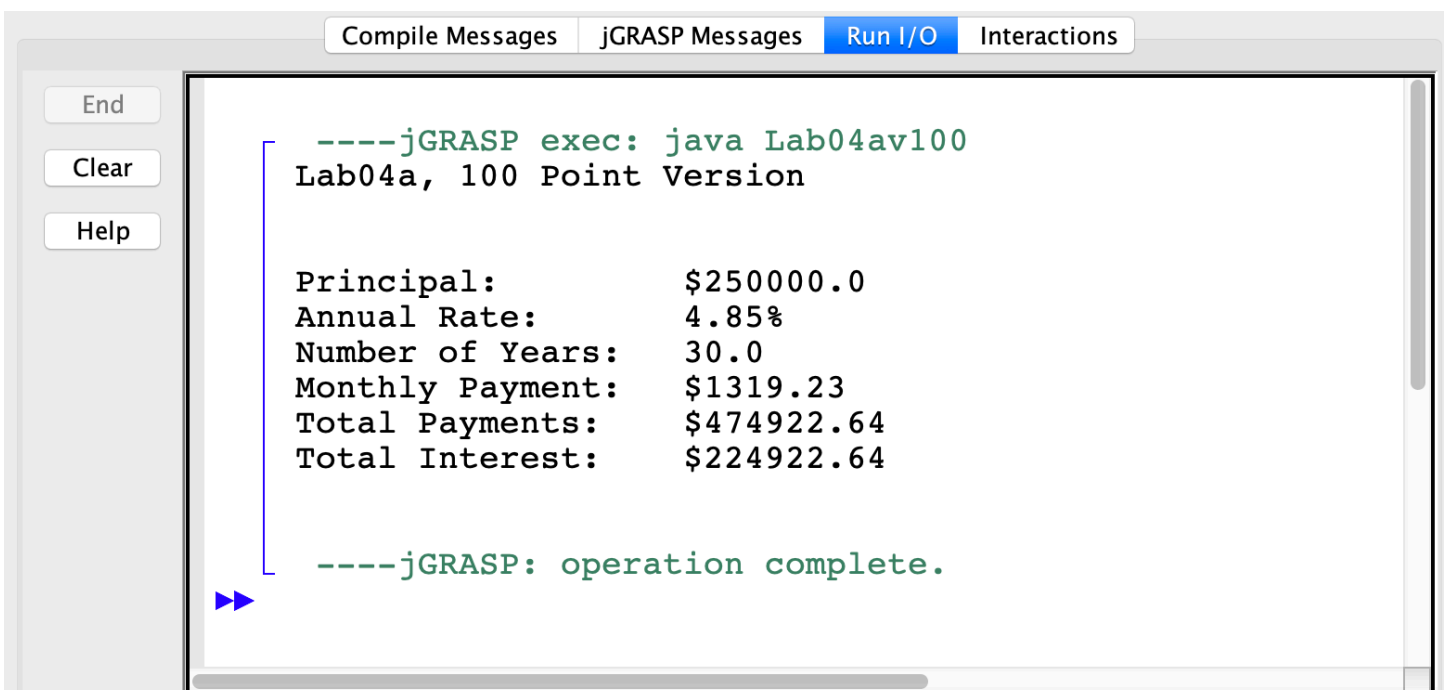
Lab04a, 90 Point Version

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

-----jGRASP: operation complete.
```

100 Point Version

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



```
-----jGRASP exec: java Lab04av100

Lab04a, 100 Point Version

Principal:          $250000.0
Annual Rate:        4.85%
Number of Years:    30.0
Monthly Payment:    $1319.23
Total Payments:     $474922.64
Total Interest:     $224922.64

-----jGRASP: operation complete.
```