CS1010J Programming Methodology
Tutorial 1: Java Basics and Methods

> It is what we think we know already that often prevents us from learning.
>
> ~ *Claude Bernard*

To students:

This paper is to be used in week 2 tutorial. Due to time constraint, not all the questions may be discussed in class. Your tutor has the discretion to choose the questions to discuss (or you may request your tutor to discuss certain questions). Please do go through those left-over questions after class.

Tutorials are small group forums where **you** participate in discussion, practice, or raise doubts for clarification. The success of tutorials hinges very much on your (1) **ACTIVE PARTICIPATION** in class, and (2) after-class **REVISION**. You do not need to submit your work for grading.

Please cooperate with your tutors towards a fruitful and enriching learning experience.

I. Java Basics and Tracing

1. For each of the following question, compose a correct Java expression to calculate the desired result.

   (a) Convert degrees Celsius to degrees Fahrenheit, given the formula

   $$F = \frac{9}{5}C + 32$$

```
double celsius;

//Assume celsius is read from user

double fahrenheit =
```

   (b) Find out the ratio of length versus width of a rectangle.

```
int length, width;

//Assume length and width are read from user

double ratio =
```

   (c) What did you learn from the above two questions?

2. Do you get the same output with the 3 different code fragments below?

   (a)

```
System.out.println("I love programming!");
```

   (b)

```
System.out.print("I love");
System.out.println(" programming!");
```

   (c)

```
System.out.println("I love" + " programming!");
```

3. Being able to follow the execution of a program **without actually running it** is known as **program tracing**. By tracing a program, you will gain a stronger understanding of the execution flow and improve your own coding skill.

   Trace the following program fragment, using memory box to represent the value stored in each variable. What's the output?

```
int prev1 = 1, prev2 = 2;

int cur = prev1 + prev2;
System.out.println("cur is " + cur);

prev1 = prev2;
prev2 = cur;
cur = prev1 + prev2;
System.out.println("Now cur is " + cur);
```

4. Trace the following program fragment and write down its output.

```
class T1Q4 {

  public static void main(String[] args) {

    int a = 1, c = 1, d = 2;

    a++;
    int b = a + 10;

    System.out.println("a = " + a + "; b = " + b);

    a--;
    c += a;
    System.out.println("a = " + a + "; c = " + c);

    d *= 2 + d;
    System.out.println("d = " + d);
  }
}
```

5. Trace the program below manually. Determine the values of the variables **a**, **b**, and **c** in the **main** method, and the parameters **a**, **b**, and **c** in the **confuse** method at every step. What is the output of this program?

```
class T1Q5 {

  public static void main(String[] args) {

    int a = 6, b = 2, c = 5;

    a = confuse(a, b, c);

    System.out.print("a = " + a + "; b = " + b);
    System.out.println("; c = " + c);

  }

  public static int confuse(int a, int b, int c) {
    a = b + c;
    c = a * b;
    return c - a + b;
  }
}
```

II. Hands-on Session

For Q6 – Q8 below, programs are provided in the zipped tutorial package.

6. What's wrong with the following program? For verification purpose, you may compile the program in DrJava.

```
class T1Q6 {

  public static void main(String[] args) {

    int i, j = 1;

    System.out.println("i = " + i + "j = " + j);
  }
}
```

Initialize variables!

7. Correct all the errors and coding style issues in the following program.

```
class T1Q7 {

  public static void Main(String[] args) {

// ask user to enter a value into num1
       System.out.print("Enter an integer: ");

 int num1 = sc.nextInt();
 int num2 = num1 + 1.2;  // do computation
 System.out.println("num2 = " + num2); }
}
```

Good typographical style is desired.

Tip: Do you know how to do global indentation of your Java program in DrJava? Press <Ctrl> + A, then press <Tab>.

8. Spot the errors in the program below and correct them.

```
class T1Q8 {

  public static void main(String[] args) {
    void func(5);
    void func(3-7);
  }

  public static void func(y) {
    if (y < 0) {
      System.out.println("Nothing");
    } else {
      System.out.println("Something");
    }
  }
}
```

9. **[Problem Set 1 Exercise #03]** Freezer Temperature

   Download **ps1ex03.zip** from Canvas Files or CodeCrunch. You may use the skeleton program provided in the package to start off.