# **Lab 3\_2 Assignment**

**Important:** Make sure you include the 3 header comments listed in previous lab assignments.  
For each project, once your program is completed and runs, copy the code into a text file named Tutorial3.txt (or Lab3A.txt or Lab3B.txt) and submit it in this assignment. Paste both classes for each program into the same document.

**Also, in Eclipse, go to the File tab and click Close All to close previous projects before starting a new one.**

## Part 1:

1. Create a Java project called **Lab3\_2A** and a class named **Lab3\_2A**.
2. Create a second new class named **Book**.
3. In the **Book** class:
   1. Add the following private instance variables:
      1. title (String)
      2. author (String)
      3. rating (int)
   2. Add a constructor that receives 3 parameters (one for each instance variable) and sets each instance variable equal to the corresponding variable.
   3. Add a second constructor that receives only 2 String parameters, inTitle and inAuthor. This constructor should only assign input parameter values to title and author. rating won’t be given a value here.
   4. Add a public String method named **getTitle** (no parameter) that returns title.
   5. Add a void method named **setRating** with an int parameter (**inRating**). It will set **rating** equal to **inRating**.
   6. Add a public String method **toString** (no parameters). It should create and return a String variable with all the **book**’s instance data (like you did in the Employee class.)
4. Back in the main **Lab3\_2A** class.
   1. Declare and instantiate a **Book** object named **book1** sending the following parameters to the constructor ("A Tale of Two Cities", "Charles Dickens", 4)
   2. Declare and instantiate a **Book** object named **book2** sending the following parameters to the constructor ("Foundation", "Isaac Asimov")
   3. Call **setRating** for **book2** sending 5 as a parameter.
   4. Call **getTitle** for **book1** and print the returned value.
   5. Use our **toString** shortcut to print all of **book1**’s information.
   6. Print a blank line.
   7. Use the same coding to print all of **book2**’s info.

Your output should be:

A Tale of Two Cities

Title: A Tale of Two Cities

Author: Charles Dickens

Rating: 4

Title: Foundation

Author: Isaac Asimov

Rating: 5

## Part 2:

1. Create a Java project called **Lab3\_2B** that will determine the monthly payment for a house mortgage.
2. and a class named **Lab3\_2B**.
3. Create a second new class named **Mortgage**.
4. In the **Mortgage** class:
   1. Declare the following instance variables. (Make them private.)
      1. loan (double) // the total amount of the loan
      2. years (double) // the length of the loan in years
      3. rate (double) // the annual interest rate of the loan
      4. payment (double) // the monthly payment
   2. Write a constructor with no parameters that sets all the instance variables to 0
   3. Write a constructor that accepts 3 double parameters inLoan, inYears & inRate and set the appropriate instance variables equal to those parameters.

It should also call the **computePayment** method (no parameters)

* 1. Write a public void **setValues** method that accepts 3 double parameters inLoan, inYears & inRate and set the appropriate instance variables equal to those parameters.

It should also call the **computePayment** method (no parameters)

* 1. Write a private void **computePayment** method (no parameters) that calculates the monthly payment using the following equations. (You’ll need 2 local double variables, x & term, in this method.)

x = 12 \* years

term = (1 + rate / 12) raised to the power of x -- using Math.pow

payment = (loan \* (rate/12) \* term) / (term - 1)

* 1. Write a public String **toString** method (no parameters) that returns a string with all the instance variables, each on their own line with a label. (Like we have done in previous programs.)

The payment and loan should only have 2 decimal places, so you’ll need to use the String.format function.

1. Back in the main method of the main class.
   1. Declare and instantiate a **Mortgage** object named **houseLoan1**, sending 100000, 30 & .05 (*for loan, years & rate*) as parameters.
   2. Print “House Loan 1” on its own line
   3. Print **houseLoan1** (using the super-secret **toString** shortcut that you learned in the previous lab.)
   4. Print a blank line
   5. Declare and instantiate a **Mortgage** object named **houseLoan2**, sending no parameters.
   6. Call **setValues** for **houseLoan2** sending 150000, 15 & .052 as parameters.
   7. Print “House Loan 2” on its own line
   8. Print **houseLoan2** (using the super-secret **toString** shortcut that you learned in the previous lab.)

(With these values, the payment for houseLoan1 should come out to be 536.82 and houseLoan2 would be 1201.88 – with possible rounding up or down.)