

# CS101- Algorithms and Programming I

## Lab 01

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**Lab Objectives:** first programs, debugging.

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For all labs in CS 101, your solutions must conform to the CS101 style guidelines (rules!)

1. Download [Lab01\\_Q1\\_yourLastname.java](#). Change the file and class name to your own name and open it. As you can see the program does not run. There are 9 syntax errors and 1 logic error (total of 10). Find all of them and fix them so that the code works and gives the following output:

**Expected Output:**

Movie Stream Pirated Movies:  
Movie Stream offers 1323 movies for streaming  
Movie Stream earns 10.0 TL per movie (total of 13230.0 TL).  
Recently Movie Rights Protection Agency (MRPA) started to crackdown.  
MRPA sued them 3000.0 for every movie they streamed and claimed 30.0% of their income.  
Now they owe a total of 3969000.0 TLs and 3969.0 TL worth fine for their actions.  
They can either choose to pay this or the company license will be suspended 900 hours for every movie pirated.  
Which is equal to 135 years 337 days and 12 hours of prison time.

2. Write a Java program ([Lab01\\_Q2\\_yourLastName.java](#)) that stores the number of seconds as 12486, and displays the hour, minute and second equivalent.

**Sample Run:**

12486 seconds represents 3 hours 28 minutes and 6 seconds

3. Write a Java program ([Lab01\\_Q3\\_yourLastName.java](#)) that outputs the value of y, according to the given function. Assume x is -5.

$$y = \frac{x^3 + 3|x| + 9}{x^2}$$

**Sample Run:**

The result of the expression: -4

4. Create a new program, **Lab01\_Q3\_yourLastName.java**, according to the information below,

The [Fibonacci sequence](#) (0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, etc., represents a sequence of numbers where each number is the sum of the previous two numbers. The formula allows you to determine a given Fibonacci number,  $F(n)$  is the  $n$ th Fibonacci number.

$$F(n) = \frac{(\varphi)^n - (-\frac{1}{\varphi})^n}{\sqrt{5}}$$

where  $\varphi = \frac{1+\sqrt{5}}{2}$ . Note that this number is the Golden Ratio. Remarkably, even with all the square roots and divisions, the answer will be very close to a positive integer. Also, note that  $F(0) = 0$  and  $F(1) = 1$ .

You should define CONSTANTS to store the necessary constant values. Remember to give constants and variables meaningful names.

You should test your program by initializing  $n$  to the values 6, 10, 100, 101 (i.e. find the 6<sup>th</sup>, 10<sup>th</sup>, 100<sup>th</sup> and 101<sup>st</sup> Fibonacci numbers) using the formula, not a loop. Sample runs are shown below.

**Sample Run 1 (assigning 6 to n):**

Fibonacci(6) is 8.0000000000000002

**Sample Run 2 (assigning 10 to n):**

Fibonacci(10) is 55.0000000000000014

**Sample Run 3 (assigning 100 to n):**

Fibonacci(100) is 3.542248481792631E20

**Sample Run 4 (assigning 101 to n):**

Fibonacci(101) is 5.73147844013819E20

**Since the Fibonacci numbers are integers, discard the fractional parts in the results above. Try converting to an int, long are the results correct?**

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**Note:** These problems may be so simple you (think you) can do them in your head, however, it is a good idea to get into the habit of designing your program (on paper) first, before implementing it; doing so will save you a lot of time in the future when the problems get much larger.