

## Lab 3

### Console Output and Arithmetic Expressions

The following exercises are to be completed during lab class. If you do not have time to finish during lab, they must be completed before the beginning of the following lab session.

#### *Set-Up*

- Create a new project in your Eclipse workspace named: **Lab03**
- In the *src* folder, create a package named: **edu.ilstu**
- Import into this new package all of the following files from T:/it168/Labs/Lab03
  - *PrintStatements.java*
  - *ArithmeticExpressions.java*

#### Problem 1

- Open the file named **PrintStatements.java**. You will be writing the statements to print the given phrases to the console in the format shown for each problem using combinations of `println`, `print`, and escape sequence characters. No variables need to be declared for this program. The comments will help you know where to type each of the statements.
- It is a good habit to test in increments instead of typing everything in before running the program - type in your code for output 1, run the program to see if it works. When that one is working correctly, move on to the next one. Continue this way for all four output problems.
- Output 1 - Write the statement(s) to get the following output. **Run the program to test your code before going on to the next problem.**

```
Everything is  
an object.
```

- Output 2 - Write the statements to get the following output. Test the program before going on to problem 3.

```
A program is a bunch of objects
telling each other
what to do
by sending messages.
```

- Output 3 - Write the statements to get the following output. Test the program before going on to problem 4.

```
OO programming properties:
encapsulation
inheritance
polymorphism
```

- Output 4 - Write the statements to get the following output.

```
An
object
has
state
behavior
and
identity
```

## **Problem 2**

You are going to be declaring constants, declaring variables, and typing in the arithmetic expressions you wrote for problems 17 – 19 in your pre-lab.

- Open the file named **ArithmeticEquations.java** with a main method and comments to help you know where to type statements.
- Write the declaration and initialize the constant FREEZING given in the pre-lab table.
- Write the declarations and initializations for the variables given in the pre-lab table.
- Write the declarations for each of the variables you created for the result of each equation.

- Write the assignment statements storing the answer to the equation in its result variable.
- After each statement, write a print statement with a label to show the value of each answer.
- Compare the answer to each equation to your predicted value in the pre-lab. Did you get them all correct? If not, try to determine why.

### **Problem 3**

- Create a new Java class named **RestaurantBillCalculator**.
- Complete the comment blocks as required for every program. Add an appropriate description in the Javadoc class comment.
- Declare all the variables at the top of the main method. Use descriptive variable names. Declare the following:
  - a double constant for tip percentage set to 15%. Hint: Review the rules for naming constants.
  - a double constant for tax rate set to 7.5%
  - a double variable to hold the meal cost. Set the value to \$45.75.
  - three double variables to hold the tax, tip amount, and total amount. Initialize each to zero.
- Write Java statements to calculate the following:
  - tax by multiplying meal cost by tax rate
  - tip amount by multiplying meal cost by tip percentage
  - total bill amount which is the combination of meal cost, tax, and tip amount
- Display the information in the following format: (Note: Don't worry about trying to format to two decimal places yet. You will learn how to do that soon.)

```
Meal Cost:  $45.75
Tax:       $3.43125
Tip:       $6.8625
Total amount:  $56.043749999999996
```

### ***To Be Submitted***

The following files should be zipped together into a file called Lab03.zip and submitted to ReggieNet by the beginning of your next lab.

- PrintStatements.java
- ArithmeticEquations.java
- RestaurantBillCalculator.java