LAB #0
Introduction to Java Programming

Begin by downloading Eclipse IDE for Java Developers, which can also be found under the course information link: http://www.eclipse.org/downloads/

After you download Eclipse create a new project:
1. unzip the Eclipse archive file somewhere,
2. navigate to eclipse.exe and open it,
3. close the welcome screen,
4. open a new project with **File->New->Java Project**, and name it something such as **labs**.

Now, we can create a new class **File->New->Class**. If you wish, you can create a lab1 package, and you will notice that a package statement will be at the top of your program. **Note**: if you choose to work with packages, please be sure to comment this out before submitting your .java files.

Name your program **Hello.java**, and make sure you **check the box that creates the public static void main**! (you will learn more about this later, or now if you head to the internet or forward in the lectures a long way, you can safely assume that the parts have meaning but that you do not need to know what they are to use them for now).

1. Write a simple Hello World program to test the Eclipse application on your machine.
   (You can just copy and paste the one provided here)

```
/****************************************************
** Program: Hello.java
** Author: <Your Name>
** Date: <Today's date>
** Description:  My First java progam that prints
** the message "Hello World" to the console.
** Input:  none
** Output: "Hello, World!"
****************************************************/
import java.util.Scanner;

public class Hello
{
  public static void main(String[] args)
  {
    System.out.println("Hello, World!");
  }
}
```

2. Save your program (save early and save often).
3. Now test that your program works by pressing the **green play button**, i.e. the run as java application (ctrl-F11 for those who like keyboard shortcuts), to compile and run your program. Notice the output at the bottom of eclipse in the console window.
4. Congratulate yourself on having a properly set up programming environment

5.

Now to begin the real lab work, we will introduce you to a couple programming concepts and a couple of useful operators and a method for printing in Java.

1. Some ideas you will need to familiarize yourself with are:
what a **variable** is and how you can **declare**, **initialize**, and **assign** values to a variable
(notice that I use // sometimes in my writing, this is used in Java to make the line of text that the // is on into a **comment**, which means the Java compiler will ignore that line when compiling the code into a program)

   //this is a **declaration without initialization** of a variable with the type of int called number1
   int number1;

   //this is an **assignment** of the value 6 to the variable declared as number1
   number1 = 6;

   //this is a **declaration with initialization** of a variable with the type of int called number2 and a value of 10
   int number2 = 10;

   A variable declaration like this:
   (where [] denotes optional text, <> denotes required text, and symbols or words that show up outside the ,. symbols are required to be written as is)
   <type> <name> [= <initialValue>];
      where type is the type of the variable (such as int, double, String, boolean, or Scanner to name just a tiny few), which is also the name of a class, but we will talk about that more later
      where name is the name of the variable (such as input, userName, outField7, or some_class_variable)
      variable names must start with a letter, underscore, or dollar sign, can contain numbers, letters, hyphens, dollar signs, and underscores, and there are some guidelines on how you should name them (Java coding convention is listed in one of the appendices in the back of the book and in several locations online)

      examples:
         int x = 2;
         int num1 = 5;
         int num2 = 8;
         double flowerPetalMass;
         String userInput = "nothing here yet"; //(note that String type is not lowercase because it is not a primitive like int or double, it creates an actual object with operations (called methods) and member fields (internal variables)(more on this later))
         int i = x1; //declares i and initializes its value to be the same value as x

   below the hello world println, make two variables of type int and assign them the values of 5 and 8 respectively
   and below that, make two variables of type double and assign them the values of 5.0 and 8 respectively (notice that I did not put down a decimal point for the value 8, but that it should still be thought of as 8.0 when you think of using it)

7. Now that our program will do more than just print Hello World!, we should update the description to say that the program also computes some simple computations and prints the values of the results.

8. now type some more println statements so the new section looks like the following:
   System.out.println(); //used to space out the hello world from the next block of output

   System.out.println("Result of SUM is:" + (intNum1 + intNum2)); //result should be the value of 5 + 8, which is 13
   System.out.println("Result of DIFF is:" + (intNum1 - intNum2)); //result should be the value of 5 - 8, which is -3
   System.out.println("Result of PROD is:" + (intNum1 * intNum2)); //result should be the value of 5 * 8, which is 40

   now run your program and see the printout for hello world and the three values you just computed

9. next let us make a few more calculations, this time with some more interesting results
   System.out.println(); // used to space output of one block of text and another
   System.out.println("Result of DIV with double values is:" + (doubleNum1 / doubleNum2)); //result should be 5.0 / 8.0, which is 5/8, or 0.625 in decimal format
   System.out.println("Result of DIV with int values is:" + (intNum1 / intNum2)); //result may surprise you in that it should be 5 / 8, which is 0 in Java, this is an effect of dividing using two integer values, they cannot store a fractional value so they only show the whole number of the division
   System.out.println("Result of DIV with my int values reversed is:" + (intNum2 / intNum1)); //result should not surprise you as much this time 8 / 5 is 1 because 8 / 5 would be 1 with some remainder, but since ints cannot store fractional values, it essentially gets thrown away

   save and run your program again and check your results

10. almost done, lastly we will use an operator called modulus (as a verb it is often referred to as modulo or just mod), write a few more println statements down so it looks like the following:
    System.out.println(); // used to space output of one block of text and another
    System.out.println("Result of Mod is:" + (intNum1 % intNum2)); //result should be the value of 5 mod 8, which is the remainder of 5 / 8, which should be 5 (this is because 5/8 says 5 goes into 8 a total of 0 times with 5 remainder)
    System.out.println("Result of Mod is:" + (intNum2 % intNum1)); //result should be the value of 8 mod 5, which is the remainder of 8 / 5, which should be 3 (this is because 8/5 is 1 with 3 remainder)

    now save and run the program again to take a look at the results of your calculations

999. lastly submit your working .java file (not the .class file) to both TEACH (access is outlined in Assignment 0) and blackboard.

Your program should look something like the following when you are done (though yours may look a little better because of my long comments being broken up in my text editor):

```java
/*****************************************************
** Program: Hello.java
** Author: <Your Name>
** Date: <Today's date>
** Description:  My First java progam that prints
** the message "Hello World" to the console, then does some computations and prints those values
     out.
** Input:  none
** Output: "Hello, World!" followed by some printed computations
*****************************************************/
import java.util.Scanner;

public class Hello
{
  public static void main(String[] args)
  {
    System.out.println("Hello, World!");

    int intNum1 = 5;
    int intNum2 = 8;

    double doubleNum1 = 5.0;
    double doubleNum2 = 8;


    System.out.println(); //used to space out the hello world from the next block of output
    System.out.println("Result of SUM is: " + (intNum1 + intNum2)); //result should be the value of 5 +
    8, which is 13
    System.out.println("Result of DIFF is: " + (intNum1 - intNum2)); //result should be the value of 5 -
    8, which is -3
    System.out.println("Result of PROD is: " + (intNum1 * intNum2)); //result should be the value of 5
    * 8, which is 40


    System.out.println(); // used to space output of one block of text and another
    System.out.println("Result of DIV with double values is: " + (doubleNum1 / doubleNum2)); //result
    should be 5.0 / 8.0, which is 5/8, or 0.625 in decimal format
    System.out.println("Result of DIV with int values is: " + (intNum1 / intNum2)); //result may surprise
    you in that it should be 5 / 8, which is 0 in Java, this is an effect of dividing using two integer
    values, they cannot store a fractional value so they only show the whole number of the division
    System.out.println("Result of DIV with my int values reversed is: " + (intNum2 / intNum1)); //result
    should not surprise you as much this time 8 / 5 is 1 because 8 / 5 would be 1 with some


    System.out.println(); // used to space output of one block of text and another
```

```java
    System.out.println("Result of Mod is: " + (intNum1 % intNum2)); //result should be the value of 5
    mod 8, which is the remainder of 5 / 8, which should be 5 (this is because 5/8 says 5 goes into 8 a
    total of 0 times with 5 remainder)
    System.out.println("Result of Mod with reversed values is: " + (intNum2 % intNum1)); //result
    should be the value of 8 mod 5, which is the remainder of 8 / 5, which should be 3 (this is because
    8/5 is 1 with 3 remainder)
  }
}
```

and the output to the console should look like this:

```
Hello, World!

Result of SUM is:13
Result of DIFF is:-3
Result of PROD is:40

Result of DIV with double values is:0.625
Result of DIV with int values is:0
Result of DIV with my int values reversed is:1

Result of Mod is:5
Result of Mod is:3
```