# CSE1341 – Lab #1

**PRE-LAB [10 points]**
**Must be done prior to your lab session .**

Read the "Java SE – JDK Installation Instructions " (found in Appendix A in the textbook, or **provided by the instructor**.)  Install the JDK (Java Development Kit) on your own computer.

```
All: To use java and javac from the command line
     Mac: Spotlight: Terminal
     Windows*: Start->Run... and enter cmd
```

All operating systems: Type the program below into a file name "FirstProgram.java" using Notepad (Windows) or TextEdit (Mac) and compile it using javac in the Windows CMD window / or Mac Terminal window.  Execute it using the "java" command in the Windows CMD window / or Mac Terminal window.   Mac users – see the note at the end of this document regarding settings in the TextEdit app.

```java
import java.util.Scanner;

public class FirstProgram
{
  public static void main(String[] args)
  {
    Scanner input = new Scanner(System.in);

    System.out.println("This is my first Java program!");
    System.out.print("What is your name? ");
    String name = input.next();

    System.out.printf("Hello %s welcome to CSE 1341 at SMU! \n", name);

    System.out.println("I am pretty intelligent. I can count the numbers from 1 to 50 and find their sum!");

    int total =0;
    for (int i=1; i<=50; i++)
    {
       System.out.print(i + " ");
       total = total + i;
    }
    System.out.printf("\nThe sum is %d. \n", total);
  }
}
```

**If this compiles and executes correctly your installation of Java was successful. If you experience problems, bring your laptop to the lab and ask for help.**

# LAB - Syntax Errors and Productivity Software [90 points]

**1)** [10 points]  Start with the program you typed and compiled. Remove the two semi-colons (;) and try to compile your program. Paste the program and the error message into a word/open office document and explain what this message means.

**2)** Create a spreadsheet with solutions to the following four algorithm problems:

**2a)** [20 points] – The Fibonacci sequence is a pattern of integers starting with zero and one, where each subsequent value is equal to the sum of the prior two values:

$$F_n = F_{n-1} + F_{n-2}, \quad where \ F_0 = 0 \ and \ F_1 = 1.$$

Create a spreadsheet which contains the first two numbers of the Fibonacci sequence, and calculates each the next 25 values:

| | |
|---|---|
| 1 | 0 |
| 2 | 1 |
| 3 | 1 |
| 4 | 2 |
| 5 | 3 |
| 6 | 5 |
| 7 | 8 |
| 8 | 13 |
| 9 | 21 |
| 10 | 34 |
| 11 | 55 |
| 12 | 89 |
| 13 | 144 |
| 14 | 233 |
| 15 | 377 |
| 16 | 610 |
| 17 | 987 |
| 18 | 1597 |
| 19 | 2584 |
| 20 | 4181 |
| 21 | 6765 |
| 22 | 10946 |
| 23 | 17711 |
| 24 | 28657 |
| 25 | 46368 |
| 26 | 75025 |
| 27 | 121393 |

**2b)** [20 points] – World Population

The total world population was estimated at 7.6440 billion people in August 2018. Assuming an annual growth rate of 1.09% per year, create a spreadsheet showing the world population in 2018 and for each of the next 25 years. Hint: if calculated properly, the U.S. population in 2043 would be 10.0236 billion people.

| Year | World Population in Billions |
|------|------------------------------|
| 2018 | 7.6440000 |
| 2019 | 7.7273196 |
| 2020 | 7.8115474 |
| 2021 | 7.8966933 |
| ..... | ....... |
| ..... | ....... |

**2c)** [20 points] – Customary unit conversion.

Create a spreadsheet that converts the following:
1. Liter to gallon
2. Gallon to liter
3. Kilometers to miles
4. Miles to kilometers

The conversion formulas:

| 1 liter | = | 0.264172 gallon |
|---------|---|-----------------|
| 1 gallon | = | 3.78541 liters |
| 1 kilometer | = | 0.621 mile |
| I mile | = | 1.609 kilometers |

Use the following sample data in your spreadsheet - for grading purpose.

liter to gallon:

| liter | 40 |
|-------|-----|
| gallon | 10.56688 |

gallon to liter:

| gallon | 40 |
|--------|-----|
| liter | 151.4164 |

km to miles:

| km | 400 |
|----|-----|
| miles | 248.4 |

miles to km:

| miles | 400 |
|-------|-----|
| km | 643.6 |

**2d)** [20 points] – Compound Interest Calculator
The formula for annual compound interest, including principal sum, is:

$$A = P (1 + r/n)^{(nt)}$$

Where:

      A = the future value of the investment/loan, including interest
      P = the principal investment amount (the initial deposit or loan amount)
      r = the annual interest rate (decimal)
      n = the number of times that interest is compounded per year
      t = the number of years the money is invested or borrowed for

Assume you put $120,000 into a bank. How much will your investment be worth after 15 years at an annual interest rate of 4% compounded quarterly? How much will be the total interest earned?

| | |
|---|---:|
| Principal | $120,000 |
| Annual Interest Rate | 4% |
| Compounding Periods Per Year | 4 |
| Years | 15 |
| | |
| Amount Earned (A) | $ 218,003.6 |
| Total Interest Earned | $ 98,003.6 |

Submit the document and spreadsheet via Canvas (as a single zip-file).

**This assignment is due by 6:00AM Saturday, September 8.**

**Additional Note for Mac Users:**

The TextEdit app must be set up for plain text with no smart quotes to properly create and save a document that the compiler can read. Before starting, open preferences in TextEdit and make sure the settings match the following:
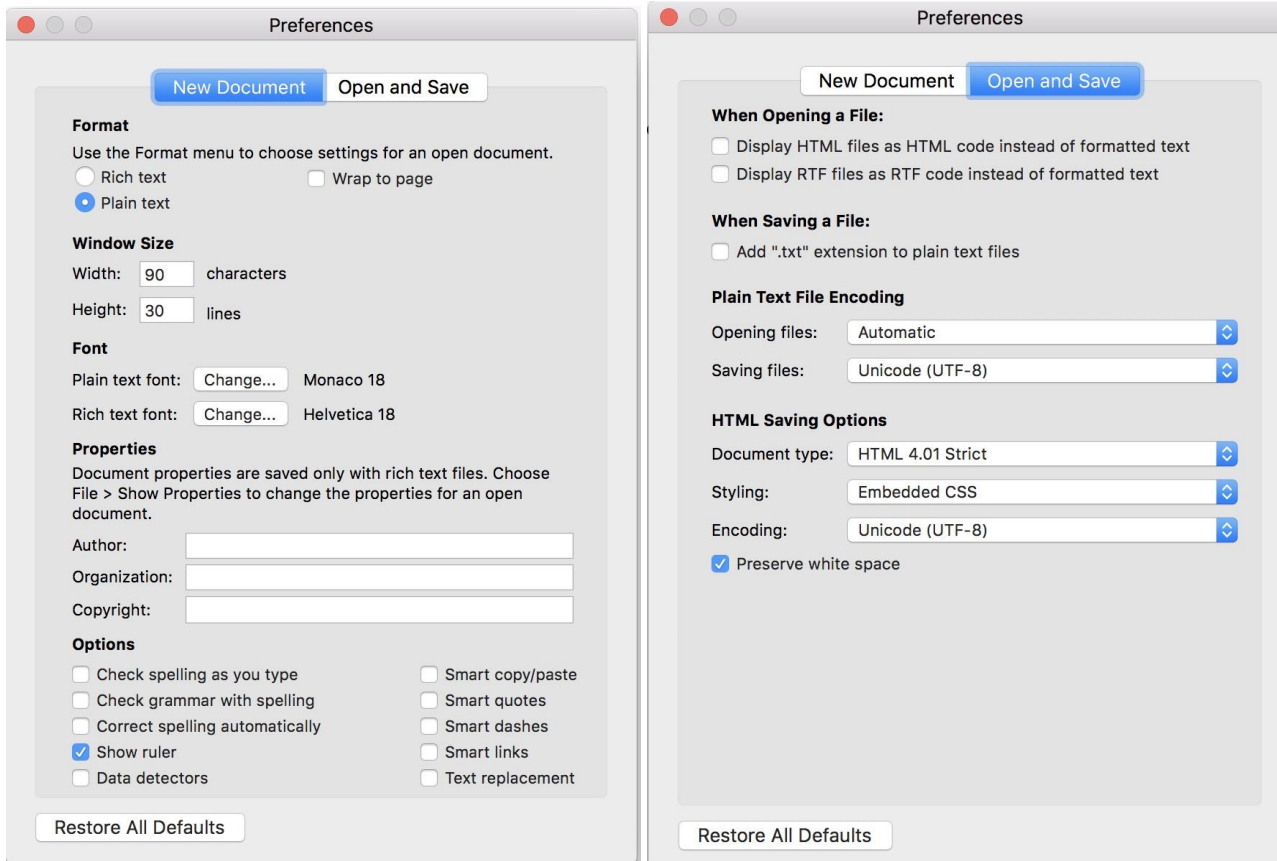


Also, make sure the **Format** menu shows *Make Rich Text* as its third item. If it says *Make Plain Text,* click it to set it to plain text mode.